



Nandurbar Taluka Vidhayak Samiti's  
**G. T. PATIL ARTS COMMERCE AND SCIENCE COLLEGE,  
NANDURBAR – 425412**

NAAC ACCREDITED 'A' GRADE  
(Affiliated to Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon)

Prof. Dr. M.J. Raghuwanshi  
I/Principal

Email: gtpcollege@rediffmail.com  
Ph: 2564-222293  
Website: ntvsgtpcollege.org

Date: 10-05-2023

## Declaration

This is to inform that information, reports, true copies of the supporting documents, numerical data etc. submitted/ presented in this file is verified by Internal Quality Assurance Cell (IQAC) and is correct as per the records. This declaration is for the purpose of NAAC Accreditation of HEI for Third Cycle period 2017-18 to 2021-22.

Date:10-05-2023

Place: Nandurbar

  
Dr.V.Z.Chaudhari  
Co-ordinator, IQAC  
GTP College, Nandurbar



  
(Prof. Dr. M.J. Raghuwanshi)  
**PRINCIPAL**  
GT Patil College,  
Nandurbar-425412

**AQAR (2017-2022)**

**&**

**NAAC Second Cycle Certificate**



राष्ट्रीय मूल्यांकन एवं प्रत्यायन परिषद  
विश्वविद्यालय अनुदान आयोग का स्वायत्त संस्थान  
**NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL**  
*An Autonomous Institution of the University Grants Commission*

# *Certificate of Accreditation*

*The Executive Committee of the  
National Assessment and Accreditation Council  
on the recommendation of the duly appointed  
Peer Team is pleased to declare the  
Nandurbar Taluka Vidhayak Samiti's  
G. J. Patil Arts, Commerce and Science College  
Nandurbar, affiliated to North Maharashtra University, Maharashtra as  
Accredited  
with CGPA of 3.10 on four point scale  
at A grade  
valid up to March 02, 2020*

*Date : March 03, 2015*



*Amar Mishra  
Director*

**THE ANNUAL QUALITY ASSURANCE REPORT (AQAR)  
OF THE IQAC  
2017-2018**



**SUBMITTED BY**

N. T.V.S.'s

**G.T.PATIL ARTS, COMMERCE AND SCIENCE COLLEGE**

Nandurbar, Dist. Nandurbar - 425 412(M.S.)

(ESTD-1964)

Affiliated to North Maharashtra University,  
Jalgaon(Maharashtra)

**Track ID-MHCOGN10892**

**- SUBMITTED TO -**

**NATIONAL ASSESSMENT & ACCREDITATION COUNCIL,  
BANGALORE - 560 010**

## The Annual Quality Assurance Report (AQAR) of the IQAC

All NAAC accredited institutions will submit an annual self-reviewed progress report to NAAC, through its IQAC. The report is to detail the tangible results achieved in key areas, specifically identified by the institutional IQAC at the beginning of the academic year. The AQAR will detail the results of the perspective plan worked out by the IQAC. (Note: The AQAR period would be the Academic Year. For example, July 1, 2012 to June 30, 2013)

### Part – A

#### I. Details of the Institution

1.1 Name of the Institution

G.T.Patil Arts, Commerce and Science College, Nandurbar

1.2 Address Line 1

Shani Mandir Road, Nandurbar

Address Line 2

City/Town

Nandurbar

State

Maharashtra

Pin Code

425412

Institution e-mail address

gtpcollege@rediffmail.com

Contact Nos.

02564-222293

Name of the Head of the Institution:

Prof.Dr. V.S. Shrivastava

Tel. No. with STD Code:

02564-222293

Mobile:

9423905823

Name of the IQAC Co-ordinator:

Prof.Dr.C.P. Sawant

Mobile:

9420533719

IQAC e-mail address:

drcpsawant@rediffmail.com

**1.3 NAAC Track ID**

(For ex. MHCOGN 18879)

MHCOGN10892

**1.4 NAAC Executive Committee No. & Date:**

(For Example EC/32/A&A/143 dated 3-5-2004.  
This EC no. is available in the right corner- bottom  
of your institution's Accreditation Certificate)

EC (SC)/0/RAR/022 dated 03-03-2015

1.5 Website address:

www.ntvsgtpcollege.org

Web-link of the AQAR:

www.ntvsgtpcollege.org/AQAR2016-17pdf

1.6 Accreditation Details

Sl. No.	Cycle	Grade	CGPA	Year of Accreditation	Validity Period
1	1 <sup>st</sup> Cycle	B+		16/02/2004	5 yrs
2	2 <sup>nd</sup> Cycle	A	3.10	03/03/2015	5 yrs
3	3 <sup>rd</sup> Cycle				
4	4 <sup>th</sup> Cycle				

1.7 Date of Establishment of IQAC :

01/07/2005

1.8 AQAR for the year (for example 2010-11)

2017-2018

1.9 Details of the previous year's AQAR submitted to NAAC after the latest Assessment and Accreditation by NAAC ((for example AQAR 2010-11 submitted to NAAC on 12-10-2011))

- i. AQAR 2013-14 submitted to NAAC on 16.08.2014
- ii. AQAR 2014-15 submitted to NAAC on 1.09.2015
- iii. AQAR 2015-16 submitted to NAAC on 15.10.2016
- iv. AQAR 2016-17 submitted to NAAC on 23.09.2017
- v. AQAR 2017-18 submitted to NAAC on 31.12.2018

1.10 Institutional Status

University                      State  Central  Deemed  Private

Affiliated College              Yes  No

Constituent College            Yes  No

Autonomous college of UGC    Yes  No

Regulatory Agency approved Institution Yes  No

(eg. AICTE, BCI, MCI, PCI, NCI)

Type of Institution    Co-education  Men  Women

                                  Urban  Rural  Tribal

Financial Status        Grant-in-aid  UGC 2(f)  UGC 12B

                                  Grant-in-aid + Self Financing  Totally Self-financing

1.11 Type of Faculty/Programme

Arts  Science  Commerce  Law  PEI (Phys Edu)

TEI (Edu)  Engineering  Health Science  Management

Others (Specify)

1.12 Name of the Affiliating University (*for the Colleges*)

North Maharashtra University,  
Jalgaon (Maharashtra)

√

1.13 Special status conferred by Central/ State Government-- UGC/CSIR/DST/DBT/ICMR etc

Autonomy by State/Central Govt. / University

NO

University with Potential for Excellence

NO

UGC-CPE

NO

DST Star Scheme

NO

UGC-CE

NO

UGC-Special Assistance Programme

NO

DST-FIST

√

UGC-Innovative PG programmes

NO

Any other (*Specify*)

NO

UGC-COP Programmes

## **2. IQAC Composition and Activities**

2.1 No. of Teachers

07

2.2 No. of Administrative/Technical staff

03

2.3 No. of students

00

2.4 No. of Management representatives

02

2.5 No. of Alumni

01

2.6 No. of any other stakeholder and  
community representatives

01

2.7 No. of Employers/ Industrialists

01



2.8 No. of other External Experts

2.9 Total No. of members

15

2.10 No. of IQAC meetings held

04

2.11 No. of meetings with various stakeholders:

No.

05

Faculty

02

Non-Teaching Staff

01

Alumni

01

Others

01

2.12 Has IQAC received any funding from UGC during the year? Yes

No

If yes, mention the amount

2.13 Seminars and Conferences (only quality related)

(i) No. of Seminars/Conferences/ Workshops/Symposia organized by the IQAC

Total Nos.

-

International

-

National

-

State

-

Institution Level

02

(ii) Themes

- Organized One day workshop on "Teaching Learning and Evaluation."
- New Procedure on NAAC Assessment

## 2.14 Significant Activities and contributions made by IQAC

- The IQAC plans for various academic and non-academic activities.
- Motivated staff registered for Ph. D.
- One Institutional Workshop Organised.
- Preparation and submission of AQAR
- IQAC is constantly evaluating the attendance of students as well as teaching learning process through the feedbacks
- Assist the Principal in ensuring quality in day to day administration
- Prepared the academic calender

## 2.15 Plan of Action by IQAC/Outcome

The plan of action chalked out by the IQAC in the beginning of the year towards quality enhancement and the outcome achieved by the end of the year \*

The governing body of the college approved the AQAR 2017-18 and recommended the same for sending the NAAC office. The governing body further directed the Principal to execute all the plan of action proposed by the IQAC.

### ➤ **Plan of Action**

- The AQAC of the college has planned for complete automation of the central library of the college.
- New books as per the revised syllabus of North Maharashtra University, Jalgaon.
- Academic Audit of Teachers.
- Continue Evaluation.
- Enhance tutorial system.
- Strengthen extension activities.
- To strengthen remedial classes for slow learners.

### ➤ **Achievements**

The following are Achievements in the Academic Session 2017-18.

- Automation of the library has made remarkable progress.
- Academic Audit of Teachers- Executed
- Continue Evaluation- Executed
- New books procured in the library as per the requirement.
- Tutorial series was conducted by the college in every month.
- Extension activities was conducted.
- Remedial classes are being conducted.

*\* Attach the Academic Calendar of the year as Annexure I*

2.15 Whether the AQAR was placed in statutory body      Yes       No

Management       Syndicate       Any other body

Provide the details of the action taken

- AQAR was discussed in IQAC meeting with all staff members. Strategies to improve quality indicators of the institutions were discussed

## Part – B

### Criterion – I

#### I. Curricular Aspects

##### 1.1 Details about Academic Programmes

Level of the Programme	Number of existing Programmes	Number of programmes added during the year	Number of self-financing programmes	Number of value added / Career Oriented programmes
PhD	10	-		
PG	06	-	08	
UG	17	-	03	
PG Diploma				
Advanced Diploma				
Diploma	1			
Certificate	1			02
Others				
<b>Total</b>	35		11	02
Interdisciplinary				
Innovative				

- 1.2 (i) Flexibility of the Curriculum: CBCS/Core/Elective option / Open options  
(ii) Pattern of programmes:

Pattern	Number of programmes
Semester	34
Trimester	
Annual	

1.3 Feedback from stakeholders\* Alumni  Parents  Employers  Students   
*(On all aspects)*

Mode of feedback : Online  Manual  Co-operating schools (for PEI)

*\*Please provide an analysis of the feedback in the Annexure II*

1.4 Whether there is any revision/update of regulation or syllabi, if yes, mention their salient aspects.

➤ The university revised the syllabus once in every three years as per the suggestion of Board of Studies in various subjects. The same syllabus is followed by affiliated colleges.

1.5 Any new Department/Centre introduced during the year. If yes, give details.

Music Department

## Criterion – II

### 2. Teaching, Learning and Evaluation

2.1 Total No. of permanent faculty	Total	Asst. Professors	Associate Professors	Professors	Others
	66	34	31	-	01

2.2 No. of permanent faculty with Ph.D. 30

2.3 No. of Faculty Positions Recruited (R) and Vacant (V) during the year	Asst. Professors		Associate Professors		Professors		Others		Total	
	R	V	R	V	R	V	R	V	R	V
	34	23	31	-	04	-	01	-	89	23

2.4 No. of Guest and Visiting faculty and Temporary faculty 50  09(Ad-hoc)

2.5 Faculty participation in conferences and symposia:

No. of Faculty	International level	National level	State level
Attended	04	52	01
Presented papers	02	32	-
Resource Persons	-	01	01

2.6 Innovative processes adopted by the institution in Teaching and Learning:

- Skill Development through Audit courses and Students Training Program.
- Educational and Industrial visits were organized.
- Organization of Poster/Project Exhibition.

2.7 Total No. of actual teaching days

during this academic year

180
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2.8 Examination/ Evaluation Reforms initiated by the Institution (for example: Open Book Examination, Bar Coding, Double Valuation, Photocopy, Online Multiple Choice Questions)

College follows the examination evaluation procedures framed by the affiliating university.

Various examinations/evaluations undertaken:

Regular, weekly tutorials are conducted

Routine and open book tests are conducted

Paper presentations and seminars are also encouraged

Continuous evaluation is carried out throughout the semester through regular tests, objective tests, projects, presentations, quizzes et

2.9 No. of faculty members involved in curriculum restructuring/revision/syllabus development as member of Board of Study/Faculty/Curriculum Development workshop

BOS	Faculty participating in work shop
05	40

2.10 Average percentage of attendance of students

80 %
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2.11 Course/Programme wise distribution of pass percentage : 2017-18

Title of the Programme	Total no. of students appeared	Division						
		A+	A	B+	B	C+	C	Pass %
B.A.	303	35	60	62	28	--	--	61
B.Com.	125	10	45	22	23	--	-	80
B.Sc.	175	62	54	62	69	--	--	65
M.A.	264	80	52	27	25	--	--	70
M.Com.	133	27	21	40	09	--	--	73
M.Sc.	111	10	25	15	5	00	00	49

2.12 How does IQAC Contribute/Monitor/Evaluate the Teaching & Learning processes :

- Introduced MCQ test before internal test in each semester.
- IQAC collects the teaching plans and monthly performance report of the faculties.
- IQAC also analyses the student's feedback and submit the same to the principal.
- The principal goes through the analysis and places it in the staff meeting for discussion and necessary action.
- The IQAC helps the administration for smooth and effective implementation of teaching-learning process.
- Encouraging participation in faculty development programmes.
- Taking regular feedback teacher's quality

2.13 Initiatives undertaken towards faculty development

<i>Faculty / Staff Development Programmes</i>	<i>Number of faculty benefitted</i>
Refresher courses	03
UGC – Faculty Improvement Programme	NIL
HRD programmes	NIL
Orientation programmes	02
Faculty exchange programme	
Staff training conducted by the university	NIL
Staff training conducted by other institutions	2 non-teaching + 1 teaching
Summer / Winter schools, Workshops, etc.	
Others	

2.14 Details of Administrative and Technical staff

Category	Number of Permanent Employees	Number of Vacant Positions	Number of permanent positions filled during the Year	Number of positions filled temporarily
Administrative Staff	17	06	-	04
Technical Staff	36	13	-	04

## Criterion – III

### 3. Research, Consultancy and Extension

#### 3.1 Initiatives of the IQAC in Sensitizing/Promoting Research Climate in the institution

- College has identified by DST-FIST
- IQAC of the college regularly assists the faculty members by passing information about funding agencies like UGC, DST, VCRMS etc. that invite proposals for research funding.
- IQAC helps faculty in preparing the projects for submission to various agencies.
- IQAC gives information to the faculty members regarding the upcoming seminars, workshops, conferences etc.
- The college has a research committee constituted with Principal as convenor and five faculty members from different departments as members. It tracks the schemes of UGC.
- The IQAC meets regularly to discuss various plans to promote research climate and motivate the faculty to do Ph. D.
- The IQAC of the college encourages the staff to apply for faculty development programme, major and minor research projects and to organize seminars conferences and workshops.
- It also motivates the staff for to publish research papers, articles, reviews and books.
- The staff and students are informed about various fellowships and schemes available under UGC and they are encouraged to apply for them.
- One faculty member sanctioned minor research projects by UGC and two minor research projects approved by Vice Chancellor motivation Research scheme and five minor research projects are submitted to UGC.
- IQAC promotes students to participation in AVISHKAR.

#### 3.2 Details regarding major projects

	Completed	Ongoing	Sanctioned	Submitted
Number	-			01
Outlay in Rs. Lakhs				



3.3 Details regarding minor projects

	Completed	Ongoing	Sanctioned	Submitted
Number	03	04	06	03
Outlay in Rs. Lakhs	3, 00, 000	530000	254000	3,00,000

3.4 Details on research publications

	International	National	Others
Peer Review Journals	20	10	
Non-Peer Review Journals	20	40	
e-Journals	02	02	
Conference proceedings	02	03	

3.5 Details on Impact factor of publications:

Range  Average  h-index  Nos. in SCOPUS

3.6 Research funds sanctioned and received from various funding agencies, industry and other organisations

Nature of the Project	Duration Year	Name of the funding Agency	Total grant sanctioned	Received
Major projects				
Minor Projects	2 yrs	UGC	75000	-
Interdisciplinary Projects				
Industry sponsored				
Projects sponsored by the University	2 yrs	VCRMS	189000	-
Students research projects <i>(other than compulsory by the University)</i>				
Any other(Specify)DST-FIST	5 yrs	DST	800000	2381294
Total				

3.7 No. of books published i) With ISBN No.  Chapters in Edited Books

ii) Without ISBN No.

3.8 No. of University Departments receiving funds from

UGC-SAP  CAS  DST-FIST

DPE  DBT Scheme/funds

3.9 For colleges Autonomy  CPE  DBT Star Scheme

INSPIRE  CE  Any Other (specify)

3.10 Revenue generated through consultancy

3.11 No. of conferences organized by the Institution

Level	International	National	State	University	College
Number	-	-		01	01
Sponsoring agencies	-	-	-	College	College

3.12 No. of faculty served as experts, chairpersons or resource persons

3.13 No. of collaborations International  National  Any other

3.14 No. of linkages created during this year

3.15 Total budget for research for current year in lakhs : **6.5 Lakhs**

From Funding agency  From Management of University/College

Total

3.16 No. of patents received this year

Type of Patent		Number
National	Applied	NIL
	Granted	-
International	Applied	NIL-
	Granted	-
Commercialised	Applied	NIL-
	Granted	-

3.17 No. of research awards/ recognitions received by faculty and research fellows Of the institute in the year

Total	International	National	State	University	Dist	College
18	-	02	-	01	10	05

3.18 No. of faculty from the Institution who are Ph. D. Guides   
and students registered under them

3.19 No. of Ph.D. awarded by faculty from the Institution

3.20 No. of Research scholars receiving the Fellowships (Newly enrolled + existing ones)

JRF                      SRF                      Project Fellows                       Any other                     

3.21 No. of students Participated in NSS events:

University level                       State level                        
National level                                            International level                     

3.22 No. of students participated in NCC events:

University level                       State level                        
National level                                            International level                     

3.23 No. of Awards won in NSS:

University level                       State level                        
National level                                            International level                     

3.24 No. of Awards won in NCC:

University level                       State level                        
National level                                            International level                     

3.25 No. of Extension activities organized

University forum                       College forum   
NCC                                            NSS                                            Any other                     

3.26 Major Activities during the year in the sphere of extension activities and Institutional Social Responsibility

- NSS annual camp
- Blood donation camp
- Environmental awareness
- Save girl child campaign
- AIDS awareness
- Women health and social awareness programme.
- Conducted a tracking camp.
- Nirmalya Sankalan

• **Criterion – IV**

**4. Infrastructure and Learning Resources**

4.1 Details of increase in infrastructure facilities:

Facilities	Existing	Newly created	Source of Fund	Total
Campus area	29.49 Acres			
Class rooms	29			
Laboratories	23			
Seminar Halls	01			
No. of important equipments purchased ( $\geq$ 1-0 lakh) during the current year.	04	A.A.S. and Other	DST	21 lakhs
Value of the equipment purchased during the year (Rs. in Lakhs)				
Others				

4.2 Computerization of administration and library

<ul style="list-style-type: none"> <li>➤ Initiative has been taken for automation of library for this purpose.</li> <li>➤ Computerized data base software for library</li> <li>➤ Computerized documentation of the fees paid by students (Office).</li> </ul>
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4.3 Library services:

	Existing		Newly added		Total	
	No.	Value	No.	Value	No.	Value
Text Books & Reference Books	81461	6828675	971	242505	82432	7071180
06 Weekly	Rojgar	/Nokri	News	Masik		
e-Books	Member of inflibnet N.1132					
Journals	247	135489	65	45000	312	180489
e-Journals	Member of inflibnet N.1132					
Digital Database						
CD & Video	180	-	10	-	190	-
10 Daily news papers						

#### 4.4 Technology up gradation (overall)

	Total Computers	Computer Labs	Internet	Browsing Centres	Computer Centres	Office	Departments	Others
Existing	111	03	10	-	-	08	10	02
Added	50	01	-	-	-	04	06	04
Total	161	04	10	-	-	12	16	06

#### 4.5 Computer, Internet access, training to teachers and students and any other programme for technology upgradation (Networking, e-Governance etc.)

- Computer and internet access training for teachers
- Workshop on web designing for students
- Internet connectivity terminals for teachers

#### 4.6 Amount spent on maintenance in lakhs :

6, 29,700

i) ICT

ii) Campus Infrastructure and facilities

9, 40,790

iii) Equipments

1, 32,503

iv) Others

12, 29,180

**Total :**

29, 32,173

### Criterion – V

## 5. Student Support and Progression

### 5.1 Contribution of IQAC in enhancing awareness about Student Support Services

- IQAC organised students awareness programmes such as how to use library, how to use internet etc.
- Students are also informed about college health care centre.
- Career counselling centre.
- Various indoor-outdoor sports facilities etc by IQAC for time to time.
- Grievances redressed cell exist.
- NET-SET coaching
- Extension of timing in the library: The working hour of the Library has been extended till 9.30 p.m. for the benefit of the students.

## 5.2 Efforts made by the institution for tracking the progression

- The monthly performance reports of the teachers reveal the completion of the syllabus according to the respective teaching plan.
- MCQ test in every semester for continue evaluation.
- Feedback from student
- Student counselling
- Weak students are identified in the class with the help of their respective class teachers and Remedial Coaching is arranged

### 5.3 (a) Total Number of students

UG	PG	Ph.D.	Total
2503	1209	45	3757

(b) No. of students outside the state

-

(c) No. of international students

-

	No	%		No	%
Men	2116	57.01	Women	1596	42.99

Last Year (2016-17)						This Year (2017-17)					
General	SC	ST	OBC	Physically Challenged	Total	General	SC	ST	OBC and other	Physically Challenged	Total
683	204	1301	108			739	205	137	138		
			0					9	9		

Demand ratio

Dropout % UG-31.5%, PG-7.5 %

### 5.4 Details of student support mechanism for coaching for competitive examinations (If any)

- Coaching for Competative exam students.
- SET/NET coaching for PG Students.

No. of students beneficiaries

Less than 25%

5.5 No. of students qualified in these examinations

NET	<input checked="" type="checkbox"/>	SET/SLET	<input checked="" type="checkbox"/>	GATE	<input type="checkbox"/>	CAT	<input type="checkbox"/>
IAS/IPS etc	<input type="checkbox"/>	State PSC	<input type="checkbox"/>	UPSC	<input type="checkbox"/>	Others	<input type="checkbox"/>

5.6 Details of student counselling and career guidance

- Career guidance for final year B. A., B. Com. and B. Sc. students by career guidance cell
- Career guidance for B. Sc. students on “How to face interview in IT field ” by the Department of Computer Science.
- Counselling centre is available in the college and the trained faculties counsel the students as per their need
- Career guidance and placement cell provides guidance to the students regarding higher studies and employment
- Placement cell arranges campus interviews for placement in various companies

No. of students benefitted

Less than 25

5.7 Details of campus placement

	<i>On campus</i>		<i>Off Campus</i>
Number of Organizations Visited	Number of Students Participated	Number of Students Placed	Number of Students Placed
03	45	20	20

5.8 Details of gender sensitization programmes

- Women’s day was celebrated by the college.
- Yuvati Sabha was founded for women’s development
- Workshop on “gender awareness and sensitization” organized by the college.
- The women cell conduct a number of programmes on various issues related to the gender problems.
- Awareness programme of gender equality and women rights conducted for all degree students
- Legal literacy programme was conducted by the college for students.

## 5.9 Students Activities

### 5.9.1 No. of students participated in Sports, Games and other events

State/ University level  National level  International level

### No. of students participated in cultural events

State/ University level  National level  International level

### 5.9.2 No. of medals /awards won by students in Sports, Games and other events

Sports : State/ University level  National level  International level

Cultural: State/ University level  National level  International level

## 5.10 Scholarships and Financial Support

	Number of students	Amount
Financial support from institution /University	69	245000
Financial support from government	2058	11979675
Financial support from other sources /University	02	1,00,000/-
Number of students who received International/ National recognitions	03	4,44,000/-

### 5.11 Student organised / initiatives

Fairs : State/ University level  National level  International level

Exhibition: State/ University level  National level  International level

5.12 No. of social initiatives undertaken by the students

5.13 Major grievances of students (if any) redressed: No major grievances were reported during 2013-14



## Criterion – VI

### 6. Governance, Leadership and Management

6.1 State the Vision and Mission of the institution

Vision: To prepare graduates to assume position of political, economics, intellectuals, artistic and environmental leadership tribal, regional and national context

Mission: “Empower the Tribal and Rural Students through the Higher Education”

6.2 Does the Institution has a management Information System

Yes

6.3 Quality improvement strategies adopted by the institution for each of the following:

#### 6.3.1 Curriculum Development

- The curriculum is designed by the university
- Three faculty members are the chairmen of Board of Studies as well as one is on academic council and seven faculties are on BOS.
- The number of faculty members participating in designing new curriculum.
- The college provides facilities for co-curricular activities like N.S.S., N. C. C. and sports.

#### 6.3.2 Teaching and Learning

- The co-ordinator of IQAC is invited for the meeting of head of the departments with the principal in order to seek some suggestions in the development of the institution. As the co-ordinator is in personal contact with each department, teacher, and student. He is able to analyse and understand the needs of institution, teachers and students.
- Frequently use of ICT in classroom teaching.
- Encouraging commerce students for evaluating businesses related articles.
- Giving individual attention during practical classes.
- Academic calendar is provided to the staff and students in the beginning of the academic year in which the academic activities and examination schedule are given.
- The college has well experienced and qualified teaching staff to teach all the courses
- The staff and students are encouraged to attain refresher courses, seminars, conference, orientation courses etc.

### 6.3.3 Examination and Evaluation

- Continuous evaluation by MCQs
- Group Discussion
- Internal evaluation process reset
- All exam systems follow as per university rules.
- Periodical examination and tests are conducted.
- Students' progress is analyzed through assignments, seminars and group discussion.

### 6.3.4 Research and Development

- Faculty and students are sent to participate for paper presentation competition.
- Teachers received Minor and VCRMS Project grants from various
- funding agencies.
- Promotion of minor research projects.
- The college encourages the teaching faculty to pursue research work. Special concession is given to staff members who are undertaking research in the form of reduced work hours.
- Students research projects are made mandatory in some subjects.
- The faculty motivates and extend help to the students to do study projects.
- The staff is motivated to do M. Phil. and Ph. D. As well as major and minor research projects.
- The management encourages the staff to do research part time and published the research papers.

### 6.3.5 Library, ICT and physical infrastructure / instrumentation

- Library will be upgraded with 10 and more computers.
- There are plans for the construction of new class rooms.
- Our institution is member of N-list (National Library and Information Services Infrastructure of Scholarly content) which is working under INFIBNBT (Information and Library Network Centre ) that provides access to electronic journals and electronic books.
- OPAC system facility is provided in the library and students are trained to use it.

### 6.3.6 Human Resource Management

- All faculty members are involved in different activities.
- The IQAC organises workshop for teaching as well as non-teaching staff to enhance their competency.

### 6.3.7 Faculty and Staff recruitment

- Depends on Maharashtra Government Policy. But management recruits Ad-hoc faculty as per demand.

### 6.3.8 Industry Interaction / Collaboration

- Chemistry department touch with industries and many of them are alumni of the college.
- Industrial visits are organized by Chemistry Department.

### 6.3.9 Admission of Students

- First, come first serve basis.
- As per University guideline and Govt. rules

### 6.4 Welfare schemes for

Teaching	Tuition Fees concession to the Children of staff Members C.credit society. Provident fund
Non teaching	Credit society Provident fund
Students	scholarships/group insurance

### 6.5 Total corpus fund generated

6.6 Whether annual financial audit has been done    Yes     No

6.7 Whether Academic and Administrative Audit (AAA) has been done?

Audit Type	External (NAAC/Uni.)		Internal(Management)	
	Yes/No	Agency	Yes/No	Authority
Academic	Yes	Yes	Yes	Yes
Administrative	Yes	Yes	Yes	Yes

6.8 Does the University/ Autonomous College declares results within 30 days?

For UG Programmes      Yes       No

For PG Programmes      Yes       No

6.9 What efforts are made by the University/ Autonomous College for Examination Reforms?

NIL

6.10 What efforts are made by the University to promote autonomy in the affiliated/constituent colleges?

NIL

6.11 Activities and support from the Alumni Association

- Annual meeting organised.
- Garden benches are donated

6.12 Activities and support from the Parent – Teacher Association

- One parent-teaching meeting per semester conducted.
- Suggestions are incorporated by day to day suggestion.
- Suggestions to improve the academic climate of the college are collected through parent teacher meetings.

6.13 Development programmes for support staff

- Computer training for Non-teaching staff.
- Work training for non-teaching staff.

6.14 Initiatives taken by the institution to make the campus eco-friendly

- Green campus

## Criterion – VII

### 7. Innovations and Best Practices

7.1 Innovations introduced during this academic year which have created a positive impact on the functioning of the institution. Give details.

- Computer training for teaching and non teaching staff.
- Academic and administration audit introduced.

7.2 Provide the Action Taken Report (ATR) based on the plan of action decided upon at the beginning of the year

Yes, as per plan. All activities were conducted as per academic calendar.

7.3 Give two Best Practices of the institution (*please see the format in the NAAC Self-study Manuals*)

- Upliftment of tribal student.
- Awareness about Organic Farming.
- College security through CCTV surveillance.
- Biometric attendance for teachers and staff.

*\*Provide the details in annexure (annexure need to be numbered as i, ii,iii)*

7.4 Contribution to environmental awareness / protection

- Green campus

7.5 Whether environmental audit was conducted? Yes  No

7.6 Any other relevant information the institution wishes to add. (for example SWOT Analysis)

- College is identified as DST-FIST.
- College is awarded as Best College of North Maharashtra University.

#### **. Plans of institution for next year**


- More seminars and conference to be conducted.
- Collaboration with institution and industries to be initiated.
- New classroom and library expansion to be constructed.
- Online assignments.
- More certificate courses.

Name Prof. Dr. C. P. Sawant



Signature of the Coordinator, IQAC

Name Prof. Dr. V. S. Shrivastava



Signature of the Chairperson, IQAC  
**PRINCIPAL**  
G.T. Patil Arts, Commerce &  
Science College  
NANDURBAR - 425 412 (M.S.)

\*\*\*

Annexure I

**Nandurbar Taluka Vidhayak Samiti's**

**G.T. Patil Arts, Commerce & Science College, Nandurbar**

**Dist: Nandurbar 425 412 (M.S.)**

**Academic Calendar**

**2017-18**

<b>First Term</b>	Thursday	15 June, 2017	139 Days
	Tuesday	31 Oct ,2017	
<b>Winter Vacation</b>	Wednesday	1 Nov ,2017	26 Days
	Sunday	26 Nov ,2017	
<b>Second Term</b>	Monday	27 Nov ,2017	156 Days
	Saturday	30 April , 2018	
<b>Summer Vacation</b>	Sunday	01 May, 2018	45 Days
	Tuesday	14 June, 2018	

## Government Holiday

Sr.No.	Events	Date	Day
1	Ramjan -Id	26 June,2017	Monday
2	Independence Day	15 August, 2017	Tuesday
3	Parshi Nav Varsh	17 August ,2017	Thursday
4	Pola	21 August ,2017	Monday
5	Ganesh Chaturthi	25 August , 2017	Friday
6	Bakri -Id	02September, 2017	Saturday
7	Vijaya Dashami	30September,2017	Saturday
8	Mahatma Gandhi Jayanti	02 October 2017	Monday
9	Diwali laxmipujan to Bhaubij	18 to 21 October 2017	Wednesday to Saturday
10	Guru Nanak Jayanti	4 November ,2017	Friday
11	Id –A-Milad	12 December ,2017	Monday
12	khrismas	25 December, 2017	Monday
13	Republic Day	26 January 2018	Friday
14	Mahashivratri	13 February 2018	Tuesday
15	Chhatrapat Shivaji Maharaj Jayanti	19 February 2018	Monday
16	Holi	02March 2018	Friday
17	Mahavir Jayanti	29 March 2018	Thursday
18	Good Friday	30 March 2018	Friday
19	Dr .Babasheb Ambedkar Jayanti/Good Friday	14 April 2018	Saturday
20	Buddha Pornima	30 April 2018	Monday

North Maharashtra University has given authority to the principal of the college to declare three holidays beside the list of holidays published by the university.



## **Annexure 2**

Feedback from the alumni and the student

### **The outcome of the feedback taken from the alumni and students**

1. About 75% of the student gave the feedback that the curriculum prepared them for finding a job or for getting admission to proceed with further studies.
2. 25% of the student gave the feedback that the curriculum must be updated to suit the needs of the job market.
3. The average rating of the teaching faculty as rated by the student is 83.6%. This is the average % considering all the teaching faculty.
4. Alumni majority felt that the curriculum must be updated and made more industry/ job oriented.

## Annexure 3

### Best Practice –I

**Title: Drushti – University Level Event**

**Goal:** The College has been committing to students' skill development. On that ground, the Department of English has taken initiative in grooming not only the students of the college but all over the University region. The Department began the university level event called ' Drushti' which means 'Vision'. The event was started in the year 2016 after the demise of our late chairman Dadasaheb Raghuwanshi to revive his memories. The vision behind the event was to encourage students about writing, presentation and various soft skills. There are different objectives of the activities as follows:

- To prepare students to learn various soft skills.
- To impart global skills among the students of the region.
- To disseminate innovative visionary paths to the vulnerable students.
- To develop the habits of learning about employability skills in practical way.

**Context:** Under the event there are basically two activities are conducted. As the university level Essay Writing Competition and University sponsored one day workshop on skill Development. In this academic year on 22 Sept 2017 the workshop was conducted on " Public Speaking and Competitive Skills" for which there were 180 students from 25 colleges of the North Maharashtra University region participated.

**Practice:** The resource persons Prof. Tejas Beldar and Mrs. Preeti Malviya deliberate the valuable ideas in two different sessions. For the inauguration the District Superintendent of Police Shri. Sanjay Patil and MLA Shri. Chandrakant Raghuwanshi motivated participants with their experienced and inspiring talks. During the technical sessions the students were exposed with useful games and small fun activities about competitive skills. The game 'Kaun Banega Drushtiraj' motivated students to improve their general knowledge. For the Essay writing competition there were 100 essays received from various colleges of the NMU region. The

subjects for the competition were burning issues of the nations which includes: Demonetization : Impact and Challenges, Smart India, Employability Skills and Reading for Pleasure. The three best were given cash prize and mementoes and five students were given consolation prizes.

**Evidence of Success:** It had been practice of the Department from 2016 which includes the workshop on 'Confidence Building and Employability Skills' also . The students for the existing workshop were aware of the previous year events so got motivated and enthusiastic about to gain more intellectual fist. The three active participants were felicitated as active participants by the guests offering a memento to each. The students feedback came as real booster to the organizers to organize.

**Problems encountered and Resources Required:**

The technical sessions were conducted with the help of powerpoint presentation which gave effective impact on students. But the resource persons were expecting collar mic for more movements among the students with free hands. The selected students were reacting to the questions raised by the resource persons. It was noticed by the resources so they conducted a brain storming session to get all the students involvement. The workshop was conducted in library reading hall, a review came from the participants that it should have been conducted in an auditorium for better results. But the college lacks well equipped auditorium.

## **Best Practice -II**

**Title: Promoting students to participate in Avishkar and research oriented activities like organic farming**

**Goal:** The College also marches with target of preparing students for their personal and social growth. The volunteers are promoted to participate in the research oriented Competition called 'Avishkar' . Every year this is organized by the KBC NMU Jalgaon.

- To prepare students to learn various research methods.
- To impart practical knowledge among the students of the region.
- To disseminate innovative visionary paths to the vulnerable students.

- To develop the habits of creating new ideas through research and scientific methods.
- To develop importance of organic farming.

**Context:** Under these practices selected students are encouraged to participate in research competition like Avishkar where out tribal students get an opportunity to present their research models as well as research projects. Apart from this many students of science faculty prepare small innovative projects which are at fundamental level useful for people around.

**Practice:** The students of Chemistry department prepared project of organic farming which is highly useful for farmers in nearby villages in Nandurbar District. Students also visited different villages like Shanimandal, Asane, Ghotane, Saitane, Dhanora, Tokartalav, Kevadipada, Ashte, Dahindule, Karajkupe etc to counsel the farmers about it. The students who presented their projects in the competition Avishkar were appreciated and selected for University and state level completion.

**Evidence of Success:** In the academic year 2017-18 there were 50 students participated in Avishkar at the District level and 20 students participated in the University level competition. One student from Chemistry Department named Mr. Kalpesh Chatur Sawant got selected for state level Avishkar. The Students who did work on organic farming getting good response from surrounding farmers for counselling.

**Problems encountered and Resources Required:**

Being vulnerable region students lack much advanced Laboratories for their further research. Still institution is trying its best to bring new machineries and raw material for students doing research from science faculty. There is lack of awareness in the students of Humanities and Commerce about research competition like Avishkar. They are encouraged to participate in local level competition to raise their strength in such competition.

# **The Annual Quality Assurance Report (AQAR) of the IQAC**

*(For Affiliated/Constituent Colleges)*

Institutions Accredited by NAAC need to submit an Annual self-reviewed progress report i.e. Annual Quality Assurance Report (AQAR) to NAAC, through its IQAC. The report is to detail the tangible results achieved in key areas, specifically identified by the IQAC at the beginning of the Academic year. *The AQAR period would be the Academic Year. (For example, July 1, 2017 to June 30, 2018)*

## **Part – A**

### **Data of the Institution**

*(Data may be captured from IIQA)*

- |           |   |  |
|-----------|---|--|
| <b>1</b>  | <b>Name of the Institution</b>                  | <b>: G.T.Patil Arts, Commerce and Science College, Nandurbar</b>                   |
|           | • Name of the Head of the institution           | : Prof. Dr. V.S. Shrivastava   |
|           | • Designation:                                  | : Principal  |
|           | • Does the institution function from own campus | : Yes  |
|           | • Alternate/Phone no.                           | : 02564-222293   |
|           | • Mobile no.                                    | : 9423905823   |
|           | • Registered e-mail                             | : <a href="mailto:gtpcollege@rediffmail.com">gtpcollege@rediffmail.com</a>         |
|           | • Alternate e-mail                              | : <a href="mailto:drvinod_shrivastava@yahoo.com">drvinod_shrivastava@yahoo.com</a> |
|           | • Address                                       | : Shani Mandir Road, Nandurbar   |
|           | • City/Town                                     | : Nandurbar  |
|           | • State/UT                                      | : Maharashtra  |
|           | • Pin Code                                      | : 425412   |
| <b>2.</b> | <b>Institutional status</b>                     | <b>:</b>   |
|           | • Affiliated / Constituent                      | : Affiliated   |
|           | • Type of Institution                           | : Co-education   |
|           | • Location                                      | : Rural  |
|           | • Financial Status                              | : Grants-in aid and UGC 2(f) and 12 (B)  |
|           | • Name of the Affiliating University            | : KBC North Maharashtra University, Jalgaon  |

- Name of the IQAC Co-ordinator : Prof. Dr. C.P. Sawant
- Phone no. : 02564-222293
- Alternate phone no. : 02564-297334
- Mobile : 9420533719
- Alternate Mobile No. : 9623969239
- IQAC e-mail address : [gtpcollege@rediffmail.com](mailto:gtpcollege@rediffmail.com)
- Alternate Email address : [drcpsawant@rediffmail.com](mailto:drcpsawant@rediffmail.com)

**3. Website address :**

Web-link of the AQAR: (Previous Academic Year) :  
<http://www.ntvsgtpcollege.org/index.php/iqac-report>

**4. Whether Academic Calendar prepared during the year? : Yes, It is uploaded in the Institutional website :**

Weblink : [http://www.ntvsgtpcollege.org/uploads/Academic\\_Calender\\_2018-19.pdf](http://www.ntvsgtpcollege.org/uploads/Academic_Calender_2018-19.pdf)

**5. Accreditation Details :**

Cycle	Grade	CGPA	Year of Accreditation	Validity Period
1 <sup>st</sup>	B+	--	2004	from: 16/02/2004 to: 15/02/2009
2 <sup>nd</sup>	A	3.10	2015	from:03/03/2015 to: 02/03/2020

6. Date of Establishment of IQAC : 01/07/2005

7. Internal Quality Assurance System

<b>7.1 Quality initiatives by IQAC during the year for promoting quality culture</b>		
<b>Item/ Title of the quality initiative by IQAC</b>	<b>Date &amp; duration</b>	<b>Number of participants/ beneficiaries</b>
The regular meeting of Internal Quality Assurance Cell (IQAC) for renewal of ISO certificate and discussion about result analysis and preparation of AQAR 2017-18	<b>05/07/2018</b>	<b>12</b>
Discussion, Modification and Finalisation of AQAR-2017-18 placing before governing body and uploading on website	<b>25/10/2018</b>	<b>15</b>
Feedback from 1) Alumni 2) Students 3) Parents collected, analysed and used for improvements	Alumni 11-05-2018 Students 14-05-2018 Parents 11-05-2018	Alumni 20 Students 600 Parents 60
Academic Administrative Audit (AAA) conducted and its follow up action	20-01-2019	All students, faculty members and support staff
Uploading of college data to the Management Information system (MIS) portal of MHRD, Govt. of India	30/04/2019	<b>20</b>

**Note: Some Quality Assurance initiatives of the institution are:**

**(Indicative list)**

- Regular meeting of Internal Quality Assurance Cell (IQAC); timely submission of Annual Quality Assurance Report (AQAR) to NAAC; Feedback from all stakeholders collected, analysed and used for improvements
- Academic Administrative Audit (AAA) conducted and its follow up action
- Participation in NIRF
- ISO Certification
- NBA etc.
- Any other Quality Audit

8. Provide the list of funds by Central/ State Government -

UGC/CSIR/DST/DBT/ICMR/TEQIP/World Bank/CPE of UGC etc.

Institution/Department/ Faculty	Scheme	Funding agency	Year of award with duration	Amount
Science Departments	DST -FIST	DST	2014-15	80,00000

9. Whether composition of IQAC as per latest NAAC guidelines: Yes Uploaded

\*upload latest notification of formation of IQAC

<http://www.ntvsgtpcollege.org/index.php/iqac-report/formation-of-iqac>

10. No. of IQAC meetings held during the year : **03**

The minutes of IQAC meeting and compliance to the decisions have been uploaded on the institutional website..... **Yes**

(Please upload, minutes of meetings and action taken report)

11. Whether IQAC received funding from any of the funding agency to support its activities during the year? **Yes**

If yes, mention the amount : 3.0 lakh Sanctioned in 2014-15(For five Years)

12. Significant contributions made by IQAC during the current year (maximum five bullets)

- IQAC plays key role in preparation and implementation of academic calendar in college.
- IQAC is monitoring and implementing the Career Advancement scheme of the teachers.
- IQAC monitors all such programmes in the college like seminars, outreach initiatives, student meets and career counselling initiatives.

- IQAC oversees the activity of the Research Committee and motivates faculties to write research proposal and making them aware of the different funding agency.
- Paper-wise result analysis to be submitted by departments along with follow up remedial measures which are then discussed in the IQAC.

**13. Plan of action chalked out by the IQAC in the beginning of the Academic year towards Quality Enhancement and the outcome achieved by the end of the Academic year**

<b>Plan of Action</b>	<b>Achievements/Outcomes</b>
The IQAC prepares the Academic calendar of the year 2018-19,	As per Academic Calendar IQAC chalks out the plan of action in the beginning of the year towards quality enhancement.
Meeting for the preparation of AQAR Report of the year 2017-18.	The IQAC has approved AQAR of the year 2017-18 in the meeting held on 25.10.2018 and was submitted on 31 /12/ 2018.
To enhance the teaching quality the teaching faculty were encouraged to take up research work	Minor research projects were conducted by some departments on various topics and it was fully sponsored by the VCRMS and UGC.
Counselling session for students regarding implementation of CBCS through academic calendar	Implemented
Encouraging the stakeholders of our institution for eco-friendly campus environment	Our institution achieved Green campus environment by planting saplings.
IQAC motivates the faculty to participate in syllabus framing workshops, conferences, seminars, refresher and orientation faculty development programmes	Implemented
Forwarding of pending applications of full time teachers for promotion under career advancement scheme	Scrutiny and forwarding of applications of eight full time teachers to the competent authority has been completed upto May 2019

**14. Whether the AQAR was placed before statutory body? Yes**

Name of the statutory body : Governing Body (Management)  
 Date of meeting(s) : 25/10/2018

**15. Whether NAAC/or any other accredited body(s) visited IQAC or interacted with it to assess the functioning?**

**No Date:**

**16. Whether institutional data submitted to AISHE: Yes**



**17. Does the Institution have Management Information System? Yes**

If yes, give a brief description and a list of modules currently operational.

(Maximum 500 words)

The College operates Management Information System for the smooth functioning of the management and disseminating information to different stakeholders. The information provided below are the modules on which the College operates its MIS Base Module:

1. Application Entries
2. Admissions Processing / Rejections
3. Students' Profile with results analysis
4. Students' Reports Gender wise
5. Class wise Reports
6. Research Funding Agencies/Research Projects/Research Guides/Ph.D. Registered Students /Ph.D. awarded students.
7. Department, Designation
8. Full-fledged Salary Management System Accounts.
9. Income expenditure Module.
10. Fee Collection Fee Profile
11. Daily Reports on Income
12. Monthly Reports of Income
13. Yearly Reports of Income
14. Income Ledger
10. Bank Reconciliation Other Modules.
11. Infrastructure, ICT Facility
12. Library: Text Books/Reference Books/Research Journals/Software's.
13. Hostel Facility
14. Drinking Water Facility.
15. NSS/NCC/Sports Activities

## Part-B

### **CRITERION I – CURRICULAR ASPECTS**

#### **1.1 Curriculum Planning and Implementation**

1.1.1 Institution has the mechanism for well planned curriculum delivery and documentation. Explain in 500 words

- Our college is affiliated to Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon. The University designs the curriculum and college implements it as per the guidelines of university.
- The university frames syllabus as per the U.G.C. norms and gives guidelines for the completion of the syllabus. University provides some text books and a list of reference books.
- At the beginning of every academic year, the institution refers the academic calendar activities of the University and prepares action plans for various departments and in the staff meeting everything is discussed.
- The teachers prepare annual teaching plan at the beginning of the academic year. The monthly syllabus completion report is submitted to the Head of Department. The periods of teacher are engaged by other members of staff in the department in absence of other members. If the college remains closed because of some unexpected circumstances, the work for that day is planned on the next holiday.
- The university regularly organizes workshops and seminars to revise syllabus and gives guidelines about the curriculum. It further guides the use of new educational technology, ICT in teaching and learning aspects of the curriculum and even newly introduced laboratory techniques through seminars and workshops.
- The board of studies for various subjects is framed by university through the process of election. The board of studies designs the syllabus of their respective subjects. Five faculties are the members of BOS.
- University conducts periodic meetings of board of studies in all subjects ensuring participation of subject teachers from the departments for the purpose of monitoring the present syllabus and for feedback from the subject teachers.
- Though the curriculum is designed and revised by the North Maharashtra University; but for the effective curriculum delivery, following initiatives are taken by the institution.
- The college faculty is trained by the computer department to make them familiar with the use of computers so that they are able to use the modern technological resources like internet, projectors and OHP'S etc. to supplement their class room lectures.
- In addition to the regular subject classes, the college also organizes special lectures by inviting experts from various fields to share their knowledge with the students.
- Student seminars are organized where the students are allowed to make presentations on topics of their interest which are related to the curriculum.
- For topics which have experimental components; students are given practical demonstrations.
- The college arranges educational tours to industries, research institutes, exhibitions and various places for historical importance to provide students a first-hand knowledge of various things

<b>1.1.2 Certificate/ Diploma Courses introduced during the Academic year</b>					
<b>Name of the Certificate Course</b>	<b>Name of the Diploma Courses</b>	<b>Date of introduction and duration</b>	<b>focus on employability/ entrepreneurship</b>	<b>Skill development</b>	
Goods and Service Tax	--	2016-17	--	--	
--	Skill development in English	2018-19	--	--	
<b>1.2 Academic Flexibility</b>					
1.2.1 New programmes/courses introduced during the Academic year					
<b>Programme with Code</b>	<b>Date of Introduction</b>	<b>Course with Code</b>	<b>Date of Introduction</b>		
<b>Nil</b>	<b>Nil</b>	<b>Nil</b>	<b>Nil</b>		
1.2.2 Programmes in which Choice Based Credit System (CBCS)/Elective course system implemented at the affiliated Colleges (if applicable) during the Academic year.					
<b>Name of Programmes adopting CBCS</b>	<b>UG</b>	<b>PG</b>	<b>Date of implementation of CBCS/Elective Course System</b>	<b>UG</b>	<b>PG</b>
B.A., B.Com., B.Sc.	<b>Yes</b>	<b>No</b>	June 2019	<b>2019</b>	
Already adopted (mention the year)					
1.2.3 Students enrolled in Certificate/ Diploma Courses introduced during the year					
	<b>Certificate</b>	<b>Diploma Courses</b>			
No of Students	16	20			
<b>1.3 Curriculum Enrichment</b>					
1.3.1 Value-added courses imparting transferable and life skills offered during the year					
<b>Value added courses</b>	<b>Date of introduction</b>	<b>Number of students enrolled</b>			
Nil	Nil	Nil			
1.3.2 Field Projects / Internships under taken during the year					
<b>Project/Programme Title</b>		<b>No. of students enrolled for Field Projects / Internships</b>			
1. Field trips by Zoology, Botany , Geography & Microbiology Departments 2. Industrial Tour of Chemistry Department		25 (Zoology), 15 (Botany), 20 (Microbiology), 45(Geography)85 (Chemistry)			

## 1.4 Feedback System

1.4.1 Whether structured feedback received from all the stakeholders.

1) Students	2) Teachers	3) Employers	4) Alumni	5) Parents
Yes	Yes	No	Yes	Yes

1.4.2 How the feedback obtained is being analyzed and utilized for overall development of the institution? (maximum 500 words)

The development of any organization, especially a college, depends upon a well-functioning feedback system. It requires a thorough preparation to initiate, launch and implement the feedback system. This college has been practicing the feedback systems accommodating all the stakeholders including students, alumni and parents to help the individuals and organization as a whole to improve the performance and effectiveness of the Institution. Parents are important stake holders of this system. Parent-teacher meeting is periodically conducted in this college and their suggestions are regularly obtained and analysed. The following parameters are accommodated in the feedback: Efficiency of Teaching faculty, Fees Structure, Infrastructure, Library, Environment, Career guidance and Placement.

Feedback on the teaching-learning process is received from students as "Students satisfaction survey" based on a structured questionnaire framed and approved by the IQAC of this college. The questionnaire can be downloaded from the website. The received feedback is then analysed by the IQAC and uploaded to the college website and it is also forwarded to the Head of the institution with necessary suggestions based on this feedback. Teachers provide informal as well as formal feedback to the head of the institution on different academic, administrative and other affairs related to the college. Members of anti-ragging committee and internal complaints committee also receive feedback from students through class campaigns. Grievances and necessary suggestions can be registered to the Grievance Redressal cell of the college through the box fixed in the Principal's office, the cell composition is altered every year at the beginning of academic session. Departments receive feedback from parents through parent teacher meetings and discuss different issues related to the overall development of their ward. The college is planning to introduce online feedback system from the academic session 2019-2020.

<b>CRITERION II -TEACHING-LEARNING AND EVALUATION</b>			
<b>2.1 Student Enrolment and Profile</b>			
<b>2.1. 1 Demand Ratio during the year</b>			
<b>Name of the Programme</b>	<b>Number of seats available</b>	<b>Number of applications received</b>	<b>Students Enrolled</b>
<b>F.Y. B.A.</b>	<b>720</b>		<b>624</b>
<b>S.Y.B.A.</b>	<b>320</b>		<b>295</b>
<b>T.Y.B.A.</b>	<b>220</b>		<b>210</b>
<b>F.Y. B.Com.</b>	<b>520</b>		<b>241</b>
<b>S.Y. B.Com.</b>	<b>520</b>		<b>156</b>
<b>T.Y. B.Com</b>	<b>520</b>		<b>145</b>
<b>F.Y. B.Sc.</b>	<b>320</b>		<b>328</b>
<b>S.Y. B.Sc.</b>	<b>220</b>		<b>208</b>
<b>T.Y. B.Sc.</b>	<b>220</b>		<b>230</b>
<b>M.A. I Marathi</b>	<b>120</b>		<b>96</b>
<b>M.A. -I Hindi</b>	<b>60</b>		<b>50</b>
<b>M.A. -I English</b>	<b>60</b>		<b>57</b>
<b>M.A. -I History</b>	<b>60</b>		<b>87</b>
<b>M.A. -I Economics</b>	<b>60</b>		<b>87</b>
<b>M.A. -I Psychology</b>	<b>20</b>		<b>18</b>
<b>M.A. II Marathi</b>	<b>120</b>		<b>102</b>
<b>M.A. -II Hindi</b>	<b>60</b>		<b>44</b>
<b>M.A. -II English</b>	<b>60</b>		<b>40</b>
<b>M.A. -II History</b>	<b>60</b>		<b>75</b>
<b>M.A. -II Economics</b>	<b>60</b>		<b>51</b>
<b>M.A. -II Psychology</b>	<b>20</b>		<b>14</b>
<b>M.Com.-I</b>	<b>120</b>		<b>160</b>
<b>M.Com.-II</b>	<b>120</b>		<b>118</b>
<b>M.Sc.-I (Organic Chemistry)</b>	<b>30</b>		<b>28</b>
<b>M.Sc.-I Computer Sci.</b>	<b>20</b>		<b>09</b>
<b>M.Sc.-I Physics</b>	<b>18</b>		<b>14</b>
<b>M.Sc.-I Botany</b>	<b>20</b>		<b>02</b>
<b>M.Sc.-I Zoology</b>	<b>20</b>		<b>16</b>
<b>M.Sc.-I Mathematics</b>	<b>20</b>		<b>16</b>

<b>M.Sc.-I Geography</b>	<b>18</b>	<b>08</b>
<b>M.Sc.-II (Organic Chemistry)</b>	<b>30</b>	<b>29</b>
<b>M.Sc.-II Computer Sci.</b>	<b>20</b>	<b>15</b>
<b>M.Sc.-II Physics</b>	<b>18</b>	<b>24</b>
<b>M.Sc.-II Botany</b>	<b>20</b>	<b>10</b>
<b>M.Sc.-II Zoology</b>	<b>20</b>	<b>11</b>
<b>M.Sc.-II Mathematics</b>	<b>20</b>	<b>27</b>
<b>M.Sc.-II Geography</b>	<b>18</b>	<b>10</b>
<b>Total:</b>		<b>3655</b>

2.2.1. Student - Full time teacher ratio (current year data)

Year	Number of students enrolled in the institution (UG)	Number of students enrolled in the institution (PG)	Number of full time teachers available in the institution teaching only UG courses	Number of full time teachers available in the institution teaching only PG courses	Number of teachers teaching both UG and PG courses
2018-19	B.A. : 1124	M.A. : 721	12	--	24
	B.Com.: 542	M.Com. : 281	--	--	08
	B.Sc. : 766	M.Sc.(Self Financed) : 219	16	10 (Non Grant)	--
<b>Total</b>	<b>2432</b>	<b>1221</b>	<b>28</b>	<b>10</b>	<b>32</b>

2.3 Teaching - Learning Process

2.3.1 Percentage of teachers using ICT for effective teaching with Learning Management Systems (LMS), E-learning resources etc. (current year data)

Number of teachers on roll	Number of teachers using ICT (LMS, e-Resources)	ICT tools and resources available	Number of ICT enabled classrooms	Number of smart classrooms	E-resources and techniques used
60	30	08	01	02	

### 2.3.2 Students mentoring system available in the institution? Give details. (maximum 500 words)

1. Students Mentoring systems was implemented in the institution where in Students were mentored by one teacher who were counselling, guiding and making efforts to improve students' academic, as well as non-academic performance and in turn parents were informed regarding the Student's progress.
2. G.T.P. College has a strong mentoring system in place where students have the opportunity to develop a relationship with a faculty member who can become a role model for the student by offering support and counselling. It is a particular form of relationship designed to provide personal and professional support to an individual. The mentor's role is to help the mentee strengthen their ability, recognize their skills, abilities, and interests, and assist them in thinking through and accomplishing long-term goals. The mentorship program is for all the students in general, and the first year students, in particular. The mentor not only helps the newcomers in settling in the institution, but also solves their academic and personal problems while on campus. Mentors meet their mentees on a weekly basis which is incorporated in their academic time table. During this meeting the mentors interact with their mentees to discuss their needs or support required. Further, a quarterly meeting also takes place of all the mentors with the Vice- Principal and the Principal of the institution to update them on the student progress and to discuss issues, if any. In the last academic year, we had some problems that the mentees had encountered, for which the potential strategies were formulated and were resolved.
3. Each student of GTPC is attached to faculty mentors for personal guidance, career advancement and development. Faculty members continue to be the mentors with the students allocated to them for their entire stay at GTPC. Every faculty member is expected to create a rapport with the student mentee, encourage her to ask questions, attempt to clarify doubts and facilitate counselling on different issues. The essence of mentorship is a sustained human relationship; a one to one developmental relationship that ensures a student that he is a valued person. A mentor is expected to focus on the mentee's holistic development by guiding her in areas like academics, comprehensive viva, comprehensive projects/dissertation, career choices, final placements etc
4. The institution has well-defined students mentoring system at all levels i.e. undergraduate and postgraduate level wherein individual attention is being provided to each and every student. Faculty Members are nominated by the College to be section-wise mentors. Students are divided into groups and each group is allocated a separate faculty member to look into the students grievances. Students can seek advice of their allocated faculty not only in the field of education but also towards their career progression and future endeavours. Orientation programmes and regular workshops are also conducted in order to sensitize the students about the various aspects of the College. In addition, the tutorial system where faculty members interact with a small group of students (normally 10-12 students per group) ensures one-to-one academic interaction and informal mentoring as well.

<b>Number of students enrolled in the institution</b>	<b>Number of fulltime teachers</b>	<b>Mentor: Mentee Ratio</b>
<b>3653</b>	<b>61</b>	<b>1:60</b>

## 2.4 Teacher Profile and Quality

### 2.4.1 Number of full time teachers appointed during the year

<b>No. of sanctioned positions</b>	<b>No. of filled positions</b>	<b>Vacant positions</b>	<b>Positions filled during the current year</b>	<b>No. of faculty with Ph.D</b>
<b>93</b>	<b>61</b>	<b>22</b>	<b>10</b>	<b>33</b>

### 2.4.2 Honours and recognitions received by teachers

*(received awards, recognition, fellowships at State, National, International level from Government, recognised bodies during the year )*

<b>Year of award</b>	<b>Name of full time teachers receiving awards from state level, national level, international level</b>	<b>Designation</b>	<b>Name of the award, fellowship, received from Government or recognized bodies</b>

## 2.5 Evaluation Process and Reforms

2.5.1 Number of days from the date of semester-end/ year- end examination till the declaration of results during the year

<b>Program me Name</b>	<b>Programe Code</b>	<b>Semester/ year</b>	<b>Last date of the last semester-end/ year-end examination</b>	<b>Date of declaration of results of semester-end/ year- end examination</b>
B.A./ B.Com./ B.Sc.		Semester I/ Semester-III/ Semester-V	30 November 2018	After 45 days of examination
B.A./ B.Com./ B.Sc.		SemesterII/ Semester-IV/ Semester-VI	30 April 2019	After 45 days of examination
M.A./M.C om./M.Sc		Semester -I/ Semester-III	10 December 2018	After 45 days of examination
M.A./M.C om./M.Sc		Semester -II/ Semester-IV	10 May 2019	After 45 days of examination



**2.5.2 Reforms initiated on Continuous Internal Evaluation(CIE) system at the institutional level (250 words)**

G.T.P. College is a college affiliated to the KBC NMU University Jalgaon and adheres to the syllabus laid down by the KBC North Maharashtra University, Jalgaon. We follow number of guidelines and methods to carry out a continuous internal evaluation system at the institutional level. This allows the students to understand each concept individually as well. After each topic is taught in detail, various assessments in the form of class tests, tutorials, seminars, poster presentations are conducted. Teachers take a detailed discussion about the topic as per the university question format and gives the students a clear understanding of what to expect. Students are made aware of the evaluation process by orientation program at the beginning of the course, an academic calendar with the continuous internal evaluation (CIE) dates displayed on the college as well as department notice boards. These tests allow the teachers to continuously assess the students to track their progress and to identify slow and advanced learners. Evaluation is done both in theory and practical examinations. The assessment remains impartial and accurate. The performance of the students is monitored by the Head of Department and the necessary feedback is given to the Principal and concerned faculty members. The Principal conducts review meetings department wise to discuss the improvement of students" performance. Remedial Classes are conducted for the slow learners, absentees and the students who participate in sports and extracurricular activities

**2.5.3 Academic calendar prepared and adhered for conduct of Examination and other related matters (250 words)**

The college prepares academic calendar at the beginning of the year which captures the important dates like start and end of the session. The academic calendar is also distributed among all teaching & non-teaching staff of the college. The academic calendar includes the academic activities at the college level. The draft calendar is discussed in HOD's meeting and all the suggestions which are approved in the meeting is incorporated before releasing the calendar to all departments by the principal. All the internal assessment tests are conducted centrally as per the academic calendar. Formative and summative feedback is administered as per the schedule.

The academic calendar contains the yearly schedule of the college ranging from the list of holidays (national level holidays, state level holidays, local holidays and the institutional holidays), date schedule of the college examinations and other forms of evaluation such as evaluation through performance in Departmental seminar presentation etc. The tentative dates of publication of college results are also mentioned in the academic calendar. The tentative dates of activities of NSS, NCC. Schedule of other activities such as Parent-teacher meeting, College social and other cultural programmes, College sports etc are also provided in the academic calendar.

## 2.6 Student Performance and Learning Outcomes

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the institution are stated and displayed in website of the institution (to provide the web link)

1. The College has clearly stated learning outcomes of the Programs and Courses. The Following mechanism is followed by the institution to communicate the learning outcomes to the teachers and students.
2. Hard Copy of syllabi and Learning Outcomes are available in the departments for ready reference to the teachers and students.
3. Learning Outcomes of the Programs and Courses are displayed on the walls outside each department.
4. Soft Copy of Curriculum available on University website [http://www.nmu.ac.in/Student Corner/Academics /Syllabi.aspx](http://www.nmu.ac.in/StudentCorner/Academics/Syllabi.aspx).  
and Learning Outcomes of Programs and Courses are uploaded to the college website.  
Web link: <http://www.ntvsgtpcollege.org/>

### 2.6.2 Pass percentage of students

Programme Code	Programme name	Number of students appeared in the final year examination	Number of students passed in final semester/ year examination	Pass Percentage
	T.Y. B.A. Marathi	24	21	87.05
	T.Y. B.A. Defence Studies	19	18	94.7
	T.Y. B.A. English	14	12	85.7
	T.Y. B.A. Political Science	32	32	100
	T.Y. B.A. Hindi	15	12	80
	T.Y. B.A. History	22	17	70.58
	T.Y. B.A. Economics	38	31	81.5
	T.Y. B.A. Psychology	06	06	100
	T.Y. B.A. Geography	25	18	72
	T.Y.B.Com	143	99	69
	T.Y. B.Sc. Chemistry	99	57	57.57
	T.Y. B.Sc. Botany	27	25	92.48
	T.Y. B. Sc. Zoology	31	18	58.06
	T.Y. B.Sc. Micro	20	14	70
	T.Y. B.Sc. Physics	05	05	100

	T.Y. B.Sc. Electronics	--	--	--
	T.Y. B.Sc. Computer Science	19	08	42
	T.Y. B.Sc. Maths	24	13	52
<b>PG</b>				
	M.A.-I History	80	69	86.25
	M.A.-I Marathi	96	85	88.54
	M.A.-I English	46	27	58.7
	M.A.-I Hindi	53	33	55.93
	M.A.-I Psychology	18	15	83.33
	M.A.-I Economics	76	70	92
	M.A.-II History	72	48	66.66
	M.A.-II Marathi	103	76	83.51
	M.A.-II English	31	20	64.5
	M.A.-II Hindi	40	26	65
	M.A.-II Psychology	14	12	85.71
	M.A.-II Economics	47	32	68
	M.Com.-I	144	138	96
	M.Com.-II	113	53	47
	M.Sc.-I Chemistry	29	10	34.5
	M.Sc.-I Physics	14	01	7.14
	M.Sc.-I Maths	12	04	33.33
	M.Sc.-I Botany	02	01	50
	M.Sc.-I Zoology	16	11	68.75
	M.Sc.-I Geography	09	07	77.78
	M.Sc.-I Computer Science	09	03	33
	M.Sc.-II Chemistry	28	08	58.57
	M.Sc.-II Physics	24	02	8.33
	M.Sc.-II Maths	20	04	20
	M.Sc.-II Botany	09	06	66.66
	M.Sc.-II Zoology	11	08	72.72
	M.Sc.-II Geography	08	06	75
	M.Sc.-II Computer Science	14	07	50

## 2.7 Student Satisfaction Survey

2.7.1 Student Satisfaction Survey (SSS) on overall institutional performance (Institution may design the questionnaire) (results and details be provided as weblink)

[http://www.ntvsgtpcollege.org/uploads/Student\\_Feedback.pdf](http://www.ntvsgtpcollege.org/uploads/Student_Feedback.pdf)

## CRITERION III – RESEARCH, INNOVATIONS AND EXTENSION

### 3.1 Resource Mobilization for Research

3.1.1 Research funds sanctioned and received from various agencies, industry and other organisations

Nature of the Project	Duration	Name of the funding Agency	Total grant sanctioned	Amount received during the Academic year
Major projects				
Minor Projects	02	UGC-WRO Pune	125000/-	
Interdisciplinary Projects				
Industry sponsored Projects				
Projects sponsored by the University/ College	01	VCRMS	35,000/-	
Students Research Projects ( <i>other than compulsory by the College</i> )				
International Projects				
Any other(Specify)				
<b>Total</b>	<b>03</b>		<b>160,000/-</b>	

### 3.2 Innovation Ecosystem

3.2.1 Workshops/Seminars Conducted on Intellectual Property Rights (IPR) and Industry-Academia Innovative practices during the year

Title of Workshop/ Seminar	Name of the Dept.	Date(s)
Workshop on Global Skills	English	05 to 07 Feb. 2019
Green Synthesis of Nano materials and their applications	Chemistry	09 Feb. 2019

3.2.2 Awards for Innovation won by Institution/Teachers/Research scholars/Students during the year

Title of the innovation	Name of the Awardee	Awarding Agency	Date of Award	Category

3.2.3 No. of Incubation centre created, start-ups incubated on campus during the year

Incubation Centre	Name	Sponsored by

Name of the Start-up	Nature of Start-up	Date of commencement

### 3.3 Research Publications and Awards

3.3.1 Incentive to the teachers who receive recognition/awards

State	National	International

3.3.2 Ph. Ds awarded during the year (*applicable for PG College, Research Center*)

Name of the Department	No. of Ph. Ds Awarded
Chemistry	02
Commerce	01
History	01
Marathi	01

3.3.3 Research Publications in the Journals notified on UGC website during the year

	Department	No. of Publication	Average Impact Factor, if any
National	Commerce	06	0.1-5
National	Physics	07	0.1-5
International	Physics	02	0.1-5
International	Chemistry	15	0.1-5
National	Chemistry	05	0.1-5
National	Computer Sci.	01	0.1-5
International	Geography	02	0.1-5

National	Geography	06	0.1-5
National	Politics	02	0.1-5
National	Hindi	12	0.1-5
National	English	07	0.1-5
National	Marathi	08	0.1-5
International	Defence	03	0.1-5
National	Economics	12	0.1-5
International		02	0.1-5
National	Sports	01	0.1-5
International		02	0.1-5

03

3.3.4 Books and Chapters in edited Volumes / Books published, and papers in National/ International Conference Proceedings per Teacher during the year

Department	No. of publication
Chemistry	07
Commerce	06
Economics	01
Marathi	02
Hindi	02
History	03
Electronics	01
Physics	01

3.3.5 Bibliometrics of the publications during the last Academic year based on average citation index in Scopus/ Web of Science or Pub Med/ Indian Citation Index

Title of the paper	Name of the author	Title of the journal	Year of publication	Citation Index	Institutional affiliation as mentioned in the publication	Number of citations excluding self-citations

3.3.6 h-index of the Institutional Publications during the year. (based on Scopus/ Web of science)

Title of the paper	Name of the author	Title of the journal	Year of publication	h-index	Number of citations excluding self citations	Institutional affiliation as mentioned in the publication

3.3.7 Faculty participation in Seminars/Conferences and Symposia during the year :

No. of Faculty	International level	National level	State level	Local level
Attended Seminars/ Workshops	05	60	11	18
Presented papers	02	29	03	04
Resource Persons	--	--	01	04

**3.4 Extension Activities**

3.4.1 Number of extension and outreach programmes conducted in collaboration with industry, community and Non- Government Organisations through NSS/NCC/Red cross/Youth Red Cross (YRC) etc., during the year

Title of the Activities	Organising unit/ agency/ collaborating agency	Number of teachers co-ordinated such activities	Number of students participated in such activities
District Youth Parliament	NSS	5	74
International Day of Yoga	NCC	5	44
Anti-Plastic Rally	NCC	10	53
Awareness camp on Watershed Management	NSS	7	100
MahaRally on Swachh Bharat in Collaboration	NSS and NCC	10	154
NCC Day	NCC	10	54
Tree Plantation	Unnat Bharat Abhiyaan Committee	10	50

3.4.2 Awards and recognition received for extension activities from Government and other recognized bodies during the year

<b>Name of the Activity</b>	<b>Award/recognition</b>	<b>Awarding bodies</b>	<b>No. of Students benefited</b>
University Merit	Gold Medal at TYBCOM in Commerce Faculty Kanse Ankita Shankarrao	1. The institute of Chartered Accountant of India 2. Late Babulalji Chaube (KBC NMU Jalgaon )	<b>01</b>
University Merit	Silver Medal at TYBSC (Microbiology) in Science Faculty Agnihotri Neha Narendra	KBC NMU Jalgaon	<b>01</b>
University Merit	Bronz Medal at TYBA in Defence Studies	KBC NMU Jalgaon	<b>01</b>
CATC – Sports and Cultural Activity	18 Gold Medals to NCC cadets (20/6/18 to 29/6/18)	49 MH Battalion NCC, Amalner	<b>10</b>
Sports at Inter-University Competitions	Cricket, Hockey, Handball, Floorball, Kho-Kho etc	KBC NMU Jalgaon	<b>20</b>
CATC – Sports and Cultural Activity	07 Gold Medals to NCC cadets (17/6/18 to 27/6/18)	48 MH Battalion NCC Dhule	<b>06</b>

3.4.3 Students participating in extension activities with Government Organisations, Non-Government Organisations and programmes such as Swachh Bharat, Aids Awareness, Gender Issue, etc. during the year

<b>Name of the scheme</b>	<b>Organising unit/agency /collaborating agency</b>	<b>Name of the activity</b>	<b>Number of teachers coordinated such activities</b>	<b>Number of students participated in such activities</b>
Swachh Bharat	NCC	Anti-Plastic	10	53
Swachh Bharat Abhiyan	Central Ministry of Youth Affairs	MahaRally on Swachh Bharat in Collaboration	10	85
Mahhatma Gandhi Swacchata week	KBC NMU, Jalgaon	Swacchata Abhiyan	10	85



<b>3.5 Collaborations</b>				
3.5.1 Number of Collaborative activities for research, faculty exchange, student exchange during the year				
<b>Nature of Activity</b>	<b>Participant</b>	<b>Source of financial support</b>	<b>Duration</b>	
3.5.2 Linkages with institutions/industries for internship, on-the-job training, project work, sharing of research facilities etc. during the year				
<b>Nature of linkage</b>	<b>Title of the linkage</b>	<b>Name of the partnering institution/industry /research lab with contact details</b>	<b>Duration (From-To)</b>	<b>participant</b>
3.5.3 MoUs signed with institutions of national, international importance, other universities, industries, corporate houses etc. during the year				
<b>Organisation</b>	<b>Date of MoU signed</b>	<b>Purpose and Activities</b>	<b>Number of students/teachers participated under Mo Us</b>	
<b>CRITERION IV – INFRASTRUCTURE AND LEARNING RESOURCES</b>				
<b>4.1 Physical Facilities</b>				
4.1.1 Budget allocation, excluding salary for infrastructure augmentation during the year				
<b>Budget allocated for infrastructure augmentation</b>		<b>Budget utilized for infrastructure development</b>		
4.1.2 Details of augmentation in infrastructure facilities during the year				
<b>Facilities</b>		<b>Existing</b>	<b>Newly added</b>	
Campus area		29.49 Acre		
Class rooms		29		
Laboratories		17		
Seminar Halls		01		
Classrooms with LCD facilities		02		
Classrooms with Wi-Fi/ LAN		02		
Seminar halls with ICT facilities		01		
Video Centre		--		

No. of important equipments purchased ( $\geq$ 1-0 lakh) during the current year.						
Value of the equipment purchased during the year (Rs. in Lakhs)						
Others						
<b>4.2 Library as a Learning Resource</b>						
4.2.1 Library is automated {Integrated Library Management System -ILMS }						
<b>Name of the ILMS software</b>	<b>Nature of automation (fully or partially)</b>	<b>Version</b>	<b>Year of automation</b>			
Library Manager	Partially	2.0	2011			
4.2.1 Library Services:						
	Existing		Newly added	Total		
	No.	Value	No.	Value	No.	Value
Text Books	4800	510300	128 0	142000	5380	572360 5
Reference Books	6200	181250 0	260	127830	6460	1940330
e-Books	N-list	5900	N- list	5900	--	--
Journals	58	20440	56	21216	--	--
e-Journals	N-list	5900	N- list	5900		
Digital Database	N-list	--	--	--	--	--
CD & Video	200	--	12	--	212	
Library automation						
Weeding (Hard & Soft)	--	--	700	79940		
Others (specify)						

<b>4.3 IT Infrastructure</b>									
4.3.1 Technology Upgradation (overall)									
	Total Computers	Computer Labs	Internet	Browsing Centres	Computer Centres	Office	Departments	Available band width (MGBPS)	Others
Existing	75	05	Yes	01	01	01	08	100MBPS	--
Added									
Total									
4.3.2 Bandwidth available of internet connection in the Institution (Leased line)									
100 MBPS									
4.3.3 Facility for e-content									
Name of the e-content development facility					Provide the link of the videos and media centre and recording facility				
-----					----				
4.3.4 E-content developed by teachers such as: e-PG-Pathshala, CEC (under e-PG-Pathshala CEC (Under Graduate) SWAYAM other MOOCs platform NPTEL/NMEICT/any other Government initiatives & institutional (Learning Management System (LMS) etc									
Name of the teacher	Name of the module			Platform on which module is developed			Date of launching e - content		
---	---			---			---		
<b>4.4 Maintenance of Campus Infrastructure</b>									
4.4.1 Expenditure incurred on maintenance of physical facilities and academic support facilities, excluding salary component, during the year									
Assigned budget on academic facilities		Expenditure incurred on maintenance of academic facilities			Assigned budget on physical facilities		Expenditure incurred on maintenance of physical facilities		
25,00000		23,00000			15,00000		1505000		

4.4.2 Procedures and policies for maintaining and utilizing physical, academic and support facilities - laboratory, library, sports complex, computers, classrooms etc. (*maximum 500 words*) (information to be available in institutional Website, provide link)

[http://www.ntvsgtpcollege.org/uploads/soisuvidha\\_Format\\_Committee\\_2014.pdf](http://www.ntvsgtpcollege.org/uploads/soisuvidha_Format_Committee_2014.pdf)

The primary responsibility of the College for developing the College infrastructure within the permission of Governing Body of the College. Under its direction the College Administration avails funds from the University Grants Commission and other Agencies by which the necessary developmental works are done. In terms of the College Library, books are arranged in simple but systematic manner to help the user locate the books easily. Information regarding the arrival of new resources are circulated to all the departments and also posted on the notice board as part of the Current Awareness Service. In order to provide speedy and efficient service, library cards are issued to the students. Periodic upgradation of books and journals are done according to the needs of the students and faculties of various departments. Recognizing the importance of IT as a complementary process in education the College is committed to upgrading its IT infrastructure and associated facilities on a regular basis. The purchase of hardware and upgradation of software is needbased. The College administration in coordination with the ICT Committee makes plans and decides on strategies regarding this matter.

#### **CRITERION V - STUDENT SUPPORT AND PROGRESSION**

##### **5.1 Student Support**

##### **5.1.1 Scholarships and Financial Support**

	<b>Name /Title of the scheme</b>	<b>Number of students</b>	<b>Amount in Rupees</b>
Financial support from institution			
Financial support from other sources			
a) National	EBC Scholarship	144	233200/-
National	SC GOI Scholarship	98	603378/-
National	SC Freeship Scholarship	14	27003/-
National	ST GOI Scholarship	1082	1188372/-
National	ST Freeship Scholarship	09	3600/-
National	NT Scholarship	126	400075/-
National	NT Freeship Scholarship	17	22265/-
National	OBC Scholarship	497	1974455/-
National	OBC Freeship Scholarship	63	77545/-
National	SBC Scholarship	13	19725/-
National	SBC Freeship Scholarship	05	2500/-
National	Minority Scholarship	02	4700/-
b) International	--	--	--

5.1.2 Number of capability enhancement and development schemes such as Soft skill development, Remedial coaching, Language lab, Bridge courses, Yoga, Meditation, Personal Counselling and Mentoring etc.,

Name of the capability enhancement scheme	Date of implementation	Number of students enrolled	Agencies involved
Yoga ,Meditation	21/06/2018	500	G.T.P. College
Soft Skill Development	05-07 Feb	45	G.T.P. College
Remedial coaching	15 August to 15 Sept.	85	G.T.P. College
Bridge courses	01 August to 30 August 2018	99	G.T.P. College
Personal Counselling and Mentoring	Academic year	60 Students per faculty	G.T.P. College
Phonological development of Students	18 to 20 Feb. 2019	40	G.T.P. College
Communication skill development program in language lab.	01/12/2018	50	Department of English G.T.P. College

5.1.3 Students benefited by guidance for competitive examinations and career counselling offered by the institution during the year

Year	Name of the scheme	Number of benefited students by Guidance for Competitive examination	Number of benefited students by Career Counselling activities	Number of students who have passed in the competitive exam	Number of students placed
2018-19	NET SET Coaching Classes	50	--	03	--
2018-19	Carrier Counselling Scheme of State Gov.	--	100	--	--

5.1.4 Institutional mechanism for transparency, timely redressal of student grievances, Prevention of sexual harassment and ragging cases during the year

Total grievances received	No. of grievances redressed	Average number of days for grievance redressal

<b>5.2 Student Progression</b>					
5.2.1 Details of campus placement during the year					
<b>On campus</b>			<b>Off Campus</b>		
<b>Name of Organizations Visited</b>	<b>Number of Students Participated</b>	<b>Number of Students Placed</b>	<b>Name of Organizations Visited</b>	<b>Number of Students Participated</b>	<b>Number of Students Placed</b>
5.2.2 Student progression to higher education in percentage during the year					
<b>Year</b>	<b>Number of students enrolling into higher education</b>	<b>Programme graduated from</b>	<b>Department graduated from</b>	<b>Name of institution joined</b>	<b>Name of Programme admitted to</b>
5.2.3 Students qualifying in state/ national/ international level examinations during the year (eg: NET/SET/SLET/GATE/GMAT/CAT/GRE/TOFEL/Civil Services/State Government Services)					
<b>Items</b>		<b>No. of Students selected/ qualifying</b>	<b>Registration number/roll number for the exam</b>		
NET		01	521425		
SET		02	801858,118346		
SLET					
GATE					
GMAT					
CAT					
GRE					
TOFEL					
Civil Services					
State Government Services					
Any Other					

5.2.4 Sports and cultural activities / competitions organised at the institution level during the year		
Activity	Level	Participants
Kho-Kho	Intercollege	12
Hockey	Intercollege	21
Football	Intercollege	16
Badminton	Intercollege	06
Basketball	Intercollege	12
Handball	Intercollege	12
Cricket	Intercollege	16
Yoga	Intercollege	01
Floorball	Intercollege	12
Rugby	Intercollege	12
Chess	Intercollege	05
Wrestling	Intercollege	04
Cross-country	Intercollege	10
Athletic	Intercollege	19
Football	Interdivisional	04
Hockey	Interdivisional	08
Athletics	Interdivisional	08
Kho-Kho	Interdivisional	03
Handball	Interdivisional	03
Basketball	Interdivisional	04
Badminton	Interdivisional	02
Chess	Interdivisional	01
Cross-country	Interdivisional	02
Yoga	Interdivisional	01
Kusti	Interdivisional	01
Volleyball	Interdivisional	01
Cricket	Interdivisional	06
Rugby	Interdivisional	06
Floorball	Interdivisional	02

### 5.3 Student Participation and Activities

5.3.1 Number of awards/medals for outstanding performance in sports/cultural activities at national/international level (award for a team event should be counted as one)

Year	Name of the award/ medal	National/ International	Sports	Cultural	Student ID number	Name of the student
2018-19	Gold Medal	District		Group Dance		Group
2018-19	Silver Medal	District		Folk Song		Mr. Bhavsar Darshan C.
2018-19	Gold Medal	District		Poem		Mr. Kamlesh Mahale
2018-19	Silver Medal	District		Classical Vocal		Miss. Hiral Chavhan
2018-19	Silver Medal	District		Classical Vocal		
2018-19	Silver Medal	District		Classical Dance		Group
2018-19	Silver Medal	District		Vidamban Natya		Group
2018-19	Bronze Medal	District		Debate		Miss. Rohini Patil and Miss., Kalyani Kalkate
2018-19	Silver Medal	University		Poem		Mr. Kamlesh Mahale
2018-19	First Prize	Intercollege	Rugby (Boys)			Group
2018-19	First Prize	Intercollege	Cricket			Group
2018-19	First Prize	Intercollege	Handball			Group
2018-19	First Prize	Intercollege	Hockey			Group
2018-19	Second Prize	Intercollege	Football			Group
2018-19	First Prize	Intercollege	Hockey			Group
2018-19	Second Prize	Intercollege	Athletics			Group
2018-19	Second Prize	Intercollege	Kho-Kho			Group
2018-19	Third Prize	Intercollege	Handball			Group
2018-19	Second Prize	Intercollege	Basketball			Group



<p>4.3.2 Activity of Student Council &amp; representation of students on academic &amp; administrative bodies/committees of the institution (maximum 500 words)</p> <ul style="list-style-type: none"> <li>• Yes, the college has students' Council. The council is constituted as per the directives of KBC North Maharashtra University, Jalgaon. The council consists of 15 members as office bearer: i) Principal of the college ii) One senior teacher nominated by the Principal. iii) National Service Scheme Program Officer. iv) One student from each class who has shown academic merit at the preceding qualifying examination and who is engaged in full time studies in the college to be nominated by the Principal. v) Director of Sports and Physical Education. Council Activities: i) The member of class representative act for running the day to day affairs of the college. ii) The council plays a major role in the organization of Annual Day, NSS Camp, Teachers Day, Sports Day, Literary Events, Publication of the annual college magazine, Drama/Debate Committee, Cultural Committee Admission processes. The Council helps in organizing Annual Gathering, blood donation camp, eye check-up camp, health check-up camp once in the year in the college. The Council also assists in conducting awareness campaigns rally, environment consciousness rally and Swacch Bharat Abhiyan Rally on 2nd Oct every year. Moreover, in all decision making bodies the student representatives hold a good position and also participate in any decision making in the curricular and curricular activities. In IQAC the students' member plays a pivotal role. In Grievance cell, Anti ragging cell all decisions are taken while keeping their views in mind. The Institute holds national and international conferences where the participation of students is praiseworthy.</li> <li>• The students representative are nominated as the members of different academic administrative bodies/committees of the institution • Gymkhana • Students Council • Internal Complaint Committee • Library Advisory Committee • NAAC IQAC • Canteen Committee • N.S.S. • Environment Protection Cell ENACT (Green Practices Green Budgeting) • Social Activity Cell • Grievance redressal cell</li> </ul>
<p><b>5.3 Alumni Engagement</b></p>
<p>5.3.1 Whether the institution has registered Alumni Association? Yes/No, if yes give details (maximum 500 words):</p>
<p>No</p>
<p>5.3.2 No. of registered enrolled Alumni:</p>
<p>No Data Entered/Not Applicable !!!</p>
<p>5.3.3 Alumni contribution during the year (in Rupees) :</p>
<p>No Data Entered/Not Applicable !!!</p>
<p>5.3.4 Meetings/activities organized by Alumni Association :</p>
<p>No Data Entered/Not Applicable !!!</p>

## CRITERION VI –GOVERNANCE, LEADERSHIP AND MANAGEMENT

### 6.1 Institutional Vision and Leadership

6.1.1 Mention two practices of decentralization and participative management during the last year (maximum 500 words)

The college practices day to day decentralization and participative management. Following sequence of operations related to decentralization of power and the institution follows participative management:

The following highlight the extent of participative management practiced in the institution:

1. The governing body, the advisory committee, finance committee, examination committee, local management committee/CDC constituted as per the UGC norms for college are made functional.
2. The principal takes policy decisions in consultation with the college development council/local management committee and vice principals and looks after the overall administration.
3. Heads of different committees looks after the admission process, student issues and teaching learning process, maintenance of amenities, discipline and campus cleanliness and assist the principal in administrative matters.
4. The HoDs are entrusted with the responsibility of workload allocation, preparation of timetable, monitoring attendance of faculties and students, execution of teaching learning, demonstration and practical work, evaluation of academic contribution of faculty and progress of students. Procurement of Departmental requirements are done through the HoDs as per the norms of purchase committee and they assist the principal in administration.
5. There are different Committees such as prospectus committee, website management committee, staff grievance redressal committee, antiragging committee, women empowerment committee, research committee, NSS, IQAC are some of the forms where faculty get involved in the planning and execution of the cocurricular and extracurricular activities of the institution.
6. The IQAC cell arranges the meeting of QAC and monitors QA issue and sustenance of quality in academic matters.
7. IQAC also promotes quality enhancement measures in the college. An independent placement officer looks after the campus interview in and outside the campus and placements through placement cell.
8. Taking in to account the demand made by students, teachers, departmental heads, support unit in charge and office, the principal seeks the requirement from concerned heads by giving them notice for remaining stalk verification and submission of report to office. After evaluating the necessity of requirements, the list of requirement is finalized. The consolidated requirement of all departments is placed before the purchase committee consisting of the representative of management, principal, office superintendent and senior teachers for the approval.

6.1.2 Does the institution have a Management Information System (MIS)?

Yes/No/Partial: **Yes Partial**

## 6.2 Strategy Development and Deployment

6.2.1 Quality improvement strategies adopted by the institution for each of the following (with in 100 words each):

❖ **Curriculum Development :** For the smooth flow of the syllabus, teachers are made to submit their lesson plan for every semester. The IQAC ensures quality in Curriculum development through regular meetings among the teaching staff regarding academic affairs and collecting feedback from various stakeholders.

❖ **Teaching and Learning :** Educational excursion, field work and industrial visits are also part of the evaluation system. Enhancement of learning skills of the Students through participation in different seminars. Regular feedback is obtained from students for improving teaching learning method.

❖ **Examination and Evaluation** the College follows the semester system as per the directives of the KBC NMU, Jalgaon. The College also complemented continuous assessment of student's performance through internal test, assignments, project works, attendance, seminars, end semester exam, etc. with the traditional written examination. The external evaluation process is done in accordance to the performance of the students during the end semester exam.

❖ **Research and Development :** To enhance the teaching quality the teaching faculty were constantly motivated to take up research work and the management provided the facility of a research budget of up to Rs.1 lakh. As per of the fulfilment of the research activity all the departments of the College successfully accomplished a minor research each during the year 2018. Encouraging Faculties to take Ph.D.

❖ **Library, ICT and Physical Infrastructure / Instrumentation Library:** The library is equipped with Digital library facilities NLIST also national and international journals are provided. Circulations are maintained through Integrated Library Management Software(ILMS). The College library is enabled with free WiFi facility of 100 mbps for the use of eresources within the campus. New books are added every year for the requirement of teaching learning process. ICT: Usage of teaching and learning process LCD projectors are installed in Audio Visual Room and Conference Hall. Procurement of more LCD projector and laptop for the same purpose. Physical Infrastructure: More fans were installed and the conventional blackboards were replaced with whiteboards, a water cooler was procured.

❖ **Human Resource Management :** All human resources available within the College is deployed and engaged according to one's aptitude and abilities. Maintenance of Grievance Redressal Cell, AntiRagging Committee, Sexual Harassment Committee.

❖ **Industry Interaction / Collaboration**

❖ **Admission of Students:** The Principal of the College along with the admission committee carry out the admission process. Financial help is offered through the flexibility in payment of fees in easy instalments for the needy students. Economically poor students are provided with free admission by the College authority. The students are guided to opt for right choice of subject combination at the time of admission.

6.2.2 : Implementation of e-governance in areas of operations:					
❖ Planning and Development : Implemented SMS system for dissemination of information including regular notice to all stakeholders.					
❖ Administration Computerised system					
❖ Finance and Accounts : The accounts of the College are maintained under cash basis of accounting. Fees are collected manually which maintain records of students' receipts and profile account. Daily cash collection and payment reports are recorded in the cash book later which is posted to various ledgers. Class wise fees receivable and the actual fees received are reconciled after every semester. Staff salary along with their profile is maintained in the system.					
❖ Student Admission and Support					
❖ Examination					
<b>6.3 Faculty Empowerment Strategies</b>					
6.3.1 Teachers provided with financial support to attend conferences / workshops and towards membership fee of professional bodies during the year					
Year	Name of teacher	Name of conference/ workshop attended for which financial support provided	Name of the professional body for which membership fee is provided	Amount of support	
6.3.2 Number of professional development / administrative training programmes organized by the College for teaching and non teaching staff during the year					
Year	Title of the professional development programme organised for teaching staff	Title of the administrative training programme organised for non-teaching staff	Dates (from-to)	No. of participants (Teaching staff)	No. of participants (Non-teaching staff)

6.3.3 No. of teachers attending professional development programmes, viz., Orientation Programme, Refresher Course, Short Term Course, Faculty Development Programmes during the year

<b>Title of the professional development programme</b>	<b>Number of teachers who attended</b>	<b>Date and Duration (from – to)</b>
<b>Refresher Course</b>	<b>06</b>	
	Dr. P. K. Gautam	01/12/2018 to 21/12/2018
	Dr. M.R. Patil	03/03/2019 to 20/03/2019
	Dr. V. G. Somkuwar	23/07/2018 to 17/08/2018
	Mr. A.D. Akhade	30/03/2019 (SWAYAM)
	Dr. V.Z. Chaudhari	29/10/2018 to 18/11/2018
	Dr. A.R. Bhuyar	08/02/2019 to 28/02/2019
<b>Faculty Development Programmes</b>	<b>02</b>	
	Mrs. S. B. Pimpare	19/12/2018 to 25/12/2018
	Mrs. S. B. Pimpare	09/01/2019 to 15/01/2019

6.3.4 Faculty and Staff recruitment (no. for permanent/fulltime recruitment):

Teaching		Non-teaching		T e m p o r a r y
Permanent	Fulltime	Permanent	Fulltime	
61	61	64	64	

6.3.5 Welfare schemes for

Teaching	Employee provident fund and staff welfare fund facilities, G.T. Patil Co-Operative Society
Non teaching	E.P.F. facility and staff welfare fund facility, G.T. Patil Co-Operative Society
Students	Different Scholarships of state government for the students

#### 6.4 Financial Management and Resource Mobilization

6.4.1 Institution conducts internal and external financial audits regularly (with in 100 words each)  
Internal audit is done after every six months where the auditing team checks the income received from the students which is recorded in the software and reconciled with the fees that is to be received according to class wise. Cash book is checked with the help of bank statement and vouchers maintained by the institution along with physical cash verification. Reports of Income and Expenditure statement is submitted to the Chattered Accountant who prepared the financial statement and other reports for the institution.

6.4.2 Funds / Grants received from management, non-government bodies, individuals, philanthropies during the year(not covered in Criterion III)

Name of the non government funding agencies/ individuals	Funds/ Grants received in Rs.	Purpose

6.4.2 Total corpus fund generated

#### 6.5 Internal Quality Assurance System

6.5.1 Whether Academic and Administrative Audit (AAA) has been done?

Audit Type	External		Internal	
	Yes/No	Agency	Yes/No	Authority
Academic	Yes	KBC NMU	No	--
Administrative	Yes	KBC NMU	No	--

6.5.2 Activities and support from the Parent – Teacher Association (at least three)

Many points of agenda were discussed during the meeting to improve the College in many areas like infrastructure, discipline, extracurricular activities and performances of the students. 1. The College always invites suggestion for improvement from the parents and the stakeholders and the feedback obtained from them are always given due importance. 2. Communication of views which the students were hesitant to share to the teachers about the College and the department through the parents. 3. Interpersonal interaction also took place between the parents and the concerned subject teachers out of which the parents were able to find out about their ward's attendance record and their performance in the recently concluded examination.

6.5.3 Development programmes for support staff (at least three)

- Lab Safety Measures awareness programme for lab. Assistant and lab attendants.
- Computer Training of the office staff so that they are able to handle the online admission and registration of students.
- Meeting with support staff before centralise admission process for PG classes.

6.5.4 Post Accreditation initiative(s) (mention at least three)				
1. introduction of skill based courses namely CCC programme under Digital India				
3. Getting ISO 9001:2015 Certifications.				
4. Certificate course in GST.				
<b>6.5.5</b>				
a. Submission of Data for AISHE portal : Yes				
b. Participation in NIRF : No				
c. ISO Certification : Yes				
d. NBA or any other quality audit : No				
6.5.6 Number of Quality Initiatives undertaken during the year				
Year	Name of quality initiative by IQAC	Date of conducting activity	Duration (from--- to ---)	Number of participants
2018-19	Workshop on Global Skills	05 to 07 Feb. 2019	03 Days	40
2018-19	Green Synthesis of Nano materials and their applications	09 Feb. 2019	01 Day	50

<b>CRITERION VII – INSTITUTIONAL VALUES AND BEST PRACTICES</b>			
<b>7.1 - Institutional Values and Social Responsibilities</b>			
7.1.1 Gender Equity (Number of gender equity promotion programmes organized by the institution during the year)			
Title of the programme	Period (from-to)	Participants	
		Female	Male
7.1.2 Environmental Consciousness and Sustainability/Alternate Energy initiatives such as: Percentage of power requirement of the College met by the renewable energy sources			
7.1.3 Differently abled (Divyangjan) friendliness			
Items Facilities	Yes/No	No. of Beneficiaries	
Physical facilities	Yes		
Provision for lift	No		
Ramp/ Rails	Yes	10	
Braille Software/facilities	No		
Rest Rooms	Yes	Guests	

Scribes for examination	--	
Special skill development for differently abled students	No	
Any other similar facility		

#### 7.1.4 Inclusion and Situatedness

Enlist most important initiatives taken to address locational advantages and disadvantages during the year

Year	Number of initiatives to address locational advantages and disadvantages	Number of initiatives taken to engage with and contribute to local community	Date and duration of the initiative	Name of the initiative	Issues addressed	Number of participating students and staff

#### 7.1.5 Human Values and Professional Ethics

Code of conduct (handbooks) for various stakeholders

Title	Date of Publication	Follow up (maximum 100 words each)

#### 7.1.6 Activities conducted for promotion of universal Values and Ethics

Activity	Duration (from ----- to -----)	Number of participants

#### 7.1.7 Initiatives taken by the institution to make the campus eco-friendly (at least five)

- ❖ Maintaining a separate dustbin for used plastic bottles which are taken for recycling.
- ❖ Planting of plants inside the campus.
- ❖ Rainwater harvesting.
- ❖ Students encouraged to use bicycles in large number.
- ❖ The college organised lectures on 'Sustainable Development' and 'Environmental issues' every year.

## 7.2 Best Practices

Describe at least two institutional best practices

Upload details of two best practices successfully implemented by the institution as per NAAC format in your institution website, provide the link

<http://www.ntvsgtpcollege.org/uploads/Best-Practice.pdf>



### 7.3 Institutional Distinctiveness

Provide the details of the performance of the institution in one area distinctive to its vision, priority and thrust

Provide the weblink of the institution in not more than 500 words

The Vision of the college is to prepare graduates to assume positions of Political, Economic, Intellectual, Artistic and Environment Leadership in Tribal, Regional and National contexts.

The Mission statement of the college is :“Empower The Tribal and Rural Students Through Higher Education.”

The college is established with a clear vision. It is a pioneer institute of NTVS. It has been playing a crucial role in achieving mission of institute to serve the tribal and rural people not only by imparting education but also by taking up several social service activities for them. The mission of the institute is “Empower the tribal and rural students through higher education and research”. The main objectives of the college are:

- To bring the tribal and rural students to the main stream of education
- To make all-round development of tribal and rural students
- To create competence and self-confidence among the tribal students
- To impart value based education through socio-cultural activities
- To create cultural and nation loving citizens
- To develop versatile personality through higher education
- To motivate the tribal and rural students towards competitive examinations.

Our management, Principal, Teachers, Non-Teaching staff and students put tireless efforts in achieving the goals of our institutions.

- The college facilitate holistic development of the younger generation, which includes physical, mental and spiritual wellbeing moral values are taught and practised in the College campus. The students get requisite lessons that keep their minds ignited for seeking knowledge and are motivated to do well in every sphere of their life. The college maintaining discipline, nurturing leadership abilities, exposing hidden talents of the students and punctuality. Extracurricular activities are conducted in the College which gives a platform to the students to display their talents and potentialities. Each and every student has been assigned a on his/her preference so as to encourage their interest besides the academic. The College also consists of various committees which look after the welfare of the students and cater to their needs. The Mentoring Programme that has been initiated by the College has also made a positive impact especially on the personal development of the students.

#### 8. Future Plans of action for next academic year (500 words)

- The institution has decided to installation of solar panel as alternate source of energy.
- The College has submitted the proposal of star college for funding to DBT, New Delhi.
- To organize International conference on theme of research
- To have our new college infrastructure.
- Computer training of Office staff so that they are able to efficiently handle the automation of the online administrative work.
- To strengthen the e-governance facilities.
- Exploration of opportunities for collaborative research work leading organizations.

*Name: Prof. Dr. C. P. Sawant*



*Signature of the Coordinator, IQAC*

*Name: Dr. V. S. Shrivastava*



*Signature of the Chairperson, IQAC*

\*\*\*

**Abbreviations:**

CAS	-	Career Advancement Scheme
CAT	-	Common Admission Test
CBCS	-	Choice Based Credit System
CE	-	Centre for Excellence
COP	-	Career Oriented Programme
CPE	-	College with Potential for Excellence
DPE	-	Department with Potential for Excellence
GATE	-	Graduate Aptitude Test
NET	-	National Eligibility Test
PEI	-	Physical Education Institution
SAP	-	Special Assistance Programme
SF	-	Self Financing
SLET	-	State Level Eligibility Test
TEI	-	Teacher Education Institution

\*\*\*\*\*

For Communication with NAAC

**The Director**

**National Assessment and Accreditation Council (NAAC)**

*(An Autonomous Institution of the University Grants Commission)*

P. O. Box. No. 1075, Nagarbhavi

Bengaluru - 560 072

Phone: +91-80-2321 0261/62/63/64/65

Fax: +91-80-2321 0268, 2321 0270

E-mail: [director.naac@gmail.com](mailto:director.naac@gmail.com)

Website: [www.naac.gov.in](http://www.naac.gov.in)



## Yearly Status Report - 2019-2020

### Part A

#### Data of the Institution

<b>1. Name of the Institution</b>	NANDURBAR TALUKA VIDHAYAK SAMITEE'S G.T. PATIL ARTS, COMMERCE AND SCIENCE COLLEGE
Name of the head of the Institution	Prof. Dr. V.S. Shrivastava
Designation	Principal(in-charge)
Does the Institution function from own campus	Yes
Phone no/Alternate Phone no.	02564222293
Mobile no.	9423905823
Registered Email	gtpcollege@rediffmail.com
Alternate Email	drvinod_shrivastava@yahoo.com
Address	Shani Mandir Road, Nandurbar
City/Town	Nandurbar
State/UT	Maharashtra
Pincode	425412

<b>2. Institutional Status</b>	
Affiliated / Constituent	Affiliated
Type of Institution	Co-education
Location	Rural
Financial Status	Self financed and grant-in-aid
Name of the IQAC co-ordinator/Director	Prof. Dr. C.P. Sawant
Phone no/Alternate Phone no.	02564297334
Mobile no.	9420533719
Registered Email	gtpcollege@rediffmail.com
Alternate Email	drcpsawant@rediffmail.com

<b>3. Website Address</b>	
Web-link of the AQAR: (Previous Academic Year)	<a href="http://www.ntvsgtpcollege.org/uploads/IQAC_2018-19.pdf">http://www.ntvsgtpcollege.org/uploads/IQAC_2018-19.pdf</a>
<b>4. Whether Academic Calendar prepared during the year</b>	Yes
if yes,whether it is uploaded in the institutional website: Weblink :	<a href="http://www.ntvsgtpcollege.org/uploads/Academic_Calendar_2019-20.pdf">http://www.ntvsgtpcollege.org/uploads/Academic_Calendar_2019-20.pdf</a>

**5. Accrediation Details**

Cycle	Grade	CGPA	Year of Accrediation	Validity	
				Period From	Period To
2	A	3.10	2015	03-Mar-2015	02-Mar-2020

<b>6. Date of Establishment of IQAC</b>	01-Jul-2005
---	-------------

**7. Internal Quality Assurance System**

Quality initiatives by IQAC during the year for promoting quality culture		
Item /Title of the quality initiative by IQAC	Date & Duration	Number of participants/ beneficiaries
The regular meeting of	12-Jul-2019	12

Internal Quality Assurance Cell (IQAC) for renewal of ISO certificate and discussion about result analysis and preparation of AQAR 2019-20	1	
Discussion, Modification and Finalisation of AQAR-2019-20 placing before governing body and uploading on website	10-Oct-2019 1	15
Feedback from 1) Alumni 2) Students 3) Parents collected, analysed and used for improvements	13-May-2019 3	600
Academic Administrative Audit (AAA) conducted and its follow up action	20-Jan-2020 1	800
Uploading of college data to the Management Information system (MIS) portal of MHRD, Govt. of India	10-Mar-2020 1	20
<a href="#">View File</a>		

**8. Provide the list of funds by Central/ State Government- UGC/CSIR/DST/DBT/ICMR/TEQIP/World Bank/CPE of UGC etc.**

Institution/Department/Faculty	Scheme	Funding Agency	Year of award with duration	Amount
Science Departments	DST FIST	DST	2014 0	8000000
No Files Uploaded !!!				

<b>9. Whether composition of IQAC as per latest NAAC guidelines:</b>	Yes
Upload latest notification of formation of IQAC	<a href="#">View File</a>
<b>10. Number of IQAC meetings held during the year :</b>	5
The minutes of IQAC meeting and compliances to the decisions have been uploaded on the institutional website	No
Upload the minutes of meeting and action taken report	No Files Uploaded !!!
<b>11. Whether IQAC received funding from any of</b>	Yes

the funding agency to support its activities during the year?	
If yes, mention the amount	300000
Year	2015

### 12. Significant contributions made by IQAC during the current year(maximum five bullets)

- IQAC plays key role in preparation and implementation of academic calendar in college.
- IQAC is monitoring and implementing the Career Advancement scheme of the teachers.
- IQAC monitors all such programmes in the college like seminars, outreach initiatives, student meets and career counselling initiatives.
- IQAC oversees the activity of the Research Committee and motivates faculties to write research proposal and making them aware of the different funding agency.
- Paperwise result analysis to be submitted by departments along with follow up remedial measures which are then discussed in the IQAC.

No Files Uploaded !!!

### 13. Plan of action chalked out by the IQAC in the beginning of the academic year towards Quality Enhancement and outcome achieved by the end of the academic year

Plan of Action	Achivements/Outcomes
The IQAC prepares the Academic calendar of the year 201920	As per Academic Calendar IQAC chalks out the plan of action in the beginning of the year towards quality enhancement.
Meeting for the preparation of AQAR Report of the year 2019-20.	The IQAC has approved AQAR of the year 2019-20 in the meeting held on 10.10.2019
To enhance the teaching quality the teaching faculty were encouraged to take up research work	Minor research projects were conducted by some departments on various topics and it was fully sponsored by the VCRMS and UGC.
Counselling session for students regarding implementation of CBCS through academic calendar	Implemented
Encouraging the stakeholders of our institution for eco-friendly campus environment	Our institution achieved Green campus environment by planting saplings.
IQAC motivates the faculty to participate in syllabus framing workshops, conferences, seminars, refresher and orientation faculty development programmes	Implemented
Forwarding of pending applications of full time teachers for promotion under career advancement scheme	Scrutiny and forwarding of applications of eight full time teachers to the competent authority has been completed upto mayMay 2020

[View File](#)

**14. Whether AQAR was placed before statutory body ?**

Yes

Name of Statutory Body

Meeting Date

Governing Body (Management)

10-Oct-2020

**15. Whether NAAC/or any other accredited body(s) visited IQAC or interacted with it to assess the functioning ?**

No

**16. Whether institutional data submitted to AISHE:**

Yes

Year of Submission

2020

Date of Submission

03-Feb-2020

**17. Does the Institution have Management Information System ?**

Yes

If yes, give a brief description and a list of modules currently operational (maximum 500 words)

The College operates Management Information System for the smooth functioning of the management and disseminating information to different stakeholders. The information provided below are the modules on which the College operates its MIS Base Module:

1. Application Entries
2. Admissions Processing / Rejections
3. Students' Profile with results analysis
4. Students' Reports Gender wise
5. Class wise Reports
6. Research Funding Agencies/Research Projects/Research Guides/Ph.D. Registered Students /Ph.D. awarded students.
7. Department, Designation
8. Fullfledged Salary Management System Accounts.
9. Income expenditure Module .
10. Fee Collection Fee Profile
11. Daily Reports on Income
12. Monthly Reports of Income
13. Yearly Reports of Income
14. Income Ledger
10. Bank Reconciliation Other Modules.
11. Infrastructure, ICT Facility
12. Library: Text Books/Reference Books/Research Journals/Software's.
13. Hostel Facility
14. Drinking Water Facility.
15. NSS/NCC/Sports Activities

Part B



## CRITERION I – CURRICULAR ASPECTS

### 1.1 – Curriculum Planning and Implementation

1.1.1 – Institution has the mechanism for well planned curriculum delivery and documentation. Explain in 500 words

An institution follows curriculum designed by KBC NMU Jalgaon. The curriculum is carried out properly by concerning faculties. As per the plan from beginning to the end of academic session syllabus is completed within time, and its record is preserved by all faculties for future use and reference. 100% curriculum is delivered as per procedure by the institution, besides keeping documentation. Being affiliated to the North Maharashtra University, Jalgaon, the college follows curricula given by the university. For effective implementation of the curricula, the college prepares a roadmap every year. Highlights of the roadmap are as given below: Academic Calendar Preparation: • Prior to the commencement of the academic year, departments of the college prepare their academic calendar based on the University calendar. • This gives clear picture of the available dates for noteworthy activities to ensure proper teaching-learning transaction and continuous evaluation. • At the beginning of the academic year, Head of the Department conducts meetings and discusses departmental academic calendar with the staff members for smooth conduction of the teaching learning process and other activities. • Discussion of the syllabus with individual teachers. • Assignment of the workload and timetable to the individual teacher. • Individual teacher prepares month-wise teaching plan considering following factors: o Available dates and periods for teaching-learning process. o Syllabus to be covered • • Teaching plans are submitted to the Head of the Department. • Weekly records of teaching-learning activities are submitted to the Head of the Department. Use of Information and Communication Technology: • • For better understanding of the topic by the students, use of ICT has been increased by the faculty. • Teachers use power point presentations, animations, video clips, etc for better explanation of the topic. • Periodical meetings are held at departmental level by the Head of the department and thus monitor the smooth conduction of teaching-learning process.

1.1.2 – Certificate/ Diploma Courses introduced during the academic year

Certificate	Diploma Courses	Dates of Introduction	Duration	Focus on employ ability/entrepreneurship	Skill Development
Goods and Service Tax	Nil	14/06/2019	365	-----	----
Nil	Skill development in English	14/06/2019	365	---	---

### 1.2 – Academic Flexibility

1.2.1 – New programmes/courses introduced during the academic year

Programme/Course	Programme Specialization	Dates of Introduction
Nil	Nil	Nil
No file uploaded.		

1.2.2 – Programmes in which Choice Based Credit System (CBCS)/Elective course system implemented at the affiliated Colleges (if applicable) during the academic year.

Name of programmes adopting CBCS	Programme Specialization	Date of implementation of CBCS/Elective Course System
----------------------------------	--------------------------	---

BA	All Subjects	01/06/2019
BSc	All Subjects	01/06/2019
BCom	Commerce	01/06/2019

### 1.2.3 – Students enrolled in Certificate/ Diploma Courses introduced during the year

	Certificate	Diploma Course
Number of Students	16	20

## 1.3 – Curriculum Enrichment

### 1.3.1 – Value-added courses imparting transferable and life skills offered during the year

Value Added Courses	Date of Introduction	Number of Students Enrolled
Nil	Nil	Nil
No file uploaded.		

### 1.3.2 – Field Projects / Internships under taken during the year

Project/Programme Title	Programme Specialization	No. of students enrolled for Field Projects / Internships
BSc	Zoology, Botany , Geography & Microbiology Departments 2. Industrial Tour of Chemistry Department	170
No file uploaded.		

## 1.4 – Feedback System

### 1.4.1 – Whether structured feedback received from all the stakeholders.

Students	Yes
Teachers	Yes
Employers	No
Alumni	Yes
Parents	Yes

### 1.4.2 – How the feedback obtained is being analyzed and utilized for overall development of the institution? (maximum 500 words)

Feedback Obtained
<p>The feedback from the students is taken into account. Their problems and suggestions have been dealt with. They have expressed satisfaction over the method of imparting education by all faculty members. They have found the education beneficial. The teachers are happy with the administration of the institution. All the teachers are hardworking and their service is being used for the educational progress of the institution. An employer has also given positive remark regarding overall development of the institution. An employer is dutiful and takes every care. An alumni and parents are glad to see the ever increasing educational progress of the institution. An alumni whole heartedly assist the institution sometimes financially. The parents interact with the employer and staff members, they are happy to see their wards being educated properly and marching ahead in life towards achieving goal.</p>

## CRITERION II – TEACHING- LEARNING AND EVALUATION

### 2.1 – Student Enrolment and Profile

### 2.1.1 – Demand Ratio during the year

Name of the Programme	Programme Specialization	Number of seats available	Number of Application received	Students Enrolled
BA	Arts	230	230	230
BSc	Science	220	208	208
BCom	Commerce	120	116	116
MA	Marathi	120	103	103
MA	Hindi	60	36	36
MA	English	60	36	36
MA	History	90	89	89
MA	Economics	72	72	72
MA	Psychology	14	14	14
MCom	Commerce	160	160	160

[View File](#)

## 2.2 – Catering to Student Diversity

### 2.2.1 – Student - Full time teacher ratio (current year data)

Year	Number of students enrolled in the institution (UG)	Number of students enrolled in the institution (PG)	Number of fulltime teachers available in the institution teaching only UG courses	Number of fulltime teachers available in the institution teaching only PG courses	Number of teachers teaching both UG and PG courses
2019	2482	1170	37	10	33

## 2.3 – Teaching - Learning Process

### 2.3.1 – Percentage of teachers using ICT for effective teaching with Learning Management Systems (LMS), E-learning resources etc. (current year data)

Number of Teachers on Roll	Number of teachers using ICT (LMS, e-Resources)	ICT Tools and resources available	Number of ICT enabled Classrooms	Number of smart classrooms	E-resources and techniques used
67	30	8	1	2	Nil

[View File of ICT Tools and resources](#)

No file uploaded.

### 2.3.2 – Students mentoring system available in the institution? Give details. (maximum 500 words)

Number of students enrolled in the institution	Number of fulltime teachers	Mentor : Mentee Ratio
3652	67	1:55

## 2.4 – Teacher Profile and Quality

### 2.4.1 – Number of full time teachers appointed during the year

No. of sanctioned positions	No. of filled positions	Vacant positions	Positions filled during the current year	No. of faculty with Ph.D
92	76	16	10	33

2.4.2 – Honours and recognition received by teachers (received awards, recognition, fellowships at State, National, International level from Government, recognised bodies during the year )

Year of Award	Name of full time teachers receiving awards from state level, national level, international level	Designation	Name of the award, fellowship, received from Government or recognized bodies
2019	NIL	Nil	Nil
No file uploaded.			

## 2.5 – Evaluation Process and Reforms

2.5.1 – Number of days from the date of semester-end/ year- end examination till the declaration of results during the year

Programme Name	Programme Code	Semester/ year	Last date of the last semester-end/ year-end examination	Date of declaration of results of semester-end/ year- end examination
BA	--	I/III/IV	30/11/2019	15/01/2020
<a href="#">View File</a>				

2.5.2 – Reforms initiated on Continuous Internal Evaluation(CIE) system at the institutional level (250 words)

G.T.P. College is a college affiliated to the KBC NMU University Jalgaon and adheres to the syllabus laid down by the KBC North Maharashtra University, Jalgaon. We follow number of guidelines and methods to carry out a continuous internal evaluation system at the institutional level. This allows the students to understand each concept individually as well. After each topic is taught in detail, various assessments in the form of class tests, tutorials, seminars, poster presentations are conducted. Teachers take a detailed discussion about the topic as per the university question format and gives the students a clear understanding of what to expect. Students are made aware of the evaluation process by orientation program at the beginning of the course, an academic calendar with the continuous internal evaluation (CIE) dates displayed on the college as well as department notice boards. These tests allow the teachers to continuously assess the students to track their progress and to identify slow and advanced learners. Evaluation is done both in theory and practical examinations. The assessment remains impartial and accurate. The performance of the students is monitored by the Head of Department and the necessary feedback is given to the Principal and concerned faculty members. The Principal conducts review meetings department wise to discuss the improvement of students' performance. Remedial Classes are conducted for the slow learners, absentees and the students who participate in sports and extracurricular activities

2.5.3 – Academic calendar prepared and adhered for conduct of Examination and other related matters (250 words)

The college prepares academic calendar at the beginning of the year which captures the important dates like start and end of the session. The academic calendar is also distributed among all teaching non-teaching staff of the college. The academic calendar includes the academic activities at the college level. The draft calendar is discussed in HOD's meeting and all the suggestions which are approved in the meeting is incorporated before releasing the calendar to all departments by the principal. All the internal assessment tests are conducted centrally as per the academic calendar. Formative and summative feedback is administered as per the schedule. The academic calendar contains the yearly schedule of the college ranging from the list of holidays (national level holidays, state level holidays, local holidays and the institutional holidays), date schedule of the college examinations and other forms of

evaluation such as evaluation through performance in Departmental seminar presentation etc. The tentative dates of publication of college results are also mentioned in the academic calendar. The tentative dates of activities of NSS, NCC. Schedule of other activities such as Parent-teacher meeting, College social and other cultural programmes, College sports etc are also provided in the academic calendar.

## 2.6 – Student Performance and Learning Outcomes

2.6.1 – Program outcomes, program specific outcomes and course outcomes for all programs offered by the institution are stated and displayed in website of the institution (to provide the weblink)

<http://www.ntvsgtcollege.org/>

2.6.2 – Pass percentage of students

Programme Code	Programme Name	Programme Specialization	Number of students appeared in the final year examination	Number of students passed in final year examination	Pass Percentage
Nill	MA	Marathi	76	71	93.4
Nill	MA	Psychology	14	12	85.7
Nill	MA	Economics	76	70	92.1
Nill	MA	History	89	79	88.7
Nill	MA	English	36	32	88.9
Nill	MA	Hindi	36	33	91.7
Nill	MA	Marathi	103	89	86.4
Nill	BA	--	229	208	90.8
Nill	BSc	--	208	193	92.8
Nill	BCom	--	116	104	89.6

[View File](#)

## 2.7 – Student Satisfaction Survey

2.7.1 – Student Satisfaction Survey (SSS) on overall institutional performance (Institution may design the questionnaire) (results and details be provided as weblink)

[http://www.ntvsgtcollege.org/uploads/Student\\_Feedback.pdf](http://www.ntvsgtcollege.org/uploads/Student_Feedback.pdf)

## CRITERION III – RESEARCH, INNOVATIONS AND EXTENSION

### 3.1 – Resource Mobilization for Research

3.1.1 – Research funds sanctioned and received from various agencies, industry and other organisations

Nature of the Project	Duration	Name of the funding agency	Total grant sanctioned	Amount received during the year
Nill	0	Nill	Nill	Nill

No file uploaded.

### 3.2 – Innovation Ecosystem

3.2.1 – Workshops/Seminars Conducted on Intellectual Property Rights (IPR) and Industry-Academia Innovative practices during the year

Title of workshop/seminar	Name of the Dept.	Date
nil		

### 3.2.2 – Awards for Innovation won by Institution/Teachers/Research scholars/Students during the year

Title of the innovation	Name of Awardee	Awarding Agency	Date of award	Category
nil	Nil	Nil	Nil	Nil
No file uploaded.				

### 3.2.3 – No. of Incubation centre created, start-ups incubated on campus during the year

Incubation Center	Name	Sponsored By	Name of the Start-up	Nature of Start-up	Date of Commencement
nil	Nil	Nil	Nil	Nil	Nil
No file uploaded.					

## 3.3 – Research Publications and Awards

### 3.3.1 – Incentive to the teachers who receive recognition/awards

State	National	International
0		

### 3.3.2 – Ph. Ds awarded during the year (applicable for PG College, Research Center)

Name of the Department	Number of PhD's Awarded
Chemistry	1
Commerce	2
History	1

### 3.3.3 – Research Publications in the Journals notified on UGC website during the year

Type	Department	Number of Publication	Average Impact Factor (if any)
International	Botany	1	1
International	Zoology	5	1
International	Physics	3	1
International	Chemistry	5	1
National	Chemistry	5	1
International	Geography	6	1
International	Psychology	2	1
National	Psychology	2	1
International	History	1	1
National	History	1	1
<a href="#">View File</a>			

### 3.3.4 – Books and Chapters in edited Volumes / Books published, and papers in National/International Conference Proceedings per Teacher during the year

Department	Number of Publication
English	5
Commerce	2
History	2
Psychology	2
Geography	3

Physics	1
Maths	3
Zoology	2
Botany	1
Chemistry	1
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3.3.5 – Bibliometrics of the publications during the last Academic year based on average citation index in Scopus/ Web of Science or PubMed/ Indian Citation Index

Title of the Paper	Name of Author	Title of journal	Year of publication	Citation Index	Institutional affiliation as mentioned in the publication	Number of citations excluding self citation
Photocatalytic degradation of chlorpyrifos and methylene blue using $\gamma$ -Bi <sub>2</sub> O <sub>3</sub> nanoparticles fabricated by sol-gel method	Vinod Shankar Shrivastava	SN Applied Sciences volume	2019	0	Nano-Chemistry Research Laboratory, G. T. Patil College, Nandurbar-425412 (M.S), India.	9
Facile synthesis of nickel oxide nanoparticles for the degradation of Methylene blue and Rhodamine B dye: a comparative study	Vinod Shankar Shrivastava	Journal of Taibah University for Science	2019	0	Nano-Chemistry Research Laboratory, G. T. Patil College, Nandurbar-425412 (M.S), India.	14
Hydrothermally synthesized nanocrystalline Nb <sub>2</sub> O <sub>5</sub> and its visible-light photocatalytic activity for the degradation of congo red and	Vinod Shankar Shrivastava	Iranian Journal of Catalysis	2019	0	Nano-Chemistry Research Laboratory, G. T. Patil College, Nandurbar-425412 (M.S), India.	59

methylen blue						
Photocat alytic deg radation of methylen blue using ZnO and 2Fe-ZnO se miconducto r nanomate rials synt hesized by sol-gel method: a comparativ e study	Vinod Shankar Sh rivastava	SN Applied Sciences volume	2019	0	G.T.P. College Nandurbar	46
Ni, C, N, S multi- doped ZrO <sub>2</sub> decorated on multi- walled carbon nanotubes for effective solar induced de gradation of anionic dye	Vinod Shankar Sh rivastava	Journal of Environ mental Chemical E ngineering	2020	0	Nano- Chemistry Research L aboratory, G. T. Patil College, N andurbar-4 25412 (M.S), India.	15
Multi- doped ZnO Photocatal yst for Solar Induced De gradation of Indigo Carmin e Dye and as an Antimic robial Agent	Vinod Shankar Sh rivastava	Journal of Inorganic and Organo metallic Polymers and Materials volume	2020	0	Nano- Chemistry Research L aboratory, G. T. Patil College, N andurbar-4 25412 (M.S), India.	13
Ni and Zn modified acid activated montmorill onite clay for effective removal of	Vinod Shankar Sh rivastava	SN Applied Sciences volume	2020	0	Nano- Chemistry Research L aboratory, G. T. Patil College, N andurbar-4 25412 (M.S),	3



carbol fuchsin dye from aqueous solution					India.	
Adsorptive and photocatalytic removal of carcinogenic methylene blue dye by SnO <sub>2</sub> nanorods: an equilibrium, kinetic and thermodynamic exploration	Vinod Shankar Shrivastava	SN Applied Sciences volume	2020	0	Nano-Chemistry Research Laboratory, G. T. Patil College, Nandurbar-425412 (M.S), India.	3
Effect of Cd/S ratio on growth and physical properties of CdS thin films for photosensor application	N.P. Huse	Journal of Materials Science: Materials in Electronics	2020	0	Department of Physics, G.T.P. College Nandurbar	5
Effect of doping parameters on photocatalytic degradation of methylene blue using Ag doped ZnO nanocatalyst	Sandip P. Patil	SN Applied Sciences volume	2020	0	G.T.P. College Nandurbar	6

[View File](#)

### 3.3.6 – h-Index of the Institutional Publications during the year. (based on Scopus/ Web of science)

Title of the Paper	Name of Author	Title of journal	Year of publication	h-index	Number of citations excluding self citation	Institutional affiliation as mentioned in the publication
Photocatalytic degradation of chlorpyrifos	Vinod Shankar Shrivastava	SN Applied Sciences volume	2019	21	9	G.T.P. College Nandurbar

rifos and methylene blue using $\gamma$ -Bi <sub>2</sub> O <sub>3</sub> nanoparticles fabricated by sol-gel method						
Facile synthesis of nickel oxide nanoparticles for the degradation of Methylene blue and Rhodamine B dye: a comparative study	Vinod Shankar Shrivastava	Journal of Taibah University for Science	2019	21	14	G.T.P. College Nandurbar
Hydrothermally synthesized nanocrystalline Nb <sub>2</sub> O <sub>5</sub> and its visible-light photocatalytic activity for the degradation of congo red and methylene blue	Vinod Shankar Shrivastava	Iranian Journal of Catalysis	2019	21	59	G.T.P. College Nandurbar
Photocatalytic degradation of methylene blue using ZnO and ZnO-Fe <sub>2</sub> O <sub>3</sub> semiconductor nanomaterials synthesized by sol-gel method: a comparative study	Vinod Shankar Shrivastava	SN Applied Sciences volume	2019	21	46	G.T.P. College Nandurbar
Ni, C,	Vinod	Journal	2020	21	15	G.T.P.

N, S multi-doped ZrO <sub>2</sub> decorated on multi-walled carbon nanotubes for effective solar induced degradation of anionic dye	Shankar Shrivastava	of Environmental Chemical Engineering				College Nandurbar
Multi-doped ZnO Photocatalyst for Solar Induced Degradation of Indigo Carmine Dye and as an Antimicrobial Agent	Vinod Shankar Shrivastava	Journal of Inorganic and Organometallic Polymers and Materials volume	2020	21	13	G.T.P. College Nandurbar
Adsorptive and photocatalytic removal of carcinogenic methylene blue dye by SnO <sub>2</sub> nanorods: an equilibrium, kinetic and thermodynamic exploration	Vinod Shankar Shrivastava	SN Applied Sciences volume	2020	21	3	G.T.P. College Nandurbar
Effect of Cd/S ratio on growth and physical properties of CdS thin films for photosensor application	N.P. Huse	Journal of Materials Science: Materials in Electronics	2020	6	3	G.T.P. College Nandurbar
Effect	Sandip	SN	2020	8	5	G.T.P.

of doping parameters on photocatalytic degradation of methylene blue using Ag doped ZnO nanocatalyst	P. Patil	Applied Sciences volume				College Nandurbar
Ni and Zn modified acid activated montmorillonite clay for effective removal of carbol fuchsin dye from aqueous solution	Vinod Shankar Shrivastava	SN Applied Sciences volume	2020	21	5	G.T.P. College Nandurbar

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### 3.3.7 – Faculty participation in Seminars/Conferences and Symposia during the year :

Number of Faculty	International	National	State	Local
Attended/Seminars/Workshops	22	93	31	1
Presented papers	2	15	4	1
Resource persons	Nil	3	1	Nil

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### 3.4 – Extension Activities

3.4.1 – Number of extension and outreach programmes conducted in collaboration with industry, community and Non- Government Organisations through NSS/NCC/Red cross/Youth Red Cross (YRC) etc., during the year

Title of the activities	Organising unit/agency/ collaborating agency	Number of teachers participated in such activities	Number of students participated in such activities
Road Safety	NCC and NSS GTP College	6	85
Swachh Bharat Abhiyaan	NCC and NSS GTP College	4	105
Anti Plastic Rally	NCC and NSS GTP College	3	350
Awareness Programme	NCC and NSS GTP College	8	300

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3.4.2 – Awards and recognition received for extension activities from Government and other recognized bodies during the year

Name of the activity	Award/Recognition	Awarding Bodies	Number of students Benefited
Tobaco Free Campaign	Gold and Silver	Pledge for Life	250
Spit Free Campaign	Silver Bronze	Pledge for Life	250

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3.4.3 – Students participating in extension activities with Government Organisations, Non-Government Organisations and programmes such as Swachh Bharat, Aids Awareness, Gender Issue, etc. during the year

Name of the scheme	Organising unit/Agency/collaborating agency	Name of the activity	Number of teachers participated in such activities	Number of students participated in such activities
Road Safety week	Nandurbar Traffic Police and NCC	Awareness Programme	8	250
Tree Plantation	Municipal Corporation Nanduarbar and NCC	Tree Plantation	8	200

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### 3.5 – Collaborations

3.5.1 – Number of Collaborative activities for research, faculty exchange, student exchange during the year

Nature of activity	Participant	Source of financial support	Duration
National Level Basic Leadership Camp	1	NCC Battalion	10

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3.5.2 – Linkages with institutions/industries for internship, on-the- job training, project work, sharing of research facilities etc. during the year

Nature of linkage	Title of the linkage	Name of the partnering institution/ industry /research lab with contact details	Duration From	Duration To	Participant
nil	Nill	Nill	Nill	Nill	Nill

No file uploaded.

3.5.3 – MoUs signed with institutions of national, international importance, other universities, industries, corporate houses etc. during the year

Organisation	Date of MoU signed	Purpose/Activities	Number of students/teachers participated under MoUs
nil	Nill	Nill	Nill

No file uploaded.

## CRITERION IV – INFRASTRUCTURE AND LEARNING RESOURCES

### 4.1 – Physical Facilities

4.1.1 – Budget allocation, excluding salary for infrastructure augmentation during the year

Budget allocated for infrastructure augmentation	Budget utilized for infrastructure development
600000	400000

4.1.2 – Details of augmentation in infrastructure facilities during the year

Facilities	Existing or Newly Added
Classrooms with LCD facilities	Existing
Seminar Halls	Existing
Laboratories	Existing
Class rooms	Existing
Campus Area	Existing

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### 4.2 – Library as a Learning Resource

4.2.1 – Library is automated {Integrated Library Management System (ILMS)}

Name of the ILMS software	Nature of automation (fully or partially)	Version	Year of automation
Nil	Partially	Nil	2021

4.2.2 – Library Services

Library Service Type	Existing		Newly Added		Total	
Text Books	16080	1652300	1600	200000	17680	1852300
Reference Books	6460	1940330	110	102314	6570	2042644
e-Books	Nil	5900	Nil	5900	Nil	11800
Journals	56	21216	63	25000	119	46216
CD & Video	240	Nil	11	Nil	251	Nil
Weeding (hard & soft)	100	13200	Nil	Nil	100	13200

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4.2.3 – E-content developed by teachers such as: e-PG- Pathshala, CEC (under e-PG- Pathshala CEC (Under Graduate) SWAYAM other MOOCs platform NPTEL/NMEICT/any other Government initiatives & institutional (Learning Management System (LMS) etc

Name of the Teacher	Name of the Module	Platform on which module is developed	Date of launching e-content
Nil	Nil	Nil	Nil

No file uploaded.

### 4.3 – IT Infrastructure

#### 4.3.1 – Technology Upgradation (overall)

Type	Total Computers	Computer Lab	Internet	Browsing centers	Computer Centers	Office	Departments	Available Bandwidth (MBPS/GBPS)	Others
Existing	75	5	8	1	1	1	8	100	0
Added	10	0	8	0	0	0	8	100	0
Total	85	5	16	1	1	1	16	200	0

#### 4.3.2 – Bandwidth available of internet connection in the Institution (Leased line)

100 MBPS/ GBPS

#### 4.3.3 – Facility for e-content

Name of the e-content development facility	Provide the link of the videos and media centre and recording facility
Nil	<a href="#">Nil</a>

### 4.4 – Maintenance of Campus Infrastructure

#### 4.4.1 – Expenditure incurred on maintenance of physical facilities and academic support facilities, excluding salary component, during the year

Assigned Budget on academic facilities	Expenditure incurred on maintenance of academic facilities	Assigned budget on physical facilities	Expenditure incurred on maintenance of physical facilities
25	8	5	3

#### 4.4.2 – Procedures and policies for maintaining and utilizing physical, academic and support facilities - laboratory, library, sports complex, computers, classrooms etc. (maximum 500 words) (information to be available in institutional Website, provide link)

The primary responsibility of the College for developing the College infrastructure within the permission of Governing Body of the College. Under its direction the College Administration avails funds from the University Grants Commission and other Agencies by which the necessary developmental works are done. In terms of the College Library, books are arranged in simple but systematic manner to help the user locate the books easily. Information regarding the arrival of new resources are circulated to all the departments and also posted on the notice board as part of the Current Awareness Service. In order to provide speedy and efficient service, library cards are issued to the students. Periodic upgradation of books and journals are done according to the needs of the students and faculties of various departments. Recognizing the importance of IT as a complementary process in education the College is committed to upgrading its IT infrastructure and associated facilities on a regular basis. The purchase of hardware and upgradation of software is needbased. The College administration in coordination with the ICT Committee makes plans and decides on strategies regarding this matter.

[http://www.ntvsgtpcollege.org/uploads/soisuvidha\\_Format\\_Committee\\_2014.pdf](http://www.ntvsgtpcollege.org/uploads/soisuvidha_Format_Committee_2014.pdf)

### CRITERION V – STUDENT SUPPORT AND PROGRESSION

#### 5.1 – Student Support

##### 5.1.1 – Scholarships and Financial Support

Name/Title of the scheme	Number of students	Amount in Rupees
--------------------------	--------------------	------------------

Financial Support from institution	Nil	Nil	Nil
Financial Support from Other Sources			
a) National	GOI and State Scholarship	1960	792853
b) International	nil	Nil	Nil
<a href="#">View File</a>			

5.1.2 – Number of capability enhancement and development schemes such as Soft skill development, Remedial coaching, Language lab, Bridge courses, Yoga, Meditation, Personal Counselling and Mentoring etc.,

Name of the capability enhancement scheme	Date of implementation	Number of students enrolled	Agencies involved
Yoga Meditation	21/06/2020	500	G.T.P. College
<a href="#">View File</a>			

5.1.3 – Students benefited by guidance for competitive examinations and career counselling offered by the institution during the year

Year	Name of the scheme	Number of benefited students for competitive examination	Number of benefited students by career counseling activities	Number of students who have passed in the comp. exam	Number of students placed
2019	NET SET Coaching Classes	50	Nil	3	3
2020	Carrier Counselling Scheme of State Gov.	Nil	100	3	Nil
<a href="#">View File</a>					

5.1.4 – Institutional mechanism for transparency, timely redressal of student grievances, Prevention of sexual harassment and ragging cases during the year

Total grievances received	Number of grievances redressed	Avg. number of days for grievance redressal
10	10	7

## 5.2 – Student Progression

5.2.1 – Details of campus placement during the year

On campus			Off campus		
Name of organizations visited	Number of students participated	Number of students placed	Name of organizations visited	Number of students participated	Number of students placed
NIL	Nil	Nil	Nil	Nil	Nil
No file uploaded.					

5.2.2 – Student progression to higher education in percentage during the year

Year	Number of students	Programme graduated from	Department graduated from	Name of institution joined	Name of programme
------	--------------------	--------------------------	---------------------------	----------------------------	-------------------



	enrolling into higher education				admitted to
2019	50	B.Sc.	Chemistry	1) KBC NMU Jalgaon, 2) Sandip University Nashik, 3) RYK College, Nashik, 4) Sardar Patel University, Aanand, Gujrat	Msc and Ph.D.
2019	10	B.Sc.	Microbiology	1) KBC NMU Jalgaon, 2) Sandip University Nashik, 3) RYK College, Nashik, 4) Sardar Patel University, Aanand, Gujrat	Msc and Ph.D.
2019	15	B.Sc.	Maths	1) KBC NMU Jalgaon, 2) Sandip University Nashik, 3) RYK College, Nashik, 4) Sardar Patel University, Aanand, Gujrat, 5) MJ College, Jalgaon	Msc and Ph.D.
2019	20	B.Sc.	Zoology	1) KBC NMU Jalgaon, 2) Sandip University Nashik, 3) RYK College, Nashik, 4) Sardar Patel University, Aanand, Gujrat, 5) BAMU, Aurangabad	Msc and Ph.D.
2019	10	B.Sc.	Physics	1) KBC NMU Jalgaon, 2) Sandip University Nashik, 3) RYK College,	Msc and Ph.D.

				Nashik, 4) Sardar Patel University, Aanand, Gujrat	
2019	5	B.Sc.	Computer Sci.	1) KBC NMU Jalgaon, 2) Sandip University Nashik, 3) RYK College, Nashik, 4) Sardar Patel University, Aanand, Gujrat	Msc
<a href="#">View File</a>					

5.2.3 – Students qualifying in state/ national/ international level examinations during the year  
(eg:NET/SET/SLET/GATE/GMAT/CAT/GRE/TOFEL/Civil Services/State Government Services)

Items	Number of students selected/ qualifying
NET	1
SET	3
<a href="#">View File</a>	

5.2.4 – Sports and cultural activities / competitions organised at the institution level during the year

Activity	Level	Number of Participants
Hockey	University level Inter Zonal Tournament 209-20	160
Football	University level Inter Zonal Tournament 2019-20	160
Rugby	University level Inter Zonal Tournament 2019-20	84
Athletic	University level Inter Zonal Tournament 2019-20	200
<a href="#">View File</a>		

### 5.3 – Student Participation and Activities

5.3.1 – Number of awards/medals for outstanding performance in sports/cultural activities at national/international level (award for a team event should be counted as one)

Year	Name of the award/medal	National/ Internaional	Number of awards for Sports	Number of awards for Cultural	Student ID number	Name of the student
2019	Gold Medal	National	Nil	1	Nil	Kamlesh Mahale
2019	Bronze	National	1	Nil	Nil	Pawara Bharati Amarsing
<a href="#">View File</a>						

5.3.2 – Activity of Student Council & representation of students on academic & administrative bodies/committees of the institution (maximum 500 words)

• At the beginning of every academic year, the institute constitutes the Student Council by following the norms laid down by the University. A class representative from each class will be nominated as a member of the Student Council. The student members elect General Secretary, Cultural Secretary, Sports Secretary, and Girls representative for a term of one year. The Student Council aims at the all-round development of students and organizes several academic, co-curricular, and extracurricular events throughout the year in association with the University and other organizations. Meetings of the Student Council are conducted at least once in each term with Student`s Welfare Officer, discipline, and anti-ragging committee. The details of various academic and administrative committees under the Student Council are Cultural committee, Sports committee, NSS committee, Magazine committee Prerana • The council consists of 15 members as office bearer: i) Principal of the college ii) One senior teacher nominated by the Principal. iii) National Service Scheme Program Officer. iv) One student from each class who has shown academic merit at the preceding qualifying examination and who is engaged in full time studies in the college to be nominated by the Principal. v) Director of Sports and Physical Education. Council Activities: i) The member of class representative act for running the day to day affairs of the college. ii) The council plays a major role in the organization of Annual Day, NSS Camp, Teachers Day, Sports Day, Literary Events, Publication of the annual college magazine, Drama/Debate Committee, Cultural Committee Admission processes. The Council helps in organizing Annual Gathering, blood donation camp, eye checkup camp, health checkup camp, Plastic free campus mission once in the year in the college. The Council also assists in conducting awareness campaigns rally, environment consciousness rally and Swacch Bharat Abhiyan Rally on 2nd Oct every year. Moreover, in all decision making bodies the student representatives hold a good position and also participate in any decision making in the curricular and cocurricular activities. In IQAC the students` member plays a pivotal role. In Grievance cell, Antiragging cell all decisions are taken while keeping their views in mind. The Institute holds national and international conferences where the participation of students is praiseworthy. • The students representative are nominated as the members of different academic administrative bodies/committees of the institution • Gymkhana • Students Council • Internal Complaint Committee • Library Advisory Committee • NAAC IQAC • Canteen Committee • N.S.S. • Environment Protection Cell ENACT (Green Practices Green Budgeting) • Social Activity Cell • Grievance redressal cell

#### 5.4 – Alumni Engagement

5.4.1 – Whether the institution has registered Alumni Association?

No

5.4.2 – No. of enrolled Alumni:

1

5.4.3 – Alumni contribution during the year (in Rupees) :

0

5.4.4 – Meetings/activities organized by Alumni Association :

2

#### CRITERION VI – GOVERNANCE, LEADERSHIP AND MANAGEMENT

##### 6.1 – Institutional Vision and Leadership

6.1.1 – Mention two practices of decentralization and participative management during the last year (maximum 500

words)

College policies are well in line with government and university policies. All the teachers work together to achieve these policies. Central committees are formed for smooth functioning with responsibilities. Transparency is maintained by sharing the information on college website for ready reference of all the stakeholders of college. Discipline, the most desirous virtue for teaching learning-process, amongst the students is maintained by faculty members. Students' performance is monitored through batch counselling. The college practices day to day decentralization and participative management. Following sequence of operations related to decentralization of power and the institution follows participative management: 1. The governing body, the advisory committee, finance committee, examination committee, local management committee/CDC constituted as per the UGC norms for college are made functional. 2. The principal takes policy decisions in consultation with the college development council/local management committee and vice principals and looks after the overall administration. 3. Heads of different committees looks after the admission process, student issues and teaching learning process, maintenance of amenities, discipline and campus cleanliness and assist the principal in administrative matters. 4. The HoDs are entrusted with the responsibility of workload allocation, preparation of timetable, monitoring attendance of faculties and students, execution of teaching learning, demonstration and practical work, evaluation of academic contribution of faculty and progress of students. Procurement of Departmental requirements are done through the HoDs as per the norms of purchase committee and they assist the principal in administration. 5. There are different Committees such as prospectus committee, website management committee, staff grievance redressed committee, anti- ragging committee, women empowerment committee, research committee, NSS, IQAC are some of the forms where faculty get involved in the planning and execution of the cocurricular and extracurricular activities of the institution. 6. The IQAC cell arranges the meeting of QAC and monitors QA issue and sustenance of quality in academic matters. 7. IQAC also promotes quality enhancement measures in the college. An independent placement officer looks after the campus interview in and outside the campus and placements through placement cell. 8. Taking in to account the demand made by students, teachers, departmental heads, support unit in charge and office, the principal seeks the requirement from concerned heads by giving them notice for remaining stalk verification and submission of report to office. After evaluating the necessity of requirements, the list of requirement is finalized. The consolidated requirement of all departments is placed before the purchase committee consisting of the representative of management, principal, office superintendent and senior teachers for the approval.

6.1.2 – Does the institution have a Management Information System (MIS)?

Partial

## 6.2 – Strategy Development and Deployment

6.2.1 – Quality improvement strategies adopted by the institution for each of the following (with in 100 words each):

Strategy Type	Details
Admission of Students	The Principal of the College along with the admission committee carry out the admission process. Financial help is offered through the flexibility in payment of fees in easy instalments for the needy students. Economically poor students are provided with free admission by the College authority. The

	students are guided to opt for right choice of subject combination at the time of admission.
Industry Interaction / Collaboration	NO
Human Resource Management	All human resources available within the College is deployed and engaged according to one's aptitude and abilities. Maintenance of Grievance Redressal Cell, AntiRagging Committee, Sexual Harassment Committee.
Library, ICT and Physical Infrastructure / Instrumentation	The library is equipped with Digital library facilities NLIST also national and international journals are provided. Circulations are maintained through Integrated Library Management Software (ILMS). The College library is enabled with free WiFi facility of 100 mbps for the use of eresources within the campus. New books are added every year for the requirement of teaching learning process. ICT: Usage of teaching and learning process LCD projectors are installed in Audio Visual Room and Conference Hall. Procurement of more LCD projector and laptop for the same purpose. Physical Infrastructure: More fans were installed and the conventional blackboards were replaced with whiteboards, a water cooler was procured.
Research and Development	Research and Development- the College has PG center for 14 subjects. Also it has recognized research center for all the 14 departments. Few of the faculty members are recognized and nominated research guides under KBC NMU.
Examination and Evaluation	the College follows the semester system as per the directives of the KBC NMU, Jalgaon. The College also complemented continuous assessment of student's performance through internal test, assignments, project works, attendance, seminars, end semester exam, etc. with the traditional written examination. The external evaluation process is done in accordance to the performance of the students during the end semester exam.
Teaching and Learning	Educational excursion, field visit and industrial visits are also part of the evaluation system. Enhancement of learning skills of the Students through participation in different seminars. Regular feedback is obtained from students for improving teaching

	learning method.
Curriculum Development	? Curriculum Development For the smooth flow of the syllabus, teachers are made to submit their lesson plan for every semester. The IQAC ensures quality in Curriculum development through regular meetings among the teaching staff regarding academic affairs and collecting feedback from various stakeholders.

6.2.2 – Implementation of e-governance in areas of operations:

E-governance area	Details
Planning and Development	Development Planning and Development- All the mandatory disclosures as per apex bodies are in place, www.nmu.ac.in and nvtsgtpcollege.org Implemented
Administration	Computerised system
Finance and Accounts	The accounts of the College are maintained under cash basis of accounting. Fees are collected manually which maintain records of students' receipts and profile account. Daily cash collection and payment reports are recorded in the cash book later which is posted to various ledgers. Class wise fees receivable and the actual fees received are reconciled after every semester. Staff salary along with their profile is maintained in the system.
Examination	The necessary Infrastructure and human resources are well in place at college for organizing the university examination either online or the manual examination. Receiving the question papers, submission of student's performance evaluation report, remuneration bills towards examination work are observed using online system as well as manually.

6.3 – Faculty Empowerment Strategies

6.3.1 – Teachers provided with financial support to attend conferences / workshops and towards membership fee of professional bodies during the year

Year	Name of Teacher	Name of conference/ workshop attended for which financial support provided	Name of the professional body for which membership fee is provided	Amount of support
<b>No Data Entered/Not Applicable !!!</b>				
No file uploaded.				

6.3.2 – Number of professional development / administrative training programmes organized by the College for teaching and non teaching staff during the year

Year	Title of the professional development programme organised for teaching staff	Title of the administrative training programme organised for non-teaching staff	From date	To Date	Number of participants (Teaching staff)	Number of participants (non-teaching staff)
2019	nil	Nil	Nil	Nil	Nil	Nil
No file uploaded.						

6.3.3 – No. of teachers attending professional development programmes, viz., Orientation Programme, Refresher Course, Short Term Course, Faculty Development Programmes during the year

Title of the professional development programme	Number of teachers who attended	From Date	To date	Duration
Refresher Course University of Rajasthan , Jaipur	1	24/02/2020	23/03/2020	14
Refresher Course University of Rajasthan , Jaipur	1	23/09/2019	05/10/2019	14
Refresher course in Basic Sciences at R. D. V. V. , Jabalpur	1	16/12/2019	28/12/2019	14
Application of Chromatography and Spectrography HRDC Indore	1	27/11/2019	10/12/2019	14
Inter Disciplinary Course (HRDC Kennur University Kerala	1	11/07/2019	24/07/2019	14
INDIAN PHILOSOPHY, THOUGH AND THINKERS (IDC)HRDC University of New Delhi	1	17/09/2019	30/09/2019	14
Environmental Science and Disaster Management'	1	13/07/2019	05/08/2019	14

,HRDC RANCHI University				
Guru Ghashidas central university, bilaspur .(C.G)	1	11/09/2019	24/09/2020	14
Two Weeks Faculty Development Programme on"Managing Online Classes and Co-Creating MOOCS" ,Ramanujan College New, Delhi	4	20/04/2020	06/05/2020	16
Two Weeks Faculty Development Programme on"Managing Online Classes and Co-Creating MOOCS" ,Ramanujan College New, Delhi	9	18/05/2020	03/06/2020	16
<a href="#">View File</a>				

6.3.4 – Faculty and Staff recruitment (no. for permanent recruitment):

Teaching		Non-teaching	
Permanent	Full Time	Permanent	Full Time
83	87	40	40

6.3.5 – Welfare schemes for

Teaching	Non-teaching	Students
Employee provident fund and staff welfare fund facilities, G.T. Patil Co-Operative Society	E.P.F. facility and staff welfare fund facility, G.T. Patil Co-Operative Society	Different Scholarships of state and central government for the students

**6.4 – Financial Management and Resource Mobilization**

6.4.1 – Institution conducts internal and external financial audits regularly (with in 100 words each)

Internal audit is done after every six months where the auditing team checks the income received from the students which is recorded in the software and reconciled with the fees that is to be received according to class wise. Cash book is checked with the help of bank statement and vouchers maintained by the institution along with physical cash verification. Reports of Income and Expenditure statement is submitted to the Chattered Accountant who prepared the financial statement and other reports for the institution.

6.4.2 – Funds / Grants received from management, non-government bodies, individuals, philanthropies during the



year(not covered in Criterion III)

Name of the non government funding agencies /individuals	Funds/ Grnats received in Rs.	Purpose
NIl	Nil	Nil
No file uploaded.		

6.4.3 – Total corpus fund generated

0
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## 6.5 – Internal Quality Assurance System

6.5.1 – Whether Academic and Administrative Audit (AAA) has been done?

Audit Type	External		Internal	
	Yes/No	Agency	Yes/No	Authority
Academic	Yes	KBC NMU Jalgaon	No	Nil
Administrative	Yes	KBC NMU Jalgaon	No	Nil

6.5.2 – Activities and support from the Parent – Teacher Association (at least three)

<p>Many points of agenda were discussed during the meeting to improve the College in many areas like infrastructure, discipline, extracurricular activities and performances of the students. 1. The College always invites suggestion for improvement from the parents and the stakeholders and the feedback obtained from them are always given due importance. Parents in the meeting discussed the issue about security and discipline in the parking slots. 3. Parents assured demotivating their child /ward for usage of mobile phones in the college. 3. Interpersonal interaction also took place between the parents and the concerned subject teachers out of which the parents were able to find out about their ward's attendance record and their performance in the recently concluded examination.</p>
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6.5.3 – Development programmes for support staff (at least three)

<p>1. Training: With an objective to develop employees skills on the job training was given to employees as to how to handle on-line admissions. 2. Meeting with support staff before centralize admission process for PG classes. 3.To strengthen the Research ,Faculties and Students are motivated to contribute their research work to journals of UGC CARE list and motivated to plan to Organise National Conference.</p>
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6.5.4 – Post Accreditation initiative(s) (mention at least three)

<p>introduction of skill based courses namely CCC programme under Digital India 3. Getting ISO 9001:2015 Certifications. 4. Certificate course in GST.</p>
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6.5.5 – Internal Quality Assurance System Details

a) Submission of Data for AISHE portal	Yes
b)Participation in NIRF	No
c)ISO certification	Yes
d)NBA or any other quality audit	No

6.5.6 – Number of Quality Initiatives undertaken during the year

Year	Name of quality initiative by IQAC	Date of conducting IQAC	Duration From	Duration To	Number of participants
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2020	Meeting for Quality initiative	18/02/2020	18/02/2020	20/02/2020	40
<a href="#">View File</a>					

## CRITERION VII – INSTITUTIONAL VALUES AND BEST PRACTICES

### 7.1 – Institutional Values and Social Responsibilities

7.1.1 – Gender Equity (Number of gender equity promotion programmes organized by the institution during the year)

Title of the programme	Period from	Period To	Number of Participants	
			Female	Male
Nil	Nil	Nil	Nil	Nil

7.1.2 – Environmental Consciousness and Sustainability/Alternate Energy initiatives such as:

Percentage of power requirement of the University met by the renewable energy sources
Institute recently installed LED bulbs in the campus to reduce the electricity consumption also Institute have solar energy system for hostel

7.1.3 – Differently abled (Divyangjan) friendliness

Item facilities	Yes/No	Number of beneficiaries
Ramp/Rails	Yes	50
Provision for lift	No	Nil
Physical facilities	Yes	10
Braille Software/facilities	No	Nil
Rest Rooms	Yes	Nil
Scribes for examination	No	Nil
Special skill development for differently abled students	No	Nil
Any other similar facility	No	Nil

7.1.4 – Inclusion and Situatedness

Year	Number of initiatives to address locational advantages and disadvantages	Number of initiatives taken to engage with and contribute to local community	Date	Duration	Name of initiative	Issues addressed	Number of participating students and staff
2019	1	1	28/08/2019	1	Tree Plantation	Environmental Awareness	85
2020	1	1	27/01/2020	6	Industrial Visit	Connect to industry	56

[View File](#)

## 7.1.5 – Human Values and Professional Ethics Code of conduct (handbooks) for various stakeholders

Title	Date of publication	Follow up(max 100 words)
Nil	Nil	Nil

## 7.1.6 – Activities conducted for promotion of universal Values and Ethics

Activity	Duration From	Duration To	Number of participants
Independence Day	15/08/2019	15/08/2019	200
International Yoga Day	21/06/2019	21/06/2019	500

[View File](#)

## 7.1.7 – Initiatives taken by the institution to make the campus eco-friendly (at least five)

? Maintaining a separate dustbin for used plastic bottles which are taken for recycling. ? Planting of plants inside the campus. ? Rainwater harvesting. ? Students encouraged to use bicycles in large number. ? The college organised lectures on 'Sustainable Development' and 'Environmental issues' every year.

**7.2 – Best Practices**

## 7.2.1 – Describe at least two institutional best practices

1) Title: Participation of institute in the awareness of COVID-19 through different platforms. Goal: The College has been actively involved in the awareness of devastating pandemic COVID 19, which has disturbed the whole world economy. The institute has profoundly conducted activities for the awareness of it with following objectives. • To participate in awareness programmes of COVID 19 in Nandurbar District. • To contribute to the society through various community based awareness through social distancing. • To disseminate knowledge about measures to be taken by people at different places for safety. • To develop the habits of safety measures recommended by the Government of Maharashtra and India. • To bring expected social change among affected people. Context: The institute has been contributing for noble cause of society since begging. In the last quarter of the academic year the whole world faced pandemic situation with devastating covid 19 which brought lockdown at individual level. It brought a challenge before educational institutes specially those which incessantly contributing to the betterment of society. Similarly in such pandemic situation when had to deliberately order all about work from home which gave an opportunity to the different departments and units of the institute to bring awareness around. Practice: The Challenging situation of pandemic gave an opportunity to the Units like NSS and NCC which started creating awareness about COVID 19 through online resources like Google forms and Zoom application. Both the units actively created videos and quizzes with the help of volunteers. On the other hand NSS unit did splendid work about spitting kills creating awareness about spitting at public places was appreciated at different level. NCC also added to it , prepared awareness video about COVID 19 and uploaded on Youtube for large coverage. In continuation the Department of Zoology, Chemistry, Computer Science, Geography, Psychology, English and IQAC came up with google quizzes, competition and stress management activity during pandemic. Evidence of Success: Evidently such practice of making people, staff and students involved during the fight against Corona Virus really kept the District at limited thin line of spreading corona virus in compare to neighbouring Districts like Dhule and Jalgaon. During the month

of March, April and May the District maintain the boundary of Green zone with limited infection among people. Problems encountered and Resources Required: It has been really a challenge before the District administration to keep the safety level of individuals and managing the measures required to control the spread of Corona virus, due illiteracy rate of the District and lack of awareness. But the contribution of institute has added little bit to spread awareness about impact of Corona on life and economy. It resulted in high recovery rate of patients. Initially people took the things casual but the line of series action was well maintained by the units of the college. During this the institute faced many problems like maintaining the law and rules of social distancing. The Institute used the popular platform for contacting staff and society. At large the institute organized a National level webinar on Impact of Covid and Digital Transformation which was attended by near about 500 participants.

2) Title: Motivation by the institute for Staffs' digital development and its implementation practically. Goal: The College has been actively involved in the awareness of devastating pandemic COVID 19, which has disturbed the whole world economy. It was a great challenge before institute to maintain the enthusiasm of teaching and non-teaching staff. The institute has profoundly conducted activities for motivating the staff for digital development with following objectives.

- To encourage the staff for learning e-content development during lockdown.
- To motivate the non-teaching staff for learning new technology of assisting administration.
- To learn, unlearn and relearn new teaching software using digital platforms.

Context : After the process of lockdown it was a challenge before all educational institutes that how to maintain the tempo of academic activities among staff and students. Since the situation was about to move to longtime lockdown, the institute motivated the staff for online Digital skill based learning to secure the future of online trend should not disturb the task of the institute. Practice : Considering the pandemic period as an opportunity the institute motivated the newly appointed teaching staff for attending online orientation and RCMoocs courses on e-content development. Similarly there were webinars for non-teaching staff also about econtent management, which was attended by all maximum quantity of the staff. The authorized courses sponsored by MHRD and UGC HRDC were attended by the staff. There were near about 30 teaching faculties could complete their orientation and RCMoocs which was based on e content development which included google classroom, google forms, google sites, docs, slides, edmodo, renderforest, screen recorder, online broadcasting softwares etc. on the other hand one of the faculties from computer Department conducted a one week workshop on basics of computer for non teaching staff which was attended by 30 members. Evidence of Success : At large many faculties could attend national and international webinars on different topics related their own subject successfully. Some of the faculties also attended webinars as expert speakers at national level delivering on the innovative topics like Digital Humanities and online teaching management system during and after pandemic. On 21st June International Day of Yoga was performed by NCC and Sports Department of via online using ZOOM app. Maximum staff is happy with the approach of the institute for allowing and motivating them for online learning which resulted in teacher-student interaction continued in online mode benefiting the students to solve their doubts. The platforms like Googlemeet, Zoom and google classroom become useful source for connection. Evidently the College could organized national webinar on Covid 19 and Digital Transformation which was attended by 500 participants' online using ZOOM app. Problems encountered and Resources required : It has always been a problem of internet connectivity in remote parts of Adivasi District Nandurbar. Still faculties could manage to maintain consistency in their online learning process and contacts with students to enhance the moral of students under work from home orders by the Government of Maharashtra and the University. The basic problem was face about lack of android devices with students which created a breach in

learning process. Still somehow 40 to 70 percent

Upload details of two best practices successfully implemented by the institution as per NAAC format in your institution website, provide the link

<http://www.ntvsgtpcollege.org/uploads/Best-Practice.pdf>

### 7.3 – Institutional Distinctiveness

7.3.1 – Provide the details of the performance of the institution in one area distinctive to its vision, priority and thrust in not more than 500 words

The Vision of the college is to prepare graduates to assume positions of Political, Economic, Intellectual, Artistic and Environment Leadership in Tribal, Regional and National contexts. The Mission statement of the college is : "Empower The Tribal and Rural Students Through Higher Education." The college is established with a clear vision. It is a pioneer institute of NTVS. In this process, the student does not only acquire formal education in the chosen area but receives all round understanding of the environment and social sensitivity required to become a responsible citizen. Although most of the students belong to urban areas of Thane, it is important that they are sensitized about the stark contrast of rural part of Nandurbar district which still struggles for basic living and educational needs. Rural life poses many challenges such as lack of public health, malnutrition, water, sanitation, educational and vocational opportunities. In some of these areas, students can contribute and improve their understanding through participation. The rural society also benefits from such participative activities. The main objectives of the college are:

- To bring the tribal and rural students to the main stream of education
- To make all-round development of tribal and rural students
- To create competence and self-confidence among the tribal students
- To impart value based education through socio-cultural activities
- To create cultural and nation loving citizens
- To develop versatile personality through higher education
- To motivate the tribal and rural students towards competitive examinations.

Our management, Principal, Teachers, Non-Teaching staff and students put tireless efforts in achieving the goals of our institutions.

Provide the weblink of the institution

<http://www.ntvsgtpcollege.org>

### 8.Future Plans of Actions for Next Academic Year

2020-21

1. Promote online classroom teaching prepare subject-wise links for the same
2. Make provisions for online admission for all courses which also include collection of fees through Bank
3. Organise online workshops / webinar for the benefit of student
4. Motivate staff members to undertake major / minor research projects
5. Continual Improvement in Education process through ISO 9001:2015 Quality Management System.
6. Prepare AQAR as per revised format of NAAC for the academic year 2019-20
- 7.To develop ICT facilities
- 8.Renovation of Building
- 9.To develop facilities for Badminton and Physical Exercise
- 10.Digitization of Library



## YEARLY STATUS REPORT - 2020-2021

### Part A

#### Data of the Institution

<b>1.Name of the Institution</b>		NTVS's G.T.Patil Arts Commerce and Science College, Nandurbar
• Name of the Head of the institution		Prof.Dr. V.S. Shrivastava
• Designation		Principal (Officiating)
• Does the institution function from its own campus?		Yes
• Phone no./Alternate phone no.		02564-222293
• Mobile no		9423905823
• Registered e-mail		gtpcollege@rediffmail.com
• Alternate e-mail		drvinod_shrivastava@yahoo.com
• Address		Shani Mandir Road, Nandurbar
• City/Town		Nandurnar
• State/UT		Maharashtra
• Pin Code		425412
<b>2.Institutional status</b>		
• Affiliated /Constituent		Affiliated
• Type of Institution		Co-education
• Location		Rural

• Financial Status	Grants-in aid
• Name of the Affiliating University	KBC North Maharashtra University, Jalgaon
• Name of the IQAC Coordinator	Dr. M.J. Raghuwanshi
• Phone No.	02564222293
• Alternate phone No.	9423905823
• Mobile	9423942750
• IQAC e-mail address	gtpcollege@rediffmail.com
• Alternate Email address	drvinod_shrivastava@yahoo.com
<b>3.Website address (Web link of the AQAR (Previous Academic Year)</b>	<a href="http://www.ntvsgtpcollege.org/uploads/IQAC_2019-20.pdf">http://www.ntvsgtpcollege.org/uploads/IQAC_2019-20.pdf</a>
<b>4.Whether Academic Calendar prepared during the year?</b>	Yes
• if yes, whether it is uploaded in the Institutional website Web link:	<a href="http://ntvsgtpcollege.org/uploads/Academic_Calender_2020-21.pdf">http://ntvsgtpcollege.org/uploads/Academic_Calender_2020-21.pdf</a>

#### 5.Accreditation Details

Cycle	Grade	CGPA	Year of Accreditation	Validity from	Validity to
Cycle 1	B+	-	2004	16/02/2004	15/02/2009
Cycle 2	A	3.10	2015	03/03/2015	20/03/2020

#### 6.Date of Establishment of IQAC

01/07/2005

#### 7.Provide the list of funds by Central / State Government

UGC/CSIR/DBT/ICMR/TEQIP/World Bank/CPE of UGC etc.,

Institutional/Department /Faculty	Scheme	Funding Agency	Year of award with duration	Amount
Science	DST-FIST	DST	2014	8000000
Science	MPCB	Maha Pol. Control Board	2021	3000000

<b>8. Whether composition of IQAC as per latest NAAC guidelines</b>	<b>Yes</b>	
<ul style="list-style-type: none"> <li>• Upload latest notification of formation of IQAC</li> </ul>	<a href="#">View File</a>	
<b>9. No. of IQAC meetings held during the year</b>	<b>3</b>	
<ul style="list-style-type: none"> <li>• Were the minutes of IQAC meeting(s) and compliance to the decisions have been uploaded on the institutional website?</li> </ul>	<b>Yes</b>	
<ul style="list-style-type: none"> <li>• If No, please upload the minutes of the meeting(s) and Action Taken Report</li> </ul>	No File Uploaded	
<b>10. Whether IQAC received funding from any of the funding agency to support its activities during the year?</b>	<b>No</b>	
<ul style="list-style-type: none"> <li>• If yes, mention the amount</li> </ul>		
<b>11. Significant contributions made by IQAC during the current year (maximum five bullets)</b>		
<p>1) Faculties were encouraged to participate in NAAC 2) Conducted International webinar on IPR and Patent Fillings. 3) Motivated to Students and Teacher for Vaccination.</p>		
<b>12. Plan of action chalked out by the IQAC in the beginning of the Academic year towards Quality Enhancement and the outcome achieved by the end of the Academic year</b>		



Plan of Action	Achievements/Outcomes
The management and IQAC had decided to organized Seminar/conferences focusing on novel initiative	Organised International webinar on IPR and Patent Filing
Motivate teachers for submission of Research Project for Various Ageencies	One Submitted project sanctioned and six staff members submitted research project for funding.
Recognition of Research Lab	Got the recognition for the research Lab from university for the subject Zoology, Physics, Botany and Psychology
<b>13.Whether the AQAR was placed before statutory body?</b>	<b>Yes</b>
<ul style="list-style-type: none"> <li>Name of the statutory body</li> </ul>	
Name	Date of meeting(s)
Management	07/07/2020
<b>14.Whether institutional data submitted to AISHE</b>	
Year	Date of Submission
2020-21	04/03/2022

## Extended Profile

### 1.Programme

1.1 22

Number of courses offered by the institution across all programs during the year

File Description	Documents
Data Template	<a href="#">View File</a>

### 2.Student

2.1 3389

Number of students during the year

File Description	Documents
Institutional Data in Prescribed Format	No File Uploaded

2.2 0

Number of seats earmarked for reserved category as per GOI/ State  
Govt. rule during the year

File Description	Documents
Data Template	No File Uploaded

2.3 1238

Number of outgoing/ final year students during the year

File Description	Documents
Data Template	No File Uploaded

### 3.Academic

3.1 62

Number of full time teachers during the year

File Description	Documents
Data Template	No File Uploaded

3.2 0

Number of sanctioned posts during the year

<b>Extended Profile</b>	
<b>1.Programme</b>	
1.1 Number of courses offered by the institution across all programs during the year	<b>22</b>
<b>File Description</b>	<b>Documents</b>
Data Template	<a href="#">View File</a>
<b>2.Student</b>	
2.1 Number of students during the year	<b>3389</b>
<b>File Description</b>	<b>Documents</b>
Institutional Data in Prescribed Format	No File Uploaded
2.2 Number of seats earmarked for reserved category as per GOI/ State Govt. rule during the year	<b>0</b>
<b>File Description</b>	<b>Documents</b>
Data Template	No File Uploaded
2.3 Number of outgoing/ final year students during the year	<b>1238</b>
<b>File Description</b>	<b>Documents</b>
Data Template	No File Uploaded
<b>3.Academic</b>	
3.1 Number of full time teachers during the year	<b>62</b>
<b>File Description</b>	<b>Documents</b>
Data Template	No File Uploaded

3.2	0
Number of sanctioned posts during the year	

File Description	Documents
Data Template	No File Uploaded

#### 4. Institution

4.1	30
Total number of Classrooms and Seminar halls	
4.2	8
Total expenditure excluding salary during the year (INR in lakhs)	
4.3	75
Total number of computers on campus for academic purposes	

### Part B

#### CURRICULAR ASPECTS

##### 1.1 - Curricular Planning and Implementation

1.1.1 - The Institution ensures effective curriculum delivery through a well planned and documented process

An institution follows curriculum designed by Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon (KBC NMU). The curriculum is carried out properly by concerning faculties. As per the plan from beginning to the end of academic session syllabus is completed within time, and its record is preserved by all faculties for future use and reference. 100% curriculum is delivered as per procedure by the institution, besides keeping documentation. Being affiliated to the KBC North Maharashtra University, Jalgaon, the college follows curricula given by the university. For effective implementation of the curricula, the college prepares a roadmap every year. Highlights of the roadmap are as given below: Academic Calendar Preparation: • Prior to the commencement of the academic year, departments of the college prepare their academic calendar based on the University calendar. • This gives clear picture of the available dates for noteworthy activities to ensure proper teaching-learning transaction and continuous evaluation. • At the beginning of the academic year,

Head of the Department conducts meetings and discusses departmental academic calendar with the departmental members for smooth conduction of the teaching learning process and other activities. • Discussion of the syllabus with individual teachers. • Assignment of the workload and timetable to the individual teacher. • Individual teacher prepares month-wise teaching plan considering following factors: o Available dates and periods for teaching learning process. • Syllabus to be covered • Teaching plans are submitted to the Head of the Department. • Weekly records of teaching-learning activities are submitted to the Head of the Department. Use of Information and Communication Technology: • • For better understanding of the topic by the students, use of ICT has been increased by the faculty. • Teachers use power point presentations, animations, video clips, etc for better explanation of the topic. • Periodical meetings are held at departmental level by the Head of the department and thus monitor the smooth conduction of teaching-learning process.

File Description	Documents
Upload relevant supporting document	No File Uploaded
Link for Additional information	Nil

1.1.2 - The institution adheres to the academic calendar including for the conduct of Continuous Internal Evaluation (CIE)

There is transparency in the internal assessment. The standard adopted is as directed by the university. At the beginning of the semester faculty members inform the students about the different components in evaluation process during the semester. The internal evaluation test schedules are prepared and communicated to the students. To make sure proper conduct of formative tests, one invigilator assigned to each hall. Assessment is done by the course handling faculty members within few days from the date of examination. The marks obtained by the students internal evaluation tests are recorded in the department. The marks obtained by the students in internal evaluation tests records are submmitted to CAP.

File Description	Documents
Upload relevant supporting document	No File Uploaded
Link for Additional information	Nil

<p><b>1.1.3 - Teachers of the Institution participate in following activities related to curriculum development and assessment of the affiliating University and/are represented on the following academic bodies during the year. Academic council/BoS of Affiliating University Setting of question papers for UG/PG programs Design and Development of Curriculum for Add on/ certificate/ Diploma Courses Assessment /evaluation process of the affiliating University</b></p>	<p><b>A. All of the above</b></p>
--	-----------------------------------

File Description	Documents
Details of participation of teachers in various bodies/activities provided as a response to the metric	No File Uploaded
Any additional information	No File Uploaded

**1.2 - Academic Flexibility**

**1.2.1 - Number of Programmes in which Choice Based Credit System (CBCS)/ elective course system has been implemented**

**1.2.1.1 - Number of Programmes in which CBCS/ Elective course system implemented**

**20**

File Description	Documents
Any additional information	No File Uploaded
Minutes of relevant Academic Council/ BOS meetings	No File Uploaded
Institutional data in prescribed format (Data Template)	No File Uploaded

**1.2.2 - Number of Add on /Certificate programs offered during the year**

**1.2.2.1 - How many Add on /Certificate programs are added during the year. Data**

**requirement for year: (As per Data Template)**

0

File Description	Documents
Any additional information	No File Uploaded
Brochure or any other document relating to Add on /Certificate programs	No File Uploaded
List of Add on /Certificate programs (Data Template )	No File Uploaded

**1.2.3 - Number of students enrolled in Certificate/ Add-on programs as against the total number of students during the year**

20

File Description	Documents
Any additional information	No File Uploaded
Details of the students enrolled in Subjects related to certificate/Add-on programs	No File Uploaded

**1.3 - Curriculum Enrichment**

**1.3.1 - Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability into the Curriculum**

Educational Institution, being a very important part of society; has a major role to play in handling cross cutting issues. As colleges are developing the youth of the country, our curriculum of some regular courses tries to address issues related to Environment, Sustainability, Gender and Professional Ethics while some valueadded courses aim to inculcate social, human values, thereby leading to the holistic development of students. Our various courses cover following components to impart value education as follows.

- Our university KBC NMU Jalgaon has made Environmental Science as a compulsory credit course for all U.G. First Year students. In the course study, students get introduced to Ecology, Ecosystem, Natural Resource Conservation and Management, Biodiversity conservation and learn Environmental Pollution Control Technology.
- Our NCC and NSS programs also handle different environment

conservation activities such as Tree plantation, Nirmalya Collection.

- NSS and NCC organised Gender Equalities, Environmental Day and Water Conservation Programmes.

File Description	Documents
Any additional information	No File Uploaded
Upload the list and description of courses which address the Professional Ethics, Gender, Human Values, Environment and Sustainability into the Curriculum.	No File Uploaded

### 1.3.2 - Number of courses that include experiential learning through project work/field work/internship during the year

06

File Description	Documents
Any additional information	No File Uploaded
Programme / Curriculum/ Syllabus of the courses	No File Uploaded
Minutes of the Boards of Studies/ Academic Council meetings with approvals for these courses	No File Uploaded
MoU's with relevant organizations for these courses, if any	No File Uploaded
Institutional Data in Prescribed Format	No File Uploaded

### 1.3.3 - Number of students undertaking project work/field work/ internships

185

File Description	Documents
Any additional information	No File Uploaded
List of programmes and number of students undertaking project work/field work/ /internships (Data Template)	No File Uploaded



<b>1.4 - Feedback System</b>	
<b>1.4.1 - Institution obtains feedback on the syllabus and its transaction at the institution from the following stakeholders Students Teachers Employers Alumni</b>	<b>A. All of the above</b>
<b>File Description</b>	<b>Documents</b>
URL for stakeholder feedback report	Nil
Action taken report of the Institution on feedback report as stated in the minutes of the Governing Council, Syndicate, Board of Management	No File Uploaded
Any additional information	No File Uploaded
<b>1.4.2 - Feedback process of the Institution may be classified as follows</b>	<b>E. Feedback not collected</b>
<b>File Description</b>	<b>Documents</b>
Upload any additional information	No File Uploaded
URL for feedback report	Nil
<b>TEACHING-LEARNING AND EVALUATION</b>	
<b>2.1 - Student Enrollment and Profile</b>	
<b>2.1.1 - Enrolment Number Number of students admitted during the year</b>	
<b>2.1.1.1 - Number of students admitted during the year</b>	
<b>3389</b>	
<b>File Description</b>	<b>Documents</b>
Any additional information	No File Uploaded
Institutional data in prescribed format	No File Uploaded
<b>2.1.2 - Number of seats filled against seats reserved for various categories (SC, ST, OBC, Divyangjan, etc. as per applicable reservation policy during the year (exclusive of supernumerary seats)</b>	

### 2.1.2.1 - Number of actual students admitted from the reserved categories during the year

1972

File Description	Documents
Any additional information	No File Uploaded
Number of seats filled against seats reserved (Data Template)	No File Uploaded

### 2.2 - Catering to Student Diversity

2.2.1 - The institution assesses the learning levels of the students and organizes special Programmes for advanced learners and slow learners

**Assessment of learning outcomes:** Assessment is done to identify learners with academic lag and advanced learners at the beginning of the year. Different departments have evolved way of assessing learning levels of the students and organize suitable programmes for diverse learners with diverse learning needs. Departments try to assess level of grasping of the subject and interest level among students. Results and marks are another criterion for assessing the learning levels Other criteria include Participation in Internship program Participation in events where they showcase projects Placement in agencies of Internship.

**Efforts for Slow learner students:**

- Reading and reference material is being provided to those who wish to improve their grades and also provide Model answers which are circulated among the students for their benefit.
- Remedial Classes are conducted for the slow learners, absentees and the students who participate in sports and extracurricular activities

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

### 2.2.2 - Student- Full time teacher ratio (Data for the latest completed academic year)

Number of Students	Number of Teachers
3389	57

File Description	Documents
Any additional information	No File Uploaded

### 2.3 - Teaching- Learning Process

2.3.1 - Student centric methods, such as experiential learning, participative learning and problem solving methodologies are used for enhancing learning experiences

- Competitions like Quiz, PowerPoint Presentations, models and poster making give exposure to students to show their creativity and their knowledge.
- Different departments give survey based assignments to the students.
- Research based projects are assigned to the students. Students are encouraged to participate in National, International Conferences.

File Description	Documents
Upload any additional information	No File Uploaded
Link for additional information	Nil

2.3.2 - Teachers use ICT enabled tools for effective teaching-learning process. Write description in maximum of 200 words

Teachers reach out to the students through various technological mediums and channels. The learners can see lecture recordings, videos, presentations, notes, can join forums for discussions and debates; and can even upload their assignments, projects in this learning management system. Alongside the learning resources, evaluation process is also available in this learning management system.

Other platforms being used are google classroom, Zoom, Google meet, Google Forms, Microsoft Teams, google groups and youtube live for academic activities. The tests conducted and usage of the students on Moodle show outcome of use of ICT tools. College has setup of three digital classrooms and almost all faculties are technosavvy.

File Description	Documents
Upload any additional information	No File Uploaded
Provide link for webpage describing the ICT enabled tools for effective teaching-learning process	No File Uploaded

**2.3.3 - Ratio of mentor to students for academic and other related issues (Data for the latest completed academic year )**

**2.3.3.1 - Number of mentors**

57

File Description	Documents
Upload, number of students enrolled and full time teachers on roll	No File Uploaded
Circulars pertaining to assigning mentors to mentees	No File Uploaded
Mentor/mentee ratio	No File Uploaded

**2.4 - Teacher Profile and Quality**

**2.4.1 - Number of full time teachers against sanctioned posts during the year**

62

File Description	Documents
Full time teachers and sanctioned posts for year (Data Template)	No File Uploaded
Any additional information	No File Uploaded
List of the faculty members authenticated by the Head of HEI	No File Uploaded

**2.4.2 - Number of full time teachers with Ph. D. / D.M. / M.Ch. /D.N.B Superspeciality / D.Sc. / D.Litt. during the year (consider only highest degree for count)**

**2.4.2.1 - Number of full time teachers with Ph. D. / D.M. / M.Ch. /D.N.C Superspeciality / D.Sc. / D.Litt. during the year**

42

File Description	Documents
Any additional information	No File Uploaded
List of number of full time teachers with Ph. D. / D.M. / M.Ch./ D.N.B Super specialty / D.Sc. / D.Litt. and number of full time teachers for year (Data Template)	No File Uploaded

### 2.4.3 - Number of years of teaching experience of full time teachers in the same institution (Data for the latest completed academic year)

#### 2.4.3.1 - Total experience of full-time teachers

862

File Description	Documents
Any additional information	No File Uploaded
List of Teachers including their PAN, designation, dept. and experience details(Data Template)	No File Uploaded

### 2.5 - Evaluation Process and Reforms

2.5.1 - Mechanism of internal assessment is transparent and robust in terms of frequency and mode. Write description within 200 words.

The college organises two internal tests in one academic year. The concern faculties set two question papers for each course. The CAP of the college prepares a schedule for internal tests as per the schedule the internal tests are carried out and the CAP handovers answer sheets to concern faculties. The faculties asses the anwer sheets and prepare results and desplayon college notice board.

File Description	Documents
Any additional information	No File Uploaded
Link for additional information	Nil

2.5.2 - Mechanism to deal with internal examination related grievances is transparent, time- bound and efficient

The internal assessment/ examination marks are displayed on the departmental notice board asfor redressal /any clarifications sought from students. The grievance is addressed through the concerned teacher within a timebound framework and in an efficient manner.

File Description	Documents
Any additional information	No File Uploaded
Link for additional information	Nil

## 2.6 - Student Performance and Learning Outcomes

2.6.1 - Programme and course outcomes for all Programmes offered by the institution are stated and displayed on website and communicated to teachers and students.

Certificate course in communication skills in english- Students improved their english language skills.

Certificate course in GST- The students improved their knowledge regarding GST.

File Description	Documents
Upload any additional information	No File Uploaded
Paste link for Additional information	Nil
Upload COs for all Programmes (exemplars from Glossary)	No File Uploaded

2.6.2 - Attainment of Programme outcomes and course outcomes are evaluated by the institution.

The college regularly undertakes the compilation of Program outcomes. The results of every program being offered by the institution are evaluated. The slow learners are provided with remedial classes to resolve their problems in the future. The course outcomes are evaluated in terms of various parameters .

File Description	Documents
Upload any additional information	No File Uploaded
Paste link for Additional information	Nil

### 2.6.3 - Pass percentage of Students during the year

#### 2.6.3.1 - Total number of final year students who passed the university examination during the year

2988

File Description	Documents
Upload list of Programmes and number of students passed and appeared in the final year examination (Data Template)	No File Uploaded
Upload any additional information	No File Uploaded
Paste link for the annual report	Nil

### 2.7 - Student Satisfaction Survey

#### 2.7.1 - Student Satisfaction Survey (SSS) on overall institutional performance (Institution may design its own questionnaire) (results and details need to be provided as a weblink)

<http://ntvsgtcollege.org/>

### RESEARCH, INNOVATIONS AND EXTENSION

#### 3.1 - Resource Mobilization for Research

##### 3.1.1 - Grants received from Government and non-governmental agencies for research projects / endowments in the institution during the year (INR in Lakhs)

##### 3.1.1.1 - Total Grants from Government and non-governmental agencies for research projects / endowments in the institution during the year (INR in Lakhs)

0

File Description	Documents
Any additional information	No File Uploaded
e-copies of the grant award letters for sponsored research projects /endowments	No File Uploaded
List of endowments / projects with details of grants(Data Template)	No File Uploaded

##### 3.1.2 - Number of teachers recognized as research guides (latest completed academic year)

<b>3.1.2.1 - Number of teachers recognized as research guides</b>	
20	
File Description	Documents
Any additional information	No File Uploaded
Institutional data in prescribed format	No File Uploaded
<b>3.1.3 - Number of departments having Research projects funded by government and non government agencies during the year</b>	
<b>3.1.3.1 - Number of departments having Research projects funded by government and non-government agencies during the year</b>	
0	
File Description	Documents
List of research projects and funding details (Data Template)	No File Uploaded
Any additional information	No File Uploaded
Supporting document from Funding Agency	No File Uploaded
Paste link to funding agency website	Nil
<b>3.2 - Innovation Ecosystem</b>	
3.2.1 - Institution has created an ecosystem for innovations and has initiatives for creation and transfer of knowledge	
<p>First year students work on environmental projects where they learn the importance of ecosystem in humanlife. In addition the college has established botonical garden to aware the students of harmony between nature and humanbeings. The departments of NSS and NCC organise tree plantation camp every year during July month.</p>	
File Description	Documents
Upload any additional information	No File Uploaded
Paste link for additional information	Nil



**3.2.2 - Number of workshops/seminars conducted on Research Methodology, Intellectual Property Rights (IPR) and entrepreneurship during the year**

**3.2.2.1 - Total number of workshops/seminars conducted on Research Methodology, Intellectual Property Rights (IPR) and entrepreneurship year wise during the year**

1

File Description	Documents
Report of the event	No File Uploaded
Any additional information	No File Uploaded
List of workshops/seminars during last 5 years (Data Template)	No File Uploaded

**3.3 - Research Publications and Awards**

**3.3.1 - Number of Ph.Ds registered per eligible teacher during the year**

**3.3.1.1 - How many Ph.Ds registered per eligible teacher within the year**

1

File Description	Documents
URL to the research page on HEI website	Nil
List of PhD scholars and their details like name of the guide , title of thesis, year of award etc (Data Template)	No File Uploaded
Any additional information	No File Uploaded

**3.3.2 - Number of research papers per teachers in the Journals notified on UGC website during the year**

**3.3.2.1 - Number of research papers in the Journals notified on UGC website during the year**

10

File Description	Documents
Any additional information	No File Uploaded
List of research papers by title, author, department, name and year of publication (Data Template)	No File Uploaded

**3.3.3 - Number of books and chapters in edited volumes/books published and papers published in national/ international conference proceedings per teacher during the year**

**3.3.3.1 - Total number of books and chapters in edited volumes/books published and papers in national/ international conference proceedings year wise during year**

35

File Description	Documents
Any additional information	No File Uploaded
List books and chapters edited volumes/ books published (Data Template)	No File Uploaded

**3.4 - Extension Activities**

3.4.1 - Extension activities are carried out in the neighborhood community, sensitizing students to social issues, for their holistic development, and impact thereof during the year

The students are exposed to cross-cutting issues, through rallies, street plays, and webinars including care of the young, old, Health and hygiene, Gender sensitization, emergencies, environmental consciousness and values are also strengthened for redressal at the society level. Extension during COVID is being carried out online through webinars for all stakeholders, encompassing diverse social topics. During the pandemic period many NSS volunteers worked as COVID YODHDA. Many students created vaccination awareness through poster and rangoli.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

**3.4.2 - Number of awards and recognitions received for extension activities from government / government recognized bodies during the year**

**3.4.2.1 - Total number of awards and recognition received for extension activities from Government/ Government recognized bodies year wise during the year**

0

File Description	Documents
Any additional information	No File Uploaded
Number of awards for extension activities in last 5 year (Data Template)	No File Uploaded
e-copy of the award letters	No File Uploaded

**3.4.3 - Number of extension and outreach programs conducted by the institution through NSS/NCC/Red cross/YRC etc., ( including the programmes such as Swachh Bharat, AIDS awareness, Gender issues etc. and/or those organized in collaboration with industry, community and NGOs ) during the year**

**3.4.3.1 - Number of extension and outreach Programs conducted in collaboration with industry, community and Non- Government Organizations through NSS/ NCC/ Red Cross/ YRC etc., during the year**

03

File Description	Documents
Reports of the event organized	No File Uploaded
Any additional information	No File Uploaded
Number of extension and outreach Programmes conducted with industry, community etc for the during the year (Data Template)	No File Uploaded

**3.4.4 - Number of students participating in extension activities at 3.4.3. above during year**

**3.4.4.1 - Total number of Students participating in extension activities conducted in collaboration with industry, community and Non- Government Organizations such as Swachh Bharat, AIDs awareness, Gender issue etc. year wise during year**

100

File Description	Documents
Report of the event	No File Uploaded
Any additional information	No File Uploaded
Number of students participating in extension activities with Govt. or NGO etc (Data Template)	No File Uploaded

<b>3.5 - Collaboration</b>	
<b>3.5.1 - Number of Collaborative activities for research, Faculty exchange, Student exchange/ internship during the year</b>	
<b>3.5.1.1 - Number of Collaborative activities for research, Faculty exchange, Student exchange/ internship year wise during the year</b>	
0	
<b>File Description</b>	<b>Documents</b>
e-copies of related Document	No File Uploaded
Any additional information	No File Uploaded
Details of Collaborative activities with institutions/industries for research, Faculty	No File Uploaded
<b>3.5.2 - Number of functional MoUs with institutions, other universities, industries, corporate houses etc. during the year</b>	
<b>3.5.2.1 - Number of functional MoUs with Institutions of national, international importance, other universities, industries, corporate houses etc. year wise during the year</b>	
02	
<b>File Description</b>	<b>Documents</b>
e-Copies of the MoUs with institution./ industry/corporate houses	No File Uploaded
Any additional information	No File Uploaded
Details of functional MoUs with institutions of national, international importance, other universities etc during the year	No File Uploaded
<b>INFRASTRUCTURE AND LEARNING RESOURCES</b>	
<b>4.1 - Physical Facilities</b>	
4.1.1 - The Institution has adequate infrastructure and physical facilities for teaching- learning. viz., classrooms, laboratories, computing equipment etc.	
There are 30 classrooms, 10with ICT facilities. There are 17 laboratories, 02 staff rooms, 1 seminar halland 04 browsing centers. Wi-fi facility is available.There is two open-air stages,	

02 conference halls and 04 store rooms. There are outdoor facilities for Football, hockey, cricket, athletics and other track and field events, volleyball and basketball, as well as for indoor games in the multipurpose gymnasium. Basic amenities on college premises include separate staff and student parkings, canteen, drinking water coolers, first-aid, solar energy generation, CCTV cameras for security, fire safety and separate washrooms for men, ladies, boys. The fully computerized library is available. Fitness centre is available. Well maintained garden available on the campus.

File Description	Documents
Upload any additional information	No File Uploaded
Paste link for additional information	Nil

4.1.2 - The Institution has adequate facilities for cultural activities, sports, games (indoor, outdoor), gymnasium, yoga centre etc.

The college has adequate facilities for cultural activities, yoga, games (indoor, outdoor) and sports like, Tennis Academy with Synthetic Court, Basketball Courts, Volleyball ground Handball Ground, Cricket Ground, Football Ground, Athletics Track, Health Track Multi-purpose Gymnasium Hall for indoor games. Fitness centre is available. Well maintained garden available on the campus.

File Description	Documents
Upload any additional information	No File Uploaded
Paste link for additional information	Nil

4.1.3 - Number of classrooms and seminar halls with ICT- enabled facilities such as smart class, LMS, etc.

10

File Description	Documents
Upload any additional information	No File Uploaded
Paste link for additional information	Nil
Upload Number of classrooms and seminar halls with ICT enabled facilities (Data Template)	No File Uploaded

#### 4.1.4 - Expenditure, excluding salary for infrastructure augmentation during the year (INR in Lakhs)

##### 4.1.4.1 - Expenditure for infrastructure augmentation, excluding salary during the year (INR in lakhs)

8

File Description	Documents
Upload any additional information	No File Uploaded
Upload audited utilization statements	No File Uploaded
Upload Details of budget allocation, excluding salary during the year (Data Template)	No File Uploaded

#### 4.2 - Library as a Learning Resource

##### 4.2.1 - Library is automated using Integrated Library Management System (ILMS)

The library is equipped with Digital library facilities NLIST also national and international journals are provided. For students and teachers around 10 daily news papers and weekly journals are available. Circulations are maintained through Integrated Library Management Software (ILMS). The College library is enabled with free WiFi facility of 100 mbps for the use of eresources within the campus. New books are added every year for the requirement of teaching learning process. ICT: Usage of teaching and learning process LCD projectors are installed in Audio Visual Room and Conference Hall. Procurement of more LCD projector and laptop for the same purpose. Physical Infrastructure: More fans were installed and the conventional blackboards were replaced with whiteboards, a water cooler was procured.

File Description	Documents
Upload any additional information	No File Uploaded
Paste link for Additional Information	Nil

<b>4.2.2 - The institution has subscription for the following e-resources e-journals e-ShodhSindhu Shodhganga Membership e-books Databases Remote access toe-resources</b>	<b>A. Any 4 or more of the above</b>
--	--------------------------------------

File Description	Documents
Upload any additional information	No File Uploaded
Details of subscriptions like e-journals,e-ShodhSindhu, Shodhganga Membership etc (Data Template)	No File Uploaded

<b>4.2.3 - Expenditure for purchase of books/e-books and subscription to journals/e- journals during the year (INR in Lakhs)</b>
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<b>4.2.3.1 - Annual expenditure of purchase of books/e-books and subscription to journals/e-journals during the year (INR in Lakhs)</b>
---

<b>250900</b>
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File Description	Documents
Any additional information	No File Uploaded
Audited statements of accounts	No File Uploaded
Details of annual expenditure for purchase of books/e-books and journals/e- journals during the year (Data Template)	<a href="#">View File</a>

<b>4.2.4 - Number per day usage of library by teachers and students ( foot falls and login data for online access) (Data for the latest completed academic year)</b>
--

<b>4.2.4.1 - Number of teachers and students using library per day over last one year</b>
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<b>560</b>
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File Description	Documents
Any additional information	No File Uploaded
Details of library usage by teachers and students	No File Uploaded

### 4.3 - IT Infrastructure

4.3.1 - Institution frequently updates its IT facilities including Wi-Fi

IT facilities are regularly updated. College has broadband connection for the office. Departments are networked through LAN with unlimited internet connection. Wi-fi was installed in the entire college. New wifi hotspots are being created in the campus with renovation of networking.

File Description	Documents
Upload any additional information	No File Uploaded
Paste link for additional information	Nil

### 4.3.2 - Number of Computers

90

File Description	Documents
Upload any additional information	No File Uploaded
List of Computers	No File Uploaded

### 4.3.3 - Bandwidth of internet connection in the Institution

A. ? 50MBPS

File Description	Documents
Upload any additional Information	No File Uploaded
Details of available bandwidth of internet connection in the Institution	No File Uploaded

### 4.4 - Maintenance of Campus Infrastructure

4.4.1 - Expenditure incurred on maintenance of infrastructure (physical and academic support facilities) excluding salary component during the year (INR in Lakhs)



**4.4.1.1 - Expenditure incurred on maintenance of infrastructure (physical facilities and academic support facilities) excluding salary component during the year (INR in lakhs)**

8

File Description	Documents
Upload any additional information	No File Uploaded
Audited statements of accounts	No File Uploaded
Details about assigned budget and expenditure on physical facilities and academic support facilities (Data Templates)	No File Uploaded

4.4.2 - There are established systems and procedures for maintaining and utilizing physical, academic and support facilities - laboratory, library, sports complex, computers, classrooms etc.

HODs and other in-charges request for required Maintenance work to be done to the Principal. Principal then presents the proposal before the college management, who takes the final decision on priority basis. Principal assigns the work to the concerned personnel. Regular maintenance work in the college takes place immediately, while longer projects are executed during vacation. Physical Education department maintains the sports facilities and equipment in the college.

Weeding of old books, binding, pest control and other maintenance measures are undertaken periodically.

The maintenance of electrical items is carried out by competent non-teaching staff. Any major repair work is carried out by professionals from outside the college.

File Description	Documents
Upload any additional information	No File Uploaded
Paste link for additional information	Nil

**STUDENT SUPPORT AND PROGRESSION**

**5.1 - Student Support**

**5.1.1 - Number of students benefited by scholarships and free ships provided by the Government during the year**

**5.1.1.1 - Number of students benefited by scholarships and free ships provided by the Government during the year**

1972

File Description	Documents
Upload self attested letter with the list of students sanctioned scholarship	No File Uploaded
Upload any additional information	No File Uploaded
Number of students benefited by scholarships and free ships provided by the Government during the year (Data Template)	<a href="#">View File</a>

**5.1.2 - Number of students benefitted by scholarships, free ships etc. provided by the institution / non- government agencies during the year**

**5.1.2.1 - Total number of students benefited by scholarships, free ships, etc provided by the institution / non- government agencies during the year**

0

File Description	Documents
Upload any additional information	No File Uploaded
Number of students benefited by scholarships and free ships institution / non- government agencies in last 5 years (Date Template)	No File Uploaded

**5.1.3 - Capacity building and skills enhancement initiatives taken by the institution include the following: Soft skills Language and communication skills Life skills (Yoga, physical fitness, health and hygiene) ICT/computing skills**

**A. All of the above**

File Description	Documents
Link to Institutional website	Nil
Any additional information	No File Uploaded
Details of capability building and skills enhancement initiatives (Data Template)	No File Uploaded

**5.1.4 - Number of students benefitted by guidance for competitive examinations and career counseling offered by the institution during the year**

400

**5.1.4.1 - Number of students benefitted by guidance for competitive examinations and career counseling offered by the institution during the year**

File Description	Documents
Any additional information	No File Uploaded
Number of students benefitted by guidance for competitive examinations and career counseling during the year (Data Template)	No File Uploaded

**5.1.5 - The Institution has a transparent mechanism for timely redressal of student grievances including sexual harassment and ragging cases Implementation of guidelines of statutory/regulatory bodies Organization wide awareness and undertakings on policies with zero tolerance Mechanisms for submission of online/offline students' grievances Timely redressal of the grievances through appropriate committees**

C. Any 2 of the above

File Description	Documents
Minutes of the meetings of student redressal committee, prevention of sexual harassment committee and Anti Ragging committee	No File Uploaded
Upload any additional information	No File Uploaded
Details of student grievances including sexual harassment and ragging cases	No File Uploaded

## 5.2 - Student Progression

### 5.2.1 - Number of placement of outgoing students during the year

#### 5.2.1.1 - Number of outgoing students placed during the year

15

File Description	Documents
Self-attested list of students placed	No File Uploaded
Upload any additional information	No File Uploaded
Details of student placement during the year (Data Template)	No File Uploaded

### 5.2.2 - Number of students progressing to higher education during the year

#### 5.2.2.1 - Number of outgoing student progression to higher education

2988

File Description	Documents
Upload supporting data for student/alumni	No File Uploaded
Any additional information	No File Uploaded
Details of student progression to higher education	No File Uploaded

### 5.2.3 - Number of students qualifying in state/national/ international level examinations during the year (eg: JAM/CLAT/GATE/ GMAT/CAT/GRE/ TOEFL/ Civil Services/State government examinations)

**5.2.3.1 - Number of students qualifying in state/ national/ international level examinations (eg: JAM/CLAT/NET/ SLET/ GATE/ GMAT/CAT/GRE/ TOEFL/ Civil Services/ State government examinations) during the year**

1

File Description	Documents
Upload supporting data for the same	No File Uploaded
Any additional information	No File Uploaded
Number of students qualifying in state/ national/ international level examinations during the year (Data Template)	No File Uploaded

**5.3 - Student Participation and Activities**

**5.3.1 - Number of awards/medals for outstanding performance in sports/cultural activities at university/state/national / international level (award for a team event should be counted as one) during the year**

**5.3.1.1 - Number of awards/medals for outstanding performance in sports/cultural activities at university/state/ national / international level (award for a team event should be counted as one) during the year.**

0

File Description	Documents
e-copies of award letters and certificates	No File Uploaded
Any additional information	No File Uploaded
Number of awards/medals for outstanding performance in sports/cultural activities at university/state/national/international level (During the year) (Data Template)	No File Uploaded

5.3.2 - Institution facilitates students' representation and engagement in various administrative, co-curricular and extracurricular activities (student council/ students representation on various bodies as per established processes and norms )

At the beginning of every academic year, the institute constitutes the Student Council by following the norms laid down by the University. A class representative from each class will be

nominated as a member of the Student Council. The student members elect General Secretary, Cultural Secretary, Sports Secretary, and Girls representative for a term of one year. The Student Council aims at the all-round development of students and organizes several academic, co-curricular, and extracurricular events throughout the year in association with the University and other organizations. Meetings of the Student Council are conducted at least once in each term with Student`s Welfare Officer, discipline, and anti-ragging committee.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

**5.3.3 - Number of sports and cultural events/competitions in which students of the Institution participated during the year (organized by the institution/other institutions)**

**5.3.3.1 - Number of sports and cultural events/competitions in which students of the Institution participated during the year**

0

File Description	Documents
Report of the event	No File Uploaded
Upload any additional information	No File Uploaded
Number of sports and cultural events/competitions in which students of the Institution participated during the year (organized by the institution/other institutions (Data Template)	No File Uploaded

**5.4 - Alumni Engagement**

5.4.1 - There is a registered Alumni Association that contributes significantly to the development of the institution through financial and/or other support services

**No Registered Alumni Association**

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

<b>5.4.2 - Alumni contribution during the year (INR in Lakhs)</b>	<b>E. &lt;1Lakhs</b>
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File Description	Documents
Upload any additional information	No File Uploaded

## GOVERNANCE, LEADERSHIP AND MANAGEMENT

### 6.1 - Institutional Vision and Leadership

6.1.1 - The governance of the institution is reflective of and in tune with the vision and mission of the institution

College policies are well in line with government and university policies. All the teachers work together to achieve these policies. Central committees are formed for smooth functioning with responsibilities. Transparency is maintained by sharing the information on college website for ready reference of all the stakeholders of college. Discipline, the most desirous virtue for teaching learning-process, amongst the students is maintained by faculty members. Students' performance is monitored through batch counselling. The college practices day to day decentralization and participative management. Following sequence of operations related to decentralization of power and the institution follows participative management:

1. The governing body, the advisory committee, finance committee, examination committee, local management committee/CDC constituted as per the UGC norms for college are made functional.
2. The principal takes policy decisions in consultation with the college development council/local management committee and vice principal and looks after the overall administration.
3. Heads of different committees look after the admission process, student issues and teaching learning process, maintenance of amenities, discipline and campus cleanliness and assist the principal in administrative matters.

4. The HoDs are entrusted with the responsibility of workload allocation, preparation of timetable, monitoring attendance of faculties and students, execution of teaching learning, demonstration and practical work, evaluation of academic contribution of faculty and progress of students. Procurement of Departmental requirements are done through the HoDs as per the norms of purchase committee and they assist the principal in administration.

5. There are different Committees such as prospectus committee, website management committee, staff grievance redressed committee, anti- ragging committee, women empowerment committee, research committee, NSS, IQAC are some of the forms where faculty get involved in the planning and execution of the cocurricular and extracurricular activities of the institution.

6. The IQAC cell arranges the meeting of IQAC and monitors QA issue and sustenance of quality in academic matters.

7. IQAC also promotes quality enhancement measures in the college.

8. Taking in to account the demand made by students, teachers, departmental heads, support unit in charge and office, the principal seeks the requirement from concerned heads by giving them notice for remaining stockverification and submission of report to office. After evaluating the necessity of requirements, the list of requirement is finalized. The consolidated requirement of all departments is placed before the purchase committee consisting of the representative of management, principal, office superintendent and senior teachers for the approval.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

6.1.2 - The effective leadership is visible in various institutional practices such as decentralization and participative management.

The institution follows a decentralized authority. At the beginning of every financial year, each department prepares and proposes a budget. The budget presented by the department is based on the plan of action taking into account the infrastructure requirements submitted by the teachers in charge of various



laboratories, by the Head of the Department. Subject to the approval of the proposed budget by the Management, whenever a proposal for availing finance for any activity is initiated, depending on the proposal amount, the approvals can be obtained at various levels. This clearly shows the participative nature of the Management and its dedication towards the growth of the institution.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

## 6.2 - Strategy Development and Deployment

6.2.1 - The institutional Strategic/ perspective plan is effectively deployed

The college proposes an academic year plan to every department. All the departments prepare academic year plan and strictly work on it. Apart from the departments other important segments of the college like NSS, NCC, Sports prepare yearwise plan for various activities and deploy all the activities. In the opening of the year academic committees are constituted and college administration ask to committees to prepare yearwise plan and observe to function of committees according to plan.

File Description	Documents
Strategic Plan and deployment documents on the website	No File Uploaded
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

6.2.2 - The functioning of the institutional bodies is effective and efficient as visible from policies, administrative setup, appointment and service rules, procedures, etc.

In the beginning of the academic year the college decides certain policies regarding admission process. There is separate committee for the students to help them in admission process. There is also an appointment of few experienced teachers as academic and career counsellors to help students to select appropriate branches and subjects. For non-grant courses college appoints a qualified teachers to offer services.

File Description	Documents
Paste link for additional information	Nil
Link to Organogram of the institution webpage	Nil
Upload any additional information	No File Uploaded

<b>6.2.3 - Implementation of e-governance in areas of operation Administration Finance and Accounts Student Admission and Support Examination</b>	A. All of the above
---	---------------------

File Description	Documents
ERP (Enterprise Resource Planning)Document	No File Uploaded
Screen shots of user inter faces	No File Uploaded
Any additional information	No File Uploaded
Details of implementation of e-governance in areas of operation, Administration etc(Data Template)	No File Uploaded

**6.3 - Faculty Empowerment Strategies**

6.3.1 - The institution has effective welfare measures for teaching and non- teaching staff

Employee provident fund and staff welfare fund facilities, G.T. Patil CoOperative Society E.P.F. facility and staff welfare fund facility.G.T. Patil CoOperative Society reserves some emergency funds for the employees. Different Scholarships of state and central government for the students.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

**6.3.2 - Number of teachers provided with financial support to attend conferences/ workshops and towards membership fee of professional bodies during the year**

**6.3.2.1 - Number of teachers provided with financial support to attend conferences/workshops and towards membership fee of professional bodies during the year**

0

File Description	Documents
Upload any additional information	No File Uploaded
Details of teachers provided with financial support to attend conference, workshops etc during the year (Data Template)	No File Uploaded

**6.3.3 - Number of professional development /administrative training programs organized by the institution for teaching and non-teaching staff during the year**

**6.3.3.1 - Total number of professional development /administrative training Programmes organized by the institution for teaching and non teaching staff during the year**

0

File Description	Documents
Reports of the Human Resource Development Centres (UGCASC or other relevant centres).	No File Uploaded
Reports of Academic Staff College or similar centers	No File Uploaded
Upload any additional information	No File Uploaded
Details of professional development / administrative training Programmes organized by the University for teaching and non teaching staff (Data Template)	No File Uploaded

**6.3.4 - Number of teachers undergoing online/face-to-face Faculty development Programmes (FDP) during the year (Professional Development Programmes, Orientation / Induction Programmes, Refresher Course, Short Term Course etc.)**

**6.3.4.1 - Total number of teachers attending professional development Programmes viz., Orientation / Induction Programme, Refresher Course, Short Term Course during the year**

32

File Description	Documents
IQAC report summary	No File Uploaded
Reports of the Human Resource Development Centres (UGCASC or other relevant centers)	No File Uploaded
Upload any additional information	No File Uploaded
Details of teachers attending professional development programmes during the year (Data Template)	No File Uploaded

#### 6.3.5 - Institutions Performance Appraisal System for teaching and non- teaching staff

Every academic year all faculty members are maintained the records of performance-based appraisal system (PBAS) as per UGC norms with supporting documents and submitted to IQAC office at end of academic year. It includes teaching, administrative work, ICT teaching -learning method, research publication, etc. The IQAC guide to fill up appraisal form and monitored time to time. IQAC evaluated the appraisal form of all faculties. The performance appraisal system for non-teaching is carried out through confidential report (CR). The confidential report also filled out from the teaching staff at end of academic year and evaluated by principal.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

#### 6.4 - Financial Management and Resource Mobilization

6.4.1 - Institution conducts internal and external financial audits regularly Enumerate the various internal and external financial audits carried out during the year with the mechanism for settling audit objections within a maximum of 200 words

Yes, Institution conducts internal and external financial audit regularly. The chartered accountant meticulously audits the finance related documents for all transactions. It is an audit of balance sheet, general fund income and expenditure, and receipt and payment account. Objections and questions of any kind during

the audit were promptly addressed by presenting relevant documents to the auditors. Every effort was put in to maintain transparency in the financial records, and also to record corresponding documents of every financial transaction. The institution is a grant in aid basis the regular internal financial audit was conducted or completed by Chartered Accountant appointed by college management on ever financial year regularly.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

#### 6.4.2 - Funds / Grants received from non-government bodies, individuals, philanthropers during the year (not covered in Criterion III)

##### 6.4.2.1 - Total Grants received from non-government bodies, individuals, Philanthropers during the year (INR in Lakhs)

00

File Description	Documents
Annual statements of accounts	No File Uploaded
Any additional information	No File Uploaded
Details of Funds / Grants received from of the non-government bodies, individuals, Philanthropers during the year (Data Template)	No File Uploaded

#### 6.4.3 - Institutional strategies for mobilization of funds and the optimal utilization of resources

The predominant source of funds for the institution are from Students fees, Funding from different funding agencies, Contribution from the management

Proper utilization of financial resources is planned at the beginning of every financial year. The expenses of the funds are mainly due to the following

1. Salaries
2. Departmental Budget

3. Infrastructure

4. Maintenance etc.,

5. Administrative expenses

6. Cultural & Co-curricular activities

7. Promotional activities

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

**6.5 - Internal Quality Assurance System**

6.5.1 - Internal Quality Assurance Cell (IQAC) has contributed significantly for institutionalizing the quality assurance strategies and processes

The college has established the Internal Quality Assurance Cell immediately after first cycle accreditation. It always plays a catalytic role in quality enhancement of college. The IQAC had contributed significantly in academic year 2020-21 even though covid-19 pandemic lockdown.

IQAC has following practices and strategies for institutionalization of quality assurance.

- Preparation of Action Plan
- Preparation of Academic Calendar \
- Formation of Committees
- IQAC conducts regular meeting
- Preparation and submission of AQAR
- IQAC conducted various workshop/Seminars
- Collect the feedback of various stakeholders

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

6.5.2 - The institution reviews its teaching learning process, structures & methodologies of

operations and learning outcomes at periodic intervals through IQAC set up as per norms and recorded the incremental improvement in various activities

**Promotion of ICT in teaching -learning:** In order to improve the online teaching -learning process in Covid-19 pandemic the IQAC was taken initiatives like conducted workshop such as e-content development workshop, Moodle (LMS) workshop for faculty. The IQAC guided and gave various information of ICT tools which is being used for preparing video lecture and econtent. This initiative has resulted enhanced quality of online pedagogy. All the faculty members are used ICT tools for effective teaching-learning.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

**6.5.3 - Quality assurance initiatives of the institution include: Regular meeting of Internal Quality Assurance Cell (IQAC); Feedback collected, analyzed and used for improvements Collaborative quality initiatives with other institution(s) Participation in NIRF any other quality audit recognized by state, national or international agencies (ISO Certification, NBA)**

A. All of the above

File Description	Documents
Paste web link of Annual reports of Institution	Nil
Upload e-copies of the accreditations and certifications	No File Uploaded
Upload any additional information	No File Uploaded
Upload details of Quality assurance initiatives of the institution (Data Template)	No File Uploaded

**INSTITUTIONAL VALUES AND BEST PRACTICES**

**7.1 - Institutional Values and Social Responsibilities**

7.1.1 - Measures initiated by the Institution for the promotion of gender equity during the year

- **Safety and Securities:** The college has installed CCTV cameras in college premises at various places. The helpline number for assistance is displayed in college premises
- **Common room facility:** The college has one common room facility for girl/ladies
- **Counseling:** The college has separate women empowerment committee
- **Equal participation:** Boys and girls both are encouraged to participate equally in sports and other extracurricular activities.
- The college has common canteen, reading room, indoor and outdoor playground for both boys and girls.

File Description	Documents
Annual gender sensitization action plan	Nil
Specific facilities provided for women in terms of: a. Safety and security b. Counseling c. Common Rooms d. Day care center for young children e. Any other relevant information	Nil

**7.1.2 - The Institution has facilities for alternate sources of energy and energy conservation measures Solar energy Biogas plant Wheeling to the Grid Sensor-based energy conservation Use of LED bulbs/ power efficient equipment**

C. Any 2 of the above

File Description	Documents
Geo tagged Photographs	No File Uploaded
Any other relevant information	No File Uploaded

**7.1.3 - Describe the facilities in the Institution for the management of the following types of degradable and non-degradable waste (within 200 words) Solid waste management Liquid waste management Biomedical waste management E-waste management Waste recycling system Hazardous chemicals and radioactive waste management**

- **Solid waste management:** In this regard institution segregates degradable waste like plant leaves and non-degradable waste like paper waste. Biodegradable waste is utilized in the small Vermi-compost plant. The non-degradable counterpart of the waste is collected by the



local municipal waste collecting vehicle on regular basis.

- **Liquid waste management:** In this regard institution has taken a permission from Nandurbar Municipal Corporation to dispose the liquid waste from the college into the Municipal corporation waste waterline..
- **Biomedical waste Management:** Biomedical waste from the microbiology department is treated first before its disposal from the safety point of view.
- **Hazardous chemicals and radioactive waste management:** Chemistry department of the institute is careful towards the use of hazardous chemicals and takes care of treatment of the waste before its disposal. Institute didn't use radioactive material.

File Description	Documents
Relevant documents like agreements / MoUs with Government and other approved agencies	No File Uploaded
Geo tagged photographs of the facilities	No File Uploaded

**7.1.4 - Water conservation facilities available in the Institution: Rain water harvesting Bore well /Open well recharge Construction of tanks and bunds Waste water recycling Maintenance of water bodies and distribution system in the campus**

B. Any 3 of the above

File Description	Documents
Geo tagged photographs / videos of the facilities	No File Uploaded
Any other relevant information	No File Uploaded

**7.1.5 - Green campus initiatives include**

**7.1.5.1 - The institutional initiatives for greening the campus are as follows:**

1. Restricted entry of automobiles
2. Use of bicycles/ Battery-powered vehicles
3. Pedestrian-friendly pathways
4. Ban on use of plastic
5. Landscaping

C. Any 2 of the above

File Description	Documents
Geo tagged photos / videos of the facilities	No File Uploaded
Various policy documents / decisions circulated for implementation	No File Uploaded
Any other relevant documents	No File Uploaded

**7.1.6 - Quality audits on environment and energy are regularly undertaken by the institution**

**7.1.6.1 - The institutional environment and energy initiatives are confirmed through the following 1.Green audit 2. Energy audit 3.Environment audit 4.Clean and green campus recognitions/awards 5. Beyond the campus environmental promotional activities**

C. Any 2 of the above

File Description	Documents
Reports on environment and energy audits submitted by the auditing agency	No File Uploaded
Certification by the auditing agency	No File Uploaded
Certificates of the awards received	No File Uploaded
Any other relevant information	No File Uploaded

**7.1.7 - The Institution has disabled-friendly, barrier free environment Built environment with ramps/lifts for easy access to classrooms. Disabled-friendly washrooms Signage including tactile path, lights, display boards and signposts Assistive technology and facilities for persons with disabilities (Divyangjan) accessible website, screen-reading software, mechanized equipment 5. Provision for enquiry and information : Human assistance, reader, scribe, soft copies of reading material, screen reading**

B. Any 3 of the above

File Description	Documents
Geo tagged photographs / videos of the facilities	No File Uploaded
Policy documents and information brochures on the support to be provided	No File Uploaded
Details of the Software procured for providing the assistance	No File Uploaded
Any other relevant information	No File Uploaded

7.1.8 - Describe the Institutional efforts/initiatives in providing an inclusive environment i.e., tolerance and harmony towards cultural, regional, linguistic, communal socioeconomic and other diversities (within 200 words).

As per the norms and direction of the government, the college regulates the admission process of the students without practicing any biased approach. Institute felicitates admission to the students of all castes and religious diverse groups. The seats are allotted in different categories such as OPEN, OBC, SC, ST, EWS, NT, SBC etc. as per government reservation policy. All the admitted students belong to different communities, classes and socio-economic groups. The Institute maintains Hindu Muslim harmony. All the discriminatory practices are perishable in the institute based on social and economic diversities. In all the programs which are being celebrated and organized in the college shows participation of student from different social-economical classes. Institute also taking care of gender-based discrimination. The main objectives are to develop students holistically irrespective of class, caste, gender, and religion

File Description	Documents
Supporting documents on the information provided (as reflected in the administrative and academic activities of the Institution)	No File Uploaded
Any other relevant information	No File Uploaded

7.1.9 - Sensitization of students and employees of the Institution to the constitutional obligations: values, rights, duties and responsibilities of citizens

The college employees performed all their duties and responsibilities as per the recommendations of UGC and Government of Maharashtra. The management also provide all the possible

amenities to teaching and non teaching members and to the students. For practicing students rights student counseling is in functioning.

File Description	Documents
Details of activities that inculcate values; necessary to render students in to responsible citizens	Nil
Any other relevant information	Nil

**7.1.10 - The Institution has a prescribed code of conduct for students, teachers, administrators and other staff and conducts periodic programmes in this regard. The Code of Conduct is displayed on the website There is a committee to monitor adherence to the Code of Conduct Institution organizes professional ethics programmes for students, teachers, administrators and other staff 4. Annual awareness programmes on Code of Conduct are organized**

A. All of the above

File Description	Documents
Code of ethics policy document	No File Uploaded
Details of the monitoring committee composition and minutes of the committee meeting, number of programmes organized, reports on the various programs etc., in support of the claims	No File Uploaded
Any other relevant information	No File Uploaded

7.1.11 - Institution celebrates / organizes national and international commemorative days, events and festivals

The institution sensitizes teachers, non-teaching and students in the institution to the constitutional obligations in varied mannner. The college organises various constitutional days like Independence day, Republic day etc. Flag hoisting is done on 15th August every year in our college where teaching, non-teaching and

students are part of the same. The college organises Constitution Day on 26th November. The Political Science department organises this event every year.

The celebrated days such as Teachers Day, Ozone Day, Blood Donation Day, Mahatma Gandhi Birth Anniversary, Wild Life Conservation Week, Online Road safety Awareness Day, National Integration Day, Anti-Poverty Day, Jagdish Chandra Bose Birth Anniversary, AIDS Day, Bhopal Day, Mahaparinirvaan Din, International Biodiversity Day, Savitribai Phule Birth Anniversary, National Voters Days, Republic Day, Anti Leprosy Day, World Wetland Day, Shiv Jayanti, Marathi Bhasha Divas, National Science Day, Women's Day, World Water Day, World Health Day, World Environment Day, Jijau Saheb and Swami Vivekanand Jayanti, Independence Day, National Sport Day

File Description	Documents
Annual report of the celebrations and commemorative events for the last (During the year)	No File Uploaded
Geo tagged photographs of some of the events	No File Uploaded
Any other relevant information	No File Uploaded

## 7.2 - Best Practices

7.2.1 - Describe two best practices successfully implemented by the Institution as per NAAC format provided in the Manual.

- NSS works towards the neglected sector of society during pandemic .
- NCC creates awareness regarding COVID vaccination

File Description	Documents
Best practices in the Institutional website	Nil
Any other relevant information	Nil

## 7.3 - Institutional Distinctiveness

7.3.1 - Portray the performance of the Institution in one area distinctive to its priority and thrust within 200 words

The various departments of the institution work hard during the pandemic period. Many poor people lost their daily jobs. The institution provided food packages, asanitizers and started vaccination awareness campaign.

File Description	Documents
Appropriate web in the Institutional website	No File Uploaded
Any other relevant information	No File Uploaded

#### 7.3.2 - Plan of action for the next academic year

- Installation of solar panel of 50 KVA under non-conventional energy sources.
- Renovation of seminar hall
- Purchase of Scientific equipment and ICT tools.
- Development of compost fertilizer. Vermicompost for society.
- Starting of new department like M.A. Defence and Strategic Studies.
- Prramme under Unnat Bharat Abhiyan



## YEARLY STATUS REPORT - 2021-2022

### Part A

#### Data of the Institution

<b>1.Name of the Institution</b>	
	NTVS's G.T.Patil Arts Commerce and Science College
• Name of the Head of the institution	Prof. Dr. M.J. Raghuwanshi
• Designation	Acting Principal
• Does the institution function from its own campus?	Yes
• Phone no./Alternate phone no.	02564222293
• Mobile no	9423942750
• Registered e-mail	gtpcollege@rediffmail.com
• Alternate e-mail	drvijaychaudhari2581@gmail.com
• Address	Shani Mandir Road, Nandurbar
• City/Town	Nandurabar
• State/UT	Maharashtra
• Pin Code	425412
<b>2.Institutional status</b>	
• Affiliated /Constituent	Affiliated
• Type of Institution	Co-education
• Location	Urban

• Financial Status	UGC 2f and 12(B)
• Name of the Affiliating University	KBC North Maharashtra University Jalgaon
• Name of the IQAC Coordinator	Dr. V. Z. Chaudhari
• Phone No.	02564222293
• Alternate phone No.	9623956707
• Mobile	9823667735
• IQAC e-mail address	naac@ntvsgtpcollege.org
• Alternate Email address	drvijaychaudhari2581@gmail.com
<b>3.Website address (Web link of the AQAR (Previous Academic Year)</b>	<a href="http://ntvsgtpcollege.org/">http://ntvsgtpcollege.org/</a>
<b>4.Whether Academic Calendar prepared during the year?</b>	Yes
• if yes, whether it is uploaded in the Institutional website Web link:	<a href="http://ntvsgtpcollege.org/uploads/Academic_Calender_2021-22.pdf">http://ntvsgtpcollege.org/uploads/Academic_Calender_2021-22.pdf</a>

### 5.Accreditation Details

Cycle	Grade	CGPA	Year of Accreditation	Validity from	Validity to
Cycle 1	B+	-	2004	16/02/2004	15/02/2009
Cycle 2	A	3.10	2015	03/03/2015	02/03/2020

**6.Date of Establishment of IQAC** 01/07/2005

**7.Provide the list of funds by Central / State Government UGC/CSIR/DBT/ICMR/TEQIP/World Bank/CPE of UGC etc.,**

Institutional/Department /Faculty	Scheme	Funding Agency	Year of award with duration	Amount
NTVS 's G.T.Patil Arts Commerce and Science College	MPCB	Maharashtra Pollution Control Board	2021	3000000



<b>8. Whether composition of IQAC as per latest NAAC guidelines</b>	<b>Yes</b>	
<ul style="list-style-type: none"> <li>• Upload latest notification of formation of IQAC</li> </ul>	<a href="#">View File</a>	
<b>9.No. of IQAC meetings held during the year</b>	<b>4</b>	
<ul style="list-style-type: none"> <li>• Were the minutes of IQAC meeting(s) and compliance to the decisions have been uploaded on the institutional website?</li> </ul>	<b>Yes</b>	
<ul style="list-style-type: none"> <li>• If No, please upload the minutes of the meeting(s) and Action Taken Report</li> </ul>	No File Uploaded	
<b>10. Whether IQAC received funding from any of the funding agency to support its activities during the year?</b>	<b>No</b>	
<ul style="list-style-type: none"> <li>• If yes, mention the amount</li> </ul>		
<b>11. Significant contributions made by IQAC during the current year (maximum five bullets)</b>		
<p>The teaching process of the college was significantly handled during the second phase of Covid -19 during the academic year 2021-22. As the lockdown once again hampered the teaching, it was smartly tackled through the G-suit account the teacher conducted lectures online. •Teachers from Arts and Science had been promoted to prepare VCRMS (Minor research projects) proposals to get funding from the University under VCRM Scheme. •Motivated teachers to get patents and offering for MoUs from different arena of the society.</p>		
<b>12. Plan of action chalked out by the IQAC in the beginning of the Academic year towards Quality Enhancement and the outcome achieved by the end of the Academic year</b>		

Plan of Action	Achievements/Outcomes
Planned and appealed regarding conducting of conferences/Seminars/webinars to different Departments. • Planned for vaccination drive for college students under Yuva Savst Mission	<ul style="list-style-type: none"> <li>• National webinar conducted by the Department of English on Film and Literature</li> <li>• National Webinar Conducted by NCC and Sports Deaparents on Role of Armed forces and Sports in National Integration.</li> <li>• Conducted Vaccination Drive by NSS, NCC, Sports and Student Development Department under Mission Yuva Svasth.</li> </ul>

<b>13. Whether the AQAR was placed before statutory body?</b>	Yes
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<ul style="list-style-type: none"> <li>• Name of the statutory body</li> </ul>
--

Name	Date of meeting(s)
Management	19/12/2022

<b>14. Whether institutional data submitted to AISHE</b>
--

Year	Date of Submission
2020-21	04/03/2022

<b>15. Multidisciplinary / interdisciplinary</b>
--

The institution follows the guidelines and procedures as per the concerned BoS of affiliated university KBC North Maharashtra University Jalgaon. The students have the flexibility int the elective subjects under CBCS pattern which have been implemented from 2018-19 to choose the interdisciplinay subjects as part of the perticular programme even at the PG level the university has introduced audit course for all students of Post Graduate Programme which indicates multidisciplinary.

<b>16. Academic bank of credits (ABC):</b>
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As per the directions given by the central government of india and the NEP 2020 the institute has given direction to the first year admnited students to create their academic bank of credits through using digilocker system. According to the guideline of the

university fresh students are in the process of getting registered through digilocker. The students have been guided and maximum students have registered under it.

**17.Skill development:**

The institute conducts various workshops and organises guest lectures to meet the need of students skill development. In addition the institute also runs two affiliated courses to inculcate skill development in students.

**18.Appropriate integration of Indian Knowledge system (teaching in Indian Language, culture, using online course)**

The language department guides students to register their names for the online courses such as MOOC, NPTEL, SWAYAM, MKCL, DIED for delaing with in Indian Language, culture.

**19.Focus on Outcome based education (OBE):Focus on Outcome based education (OBE):**

After every three year curricula the university proceeds for revisions of syllabus which includes the practical orientation required in the market and professional fields. Such courses have been introduced to different programmes to enhance the employability of final year students.

**20.Distance education/online education:**

The institute runs centres for Yashavantarao Chavan Open University under various courses are conducted such as B.Sc.(PCM), M.Sc.(Env. Sci.), MCM, MBA. After and during the impact of pandemic- COVID-19 and as per the guidelines of government and the university the institution has marched towards blended teaching and learning at large using different online platforms.

**Extended Profile**

**1.Programme**

1.1 31

Number of courses offered by the institution across all programs during the year

File Description	Documents
Data Template	<a href="#">View File</a>

**2.Student**

2.1

3955

Number of students during the year

File Description	Documents
Institutional Data in Prescribed Format	<a href="#">View File</a>

2.2

0

Number of seats earmarked for reserved category as per GOI/ State Govt. rule during the year

File Description	Documents
Data Template	No File Uploaded

2.3

999

Number of outgoing/ final year students during the year

File Description	Documents
Data Template	<a href="#">View File</a>

### 3.Academic

3.1

54

Number of full time teachers during the year

File Description	Documents
Data Template	<a href="#">View File</a>

3.2

95

Number of sanctioned posts during the year

<b>Extended Profile</b>	
<b>1.Programme</b>	
1.1 Number of courses offered by the institution across all programs during the year	<b>31</b>
File Description	Documents
Data Template	<a href="#">View File</a>
<b>2.Student</b>	
2.1 Number of students during the year	<b>3955</b>
File Description	Documents
Institutional Data in Prescribed Format	<a href="#">View File</a>
2.2 Number of seats earmarked for reserved category as per GOI/ State Govt. rule during the year	<b>0</b>
File Description	Documents
Data Template	No File Uploaded
2.3 Number of outgoing/ final year students during the year	<b>999</b>
File Description	Documents
Data Template	<a href="#">View File</a>
<b>3.Academic</b>	
3.1 Number of full time teachers during the year	<b>54</b>
File Description	Documents
Data Template	<a href="#">View File</a>

3.2	95
Number of sanctioned posts during the year	

File Description	Documents
Data Template	<a href="#">View File</a>

#### 4. Institution

4.1	32
Total number of Classrooms and Seminar halls	
4.2	82836124
Total expenditure excluding salary during the year (INR in lakhs)	
4.3	90
Total number of computers on campus for academic purposes	

### Part B

#### CURRICULAR ASPECTS

##### 1.1 - Curricular Planning and Implementation

1.1.1 - The Institution ensures effective curriculum delivery through a well planned and documented process

The college takes initiative for the effective curriculum delivery. Care is taken for systematic implementation of the syllabus which is prescribed by Kavayitri Bahinabai Chaudhari North Maharashtra University. Curricular and co- curricular activities are properly planned in the academic calendar to lead towards the set outcomes.

The curriculum is revised once in three years by the university to which the college is affiliated. Some of the staff members have attended and framed the syllabus in the workshops on revised curriculum. In the workshop contents and relevance of the curriculum has been discussed. It helps in preparing of effective curriculum as per the need of the time.

The college academic calendar is prepared on the basis departmental calendar of all departments and various committees. It contains the activities to be carried out during the academic

year. The syllabuses are distributed among the faculties according to their interests and teaching experiences in the department meetings. Every staff member prepares a lecture note one day in advance of his/her lecture to be engaged. In the note, faculty members mention the points to be covered, methods of teaching to be used. Academic diaries are used to ensure minute level teaching learning execution.

File Description	Documents
Upload relevant supporting document	<a href="#">View File</a>
Link for Additional information	Nil

#### 1.1.2 - The institution adheres to the academic calendar including for the conduct of Continuous Internal Evaluation (CIE)

According to the exam schedule of the affiliated university, the college adjusts the academic calendar for the internal examination. The academic calendar is prepared well in advance of the academic session. The academic calendar is displayed on notice board for reference of students and staff. It carries schedules regarding admission process, teaching-learning schedule, evaluation blue print, curricular and co-curricular activities, extra-curricular activities, major departmental and institutional events to be organized and dates of holidays.

The college follows its academic calendar for conducting internal examinations. Continuous internal evaluation of the students is made on the base of unit tests, surprise tests, assignments, tutorials and practical classes.

The examination committee works on the slots reserved in academic calendar for internal evaluation and prepares and displays the time-table well in advance. The departments prepare their teaching plans in their meetings keeping in mind the schedule of internal evaluation as in the academic calendar of the college.

File Description	Documents
Upload relevant supporting document	No File Uploaded
Link for Additional information	<a href="http://ntvsgtcollege.org/uploads/Academic_Calender_2021-22.pdf">http://ntvsgtcollege.org/uploads/Academic_Calender_2021-22.pdf</a>

<p><b>1.1.3 - Teachers of the Institution participate in following activities related to curriculum development and assessment of the affiliating University and/are represented on the following academic bodies during the year. Academic council/BoS of Affiliating University Setting of question papers for UG/PG programs Design and Development of Curriculum for Add on/ certificate/ Diploma Courses Assessment /evaluation process of the affiliating University</b></p>	<p><b>A. All of the above</b></p>
--	-----------------------------------

File Description	Documents
<p>Details of participation of teachers in various bodies/activities provided as a response to the metric</p>	<p><a href="#">View File</a></p>
<p>Any additional information</p>	<p><b>No File Uploaded</b></p>

**1.2 - Academic Flexibility**

**1.2.1 - Number of Programmes in which Choice Based Credit System (CBCS)/ elective course system has been implemented**

**1.2.1.1 - Number of Programmes in which CBCS/ Elective course system implemented**

**31**

File Description	Documents
<p>Any additional information</p>	<p><b>No File Uploaded</b></p>
<p>Minutes of relevant Academic Council/ BOS meetings</p>	<p><b>No File Uploaded</b></p>
<p>Institutional data in prescribed format (Data Template)</p>	<p><a href="#">View File</a></p>

**1.2.2 - Number of Add on /Certificate programs offered during the year**

**1.2.2.1 - How many Add on /Certificate programs are added during the year. Data requirement for year: (As per Data Template)**

**02**

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File Description	Documents
Any additional information	No File Uploaded
Brochure or any other document relating to Add on /Certificate programs	No File Uploaded
List of Add on /Certificate programs (Data Template )	<a href="#">View File</a>

### 1.2.3 - Number of students enrolled in Certificate/ Add-on programs as against the total number of students during the year

28

File Description	Documents
Any additional information	No File Uploaded
Details of the students enrolled in Subjects related to certificate/Add-on programs	<a href="#">View File</a>

### 1.3 - Curriculum Enrichment

#### 1.3.1 - Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability into the Curriculum

The college integrates various life skills, values, local and global challenges through its curriculum delivery. Each teacher integrates all these issues as a part of his/her teaching-learning process. In the traditional faculties like Arts, Commerce and Science all these aspects are practically addressed. While teaching the prescribed syllabus, institute arranges various activities and programs to address the cross-cutting issues such as gender equality, environmental awareness, human values and Professional Ethics.

Women Development Cell (Yuvati Sabha) promotes gender equality. It conducts various gender related activities, seminars and self-defense workshops. Discipline committee strict watch to avoid incidents of sexual harassment of women students.

Environmental studies is a compulsory subject for the first year of B.A., B.Com. and B.Sc. students. Some environmental issues included also in the syllabi of History, Economics, Geography and Literature. Environmental consciousness is promoted through Tree Plantation and Swatch Bharat Abhiyaan by NSS, NCC, and Student Development Department.

Teaching of human values are covered in the curriculum of Political Science, Economics, History, Geography, Literature. The National Service Scheme (NSS) and National Cadet Corps (NCC), conduct Blood Donation Programs, Voter Awareness programs and Beti Bachav- Beti Padhav.

The college inculcates professional ethics through the prescribed syllabi.

File Description	Documents
Any additional information	No File Uploaded
Upload the list and description of courses which address the Professional Ethics, Gender, Human Values, Environment and Sustainability into the Curriculum.	<a href="#">View File</a>

### 1.3.2 - Number of courses that include experiential learning through project work/field work/internship during the year

8

File Description	Documents
Any additional information	No File Uploaded
Programme / Curriculum/ Syllabus of the courses	No File Uploaded
Minutes of the Boards of Studies/ Academic Council meetings with approvals for these courses	No File Uploaded
MoU's with relevant organizations for these courses, if any	No File Uploaded
Institutional Data in Prescribed Format	<a href="#">View File</a>

### 1.3.3 - Number of students undertaking project work/field work/ internships

143

File Description	Documents
Any additional information	No File Uploaded
List of programmes and number of students undertaking project work/field work/ /internships (Data Template)	<a href="#">View File</a>

#### 1.4 - Feedback System

**1.4.1 - Institution obtains feedback on the syllabus and its transaction at the institution from the following stakeholders Students Teachers Employers Alumni**

C. Any 2 of the above

File Description	Documents
URL for stakeholder feedback report	Nil
Action taken report of the Institution on feedback report as stated in the minutes of the Governing Council, Syndicate, Board of Management	No File Uploaded
Any additional information	<a href="#">View File</a>

**1.4.2 - Feedback process of the Institution may be classified as follows**

A. Feedback collected, analyzed and action taken and feedback available on website

File Description	Documents
Upload any additional information	<a href="#">View File</a>
URL for feedback report	<a href="http://ntvsgtpcollege.org/index.php/iqac-report/student-feedback">http://ntvsgtpcollege.org/index.php/iqac-report/student-feedback</a>

#### TEACHING-LEARNING AND EVALUATION

##### 2.1 - Student Enrollment and Profile

**2.1.1 - Enrolment Number Number of students admitted during the year**

**2.1.1.1 - Number of students admitted during the year**

3955

File Description	Documents
Any additional information	No File Uploaded
Institutional data in prescribed format	<a href="#">View File</a>

**2.1.2 - Number of seats filled against seats reserved for various categories (SC, ST, OBC, Divyangjan, etc. as per applicable reservation policy during the year (exclusive of supernumerary seats)**

**2.1.2.1 - Number of actual students admitted from the reserved categories during the year**

3399

File Description	Documents
Any additional information	<a href="#">View File</a>
Number of seats filled against seats reserved (Data Template)	<a href="#">View File</a>

## 2.2 - Catering to Student Diversity

2.2.1 - The institution assesses the learning levels of the students and organizes special Programmes for advanced learners and slow learners

### Method of subject identification:

The programme was implemented in those subjects that were considered to be difficult for an average student. As per the strategy of IQAC, the following subjects had been recommended for the remedial teaching at entry level of the degree course as slow and advanced learners. Those subjects were English, Economics, Mathematics, Botany, Physics & Accountancy.

### Objectives:

1. To raise the confidence level of the student regarding difficult subjects
2. To improve the basic knowledge of the slow learners
3. To reduce the drop out ratio of the slow learners
4. To motivate, and encourage them.

### Execution of the programme:

- Preparing the list of difficult units and concepts from the university syllabus
- Arranging some guest lecturers for the students
- Conducting examination unit tests, class tests, tutorials, home assignments

**Activities undertaken for slow learners:**

- Extra coaching and individual guidance from the subject teacher
- By solving question papers of previous University Examination from the students.
- The performance of students was being communicated to their parents.

**Activities undertaken for advanced learners:**

- Open access facility for advanced learners in the library.
- More books are provided to these students.
- Organization of quiz competitions and group discussions.

**Specific Outcome:**

The target group of the slow learners showed improvement in the knowledge of concerned subjects and scored better marks in the university examination while advanced learners showed better performance in the knowledge of concerned subjects and scored better marks in the university examination. They were participated in classroom interactions and discussions actively.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

**2.2.2 - Student- Full time teacher ratio (Data for the latest completed academic year)**

Number of Students	Number of Teachers
3955	54

File Description	Documents
Any additional information	No File Uploaded

**2.3 - Teaching- Learning Process**

2.3.1 - Student centric methods, such as experiential learning, participative learning and problem solving methodologies are used for enhancing learning experiences

To develop interest among students for learning theoretical concepts, experimental laboratory courses based on theory are effectively conducted in all science departments. Various activities like seminars, guest lectures, workshops etc. have been organized through online as well as offline mode for the active participation of students. Students are also encouraged to deliver the seminars in PowerPoint presentations on LCD projectors for enhancing their knowledge, computers and software skills and language proficiency. To inculcate the research aptitude and experimental skills, students from undergraduate and post graduate final year has to complete a Project for which well-equipped research laboratories are available in various departments. Home assignments and group discussions and doubt solving sessions are organized for enhancing learning experiences and problem solving abilities among the students. NSS department use to organize a ten days camp in remote areas for develop students field works and to make them aware of their social responsibilities. In order to improve students' creativity and decision-making abilities, the college has organized NCC camp and soft skill development programs. Various departments had planned the educational tours for the students related to their syllabus. Celebration of National Science Day, World Environment Day, World Philosophy Day, and other events had been planned by the college to cultivate human values, ethics, and leadership skills in the students.

File Description	Documents
Upload any additional information	No File Uploaded
Link for additional information	Nil

2.3.2 - Teachers use ICT enabled tools for effective teaching-learning process. Write description in maximum of 200 words

For encouraging students to participate in teaching-learning activities, college has multiple LCD projectors connected with audio systems through speakers in various departments. The institution has established a connectivity through LAN connected to computers in various departments. The institution encourages faculty members to make efficient use of ICT resources and grants. Innovative ICT teaching methods are required to improve learning patterns due to the diversity of the students' educational backgrounds and experiences. In the campus of the institution, an air conditioned conference room has been developed fixed with LCD projector and connected to speakers in which various programs has been conducted during the academic year. The campus of the institution has Wi-Fi internet access in all departments and classrooms and they all have cutting-edge teaching tools like LCDs and computers. Library of the college has various software's to access various learning resources available online and offer educational DVDs and CDs as learning resources. In order to make the class more interactive and informative online lectures of the students has been conducted through Zoom, Google Meet, Microsoft Team, and Google Classroom. Open educational resources like YouTube videos, NPTEL, Coursera, Udemy, Edx, and so on are recommended to students by teachers. The students are also recommended to attend various summer internship programs, workshops and seminars in various national institutes.

File Description	Documents
Upload any additional information	No File Uploaded
Provide link for webpage describing the ICT enabled tools for effective teaching-learning process	No File Uploaded

2.3.3 - Ratio of mentor to students for academic and other related issues (Data for the latest completed academic year )

2.3.3.1 - Number of mentors

54

File Description	Documents
Upload, number of students enrolled and full time teachers on roll	No File Uploaded
Circulars pertaining to assigning mentors to mentees	No File Uploaded
Mentor/mentee ratio	No File Uploaded

## 2.4 - Teacher Profile and Quality

### 2.4.1 - Number of full time teachers against sanctioned posts during the year

54

File Description	Documents
Full time teachers and sanctioned posts for year (Data Template)	<a href="#">View File</a>
Any additional information	No File Uploaded
List of the faculty members authenticated by the Head of HEI	No File Uploaded

### 2.4.2 - Number of full time teachers with Ph. D. / D.M. / M.Ch. /D.N.B Superspeciality / D.Sc. / D.Litt. during the year (consider only highest degree for count)

#### 2.4.2.1 - Number of full time teachers with Ph. D. / D.M. / M.Ch. /D.N.C Superspeciality / D.Sc. / D.Litt. during the year

38

File Description	Documents
Any additional information	No File Uploaded
List of number of full time teachers with Ph. D. / D.M. / M.Ch./ D.N.B Super specialty / D.Sc. / D.Litt. and number of full time teachers for year (Data Template)	<a href="#">View File</a>

### 2.4.3 - Number of years of teaching experience of full time teachers in the same institution (Data for the latest completed academic year)

#### 2.4.3.1 - Total experience of full-time teachers



820

File Description	Documents
Any additional information	No File Uploaded
List of Teachers including their PAN, designation, dept. and experience details(Data Template)	<a href="#">View File</a>

## 2.5 - Evaluation Process and Reforms

2.5.1 - Mechanism of internal assessment is transparent and robust in terms of frequency and mode. Write description within 200 words.

As our college is affiliated to KavayitriBahinabaiChaudhari North Maharashtra University, Jalgaon college follows the internal evaluation structure as per the guidelines of KavayitriBahinabaiChaudhari North Maharashtra University, Jalgaon. Now, the CBCS pattern and semester system for all levels have been implemented. As part of the internal assessment, a regular and continuous assessment of student has been monitored by all faculty members. One committee has been formulated by the college for smooth and timely conduct of internal exams throughout the academic year. Evaluations of internal marks are being done on the basis of marks obtained in each test and the attendance of the student in classroom. Monthly attendance of students is monitored and students with less attendance are communicated accordingly. Internal results are also displayed on notice board so that the students know their performance. Re-orientation of the student has been made in case of weak students. Each department conduct meeting to discuss the internal assessment of the students. Remedial teaching is also available for the students whose performance is weak in internal tests.

File Description	Documents
Any additional information	No File Uploaded
Link for additional information	Nil

2.5.2 - Mechanism to deal with internal examination related grievances is transparent, time- bound and efficient

Our institution is affiliated to KavayitriBahinabaiChaudhari North Maharashtra University, Jalgaon follows the internal examination structure as per the guidelines of KavayitriBahinabaiChaudhari

North Maharashtra University, Jalgaon. Internal test has been conducted for each paper by the respective faculty member. Unit wise important question is given to each student before internal examination as per the university pattern. Internal examination is conducted by each faculty member, which is monitored by the administrators of the institute. Evaluated answer sheets are returned to students to discuss the evaluation of marks and if student gets fewer marks or if any student is absent in internal examination the retest is conducted for the respective student. Internal record of each student is displayed on notice board. The continuous internal evaluation system is conducted. The entry of internal marks is made online on the university website portal.

File Description	Documents
Any additional information	No File Uploaded
Link for additional information	Nil

## 2.6 - Student Performance and Learning Outcomes

2.6.1 - Programme and course outcomes for all Programmes offered by the institution are stated and displayed on website and communicated to teachers and students.

The mission and objectives of the college are reflected in the curriculum taught in our college and the programme lay down as per the guidelines of the KBC North Maharashtra University Jalgaon. Linguistic and communicative skills of the students are developed through language courses. Literary studies develop students' perception, sensibility, emotions, ideas and perspectives. Practical world knowledge is imparted through social science courses. A scientific approach is developed through the science curriculum. Business skills are developed through commerce courses. Lectures by experts in the many fields of are organized for the students. Students are counseled and guided in the right direction. Through various programmes and competitions like arts, sports, the latent talents of the students are developed by giving opportunities to them. It develops the leadership ability of the students. Life skills and global skills are imparted through teaching and programs for rural and tribal students, building self-confidence. We believe that our student will be able to become a good, exemplary and successful citizen of this country in the future. The professors of the college actively participate in Refresher courses, Orientation courses, Faculty development courses, conferences, workshops. Actively participates in course redesign workshops organized by the university.

File Description	Documents
Upload any additional information	No File Uploaded
Paste link for Additional information	Nil
Upload COs for all Programmes (exemplars from Glossary)	No File Uploaded

**2.6.2 - Attainment of Programme outcomes and course outcomes are evaluated by the institution.**

Various methods are used in our college to measure the quality of students as per the guidelines of the university KBC NMU Jalgaon. The course results are evaluated through external examination and internal examination conducted by the university. Generally, the external exam is of 60 marks and the internal exam is of 40 marks. In the internal examination, the students are evaluated through mock tests, practicals, assignments, and presentations. For indirect evaluation of programme results and curriculum feedback form is filled by students and parents of the college. Feedback is sought from alumni of the college. A report is prepared after analyzing the feedback form and feedback. Students studying in class are monitored by professors. Students who fall behind in studies and communication are counseled by the professor. Through NCC, NSS, Sports, Student welfare department, Literature committee, Science committee, Commerce committee, Cultural committee, Career katta, and various types of educational, social and cultural programmes are organized for the students, through which the personality of the students is evaluated. Students are provided opportunities through various community oriented activities and assess their inherent, latent skills, abilities and problem solving skills, employability skills, digital skills, moral and ethical values and leadership.

File Description	Documents
Upload any additional information	No File Uploaded
Paste link for Additional information	Nil

**2.6.3 - Pass percentage of Students during the year**

**2.6.3.1 - Total number of final year students who passed the university examination during the year**

950

File Description	Documents
Upload list of Programmes and number of students passed and appeared in the final year examination (Data Template)	<a href="#">View File</a>
Upload any additional information	No File Uploaded
Paste link for the annual report	Nil

## 2.7 - Student Satisfaction Survey

**2.7.1 - Student Satisfaction Survey (SSS) on overall institutional performance (Institution may design its own questionnaire) (results and details need to be provided as a weblink)**

<http://ntvsgtcollege.org/index.php/igac-report/student-feedback>

## RESEARCH, INNOVATIONS AND EXTENSION

### 3.1 - Resource Mobilization for Research

**3.1.1 - Grants received from Government and non-governmental agencies for research projects / endowments in the institution during the year (INR in Lakhs)**

**3.1.1.1 - Total Grants from Government and non-governmental agencies for research projects / endowments in the institution during the year (INR in Lakhs)**

598000

File Description	Documents
Any additional information	No File Uploaded
e-copies of the grant award letters for sponsored research projects /endowments	<a href="#">View File</a>
List of endowments / projects with details of grants(Data Template)	<a href="#">View File</a>

**3.1.2 - Number of teachers recognized as research guides (latest completed academic year)**

**3.1.2.1 - Number of teachers recognized as research guides**

0

File Description	Documents
Any additional information	No File Uploaded
Institutional data in prescribed format	No File Uploaded

### 3.1.3 - Number of departments having Research projects funded by government and non government agencies during the year

#### 3.1.3.1 - Number of departments having Research projects funded by government and non-government agencies during the year

04

File Description	Documents
List of research projects and funding details (Data Template)	<a href="#">View File</a>
Any additional information	<a href="#">View File</a>
Supporting document from Funding Agency	<a href="#">View File</a>
Paste link to funding agency website	Nil

### 3.2 - Innovation Ecosystem

3.2.1 - Institution has created an ecosystem for innovations and has initiatives for creation and transfer of knowledge

The following initiatives have been undertaken for creation and transfer of knowledge:

- The college has set 05 laboratories which have been recognized as a research center by the KBCNMU, Jalgaon.
- ICT based classrooms includes Projector, Software's etc.
- Workshops on NPS
- Publication of annual Magazines Prerana
- Institution proposed Post graduate diploma in counselling -Psychology, Certificate Course in Introduction of music, Certificate course in Research Methodology

File Description	Documents
Upload any additional information	No File Uploaded
Paste link for additional information	Nil

**3.2.2 - Number of workshops/seminars conducted on Research Methodology, Intellectual Property Rights (IPR) and entrepreneurship during the year**

**3.2.2.1 - Total number of workshops/seminars conducted on Research Methodology, Intellectual Property Rights (IPR) and entrepreneurship year wise during the year**

05

File Description	Documents
Report of the event	<a href="#">View File</a>
Any additional information	No File Uploaded
List of workshops/seminars during last 5 years (Data Template)	<a href="#">View File</a>

**3.3 - Research Publications and Awards**

**3.3.1 - Number of Ph.Ds registered per eligible teacher during the year**

**3.3.1.1 - How many Ph.Ds registered per eligible teacher within the year**

00

File Description	Documents
URL to the research page on HEI website	Nil
List of PhD scholars and their details like name of the guide , title of thesis, year of award etc (Data Template)	No File Uploaded
Any additional information	No File Uploaded

**3.3.2 - Number of research papers per teachers in the Journals notified on UGC website during the year**

**3.3.2.1 - Number of research papers in the Journals notified on UGC website during the year**

43

File Description	Documents
Any additional information	No File Uploaded
List of research papers by title, author, department, name and year of publication (Data Template)	<a href="#">View File</a>

### 3.3.3 - Number of books and chapters in edited volumes/books published and papers published in national/ international conference proceedings per teacher during the year

#### 3.3.3.1 - Total number of books and chapters in edited volumes/books published and papers in national/ international conference proceedings year wise during year

14

File Description	Documents
Any additional information	No File Uploaded
List books and chapters edited volumes/ books published (Data Template)	<a href="#">View File</a>

### 3.4 - Extension Activities

3.4.1 - Extension activities are carried out in the neighborhood community, sensitizing students to social issues, for their holistic development, and impact thereof during the year

Students usually do social work for the community through the NSS and NCC. More than 300 students participated in about 20 programmes through NSS and NCC.

The special efforts have been taken to promote human values and social awareness in the students through the activities like Blood Donation Camp, Covid-19 Vaccination Camp, Tree Plantation activity, Cleanliness Campaign (Swachh Bharat Abhiyan), AIDS Awareness, Covid-19 safety awareness program, celebration of birth and death anniversary days of the national leaders, Women's day, Teachers day, Sadbhavana oath, Anti corruption oath, Fit India Abhiyan and Human Rights day etc.

As per the directions of the government of India this year have are celebrated the Azadi Ka Amruta Mahotsav from 15th August 2021 to 26th January 2022. To participate in this programme we organized various activities to sensitize national integrity.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	<a href="#">View File</a>

**3.4.2 - Number of awards and recognitions received for extension activities from government / government recognized bodies during the year**

**3.4.2.1 - Total number of awards and recognition received for extension activities from Government/ Government recognized bodies year wise during the year**

01

File Description	Documents
Any additional information	No File Uploaded
Number of awards for extension activities in last 5 year (Data Template)	<a href="#">View File</a>
e-copy of the award letters	<a href="#">View File</a>

**3.4.3 - Number of extension and outreach programs conducted by the institution through NSS/NCC/Red cross/YRC etc., ( including the programmes such as Swachh Bharat, AIDS awareness, Gender issues etc. and/or those organized in collaboration with industry, community and NGOs ) during the year**

**3.4.3.1 - Number of extension and outreach Programs conducted in collaboration with industry, community and Non- Government Organizations through NSS/ NCC/ Red Cross/ YRC etc., during the year**

09

File Description	Documents
Reports of the event organized	<a href="#">View File</a>
Any additional information	No File Uploaded
Number of extension and outreach Programmes conducted with industry, community etc for the during the year (Data Template)	<a href="#">View File</a>

**3.4.4 - Number of students participating in extension activities at 3.4.3. above during year**

**3.4.4.1 - Total number of Students participating in extension activities conducted in**



**collaboration with industry, community and Non- Government Organizations such as Swachh Bharat, AIDs awareness, Gender issue etc. year wise during year**

433

File Description	Documents
Report of the event	<a href="#">View File</a>
Any additional information	No File Uploaded
Number of students participating in extension activities with Govt. or NGO etc (Data Template)	<a href="#">View File</a>

**3.5 - Collaboration**

**3.5.1 - Number of Collaborative activities for research, Faculty exchange, Student exchange/ internship during the year**

**3.5.1.1 - Number of Collaborative activities for research, Faculty exchange, Student exchange/ internship year wise during the year**

02

File Description	Documents
e-copies of related Document	No File Uploaded
Any additional information	No File Uploaded
Details of Collaborative activities with institutions/industries for research, Faculty	<a href="#">View File</a>

**3.5.2 - Number of functional MoUs with institutions, other universities, industries, corporate houses etc. during the year**

**3.5.2.1 - Number of functional MoUs with Institutions of national, international importance, other universities, industries, corporate houses etc. year wise during the year**

02

File Description	Documents
e-Copies of the MoUs with institution./ industry/corporate houses	No File Uploaded
Any additional information	No File Uploaded
Details of functional MoUs with institutions of national, international importance, other universities etc during the year	<a href="#">View File</a>

## INFRASTRUCTURE AND LEARNING RESOURCES

### 4.1 - Physical Facilities

4.1.1 - The Institution has adequate infrastructure and physical facilities for teaching- learning. viz., classrooms, laboratories, computing equipment etc.

Adequate facilities are available in our college in terms of cultural activities, sports. From 1964, 400m sports track is available on the college ground. There is a basketball court for students. Indoor sports are played in the college including Badminton and Table Tennis. While outdoor sports include football, athletics, basketball and hockey. In the cultural activities, the activities of speech, essay, singing are conducted in the college. Along with this, selected students are sent for music, drama competition, dance competition, rangoli competition for youth festival. Though there is no recognized yoga center in the college, yoga programs are organized on occasion.

File Description	Documents
Upload any additional information	No File Uploaded
Paste link for additional information	Nil

4.1.2 - The Institution has adequate facilities for cultural activities, sports, games (indoor, outdoor), gymnasium, yoga centre etc.

Nandurbar Taluka Vidhayak Samiti's Gajamal Tulshiram Patil College has adequate infrastructural facilities, physical facilities include building, parking for students and electrical system and 01 tank for drinking water for students. The college has a reading room for students to study. The college has 2 digital class rooms and 1 digital seminar hall And 27 rooms are common. There are separate laboratory for science department. The number of

laboratories is 7. The computer are available is in the college, the total number of computer's is 45.

File Description	Documents
Upload any additional information	No File Uploaded
Paste link for additional information	Nil

#### 4.1.3 - Number of classrooms and seminar halls with ICT- enabled facilities such as smart class, LMS, etc.

12

File Description	Documents
Upload any additional information	No File Uploaded
Paste link for additional information	Nil
Upload Number of classrooms and seminar halls with ICT enabled facilities (Data Template)	<a href="#">View File</a>

#### 4.1.4 - Expenditure, excluding salary for infrastructure augmentation during the year (INR in Lakhs)

##### 4.1.4.1 - Expenditure for infrastructure augmentation, excluding salary during the year (INR in lakhs)

324774

File Description	Documents
Upload any additional information	No File Uploaded
Upload audited utilization statements	No File Uploaded
Upload Details of budget allocation, excluding salary during the year (Data Template)	<a href="#">View File</a>

#### 4.2 - Library as a Learning Resource

4.2.1 - Library is automated using Integrated Library Management System (ILMS)

- Name of ILMS software: Library Manager
- Nature of automation (fully or partially); Partially
- Version: 0.3
- Year of Automation: 2011

File Description	Documents
Upload any additional information	No File Uploaded
Paste link for Additional Information	Nil

4.2.2 - The institution has subscription for the following e-resources e-journals e-ShodhSindhu Shodhganga Membership e-books Databases Remote access toe-resources

A. Any 4 or more of the above

File Description	Documents
Upload any additional information	No File Uploaded
Details of subscriptions like e-journals,e-ShodhSindhu, Shodhganga Membership etc (Data Template)	<a href="#">View File</a>

4.2.3 - Expenditure for purchase of books/e-books and subscription to journals/e- journals during the year (INR in Lakhs)

4.2.3.1 - Annual expenditure of purchase of books/e-books and subscription to journals/e-journals during the year (INR in Lakhs)

190738

File Description	Documents
Any additional information	No File Uploaded
Audited statements of accounts	No File Uploaded
Details of annual expenditure for purchase of books/e-books and journals/e- journals during the year (Data Template)	<a href="#">View File</a>

**4.2.4 - Number per day usage of library by teachers and students ( foot falls and login data for online access) (Data for the latest completed academic year)**

**4.2.4.1 - Number of teachers and students using library per day over last one year**

6131

File Description	Documents
Any additional information	<a href="#">View File</a>
Details of library usage by teachers and students	No File Uploaded

**4.3 - IT Infrastructure**

**4.3.1 - Institution frequently updates its IT facilities including Wi-Fi**

Efforts have been made in the college in the year 2020-21 for educational development in various departments. IT facilities are available in total seven departments and in seminar hall of the college. In the year 2020-21, Wi-Fi facility has been provided in large scale. All college premises are connected with wi-fi.

File Description	Documents
Upload any additional information	No File Uploaded
Paste link for additional information	Nil

**4.3.2 - Number of Computers**

75

File Description	Documents
Upload any additional information	<a href="#">View File</a>
List of Computers	No File Uploaded

**4.3.3 - Bandwidth of internet connection in the Institution**

A. ? 50MBPS

File Description	Documents
Upload any additional Information	No File Uploaded
Details of available bandwidth of internet connection in the Institution	No File Uploaded

#### 4.4 - Maintenance of Campus Infrastructure

##### 4.4.1 - Expenditure incurred on maintenance of infrastructure (physical and academic support facilities) excluding salary component during the year (INR in Lakhs)

##### 4.4.1.1 - Expenditure incurred on maintenance of infrastructure (physical facilities and academic support facilities) excluding salary component during the year (INR in lakhs)

324774

File Description	Documents
Upload any additional information	No File Uploaded
Audited statements of accounts	No File Uploaded
Details about assigned budget and expenditure on physical facilities and academic support facilities (Data Templates)	<a href="#">View File</a>

4.4.2 - There are established systems and procedures for maintaining and utilizing physical, academic and support facilities - laboratory, library, sports complex, computers, classrooms etc.

The primary responsibility of the College for developing the College infrastructure within the permission of Governing Body of the College. Under its direction the College Administration avails funds from the University Grants Commission and other Agencies by which the necessary developmental works are done. In terms of the College Library, books are arranged in simple but systematic manner to help the user locate the books easily. Information regarding the arrival of new resources are circulated to all the departments and also posted on the notice board as part of the Current Awareness Service. In order to provide speedy and efficient service, library cards are issued to the students. Periodic upgradation of books and journals are done according to the needs of the students and faculties of various departments. The purchase of hardware and upgradation of software is needbased. The College administration in coordination with the ICT Committee makes plans and decides on strategies regarding this matter.

File Description	Documents
Upload any additional information	No File Uploaded
Paste link for additional information	Nil

## STUDENT SUPPORT AND PROGRESSION

### 5.1 - Student Support

#### 5.1.1 - Number of students benefited by scholarships and free ships provided by the Government during the year

##### 5.1.1.1 - Number of students benefited by scholarships and free ships provided by the Government during the year

1709

File Description	Documents
Upload self attested letter with the list of students sanctioned scholarship	No File Uploaded
Upload any additional information	No File Uploaded
Number of students benefited by scholarships and free ships provided by the Government during the year (Data Template)	<a href="#">View File</a>

#### 5.1.2 - Number of students benefitted by scholarships, free ships etc. provided by the institution / non- government agencies during the year

##### 5.1.2.1 - Total number of students benefited by scholarships, free ships, etc provided by the institution / non- government agencies during the year

79

File Description	Documents
Upload any additional information	<a href="#">View File</a>
Number of students benefited by scholarships and free ships institution / non- government agencies in last 5 years (Date Template)	<a href="#">View File</a>

<p><b>5.1.3 - Capacity building and skills enhancement initiatives taken by the institution include the following: Soft skills Language and communication skills Life skills (Yoga, physical fitness, health and hygiene) ICT/computing skills</b></p>	<p><b>A. All of the above</b></p>
--	-----------------------------------

File Description	Documents
Link to Institutional website	Nil
Any additional information	No File Uploaded
Details of capability building and skills enhancement initiatives (Data Template)	<a href="#">View File</a>

<p><b>5.1.4 - Number of students benefitted by guidance for competitive examinations and career counseling offered by the institution during the year</b></p>
---

0

<p><b>5.1.4.1 - Number of students benefitted by guidance for competitive examinations and career counseling offered by the institution during the year</b></p>
---

52

File Description	Documents
Any additional information	No File Uploaded
Number of students benefitted by guidance for competitive examinations and career counseling during the year (Data Template)	<a href="#">View File</a>

<p><b>5.1.5 - The Institution has a transparent mechanism for timely redressal of student grievances including sexual harassment and ragging cases Implementation of guidelines of statutory/regulatory bodies Organization wide awareness and undertakings on policies with zero tolerance Mechanisms for submission of online/offline students' grievances Timely redressal of the grievances through appropriate committees</b></p>	<p><b>A. All of the above</b></p>
--	-----------------------------------



File Description	Documents
Minutes of the meetings of student redressal committee, prevention of sexual harassment committee and Anti Ragging committee	No File Uploaded
Upload any additional information	<a href="#">View File</a>
Details of student grievances including sexual harassment and ragging cases	<a href="#">View File</a>

## 5.2 - Student Progression

### 5.2.1 - Number of placement of outgoing students during the year

#### 5.2.1.1 - Number of outgoing students placed during the year

0

File Description	Documents
Self-attested list of students placed	No File Uploaded
Upload any additional information	No File Uploaded
Details of student placement during the year (Data Template)	No File Uploaded

### 5.2.2 - Number of students progressing to higher education during the year

#### 5.2.2.1 - Number of outgoing student progression to higher education

164

File Description	Documents
Upload supporting data for student/alumni	No File Uploaded
Any additional information	No File Uploaded
Details of student progression to higher education	<a href="#">View File</a>

### 5.2.3 - Number of students qualifying in state/national/ international level examinations during the year (eg: JAM/CLAT/GATE/ GMAT/CAT/GRE/ TOEFL/ Civil Services/State government examinations)

**5.2.3.1 - Number of students qualifying in state/ national/ international level examinations (eg: JAM/CLAT/NET/ SLET/ GATE/ GMAT/CAT/GRE/ TOEFL/ Civil Services/ State government examinations) during the year**

0

File Description	Documents
Upload supporting data for the same	<a href="#">View File</a>
Any additional information	No File Uploaded
Number of students qualifying in state/ national/ international level examinations during the year (Data Template)	<a href="#">View File</a>

**5.3 - Student Participation and Activities**

**5.3.1 - Number of awards/medals for outstanding performance in sports/cultural activities at university/state/national / international level (award for a team event should be counted as one) during the year**

**5.3.1.1 - Number of awards/medals for outstanding performance in sports/cultural activities at university/state/ national / international level (award for a team event should be counted as one) during the year.**

4

File Description	Documents
e-copies of award letters and certificates	No File Uploaded
Any additional information	No File Uploaded
Number of awards/medals for outstanding performance in sports/cultural activities at university/state/national/international level (During the year) (Data Template)	<a href="#">View File</a>

5.3.2 - Institution facilitates students' representation and engagement in various administrative, co-curricular and extracurricular activities (student council/ students representation on various bodies as per established processes and norms )

In the academic year 2021-2022, due to covid-19 pandemic and the guidelines issued by government of India, Universities during this period not allowed to form any student council. However, colleges

affiliated established committee, which deals with all type of problems, issues related to students. The meeting of committee was held in every quarter in this session.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	<a href="#">View File</a>

**5.3.3 - Number of sports and cultural events/competitions in which students of the Institution participated during the year (organized by the institution/other institutions)**

**5.3.3.1 - Number of sports and cultural events/competitions in which students of the Institution participated during the year**

146

File Description	Documents
Report of the event	No File Uploaded
Upload any additional information	No File Uploaded
Number of sports and cultural events/competitions in which students of the Institution participated during the year (organized by the institution/other institutions (Data Template)	<a href="#">View File</a>

**5.4 - Alumni Engagement**

5.4.1 - There is a registered Alumni Association that contributes significantly to the development of the institution through financial and/or other support services

No, The college has sufficient number of alumni and Alumni Association Registration in progress.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

<b>5.4.2 - Alumni contribution during the year (INR in Lakhs)</b>	<b>E. &lt;1Lakhs</b>
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File Description	Documents
Upload any additional information	No File Uploaded

## GOVERNANCE, LEADERSHIP AND MANAGEMENT

### 6.1 - Institutional Vision and Leadership

6.1.1 - The governance of the institution is reflective of and in tune with the vision and mission of the institution

NTVS's G T Patil College, Nandurbar has been a leading educational institution in Nandurbar District since last six decades. The vision of the college is to be recognised as a pioneer institute and to play a crucial role in achieving mission of institute. In addition, the college is intended to serve the tribal and rural people not only by importing education but also by taking up several social service activities. The vision and mission of the institute is been fulfilled through the academic and administrative freedom, which would help us to cater to the needs of the tribal students in an efficient manner.

The academic and operational decisions based on policy of the College Development Committee (CDC) headed by the Principal in order to fulfil the vision and mission of the institute. The CDC formulates common working procedures and entrusts the implementation with the faculty members.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

6.1.2 - The effective leadership is visible in various institutional practices such as decentralization and participative management.

The decentralization mechanism of the institute constitutes in delegating the authority and providing operational autonomy to all the various functionaries to work towards decentralized governance system. The Principal, Head of the Departments (HoD's) and staff members are involved in defining the policies and procedures, framing guidelines and rules regulations pertaining to admission,

placement, discipline, grievance, counselling, training development, and library services etc. For effective implementation and improvement of the institute various committees are formed. Various committees / cells include University examination committee, Research committee, NSS, NCC, Training placement and career counselling cell, Student welfare committee, Cultural and sports committee, Student grievances redressal committee, Library Management Committee for various learning resources, Anti-ragging committee, Anti-sexual harassment cell, to name a few. With regards to participative management, the institute promotes a culture of participative management by involving the staff and students in various activities. Management governs all decisions of the institution by using facts, information aligned with the objectives and outcomes. Both the students and faculties are allowed to express by giving any suggestions or inputs to improve the excellence in any aspect of the Institute.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

## 6.2 - Strategy Development and Deployment

6.2.1 - The institutional Strategic/ perspective plan is effectively deployed

### Core Values of our Institution

1. To bring the tribal and rural students to the main stream of education.
2. To make all-round development of tribal and rural students.
3. To create competence and self confidence among the tribal students.
4. To impart value-based education through socio-cultural activities.
5. To create cultural and nation loving citizens.
6. To develop versatile personality through higher education.
7. To motivate the tribal and rural students towards competitive examinations.

### Objectives of Perspective Plan

1. Contributing to National Development

2. Developing requisite global competencies amongst students of the college
3. Inculcating a Value System among the Students
4. ICT-based teaching and learning.

**Perspective Plan:**

1. To maintain continuously good academic performance
2. To develop and execute effective teaching- learning process
3. To encourage research culture in faculty and students
4. To develop a comprehensive system of student mentoring and student support and ensure transparency in evaluation process of students
5. To empower faculty about emerging trends in their profession for academic advancement
6. To facilitate a friendly, efficient and flawless administrative set up ensuring a smooth day to day functioning

File Description	Documents
Strategic Plan and deployment documents on the website	No File Uploaded
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

6.2.2 - The functioning of the institutional bodies is effective and efficient as visible from policies, administrative setup, appointment and service rules, procedures, etc.

**Governing Body:** The Governing Body as per the Constitution of the college has -- members in all. The Office Bearers are President, Vice-President and Secretary. The Principal is an ex-officio member, while there are -- Teacher Representatives and -- Non-Teaching Staff Representative.

**Administrative Set Up:** The Secretary and the Principal form the nucleus of the administration with the former being the final authority in all financial matters. The Principal is vested with the day-to-day running of the college. He has team of, the CDC, Departmental Heads, and the Head Clerk to assist her in the discharge of this work.

**The Functions of Various Bodies:** There are Committees, Cells and Associations focussing on specific tasks and roles in the College.

**Service Rules, Procedures, Recruitment and Promotion Policies:**  
Service rules, procedures and promotional policies are guided by the K. B. C. N. M. U., Jalgaon and the rules of the State Government as amended from time to time in this regard.

**Grievance Redressal Mechanisms:** There are several Grievance Redressal Mechanisms including the Anti-Sexual Harassment Cell with its Internal Complaints Committee; the Anti-Ragging Cell; a Grievance Redressal Cell with complaints boxes prominently placed and the full implementation of the Right to Information.

File Description	Documents
Paste link for additional information	Nil
Link to Organogram of the institution webpage	Nil
Upload any additional information	No File Uploaded

**6.2.3 - Implementation of e-governance in areas of operation Administration Finance and Accounts Student Admission and Support Examination**

D. Any 1 of the above

File Description	Documents
ERP (Enterprise Resource Planning) Document	No File Uploaded
Screen shots of user inter faces	No File Uploaded
Any additional information	No File Uploaded
Details of implementation of e-governance in areas of operation, Administration etc(Data Template)	<a href="#">View File</a>

### 6.3 - Faculty Empowerment Strategies

6.3.1 - The institution has effective welfare measures for teaching and non- teaching staff

The following facilities are also provided to employees for efficient functioning:

1. Medical leave
2. Yoga classes
3. Psychological counselling
4. 24 hour power back-up (100%) through solar power plants and Generator Facilities.
5. Wi-Fi facility
6. Workspace
7. Computing facility
9. Cafeterias
11. Identity cards
13. Sports facilities
14. A large number of faculty members have been supported for National and/or International visits or higher studies by Staff members to MoU Institutions and Conferences.
15. In order to encourage the young faculty to pursue a vibrant research career Internal projects and Seed money have been provided early in their career.
16. Uniforms are available for the non-teaching and students at very low cost.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

**6.3.2 - Number of teachers provided with financial support to attend conferences/ workshops and towards membership fee of professional bodies during the year**

**6.3.2.1 - Number of teachers provided with financial support to attend conferences/workshops and towards membership fee of professional bodies during the year**

0



File Description	Documents
Upload any additional information	No File Uploaded
Details of teachers provided with financial support to attend conference, workshops etc during the year (Data Template)	No File Uploaded

**6.3.3 - Number of professional development /administrative training programs organized by the institution for teaching and non-teaching staff during the year**

**6.3.3.1 - Total number of professional development /administrative training Programmes organized by the institution for teaching and non teaching staff during the year**

0

File Description	Documents
Reports of the Human Resource Development Centres (UGCASC or other relevant centres).	No File Uploaded
Reports of Academic Staff College or similar centers	No File Uploaded
Upload any additional information	No File Uploaded
Details of professional development / administrative training Programmes organized by the University for teaching and non teaching staff (Data Template)	No File Uploaded

**6.3.4 - Number of teachers undergoing online/face-to-face Faculty development Programmes (FDP) during the year (Professional Development Programmes, Orientation / Induction Programmes, Refresher Course, Short Term Course etc.)**

**6.3.4.1 - Total number of teachers attending professional development Programmes viz., Orientation / Induction Programme, Refresher Course, Short Term Course during the year**

24

File Description	Documents
IQAC report summary	No File Uploaded
Reports of the Human Resource Development Centres (UGCASC or other relevant centers)	No File Uploaded
Upload any additional information	No File Uploaded
Details of teachers attending professional development programmes during the year (Data Template)	<a href="#">View File</a>

### 6.3.5 - Institutions Performance Appraisal System for teaching and non- teaching staff

#### Teaching Staff

1. The performance of each faculty member is assessed according to the Annual Self-Assessment for the Performance Based Appraisal System (PBAS).
2. Promotions are based on the PBAS proforma for UGC Career Advancement Scheme (CAS)
3. The Institute accords appropriate weightage for these contributions in their overall assessment.
4. The PBAS proforma filled by the Faculty Member is checked and verified by the Heads of the Departments, followed by IQAC coordinator and Principal.
5. Faculty members whose promotions are due are recommended based on their API score and are required to appear before the screening-cum-selection committee.

#### Non-Teaching Staff

1. All non-teaching staff are also assessed through annual confidential reports and annual performance appraisal.
2. The comprehensive Annual Confidential Report comprises of various parameters. Each one of them is graded on a seven-point scale, i.e., Excellent, Very Good, Good, Highly Satisfactory, Satisfactory, Average and Poor.
3. The overall assessment is based on the cumulative grade by the Reporting Officer/HoD, which is then forwarded to the Principal by the forwarding officer.
4. On satisfactory performance, all employees are granted promotions and financial upgradation appraisal scheme.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

#### 6.4 - Financial Management and Resource Mobilization

6.4.1 - Institution conducts internal and external financial audits regularly Enumerate the various internal and external financial audits carried out during the year with the mechanism for settling audit objections within a maximum of 200 words

Institution conducts internal and external financial audits regularly

The Institution has established a mechanism for conducting internal and external audits on the financial transactions every year to ensure financial compliance. Internal audit is conducted half yearly/Early by the internal financial committee of the institution. The committee thoroughly verifies the income and expenditure details and the compliance report of internal audit is submitted to the management of the institution through principal.

Process of the internal audit:

All vouchers are audited by an internal financial committee on half yearly basis. The expenses incurred under different heads are thoroughly checked by verifying the bills and vouchers. If any discrepancy is found, the same is brought to the notice of the principal. The same process is being followed for the last five years.

Process of the external audit:

The accounts of the college are audited by chartered accountant regularly as per the government rules. The auditor ensures that all payments are duly authorized after the audit, the report is sent to the management for review. The audited statement is duly signed by the authorities of the management and chartered accountant.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

**6.4.2 - Funds / Grants received from non-government bodies, individuals, philanthropers during the year (not covered in Criterion III)**

**6.4.2.1 - Total Grants received from non-government bodies, individuals, Philanthropers during the year (INR in Lakhs)**

0

File Description	Documents
Annual statements of accounts	No File Uploaded
Any additional information	No File Uploaded
Details of Funds / Grants received from of the non-government bodies, individuals, Philanthropers during the year (Data Template)	No File Uploaded

**6.4.3 - Institutional strategies for mobilization of funds and the optimal utilization of resources**

**Fees:** Fees charged as per the university and government norms from students of various granted and Non-granted courses.

**Salary Grant:** The College receives salary grant from the State Government. For this, we prepare and send an annual budget of the estimated salary grant required to the state government. This grant includes salaries of the Full Time teachers and nonteaching staff working on granted posts.

**UGC Grants:** Our College is under 2F and 12B as per UGC Act and Permanent Affiliation of the University and thus, we receive grants from the UGC for the development and maintenance of Infrastructure, upgrade of the Learning Resources and Research.

The institution set up a UGC Committee, in which The Principal and College Development Committee in accordance with IQAC takes a review of the mobilization of funds and the utilization of these sources periodically in their meetings followed by regular internal and external audits.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

## 6.5 - Internal Quality Assurance System

6.5.1 - Internal Quality Assurance Cell (IQAC) has contributed significantly for institutionalizing the quality assurance strategies and processes

College attempts to chisel out the total quality person through a persistent focus on imparting quality education, through its innovative, comprehensive and flexible education policy.

The IQAC at G T Patil College has been performing the following tasks on a regular basis:

Improvement in quality of teaching and research by regular inputs to all concerned based on feedback from students. Providing inputs for best practices in administration for efficient resource utilization and better services to students and staff. Students and staff give their feedback and suggestions on teaching and administrative performance.

The IQAC has immensely contributed in the implementation of quality assurance strategies and processes at all levels. The Institute IQAC regularly meets every three months. The Institute IQAC prepares, evaluates and recommends the following for approval by the relevant Institute and Govt. statutory authorities:

- (a) Annual Quality Assurance Report (AQAR)
- (b) Self-Study Reports of various accreditation bodies (ISO 9001, NAAC)
- (c) Performance Based Appraisal System (PBAS) for Career Advancement Scheme (CAS)
- (d) Stakeholder's feedback
- (e) Process Performance & Conformity
- (f) Action Taken Reports

**(g) New Programmes as per National Missions and Govt. Policies**

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

6.5.2 - The institution reviews its teaching learning process, structures & methodologies of operations and learning outcomes at periodic intervals through IQAC set up as per norms and recorded the incremental improvement in various activities

The Academic Calendar is prepared in advance, displayed and circulated in the Institute and strictly followed. Admission to various programmes, summer, winter and mid-term vacations, examination schedule and declaration of results are notified in the Academic Calendar.

Students are apprised of the Time-Table, Programme structure, syllabi of the courses before the semester commences. Important announcements are displayed at the notice board on regular basis and attendance and conduct of classes are monitored by the HODs and respective subject teachers.

The Academic Monitoring Committee members make random visits to ensure smooth functioning of classes and also regularly take students feedback, which is followed by the appropriate actions to enhance the teaching-learning process. In addition, Feedback from students is also taken individually by teachers for their respective courses, by Proctors, AAAC and directly through IQAC.

The teaching-learning processes are reviewed, and improvements implemented, based on the IQAC recommendations.

The major initiatives taken in the said respect include the following:

1. Introduction of regular Home Assignments.
2. Automation of Examination Processes.
3. Curriculum Development Workshops in various subjects.
4. Green initiatives in Campus - tree plantation, solar photovoltaic power plants etc.
5. MoU with prestigious Institutes, Universities, Govt. agencies and/or industries.

File Description	Documents
Paste link for additional information	Nil
Upload any additional information	No File Uploaded

**6.5.3 - Quality assurance initiatives of the institution include: Regular meeting of Internal Quality Assurance Cell (IQAC); Feedback collected, analyzed and used for improvements Collaborative quality initiatives with other institution(s) Participation in NIRF any other quality audit recognized by state, national or international agencies (ISO Certification, NBA)**

**B. Any 3 of the above**

File Description	Documents
Paste web link of Annual reports of Institution	Nil
Upload e-copies of the accreditations and certifications	<a href="#">View File</a>
Upload any additional information	<a href="#">View File</a>
Upload details of Quality assurance initiatives of the institution (Data Template)	<a href="#">View File</a>

## **INSTITUTIONAL VALUES AND BEST PRACTICES**

### **7.1 - Institutional Values and Social Responsibilities**

7.1.1 - Measures initiated by the Institution for the promotion of gender equity during the year

GTP Arts, Commerce and Science College Nandurbar sensitizes students and employees regarding gender equity and takes opportunities in keeping the social responsibility by organizing various activities. The institute promotes gender equity in admissions, recruitment, administrative functionality, academic activities, NSS activities, and extracurricular activities.

Measures initiated by the institution for the promotion of gender equity during the year:

- Separate Women's Grievance Redressal Committee is

established exclusively to encourage the girl students and the unit is successfully conducting various activities to serve the society.

- The girl students are nominated as members of various committees at department, institute levels and the institute encourage their participation in various activities.
- During orientation programs and other events, awareness is created on gender equity among the students.
- The institute celebrates Women's day and presents success stories of famous women to inspire the girl students and to make them understand their potential.
- The institute has a policy of appreciating faculty without gender bias. Women faculties are nominated, based on their ability, as heads of the departments (Department of Mathematics) and conveners of various committees and discharging their duties efficiently. Institute has separate Hostel building facilities for girls and boys in premises.

File Description	Documents
Annual gender sensitization action plan	Nil
Specific facilities provided for women in terms of: a. Safety and security b. Counseling c. Common Rooms d. Day care center for young children e. Any other relevant information	<a href="https://drive.google.com/drive/folders/1-lybCJkdsJB9mVKXpq2eLnnj38oKQEMv">https://drive.google.com/drive/folders/1-lybCJkdsJB9mVKXpq2eLnnj38oKQEMv</a>

**7.1.2 - The Institution has facilities for alternate sources of energy and energy conservation measures Solar energy Biogas plant Wheeling to the Grid Sensor-based energy conservation Use of LED bulbs/ power efficient equipment**

**B. Any 3 of the above**

File Description	Documents
Geo tagged Photographs	<a href="#">View File</a>
Any other relevant information	No File Uploaded

**7.1.3 - Describe the facilities in the Institution for the management of the following types of degradable and non-degradable waste (within 200 words) Solid waste management Liquid waste management Biomedical waste management E-waste management Waste recycling system**



Hazardous chemicals and radioactive waste management

**Solid waste management:** The institute has maintained a neat and clean ambience by a well-designed and organized solid waste management system. Each block and each floor is equipped with dry waste collecting bins, and the waste is collected every day, the waste is then transported to the concerned places and hand over to the concern fellow. The waste is emptied into Municipal corporation tractor trolley and is carried away from the campus for disposal. The waste from various offices, laboratories, corridors, class rooms etc., is also weekly removed and dumped into trolleys.

**Liquid waste management:** Liquid waste is mainly the sewage coming out from hostels, canteen, and toilet blocks of the institute. The entire campus has two pipe systems in place. Here, sullage (liquid waste coming out from bathrooms and kitchen) and sewage (liquid waste coming out from latrine) are collected separately. The sullage is treated in the indigenously designed sullage plant in the campus. It has been possible to maintain a lush green campus owing to this technology.

**E-waste management:** The E-waste management has been given due focus and all Electronic goods are put to optimum use. The old computers are used by the instructor for demonstration purposes in the practical sessions. UPS Batteries are recharged / repaired / exchanged by the suppliers. The waste compact discs are used by students for decoration and Participation in competitions 'Best out of Waste' in various activity.

File Description	Documents
Relevant documents like agreements / MoUs with Government and other approved agencies	No File Uploaded
Geo tagged photographs of the facilities	No File Uploaded

**7.1.4 - Water conservation facilities available in the Institution: Rain water harvesting Bore well /Open well recharge Construction of tanks and bunds Waste water recycling Maintenance of water bodies and distribution system in the campus**

B. Any 3 of the above

File Description	Documents
Geo tagged photographs / videos of the facilities	No File Uploaded
Any other relevant information	No File Uploaded

### 7.1.5 - Green campus initiatives include

#### 7.1.5.1 - The institutional initiatives for greening the campus are as follows:

1. Restricted entry of automobiles
2. Use of bicycles/ Battery-powered vehicles
3. Pedestrian-friendly pathways
4. Ban on use of plastic
5. Landscaping

C. Any 2 of the above

File Description	Documents
Geo tagged photos / videos of the facilities	<a href="#">View File</a>
Various policy documents / decisions circulated for implementation	No File Uploaded
Any other relevant documents	No File Uploaded

### 7.1.6 - Quality audits on environment and energy are regularly undertaken by the institution

7.1.6.1 - The institutional environment and energy initiatives are confirmed through the following 1.Green audit 2. Energy audit 3.Environment audit 4.Clean and green campus recognitions/awards 5. Beyond the campus environmental promotional activities

B. Any 3 of the above

File Description	Documents
Reports on environment and energy audits submitted by the auditing agency	<a href="#">View File</a>
Certification by the auditing agency	No File Uploaded
Certificates of the awards received	No File Uploaded
Any other relevant information	No File Uploaded

<p><b>7.1.7 - The Institution has disabled-friendly, barrier free environment Built environment with ramps/lifts for easy access to classrooms. Disabled-friendly washrooms Signage including tactile path, lights, display boards and signposts Assistive technology and facilities for persons with disabilities (Divyangjan) accessible website, screen-reading software, mechanized equipment</b></p> <p><b>5. Provision for enquiry and information : Human assistance, reader, scribe, soft copies of reading material, screen reading</b></p>	<p><b>D. Any 1 of the above</b></p>
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File Description	Documents
Geo tagged photographs / videos of the facilities	<a href="#">View File</a>
Policy documents and information brochures on the support to be provided	<a href="#">View File</a>
Details of the Software procured for providing the assistance	No File Uploaded
Any other relevant information	No File Uploaded

<p>7.1.8 - Describe the Institutional efforts/initiatives in providing an inclusive environment i.e., tolerance and harmony towards cultural, regional, linguistic, communal socioeconomic and other diversities (within 200 words).</p> <ul style="list-style-type: none"> <li>• GTP College is always putting an effort in order to maintain harmony, eliminate social and financial barriers, enhance self-esteem, encourage students to maintain an inclusive environment.</li> <li>• Along with curriculum, additional communication and soft</li> </ul>
---

skills classes are conducted to make the students from different backgrounds communicate effectively.

- Industrial visits expose students to the practical challenges and also make the students from different backgrounds adapt to one another to create a tolerance and harmony in the organization.
- Every year national festivals and other events are conducted to emphasize the importance of tolerance and harmony towards cultural, regional, linguistic, communal socioeconomic and other diversities.
- NSS and Unnat Bharat Abhiyan activities of our institution alleviate the socioeconomic diversities and progress them towards leading to a harmonious living.
- Cultural committee, have special attention over the students those are actively participate in different institutional as well as university level cultural events like Yuvarang,
- The institute provides financial support to the students who lost their parents during COVID-19 pandemic.
- Central Library has a facility to issue books from Book Bank to students.

File Description	Documents
Supporting documents on the information provided (as reflected in the administrative and academic activities of the Institution)	<a href="#">View File</a>
Any other relevant information	No File Uploaded

7.1.9 - Sensitization of students and employees of the Institution to the constitutional obligations: values, rights, duties and responsibilities of citizens

India is a democratic country with many languages, subcultures, religions and ethnic diversities but represents unity in diversity governed and guided by the Constitution irrespective of caste, religion, race sex. GTP College sensitizes the students and the employees of the institute to the constitutional obligations about values, rights, duties and responsibilities of citizens which enables them to maintain conduct as a responsible citizen.

The vision of the institute is: 'To prepare graduates to assume positions of political, economic, intellectual, artistic and environmental leadership in tribal, regional and national contexts.

The institute hoists the flag during national festivals to inspire

students and staff by inculcating the qualities of freedom fighters and to emphasize the duties and responsibilities of citizens.

The students are inspired by conducting various programs based on culture, traditions, values, duties and responsibilities by inviting outside people.

For intellectual, mental, physical and spiritual development the institute conducts sessions of yoga and music.

Institute establishes policies that reflect core values. Code of conduct is prepared for students and staff .

The institute organized awareness program on "Traffic rules and regulations" by inviting traffic DSP and other traffic department personnels

The institute conducted awareness programs including rallies on COVID-19 vaccination, plastics ban, cleanliness, Swachh Bharat etc. involving students.

On Orientation day and fresher's day, reputed persons from different socio-economical backgrounds such as police department, municipal corporation, collectorate and legal cell authorities are invited to deliver talks on duties and responsibilities of citizens and consequences of ragging.

File Description	Documents
Details of activities that inculcate values; necessary to render students in to responsible citizens	Nil
Any other relevant information	Nil

**7.1.10 - The Institution has a prescribed code of conduct for students, teachers, administrators and other staff and conducts periodic programmes in this regard. The Code of Conduct is displayed on the website There is a committee to monitor adherence to the Code of Conduct Institution organizes professional ethics programmes for students, teachers, administrators**

**B. Any 3 of the above**

**and other staff 4. Annual awareness programmes on Code of Conduct are organized**

File Description	Documents
Code of ethics policy document	<a href="#">View File</a>
Details of the monitoring committee composition and minutes of the committee meeting, number of programmes organized, reports on the various programs etc., in support of the claims	No File Uploaded
Any other relevant information	No File Uploaded

7.1.11 - Institution celebrates / organizes national and international commemorative days, events and festivals

In keeping with the Mission and Vision of the institute, that aims to inculcate values and nationalism amongst the students by celebrating the national/state festivals and birth anniversaries of great Indian personalities in the institute every year. All the necessary details are given in "Relevant Information"

File Description	Documents
Annual report of the celebrations and commemorative events for the last (During the year)	No File Uploaded
Geo tagged photographs of some of the events	<a href="#">View File</a>
Any other relevant information	<a href="#">View File</a>

## 7.2 - Best Practices

7.2.1 - Describe two best practices successfully implemented by the Institution as per NAAC format provided in the Manual.

**Best Practice I:**

**Title of the Practice:**

**Preparation and distribution of hand sanitizer for the poor and tribal peoples during COVID-19 pandemic**

**Best Practice II:**

**Title of the Practice:**

**Reading Club Activity for faculty**

File Description	Documents
Best practices in the Institutional website	Nil
Any other relevant information	Nil

**7.3 - Institutional Distinctiveness**

7.3.1 - Portray the performance of the Institution in one area distinctive to its priority and thrust within 200 words

Vision of the Institution is to empower students with quality education, knowledge, progressive technology and cultivate the sense of social responsibility and patriotism. The Institute instigates systematic effective practices into all its academic and administrative work to develop and harness the latent potentials of student and faculty.

Modernization in all spheres of Curriculum, Teaching -Learning -Evaluation, Student Support System, building learning resources are intertwined for overall student development and reflected in the teaching -learning- research ecosystems the institute is engaged with.

The institute takes initiatives for skill development of students by arranging programs such as soft skills, Language and communication skills, Life skills (Yoga, physical fitness, health and hygiene), ICT/computing skills etc. which provides an environment to transform into skillful human resource.

The Institute has taken several initiatives to cultivate innovation as the way of life. The Institute has started an Innovation and Incubation collaborative activity with Centre for Innovation Incubation and Linkages (KCIIL) of KBC, North Maharashtra University, Jalgaon in order to augment innovation-driven culture among students and faculty promoting intra disciplinary approach aiming to competitive, conducive and value added environment for products, patents and publications.

The institute believes in green technology use and promotion and has installed solar power plant with capacity of Electricity demands of the Institute. Solar water heaters, rain water harvesting, Sullage treatment plants and vermicompost are operational in the campus to save electricity and environment.

File Description	Documents
Appropriate web in the Institutional website	No File Uploaded
Any other relevant information	No File Uploaded

### 7.3.2 - Plan of action for the next academic year

Vision of the Institution is to empower students with quality education, knowledge, progressive technology and cultivate the sense of social responsibility and patriotism. The Institute instigates systematic effective practices into all its academic and administrative work to develop and harness the latent potentials of student and faculty.

Modernization in all spheres of Curriculum, Teaching Learning Evaluation, Student Support System, building learning resources are intertwined for overall student development and reflected in the teaching -learning- research ecosystems the institute is engaged with. The Institute has established its distinctive approach towards this comprehensive Vision by intending it in the form of service to the society.

The Institute has started an Innovation and Incubation collaborative activity with Centre for Innovation Incubation and Linkages (KCIIL) of KBC, North Maharashtra University, Jalgaon in order to augment innovation-driven culture among students and faculty promoting intra disciplinary approach aiming to competitive, conducive and value added environment for products, patents and publications.

To ensure this institute organizes Entrepreneurship Awareness Camps, Entrepreneurship Development Programmes, FDP and Skill Development Programmes in the institution.

The institute believes in green technology use and promotion and has installed solar power plant which fulfills 100 % of Electricity demands of the Institute.



# **Feedback: Analysis & ATR**



NANDURBAR TALUKA VIDHANANDURBAR TALUKA VIDHAYAK SAMITI'S  
**G.T.PATIL ARTS, COMMERCE AND SCIENCE COLLEGE,**  
NANDURBAR, DIST-NANDURBAR-425412 (M.S.)  
NAAC Re-Accredited 'A' Grade (CGPA 3.10)  
DST FIST Identified College, ISO 9001:2008 Certified  
Awarded "Excellent College, 2014" By North Maharashtra University, Jalgaon



Prof. Dr. V.S. Shrivastava  
Principal

Office: (02564) 222293, 226534  
E-Mail: gtpcollege@rediffmail.com  
Web: www.ntvsgtpcollege.org

## Feedback Analysis (2017-2018)

Curriculum is a prime factor for enhancement of teaching-learning environment and there is a dire need for a constant assessment and a continuous up gradation. Since our college is affiliated to North Maharashtra University, we follow the University curriculum. Each year, our College collects feedback from all the stakeholders such as students, faculties, alumnus, and parents through an online mechanism (Google forms). Based on the feedback and inputs provided by various stakeholders, the college curriculum review committee incorporates modifications in curriculum while still keeping it in line with the one provided by the University.

### Feedback on Curriculum

- **Student Feedback**

Student's feedback plays a pivotal role in enhancing the learning atmosphere. The feedback from the students on the present curriculum of various courses that our college offered were collected and it revealed the following facts:

- **SCIENCE**

76% students responded that they were satisfied with the course content in terms of job relevance, employability and professional enhancement, Whereas 24% students have showed dissatisfaction for these courses.

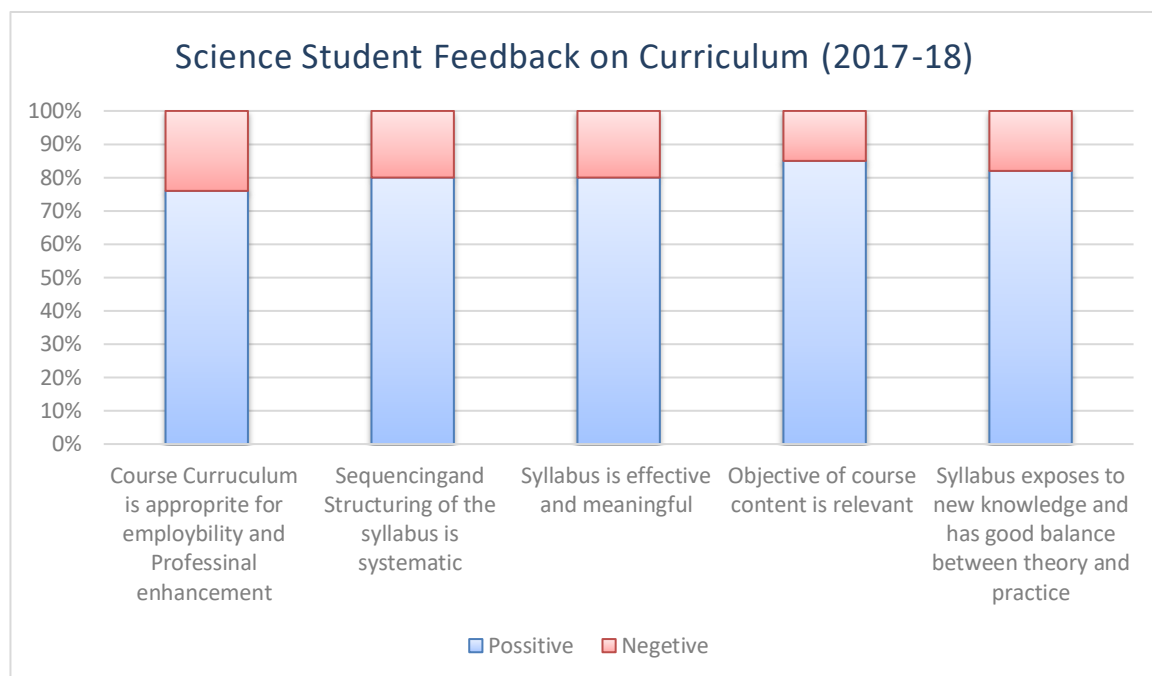
Approximate 80% students have the opinion that the sequencing and structuring of the syllabi is systematic whereas 20% students showed disagreement and suggested modification in the sequence of the existing list.

About 80% students responded positively for the effectiveness and meaningfulness of the syllabus in the subject area while 20% showed dissatisfaction.

About 85% students reported that they strongly agreed with the relevance of the objectives with the course contents.



Around 82% students agreed that the syllabus exposed them to new knowledge and had good balance between theory and practice.



## • ARTS

83% students responded that they were satisfied with the course content in terms of job relevance, employability and professional enhancement, whereas 17% students have showed dissatisfaction for these courses.

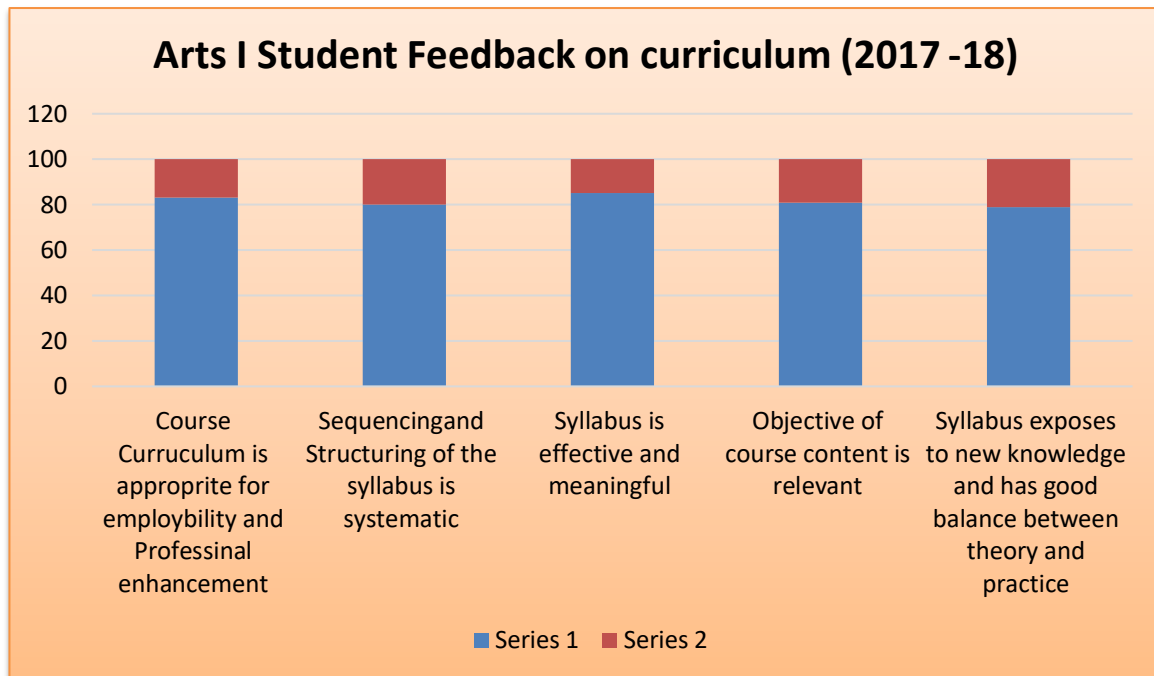
Approximate 80% students have the opinion that the sequencing and structuring of the syllabi is systematic whereas 20% students showed disagreement and suggested modification in the sequence of the existing list.

About 85% students responded positively for the effectiveness and meaningfulness of the syllabus in the subject area while 15% showed dissatisfaction.

About 81% students reported that they strongly agreed with the relevance of the objectives with the course contents.

Around 79% students agreed that the syllabus exposed them to new knowledge and had good balance between theory and practice.





## • COMMERCE

85% students responded that they were satisfied with the course content in terms of job relevance, employability and professional enhancement, whereas 15% students have showed dissatisfaction for these courses.

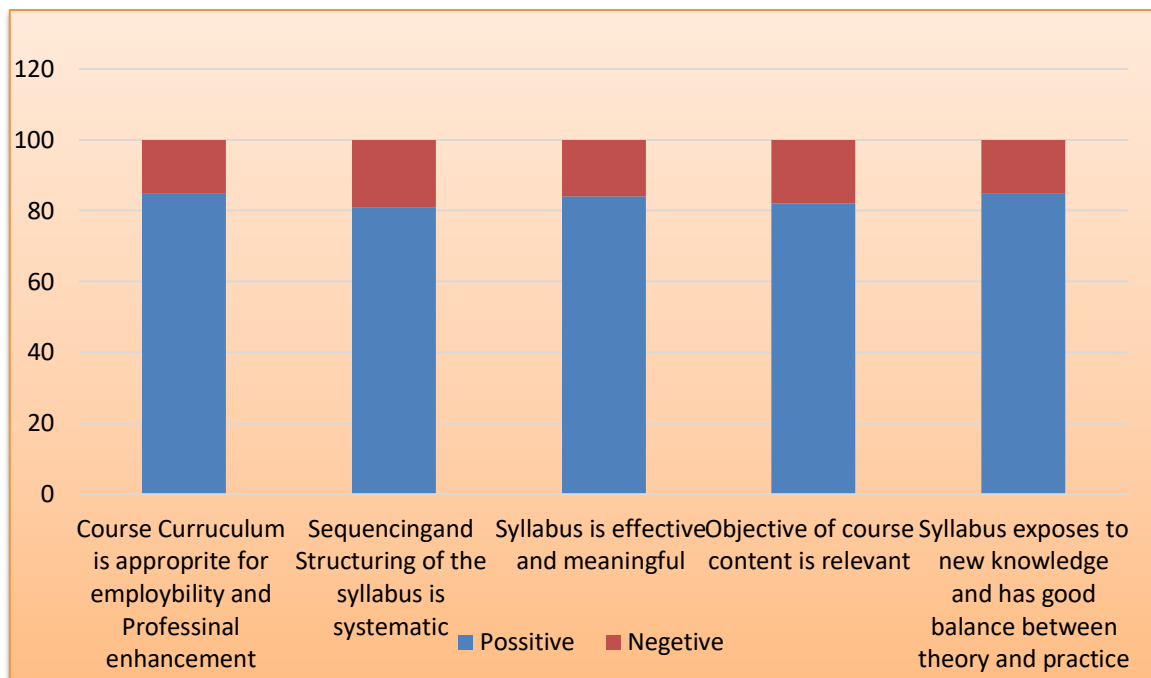
Approximate 81% students have the opinion that the sequencing and structuring of the syllabi is systematic whereas 19% students showed disagreement and suggested modification in the sequence of the existing list.

About 84% students responded positively for the effectiveness and meaningfulness of the syllabus in the subject area while 16% showed dissatisfaction.

About 82% students reported that they strongly agreed with the relevance of the objectives with the course contents.

Around 85% students agreed that the syllabus exposed them to new knowledge and had good balance between theory and practice.





### • Faculty Feedback

Faculties play a prime role in curriculum design, development, and implementation. In order to enhance the teaching-learning process, timely revisions and upgradation of the quality of pedagogy adopted, course content, etc. is required and this is done in accordance with the suggestions and inputs from the faculties. The feedback collected from the faculties revealed the following:

The analysis depicted that about 86% faculties agreed that the objectives of the syllabi are well defined and had clarity.

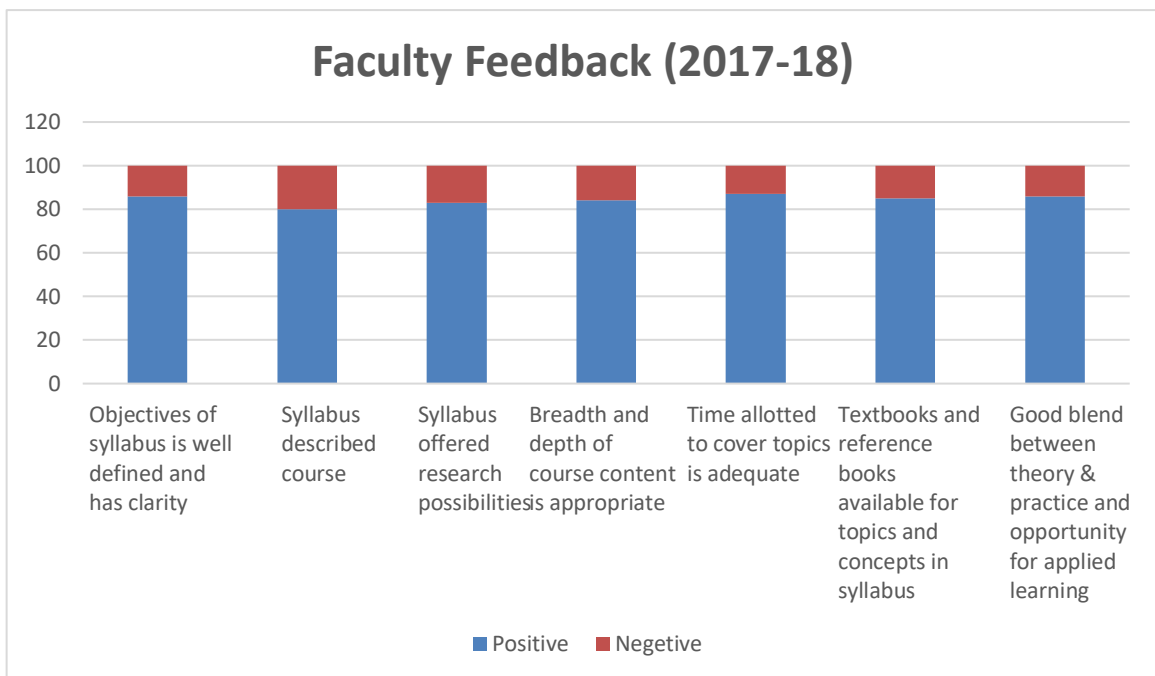
80% faculties responded that the syllabus precisely described the course.

83% faculties were of the opinion that the syllabus offered research possibilities.

84% faculties were satisfied with the breadth and depth of course content of the syllabus in terms of understanding and content coverage.

87% faculties believed that the time allotted to cover all the topics in the syllabus was adequate.

About 85% of the faculties agreed that there are textbooks and reference books available for students that help them understand the concepts and topics mentioned in the syllabus thorough About 86% faculties agreed that there was good blend between theory and practice and provided an opportunity for applied learning.



- **Parent Feedback**

The feedback collected from the parents revealed the following:

85% parents responded that they are satisfied with the overall academic environment of the college.

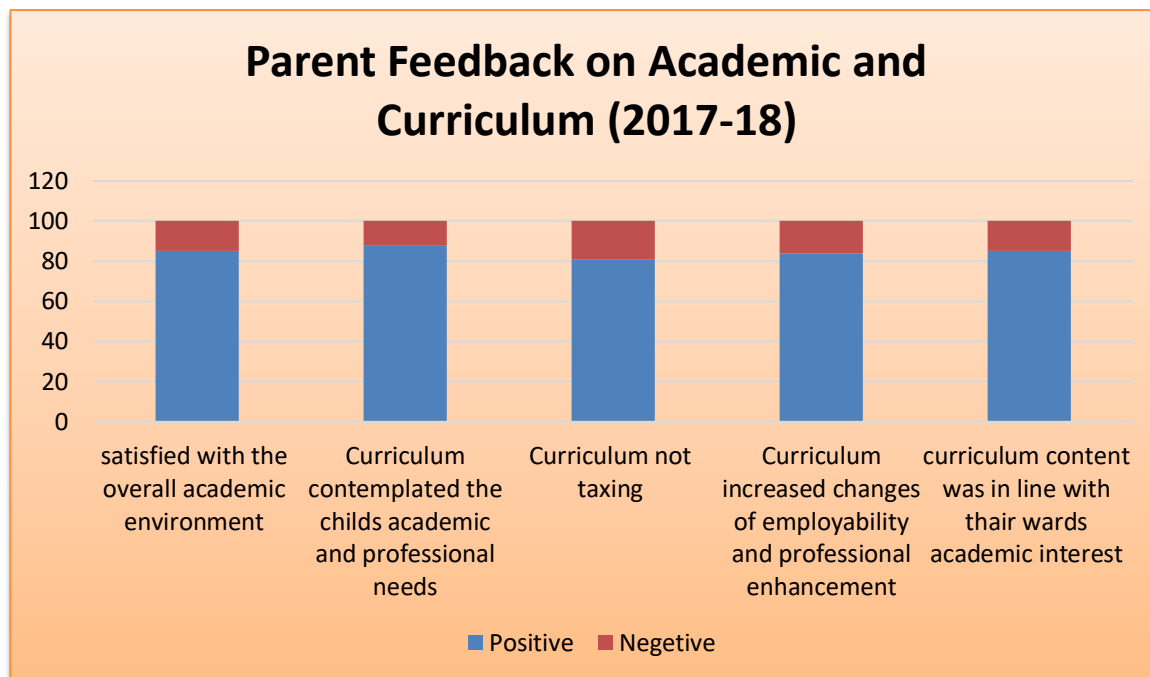
Approximate 88% of the parents indicated that the curriculum contemplated the child's academic and professional needs.

About 81% parents stated that the course contents and various other aspects of the syllabus in the course were not taxing for their wards whereas 19% parents felt the need for syllabus revision.

84 % parents believed that the curriculum would increase the chances of employability and professional enhancement of their ward.

85% parents specified that the curriculum content was in line with their ward's academic interest thus encouraging them to go beyond it.





### • **Alumnus Feedback**

Valuable inputs and feedback from our alumni enable time to time improvement in facilities, syllabus updating that develops global competence of our students resulting in enhanced employability, etc. The feedback collected from the alumnus indicated the following:

87% alumni responded that they are satisfied with the overall academic environment of the college.

About 84% alumni believed that the curriculum focused on the employability skill.

81% alumni specified that the curriculum content was in line with their academic interest thus encouraging them to go beyond it.

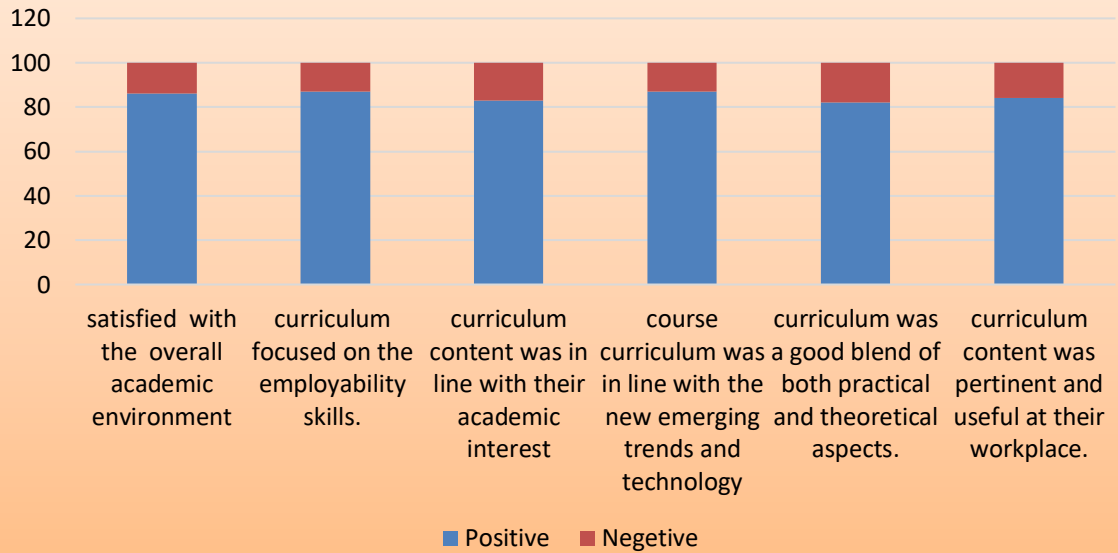
85% alumni indicated that course curriculum was in line with the new emerging trends and technology of the industry and academics.

79% alumni agreed that the curriculum was a good blend of both practical and theoretical aspects.

About 83% agreed that the curriculum content was pertinent and useful at their workplace.



## Alumnus Feedback on Curriculum



  
**IQAC Co-ordinator**  
**GTP College, Nandurbar**



  
**PRINCIPAL**  
**G. T. Patil College**  
**Nandurbar**





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## Feedback Analysis (2017-2018)

Curriculum is a prime factor for enhancement of teaching-learning environment and there is a dire need for a constant assessment and a continuous upgradation. Since our college is affiliated to North Maharashtra University, we follow the University curriculum. Each year, our College collects feedback from all the stakeholders such as students, faculties, alumnus, and parents through an online mechanism (google forms). Based on the feedback and inputs provided by various stakeholders, the college curriculum review committee incorporates modifications in curriculum while still keeping it in line with the one provided by the University.

### Feedback on Curriculum

#### • Student Feedback

Student's feedback plays a pivotal role in enhancing the learning atmosphere. The feedback from the students on the present curriculum of various courses that our college offered were collected and it revealed the following facts:

#### • SCIENCE

80% students responded that they were satisfied with the course content in terms of job relevance, employability and professional enhancement, whereas 20% students have showed dissatisfaction for these courses. Approximate 83% students have the opinion that the sequencing and structuring of the syllabi is systematic whereas 17% students showed disagreement and suggested modification in the sequence of the existing list.

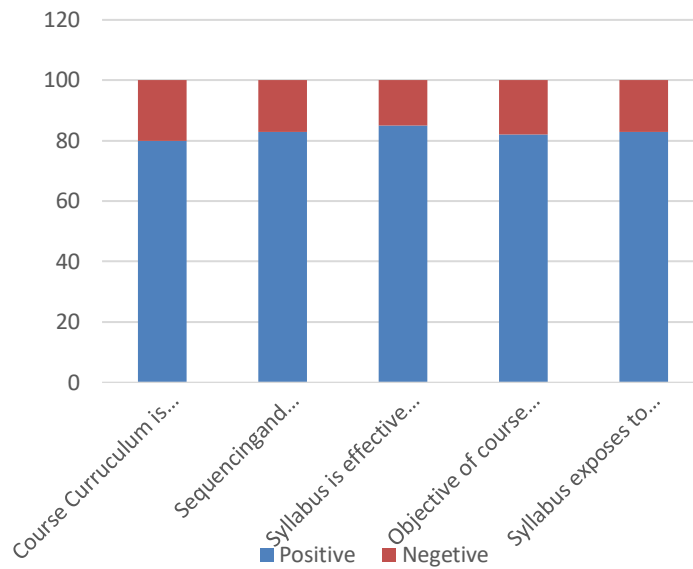
About 85% students responded positively for the effectiveness and meaningfulness of the syllabus in the subject area while 15% showed dissatisfaction.

About 82% students reported that they strongly agreed with the relevance of the objectives with the course contents.

Around 83% students agreed that the syllabus exposed them to new knowledge and had good balance between theory and practice.



## Science Student Feedback on curriculum (2018-19)



85% students responded that they were satisfied with the course content in terms of job relevance, employability and professional enhancement, whereas 15% students have showed dissatisfaction for these courses

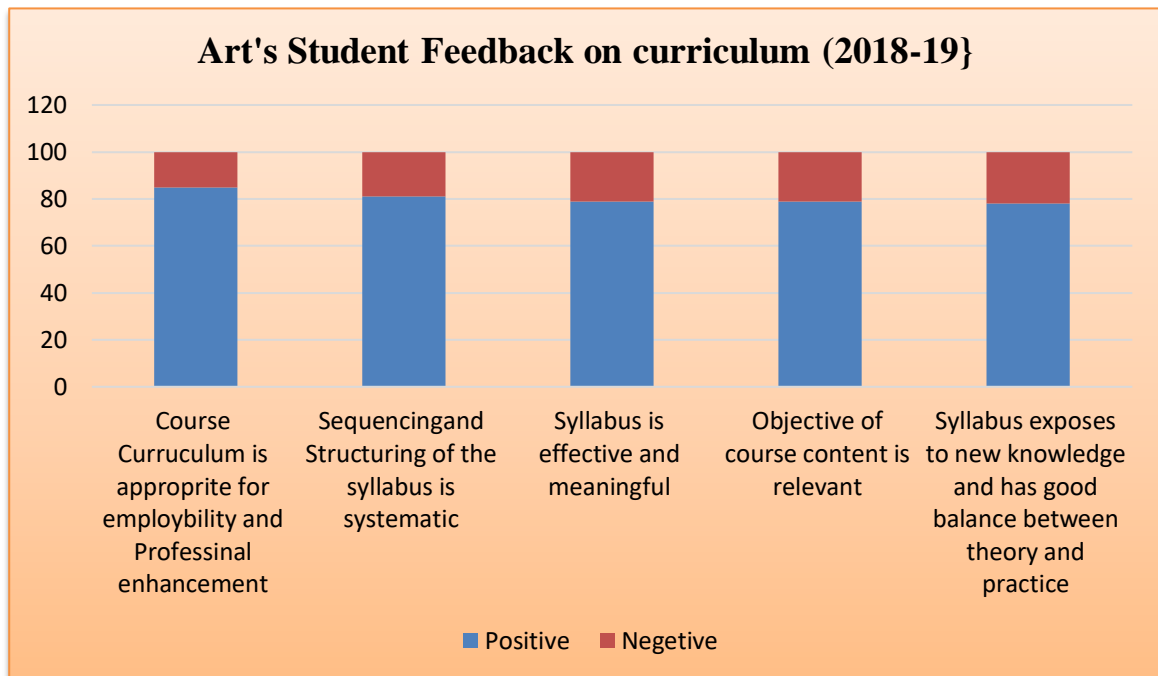
Approximate 81% students have the opinion that the sequencing and structuring of the syllabi is systematic whereas 19% students showed disagreement and suggested modification in the sequence of the existing list.

About 79% students responded positively for the effectiveness and meaningfulness of the syllabus in the subject area while 21% showed dissatisfaction.

About 79% students reported that they strongly agreed with the relevance of the objectives with the course contents.

Around 78% students agreed that the syllabus exposed them to new knowledge and had good balance between theory and practice.





## COMMERCE

78% students responded that they were satisfied with the course content in terms of job relevance, employability and professional enhancement, whereas 22% students have showed dissatisfaction for these courses.

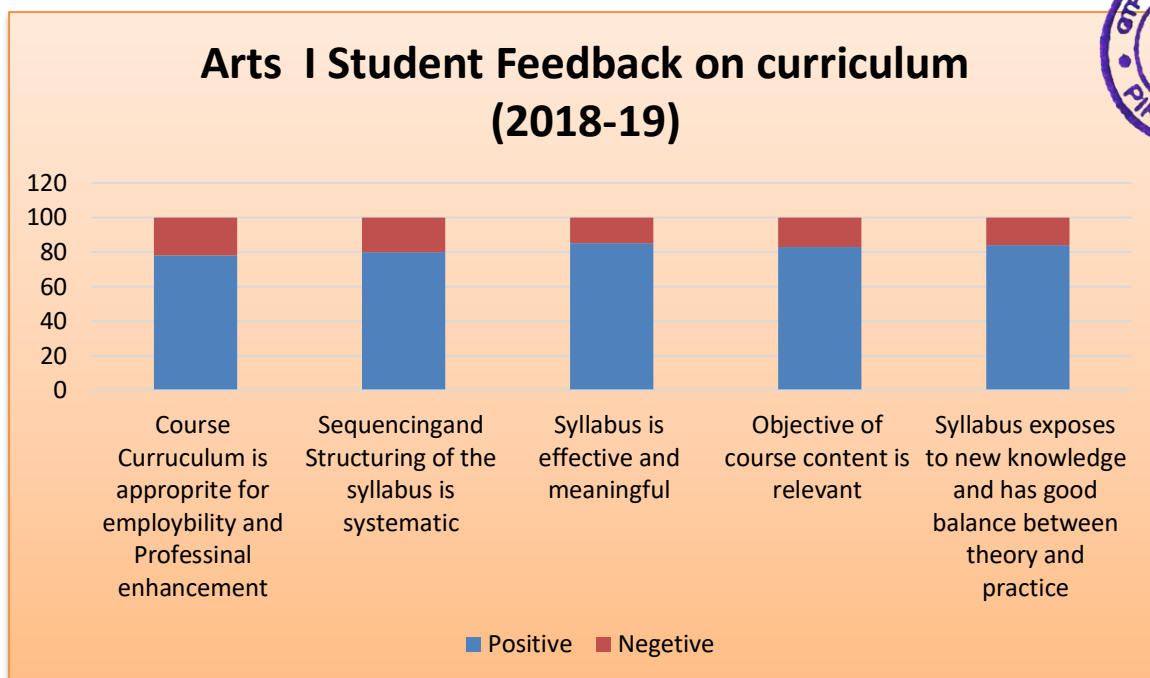
Approximate 80% students have the opinion that the sequencing and structuring of the syllabi is systematic whereas 20% students showed disagreement and suggested modification in the sequence of the existing list.

About 85% students responded positively for the effectiveness and meaningfulness of the syllabus in the subject area while 15% showed dissatisfaction.

About 83% students reported that they strongly agreed with the relevance of the objectives with the course contents.

Around 84% students agreed that the syllabus exposed them to new knowledge and had good balance between theory and practice.





## Faculty Feedback

Faculties play a prime role in curriculum design, development, and implementation. In order to enhance the teaching-learning process, timely revisions and up gradation of the quality of pedagogy adopted, course content, etc. is required and this is done in accordance with the suggestions and inputs from the faculties. The feedback collected from the faculties revealed the following:

The analysis depicted that about 87% faculties agreed that the objectives of the syllabi are well defined and had clarity.

83% faculties responded that the syllabus precisely described the course.

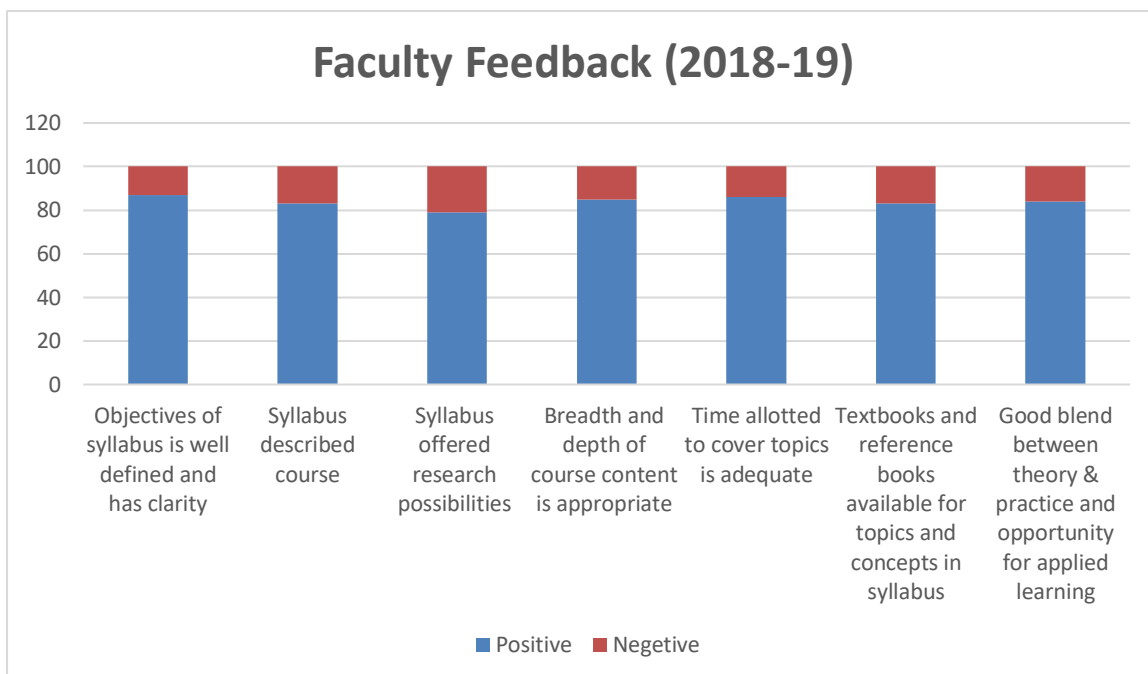
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85% faculties were satisfied with the breadth and depth of course content of the syllabus in terms of understanding and content coverage.

86% faculties believed that the time allotted to cover all the topics in the syllabus was adequate.

About 83% of the faculties agreed that there are textbooks and reference books available for students that help them understand the concepts and topics mentioned in the syllabus thoroughly.

About 83% faculties agreed that there was good blend between theory and practice and provided an opportunity for applied learning.



- Parent Feedback**

The feedback collected from the parents revealed the following:

86% parents responded that they are satisfied with the overall academic environment of the college.

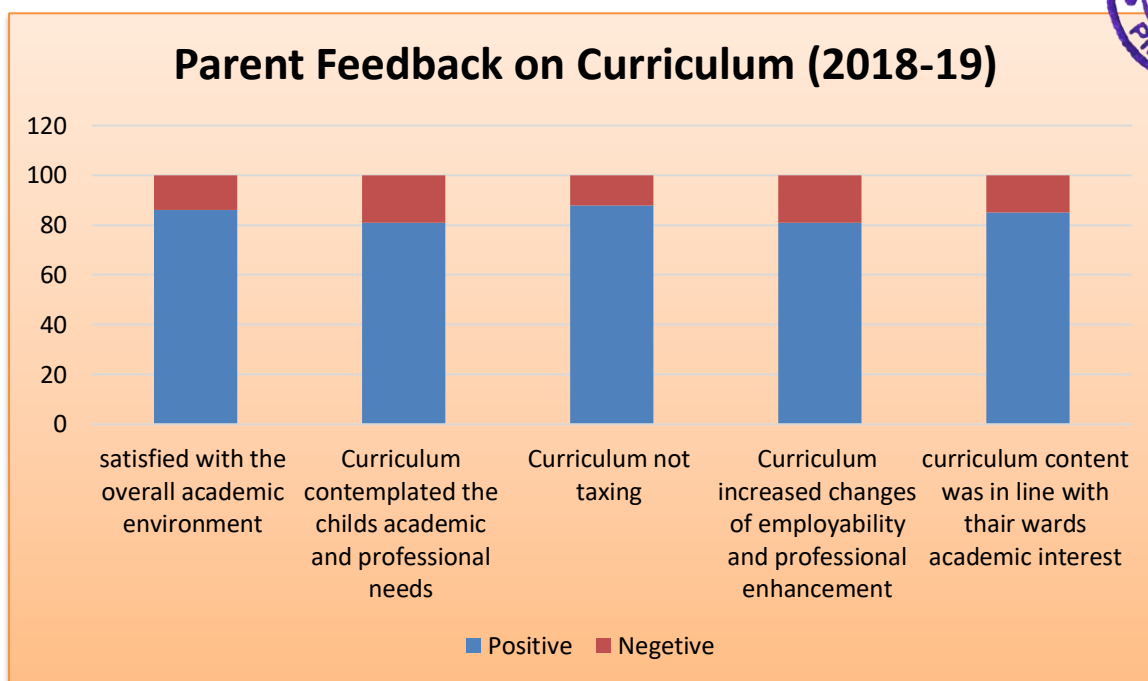
Approximate 81% of the parents indicated that the curriculum contemplated the child's academic and professional needs.

About 88% parents stated that the course contents and various other aspects of the syllabus in the course were not taxing for their wards whereas 14% parents felt the need for syllabus revision.

81% parents believed that the curriculum would increase the chances of employability and professional enhancement of their ward.

85% parents specified that the curriculum content was in line with their ward's academic interest thus encouraging them to go beyond it.





### • **Alumnus Feedback**

Valuable inputs and feedback from our alumni enable time to time improvement in facilities, syllabus updating that develops global competence of our students resulting in enhanced employability, etc. The feedback collected from the alumnus indicated the following:

82% alumni responded that they are satisfied with the overall academic environment of the college.

About 84% alumni believed that the curriculum focused on the employability skills.

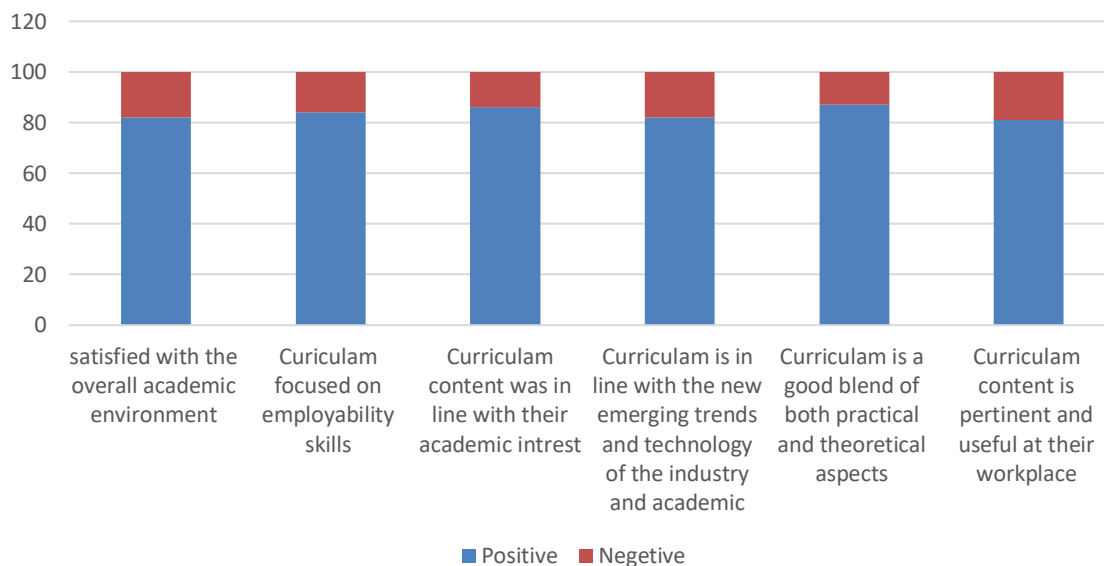
86% alumni specified that the curriculum content was in line with their academic interest thus encouraging them to go beyond it.

82% alumni indicated that course curriculum was in line with the new emerging trends and technology of the industry and academics.

87% alumni agreed that the curriculum was a good blend of both practical and theoretical aspects.

About 81% agreed that the curriculum content was pertinent and useful at their work.

## Alumnus Feedback on Curriculum (2018-19)



  
**IQAC Co-ordinator**  
**GTP College, Nandurbar**



  
**PRINCIPAL**  
**G.T. Patil College**  
**Nandurbar**



Prof. Dr. V.S. Shrivastava  
Principal

## NANDURBAR TALUKA VIDHNANDURBAR TALUKA VIDHAYAK SAMITI'S G.T.PATIL ARTS, COMMERCE AND SCIENCE COLLEGE,

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### Feedback Analysis (2019-2020)

Curriculum is a prime factor for enhancement of teaching-learning environment and there is a dire need for a constant assessment and a continuous upgradation. Since our college is affiliated to North Maharashtra University, we follow the University curriculum. Each year, our College collects feedback from all the stakeholders such as students, faculties, alumnus, and parents through an online mechanism (google forms). Based on the feedback and inputs provided by various stakeholders, the college curriculum review committee incorporates modifications in curriculum while still keeping it in line with the one provided by the University.

#### Feedback on Curriculum Student Feedback

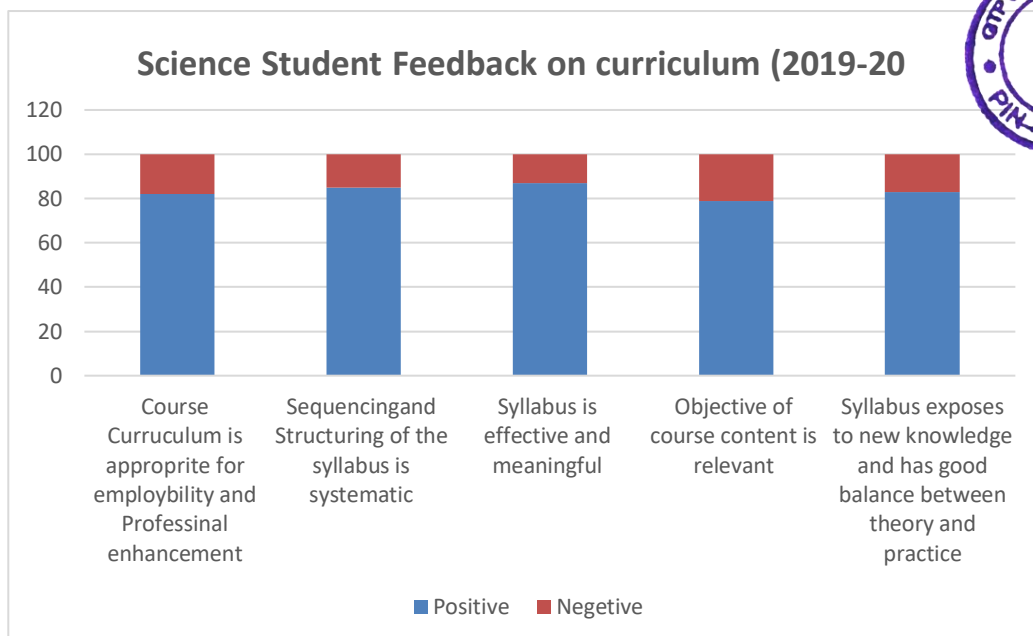
Student's feedback plays a pivotal role in enhancing the learning atmosphere. The feedback from the students on the present curriculum of various courses that our college offered were collected and it revealed the following facts:

#### Science

- 82% students responded that they were satisfied with the course content in terms of job relevance, employability and professional enhancement, whereas 18% students have showed dissatisfaction for these courses.
- Approximate 85% students have the opinion that the sequencing and structuring of the syllabi is systematic whereas 15% students showed disagreement and suggested modification in the sequence of the existing list.
- About 87% students responded positively for the effectiveness and meaningfulness of the syllabus in the subject area while 13% showed dissatisfaction.
- About 79% students reported that they strongly agreed with the relevance of the objectives with the course contents.
- Around 83% students agreed that the syllabus exposed them to new knowledge and had good balance between theory and practice.

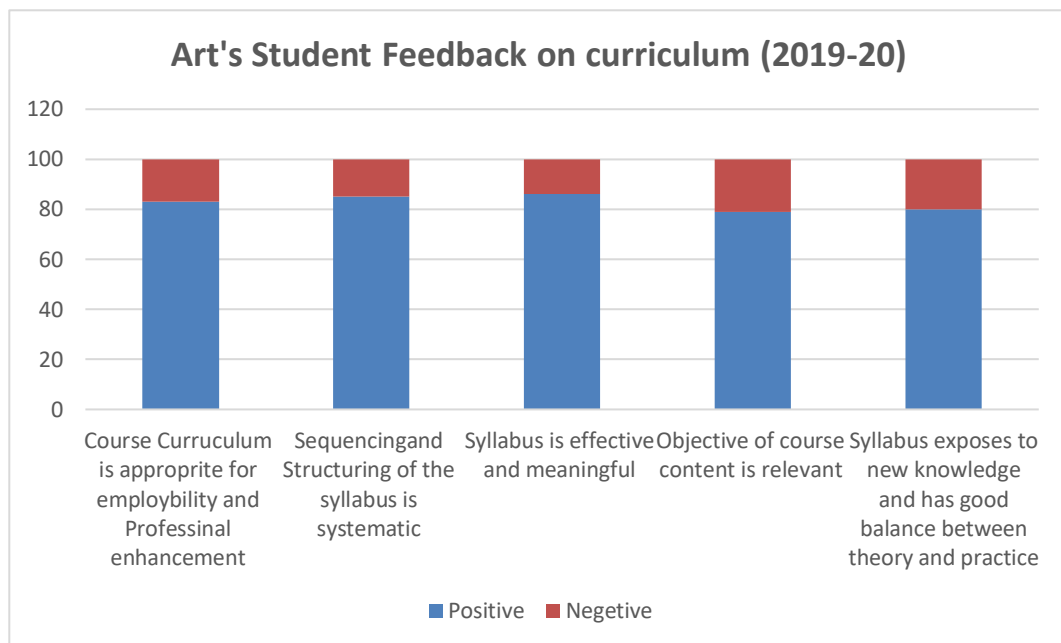






## Arts

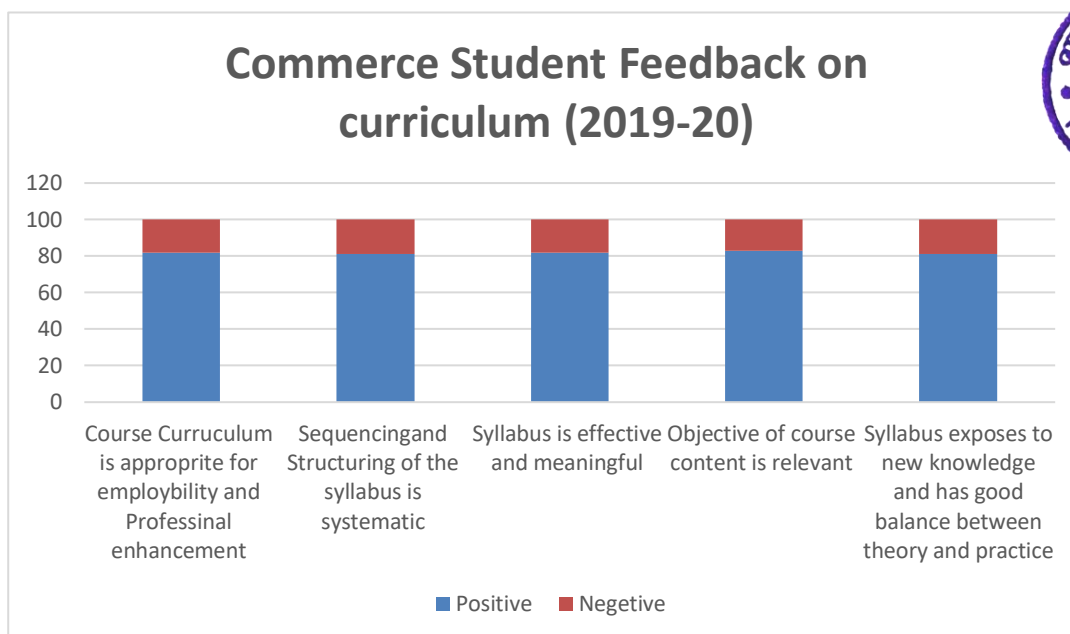
- 83% students responded that they were satisfied with the course content in terms of job relevance, employability and professional enhancement, whereas 17% students have showed dissatisfaction for these courses.
- Approximate 85% students have the opinion that the sequencing and structuring of the syllabi is systematic whereas 15% students showed disagreement and suggested modification in the sequence of the existing list.
- About 86% students responded positively for the effectiveness and meaningfulness of the syllabus in the subject area while 14% showed dissatisfaction .
- About 79% students reported that they strongly agreed with the relevance of the objectives with the course contents.
- Around 80% students agreed that the syllabus exposed them to new knowledge and had good balance between theory and practice.



## Commerce

- 82% students responded that they were satisfied with the course content in terms of job relevance , employability and professional enhancement , whereas 18% students have showed dissatisfaction for these courses .
- Approximate 81% students have the opinion that the sequencing and structuring of the syllabi is systematic whereas 19% students showed disagreement and suggested modification in the sequence of the existing list.
- About 82% students responded positively for the effectiveness and meaningfulness of the syllabus in the subject area while 18% showed dissatisfaction .
- About 83% students reported that they strongly agreed with the relevance of the objectives with the course contents.
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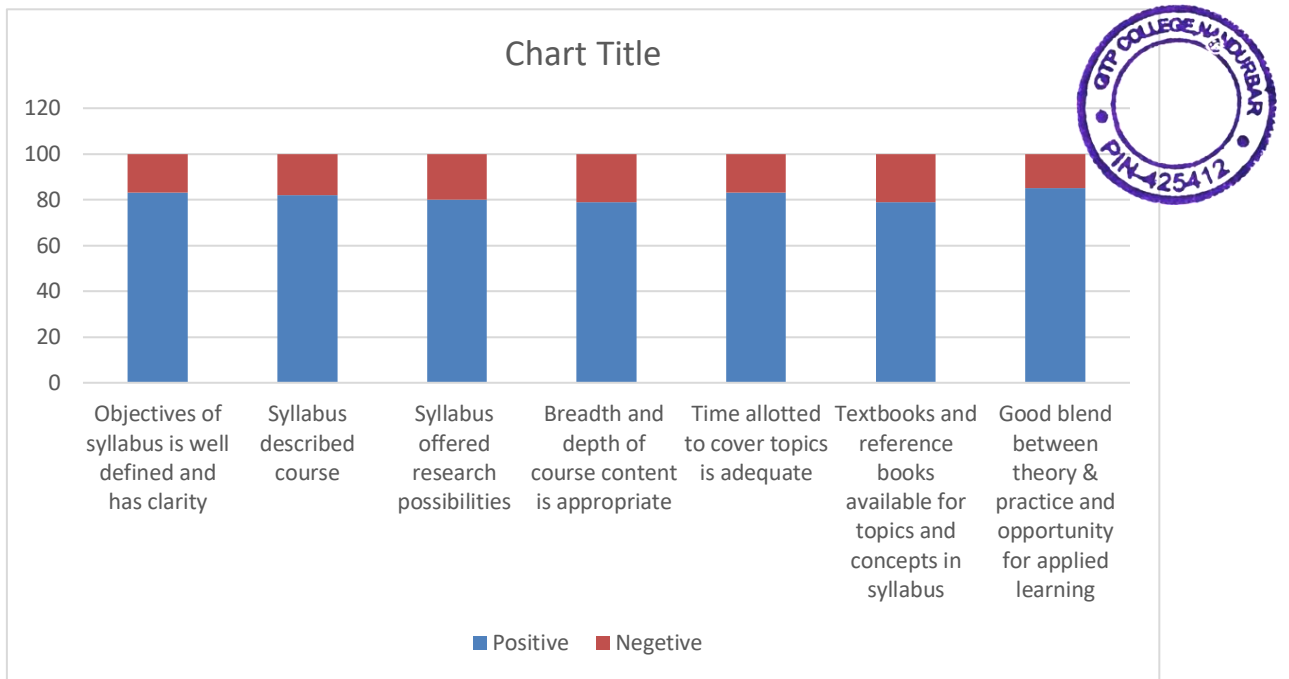


## Faculty Feedback

Faculties play a prime role in curriculum design, development, and implementation. In order to enhance the teaching-learning process, timely revisions and upgradation of the quality of pedagogy adopted, course content, etc. is required and this is done in accordance with the suggestions and inputs from the faculties. The feedback collected from the faculties revealed the following:

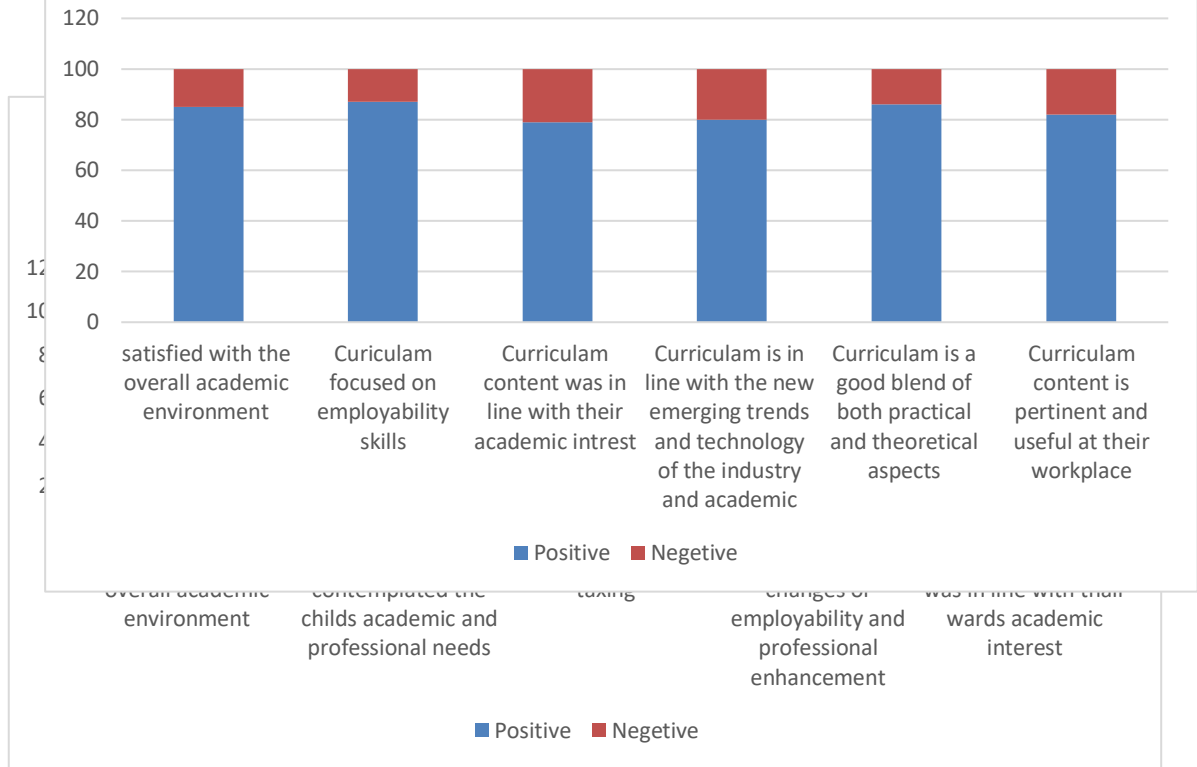
The analysis depicted that about 83% faculties agreed that the objectives of the syllabi are well defined and had clarity.

- 82% faculties responded that the syllabus precisely described the course.
- 80% faculties were of the opinion that the syllabus offered research possibilities.
- 79% faculties were satisfied with the breadth and depth of course content of the syllabus in terms of understanding and content coverage.
- 83% faculties believed that the time allotted to cover all the topics in the syllabus was adequate.
- About 79% of the faculties agreed that there are textbooks and reference books available for students that help them understand the concepts and topics mentioned in the syllabus thoroughly.
- About 85% faculties agreed that there was good blend between theory and practice and provided an opportunity for applied learning.



## Parent Feedback

- The feedback collected from the parents revealed the following:
- 82% parents responded that they are satisfied with the overall academic environment of the college.
- Approximate 73% of the parents indicated that the curriculum contemplated the child's academic and professional needs.
- About 89% parents stated that the course contents and various other aspects of the syllabus in the course were not taxing for their wards whereas 11% parents felt the need for syllabus revision.
- 78 % parents believed that the curriculum would increase the chances of employability and professional enhancement of their ward.
- 82% parents specified that the curriculum content was in line with their ward's



## Alumnus Feedback

Valuable inputs and feedback from our alumni enables time to time improvement in facilities, syllabus updation that develops global competence of our students resulting in enhanced employability, etc. The feedback collected from the alumnus indicated the following:

- 85% alumni responded that they are satisfied with the overall academic environment of the college.
- About 87% alumni believed that the curriculum focused on the employability skills.
- 79% alumni specified that the curriculum content was in line with their academic interest thus encouraging them to go beyond it.
- 80% alumni indicated that course curriculum was in line with the new emerging trends and technology of the industry and academics.
- 86% alumni agreed that the curriculum was a good blend of both practical and theoretical aspects.
- About 82% agreed that the curriculum content was pertinent and useful at their workplace.

  
**IQAC Co-ordinator**  
**GTP College, Nandurbar**



  
**PRINCIPAL**  
**G.T.Patil College**  
**Nandurbar**



**NANDURBAR TALUKA VIDHNANDURBAR TALUKA VIDHAYAK SAMITI'S  
G.T.PATIL ARTS, COMMERCE AND SCIENCE COLLEGE,  
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Prof. Dr. V.S. Shrivastava  
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## Feedback Analysis (2020-2021)

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### Feedback on Curriculum

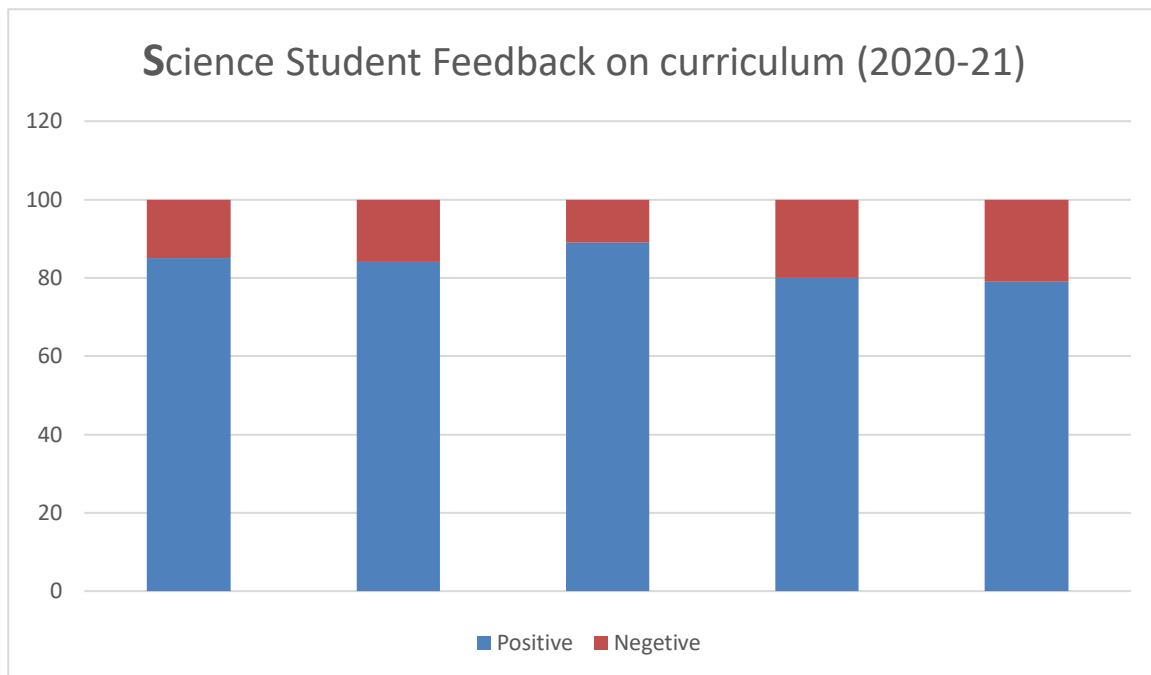
#### Student Feedback

Student's feedback plays a pivotal role in enhancing the learning atmosphere. The feedback from the students on the present curriculum of various courses that our college offered were collected and it revealed the following facts:

#### Science

- 85% students responded that they were satisfied with the course content in terms of job relevance, employability and professional enhancement, whereas 15% students have showed dissatisfaction for these courses.
- Approximate 84% students have the opinion that the sequencing and structuring of the syllabi is systematic whereas 16% students showed disagreement and suggested modification in the sequence of the existing list.
- About 89% students responded positively for the effectiveness and meaningfulness of the syllabus in the subject area while 11% showed dissatisfaction.
- About 80% students reported that they strongly agreed with the relevance of the objectives with the course contents.
- Around 79% students agreed that the syllabus exposed them to new knowledge and had good balance between theory and practice

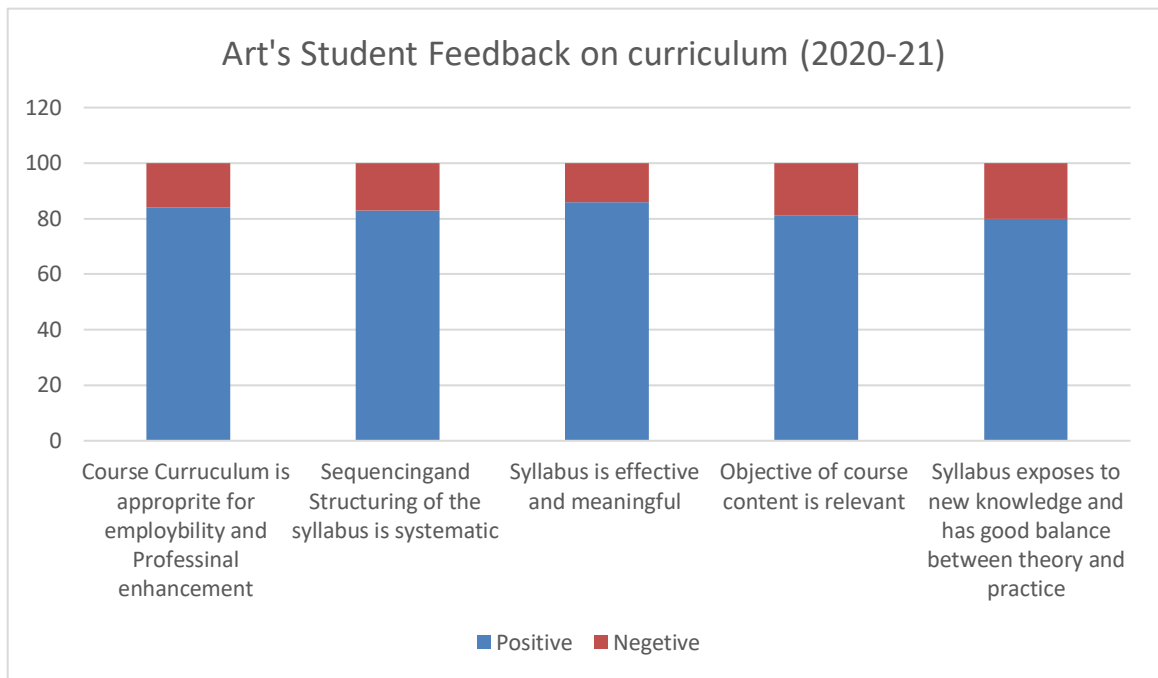




## Arts

- 84% students responded that they were satisfied with the course content in terms of job relevance, employability and professional enhancement, whereas 16% students have showed dissatisfaction for these courses.
- Approximate 83% students have the opinion that the sequencing and structuring of the syllabi is systematic whereas 17% students showed disagreement and suggested modification in the sequence of the existing list.
- About 86% students responded positively for the effectiveness and meaningfulness of the syllabus in the subject area while 14% showed dissatisfaction .
- About 81% students reported that they strongly agreed with the relevance of the objectives with the course contents.
- Around 80% students agreed that the syllabus exposed them to new knowledge and had good balance between theory and practice.



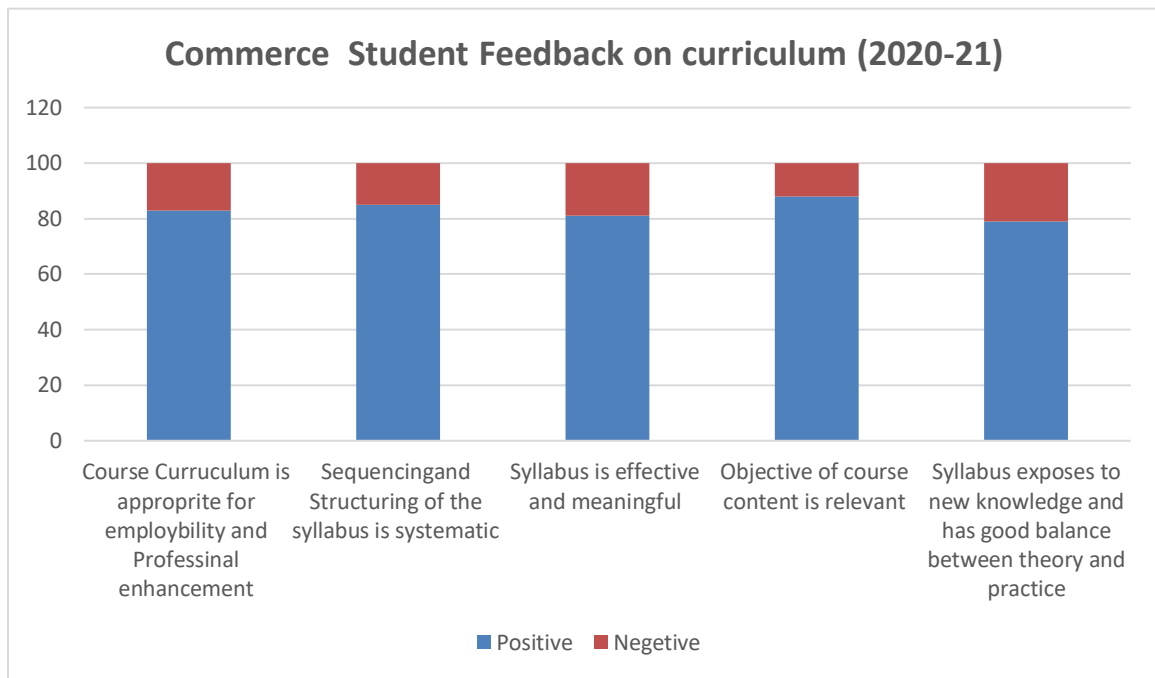


## Commerce

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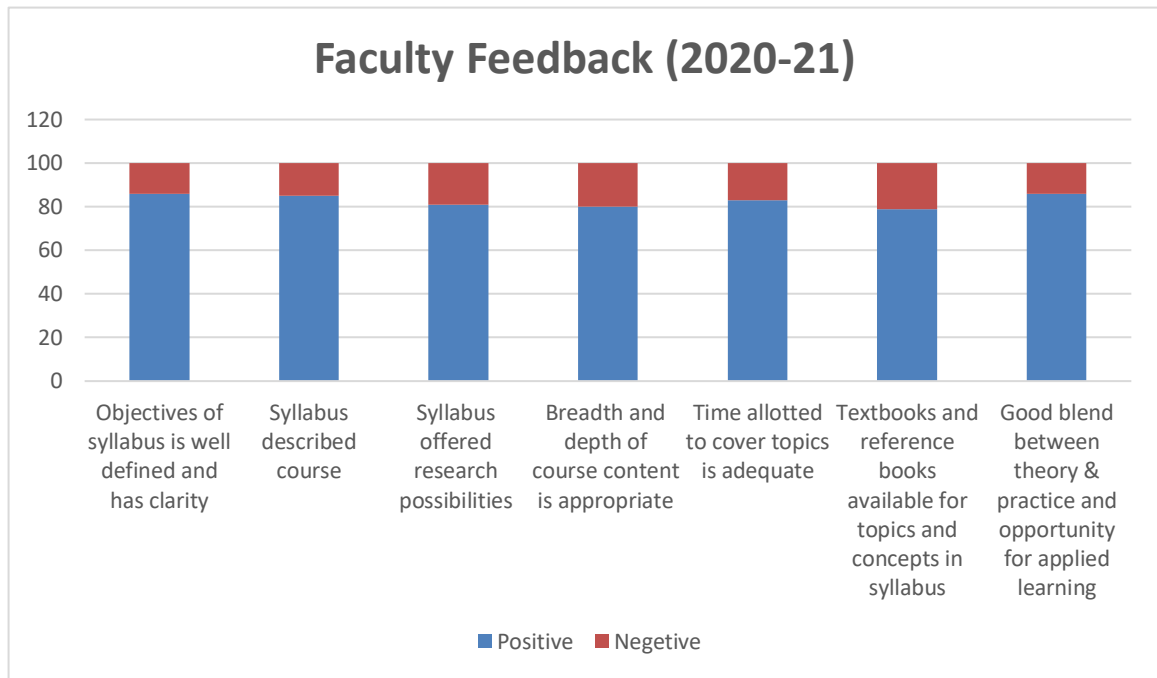


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- The analysis depicted that about 86% faculties agreed that the objectives of the syllabi are well defined and had clarity.
- 85% faculties responded that the syllabus precisely described the course.
- 81% faculties were of the opinion that the syllabus offered research possibilities.
- 80% faculties were satisfied with the breadth and depth of course content of the syllabus in terms of understanding and content coverage.
- 83% faculties believed that the time allotted to cover all the topics in the syllabus was adequate.
- About 79% of the faculties agreed that there are textbooks and reference books available for students that help them understand the concepts and topics mentioned in the syllabus thoroughly.
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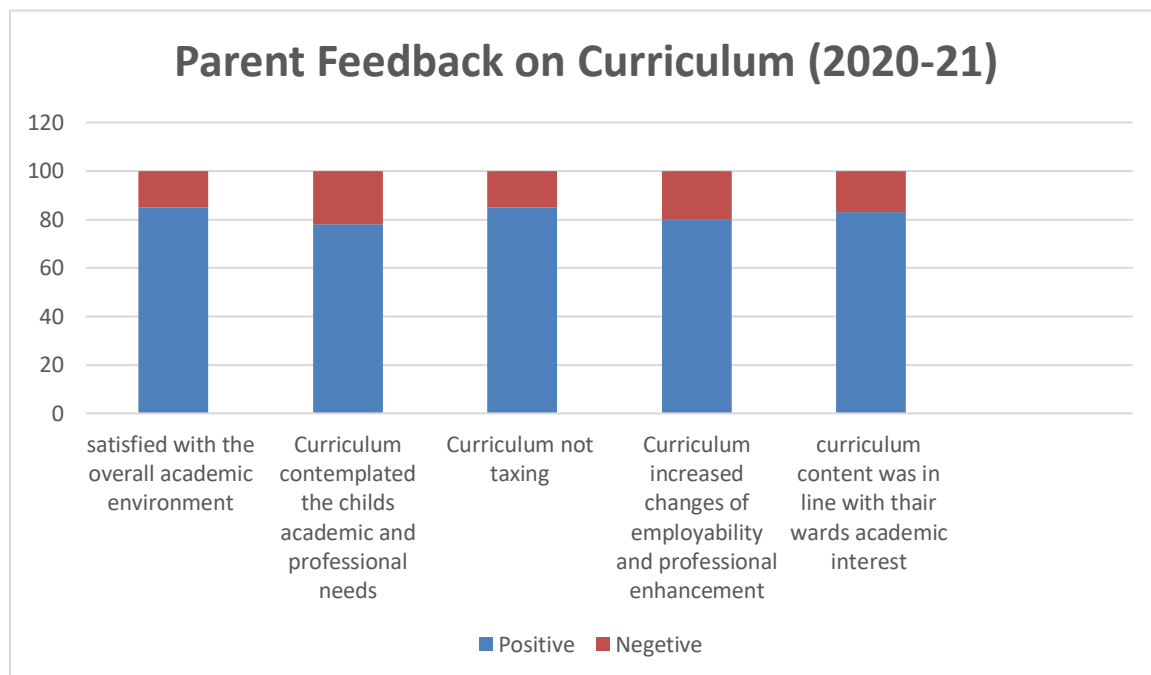


## Parent Feedback

The feedback collected from the parents revealed the following:

- 85% parents responded that they are satisfied with the overall academic environment of the college.
- Approximate 78% of the parents indicated that the curriculum contemplated the child's academic and professional needs.
- About 85% parents stated that the course contents and various other aspects of the syllabus in the course were not taxing for their wards whereas 13% parents felt the need for syllabus revision.
- 80% parents believed that the curriculum would increase the chances of employability and professional enhancement of their ward.
- 83% parents specified that the curriculum content was in line with their ward's academic interest thus encouraging them to go beyond it.





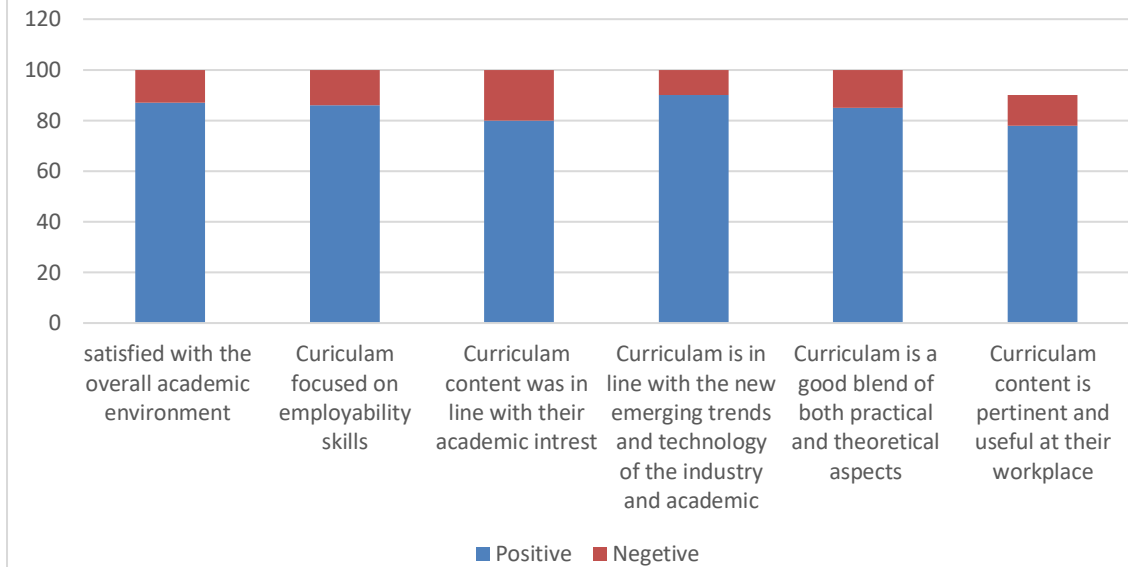
## Alumnus Feedback

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## Alumnus Feedback on Curriculum



  
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**GTP College, Nandurbar**



  
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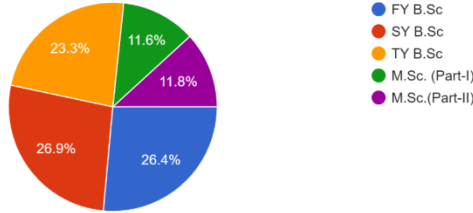
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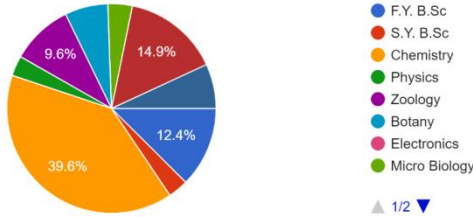
## Student Feedback (Science) 2021-22



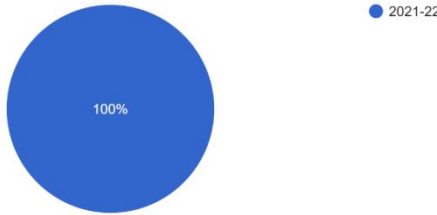
Class / वर्ग  
450 responses



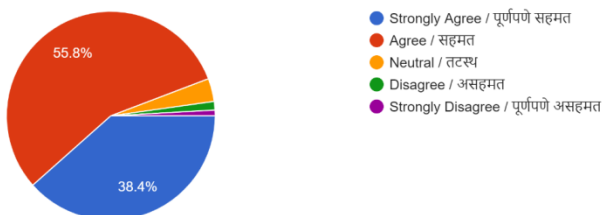
Specialization Subject / स्पेशलायझेशन विषय  
450 responses



Feedback for Academic Year / शैक्षणिक वर्षासाठी अभिप्राय  
450 responses



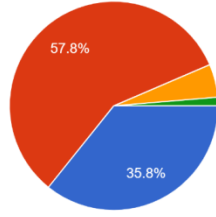
Curriculum/syllabus is in the appropriate sequence of the courses. (One course links and relates to other course) / आपण शिकत असलेल्या अभ्यासक्रमाची मांडणी योग्य आहे. (एक विषय दुसऱ्या विषयाशी निगडित आहे)  
450 responses





The courses you studied are relevant and the contents are revised at reasonable intervals / आपला अभ्यासक्रम हा सापेक्ष आहे व नियमित अंतराने सुधारित केला जातो

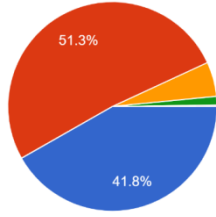
450 responses



● Strongly Agree / पूर्णपणे सहमत  
● Agree / सहमत  
● Neutral / तटस्थ  
● Disagree / असहमत  
● Strongly Disagree / पूर्णपणे असहमत

The courses you studied have enhanced your knowledge as well as your skills and capabilities. / आपल्या अभ्यासक्रमामुळे आपले ज्ञान, कौशल्ये आणि क्षमता यांच्यात वाढ झाली आहे.

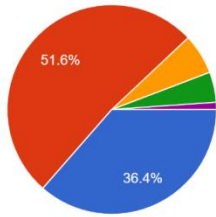
450 responses



● Strongly Agree / पूर्णपणे सहमत  
● Agree / सहमत  
● Neutral / तटस्थ  
● Disagree / असहमत  
● Strongly Disagree / पूर्णपणे असहमत

The entire syllabus gets completed in time. / संपूर्ण अभ्यासक्रम वेळेत पूर्ण होतो.

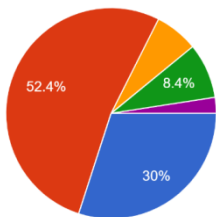
450 responses



● Strongly Agree / पूर्णपणे सहमत  
● Agree / सहमत  
● Neutral / तटस्थ  
● Disagree / असहमत  
● Strongly Disagree / पूर्णपणे असहमत

Modern teaching aids, power point presentations, web-resources, multi-media, e-content etc. are used by most of the teachers while teaching. / पावर...रख्या आधुनिक अध्यापन साधने बहुतेक शिक्षक वापरतात.

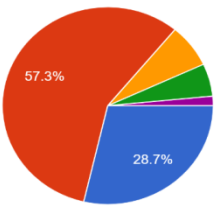
450 responses



● Strongly Agree / पूर्णपणे सहमत  
● Agree / सहमत  
● Neutral / तटस्थ  
● Disagree / असहमत  
● Strongly Disagree / पूर्णपणे असहमत

The curriculum is designed in order to enhance your employability. / अभ्यासक्रमाची रचना तुमच्या रोजगार क्षमतेत वाढ करण्याच्या दृष्टीने करण्यात आली आहे.

450 responses

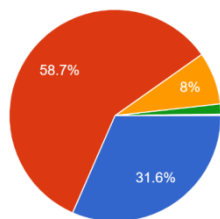


● Strongly Agree / पूर्णपणे सहमत  
● Agree / सहमत  
● Neutral / तटस्थ  
● Disagree / असहमत  
● Strongly Disagree / पूर्णपणे असहमत



Course curriculum and co-curricular activities relevant to bridge the gap between academic and industrial needs. / शैक्षणिक आणि औद्योगिक गरजांमधील...त कोर्स अभ्यासक्रम आणि सह-अभ्यासक्रम उपयोगी आहेत.

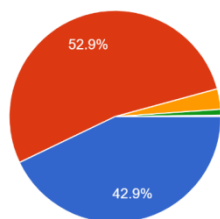
450 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

Level of Programme Outcomes impart knowledge, skills and attitudes at the time of graduation. (Outcome Base Education) / अभ्यासक्रमांमुळे आपले ज्ञान, कौशल्ये आणि दृष्टीकोन यांच्यात सुधारणा होते.

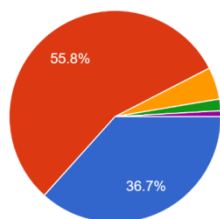
450 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The assessment and evaluation process is satisfactory to face university exam with confidence and also fair and unbiased. / मूल्यांकन आणि मूल्यमापनाच...क्षांना आत्मविश्वासाने सामोरी जाण्यासाठी सहाय्यक आहे.

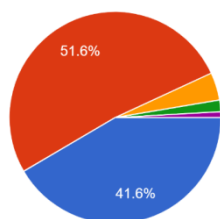
450 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The teachers encourage the students to participate in extra-curricular, co-curricular activities and research projects. / शिक्षक अतिरिक्त अभ्यासक्रम, सह-अभ्या...ये सहभागी होण्यासाठी विद्यार्थ्यांना प्रोत्साहित करतात.

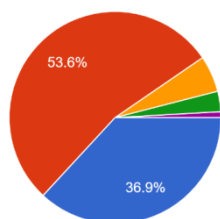
450 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The teachers make efforts to inculcate soft skills in the students. / शिक्षक विद्यार्थ्यांमधे सॉफ्ट स्किल्स वाढवण्याचा प्रयत्न करतात.

450 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत





The teachers make efforts to enhance employability skills in the students. / शिक्षक विद्यार्थ्यांमध्ये रोजगार कौशल्य वाढविण्यासाठी प्रयत्न करतात.

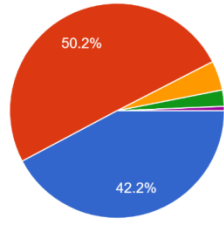
450 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The teachers encourage the students to use reference books, e-resources, e-journals etc. / शिक्षक विद्यार्थ्यांना संदर्भ पुस्तके, ई-स्तोत, ई-जर्नल्स इत्यादी वापरण्यास प्रोत्साहित करतात.

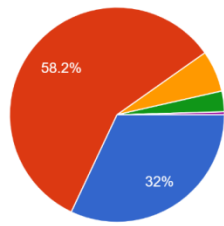
450 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The teachers keep the students updated about the latest developments in the subject/area of knowledge. / ज्ञान क्षेत्रातील नवीनतम घडामोडींविषयी शिक्षक विद्यार्थ्यांना अद्ययावत ठेवतात.

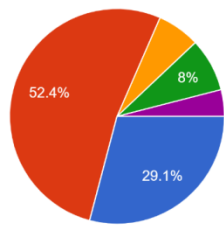
450 responses



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- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The teachers take active interest in arranging field visits, study tours etc. for enhancing learning. / अध्ययन वाढविण्यासाठी क्षेत्र भेटी, अभ्यास सहली इत्यादी आयोजित करण्यात शिक्षक सक्रिय सहभाग घेतात.

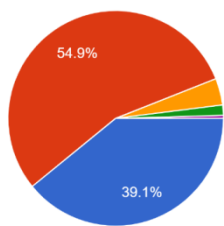
450 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The teachers usually do the necessary follow-up with a task assigned to their students. / शिक्षक विद्यार्थ्यांना वेळोवेळी अभ्यासासंदर्भात नेमून दिलेल्या कामांचा पाठपुरावा घेतात.

450 responses

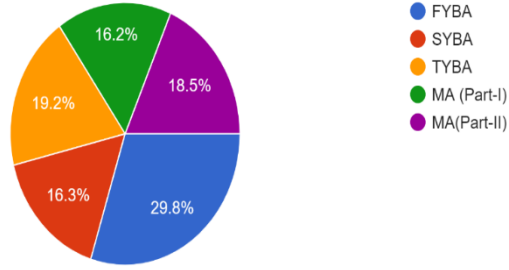


- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

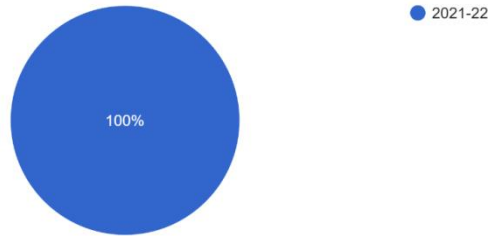
# Students feedback Curriculum Humanities (Arts)



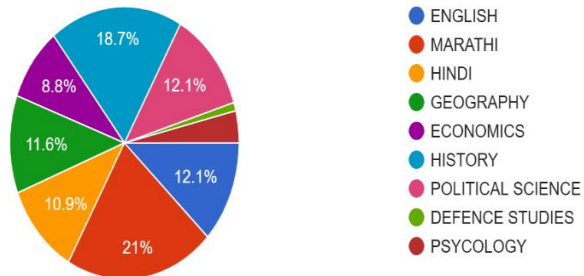
Class / वर्ग  
637 responses



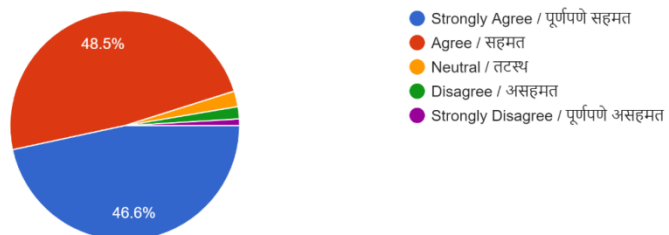
Feedback for Academic Year / शैक्षणिक वर्षासाठी अभिप्राय  
637 responses



Specialization Subject / स्पेशलायझेशन विषय  
604 responses

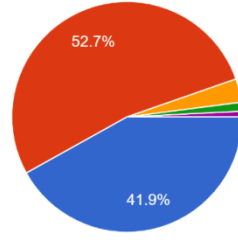


Curriculum/syllabus is in the appropriate sequence of the courses. (One course links and relates to other course) / आपण शिकत असलेल्या अभ्यासक्रमाची मांडणी योग्य आहे. (एक विषय दुसऱ्या विषयाशी निगडित आहे)  
637 responses



The courses you studied are relevant and the contents are revised at reasonable intervals / आपला अभ्यासक्रम हा सापेक्ष आहे व नियमितपणे सुधारित केला जातो.

637 responses

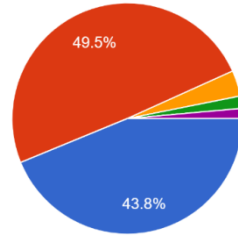


- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत



The courses you studied have enhanced your knowledge as well as your skills and capabilities. / आपल्या अभ्यासक्रमामुळे ज्ञान, कौशल्ये आणि क्षमता यांच्यात वाढ झाली आहे.

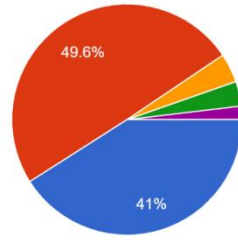
637 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The entire syllabus gets completed in time. / संपूर्ण अभ्यासक्रम वेळेत पूर्ण होतो.

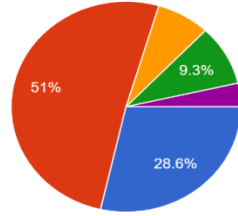
637 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

Modern teaching aids, power point presentations, web-resources, multi-media, e-content etc. are used by most of the teachers while teaching. / शिक...ारखी आधुनिक अध्यापन साधने बहुतेक शिक्षक वापरतात.

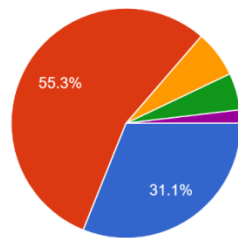
637 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

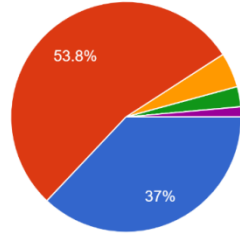
The curriculum is designed in order to enhance your employability. / तुमच्या रोजगाराची क्षमता वाढविण्यासाठी अभ्यासक्रम तयार केला आहे.

637 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

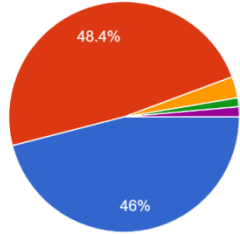
Course curriculum and co-curricular activities are relevant to bridge the gap between academic and industrial needs. / शैक्षणिक आणि औद्योगिक गरजांमधील...त कोर्स अभ्यासक्रम आणि सह-अभ्यासक्रम उपयोगी आहेत.  
637 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

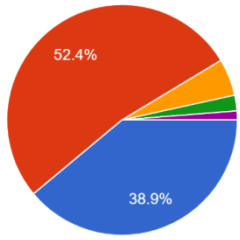


Level of Programme Outcomes impart knowledge, skills and attitudes at the time of graduation. (Outcome Base Education) / अभ्यासक्रमांमुळे आपले ज्ञान, कौशल्ये आणि दृष्टीकोन यांच्यात सुधारणा होते.  
637 responses



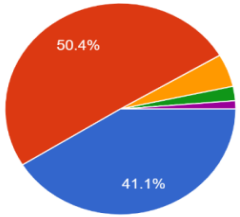
- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The assessment and evaluation process is fair and unbiased. It helps to face university exam with confidence. / मूल्यांकन आणि मूल्यमापनाची प्रक्रिया निष्पक्ष...रीक्षांना आत्मविश्वासाने सामोरी जाण्यासाठी सहाय्यक आहे.  
637 responses



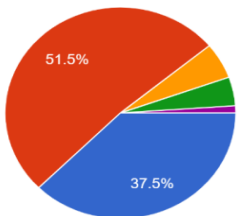
- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The teachers encourage the students to participate in extra-curricular, co-curricular activities and research projects. / शिक्षक अतिरिक्त अभ्यासक्रम, सह-अभ्या...ये सहभागी होण्यासाठी विद्यार्थ्यांना प्रोत्साहित करतात.  
637 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The teachers make efforts to enhance employability skills in the students. / शिक्षक विद्यार्थ्यांमध्ये रोजगार कौशल्य वाढविण्यासाठी प्रयत्न करतात.  
637 responses

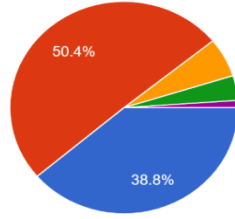


- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत



The teachers encourage the students to use reference books, e-resources, e-journals etc. / शिक्षक विद्यार्थ्यांना संदर्भ पुस्तके, ई-स्तोत्र, ई-जर्नल्स इत्यादी वापरण्यास प्रोत्साहित करतात.

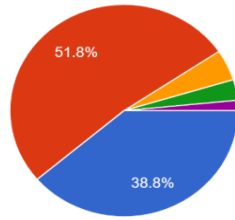
637 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The teachers keep the students updated about the latest developments in the subject/area of knowledge. / ज्ञानाच्या क्षेत्रातील नवीनतम घडामोडींविषयी शिक्षक विद्यार्थ्यांना अद्ययावत ठेवतात.

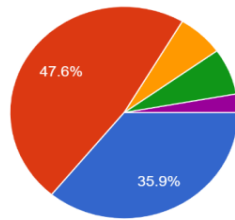
637 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The teachers take active interest in arranging field visits, study tours etc. for enhancing learning. / अध्ययन वाढविण्यासाठी क्षेत्र भेटी, अभ्यास सहली इत्यादी आयोजित करण्यात शिक्षक सक्रिय सहभाग घेतात.

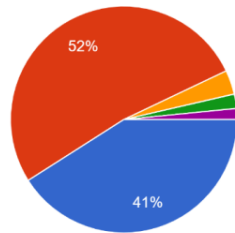
637 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The teachers usually do the necessary follow-up with a task assigned to their students. / शिक्षकांनी विद्यार्थ्यांना वेळोवेळी अभ्यासासंदर्भात नेमून दिलेल्या कामांचा पाठपुरावा घेतात?

637 responses

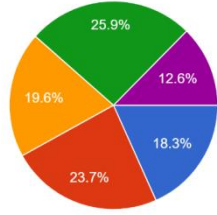


- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

# Student feedback (Commerce)



Class / वर्ग  
317 responses



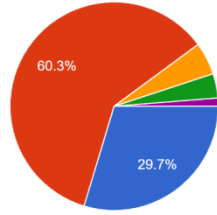
- FY B.Com.
- SY B.Com.
- TY B.Com.
- M.Com.(Part-I)
- M.Com.(Part-II)

Feedback for Academic Year / शैक्षणिक वर्षासाठी अभिप्राय  
317 responses



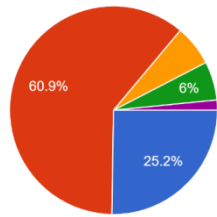
- 2021-22

Curriculum/syllabus is in the appropriate sequence of the courses. (One course links and relates to other course) / आपण शिकत असलेल्या अभ्यासक्रमाची मांडणी योग्य आहे. (एक विषय दुसऱ्या विषयाशी निगडित आहे)  
317 responses



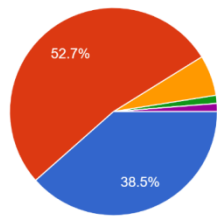
- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The courses you studied are relevant and the contents are revised at reasonable intervals / आपला अभ्यासक्रम हा सापेक्ष आहे व नियमितपणे सुधारित केला जातो  
317 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The courses you studied have enhanced your knowledge as well as your skills and capabilities. / आपल्या अभ्यासक्रमामुळे आपले ज्ञान, कौशल्ये आणि क्षमता यांच्यात वाढ झाली.  
317 responses

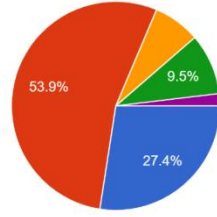


- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत



The entire syllabus gets completed in time. / संपूर्ण अभ्यासक्रम वेळेत पूर्ण होतो.

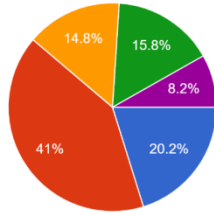
317 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

Modern teaching aids, power point presentations, web-resources, multi-media, e-content etc. are used by most of the teachers while teaching. / शिक्षक अ...सेस, मल्टी-मीडिया, ई-कंटेंट इत्यादींचा वापर करतात.

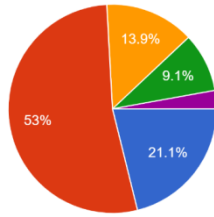
317 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The curriculum is designed in order to enhance your employability. / अभ्यासक्रमाच्या योग्य मांडणीमुळे रोजगार क्षमतेत वाढ झाली.

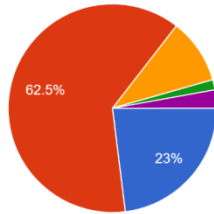
317 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

Course curriculum and co-curricular activities relevant to bridge the gap between academic and industrial needs. / शैक्षणिक आणि औद्योगिक गरजांमधील...संबंधित अभ्यासक्रम आणि सह-अभ्यासक्रम उपयोगी आहेत.

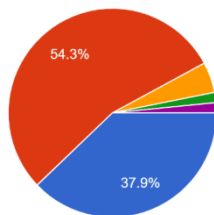
317 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

Level of Programme Outcomes impart knowledge, skills and attitudes at the time of graduation. (Outcome Base Education) / अभ्यासक्रमांमुळे आपले ज्ञान, कौशल्ये आणि दृष्टीकोन विकसित होतो.

317 responses

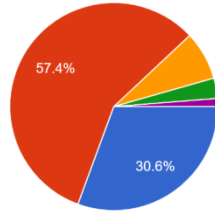


- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत



The assessment and evaluation process is satisfactory to face university exam with confidence and also fair and unbiased. / मूल्यांकन आणि मूल्यमापनाच...क्षांना आत्मविश्वासाने सामोरी जाण्यासाठी सहाय्यक आहे.

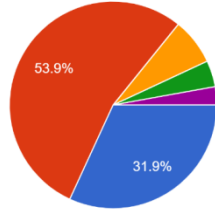
317 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The teachers encourage the students to participate in extra-curricular, co-curricular activities and research projects. / शिक्षक विद्यार्थ्यांना अतिरिक्त अभ्य...संशोधन प्रकल्पांमध्ये सहभागी होण्यासाठी प्रोत्साहित करतात.

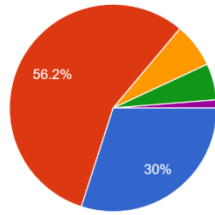
317 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The teachers make efforts to inculcate soft skills in the students. / शिक्षक विद्यार्थ्यांमध्ये सॉफ्ट स्किल्स वाढवण्याचा प्रयत्न करतात.

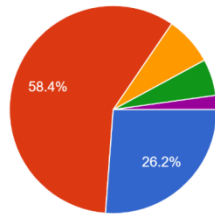
317 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The teachers make efforts to enhance employability skills in the students. / शिक्षक विद्यार्थ्यांमध्ये रोजगार कौशल्य वाढविण्यासाठी प्रयत्न करतात.

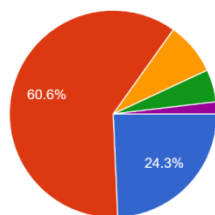
317 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The teachers encourage the students to use reference books, e-resources, e-journals etc. / शिक्षक विद्यार्थ्यांना संदर्भ पुस्तके, ई-स्तोत, ई-जर्नल्स इत्यादी वापरण्यास प्रोत्साहित करतात.

317 responses

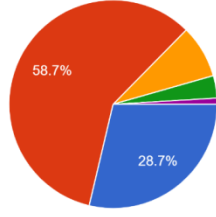


- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत



The teachers keep the students updated about the latest developments in the subject/area of knowledge. / ज्ञान क्षेत्रातील नवीनतम घडामोडींविषयी शिक्षक विद्यार्थ्यांना अद्ययावत ठेवतात.

317 responses

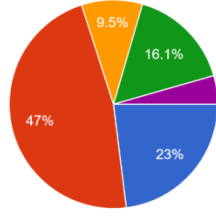


- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत



The teachers take active interest in arranging field visits, study tours etc. for enhancing learning. / अध्ययन वाढविण्यासाठी क्षेत्र भेटी, अभ्यास सहली इत्यादी आयोजित करण्यात शिक्षक सक्रिय सहभाग घेतात.

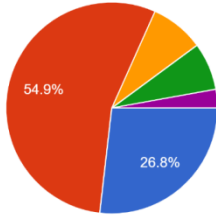
317 responses



- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

The teachers usually do the necessary follow-up with a task assigned to their students. / शिक्षक विद्यार्थ्यांना वेळोवेळी अभ्यासासंदर्भात नेमून दिलेल्या कामांचा पाठपुरावा घेतात?

317 responses

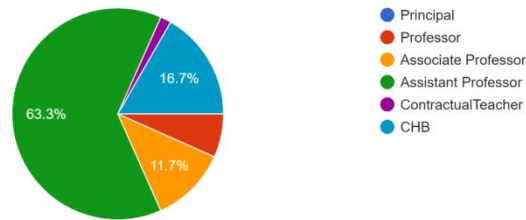


- Strongly Agree / पूर्णपणे सहमत
- Agree / सहमत
- Neutral / तटस्थ
- Disagree / असहमत
- Strongly Disagree / पूर्णपणे असहमत

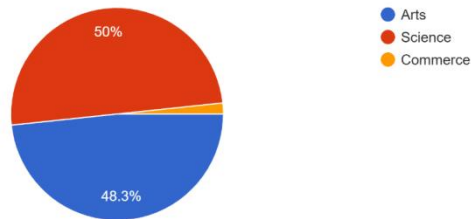
# Feedback form for Teachers



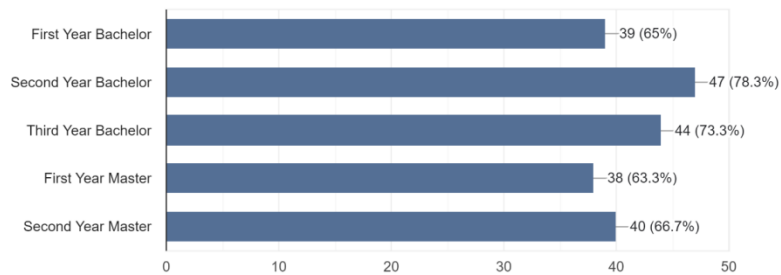
Designation  
60 responses



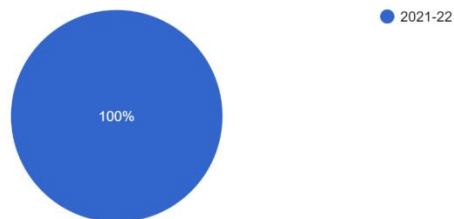
Stream  
60 responses



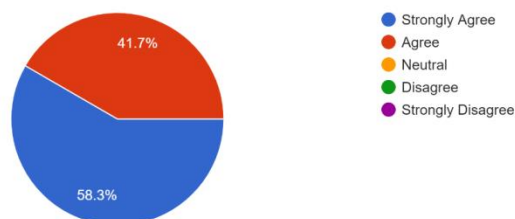
Teaching at  
60 responses



Feedback for Academic Year  
60 responses



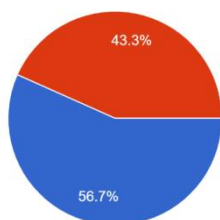
The courses / syllabi taught by me have a good balance between theory and application.  
60 responses





The objectives of the syllabi are well defined.

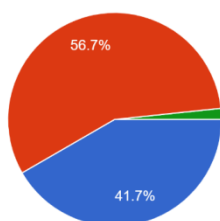
60 responses



- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

The books/journals etc. prescribed / listed as reference materials are relevant, updated and cover the entire syllabi.

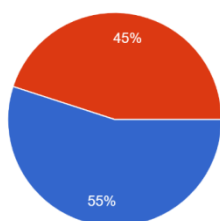
60 responses



- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

The course / syllabi of the subjects taught by me increased my interest, knowledge and perspective in the subject area.

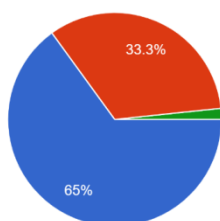
60 responses



- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

The college has given me full freedom to adopt new techniques / strategies of teaching such as group discussions, seminar presentations and learners' participation.

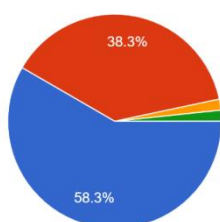
60 responses



- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

I have the freedom to adopt new techniques / strategies of testing and assessment of students.

60 responses

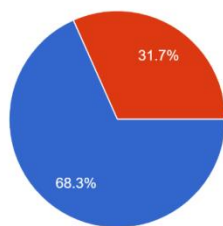


- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree



Tests and examinations are conducted well in time with proper coverage of all units in the syllabus.

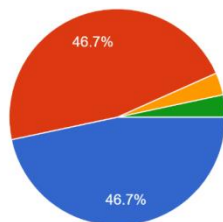
60 responses



- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

The prescribed books are available in the library in sufficient numbers.

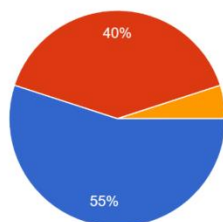
60 responses



- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

The environment in the college is conducive to teaching and research.

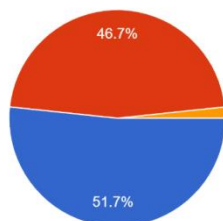
60 responses



- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

The administration is teacher friendly.

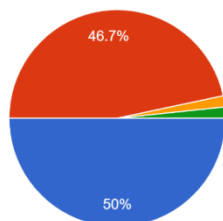
60 responses



- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

The college provides adequate opportunities and support to faculty members for upgrading their skills and qualifications.

60 responses

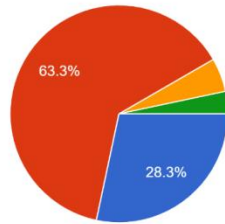


- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree



ICT facilities in the college are adequate and satisfactory.

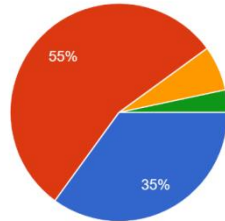
60 responses



- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Separate space in college canteen is available for teachers.

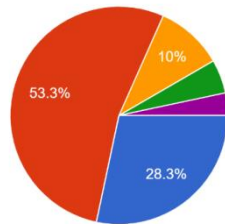
60 responses



- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Toilets / washrooms are clean and properly maintained.

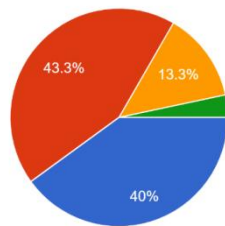
60 responses



- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

The classrooms are clean and well maintained.

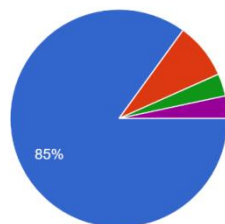
60 responses



- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

How do you generally commute to the college?

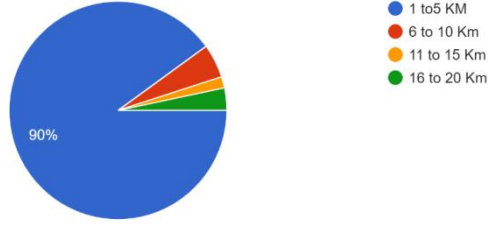
60 responses



- Own vehicle
- Public transport
- Private transport (auto/ taxi)
- Bicycle
- Waking

Approximate distance of college from your residence (in km)

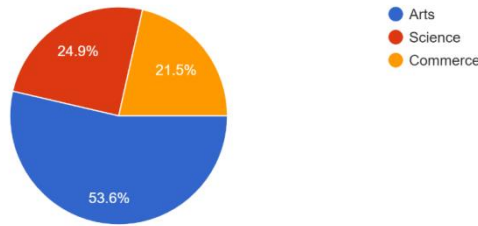
60 responses



## Feedback Form For Parent

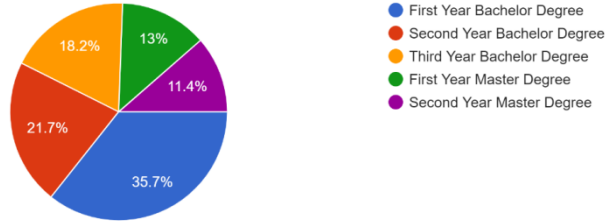
Stream in which student admitted / विद्यार्थ्यांनी प्रवेश घेतलेली शाखा

1,760 responses



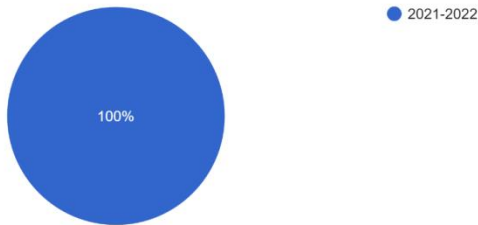
Class / वर्ग

1,760 responses



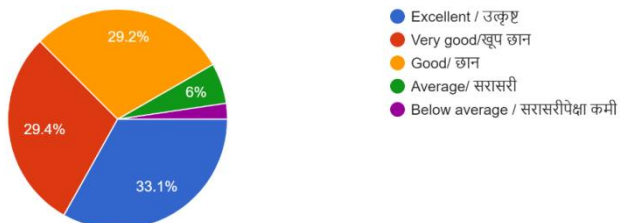
Feedback for Academic Year / शैक्षणिक वर्षासाठी अभिप्राय

1,760 responses

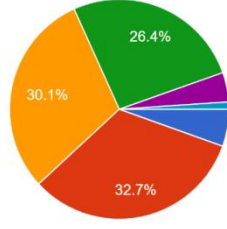


Admission procedure / प्रवेश प्रक्रिया

1,760 responses



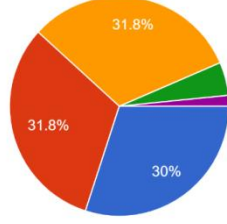
Work culture of the college observed by you and your Ward / महाविद्यालयीन कार्य संस्कृती कशी आहे.  
1,760 responses



- Work Culture observed by you and your Ward / महाविद्यालयीन कार्य संस्कृती
- Excellent / उत्कृष्ट
- Very Good / खुप छान
- Good / छान
- Average / सरासरी
- Below average / सरासरीपेक्षा कमी

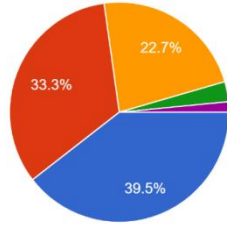


Infrastructure and lab facility / पायाभूत सुविधा व प्रयोगशाळेची सुविधा  
1,760 responses



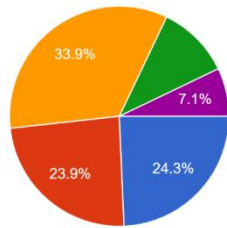
- Excellent / उत्कृष्ट
- Very Good / खुप छान
- Good / छान
- Average / सरासरी
- Below average / सरासरीपेक्षा कमी

Library facility / ग्रंथालय सुविधा  
1,760 responses



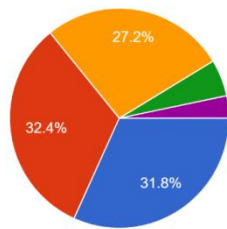
- Excellent / उत्कृष्ट
- Very Good / खुप छान
- Good / छान
- Average / सरासरी
- Below average / सरासरीपेक्षा कमी

Canteen facility / कॅन्टीन सुविधा  
1,760 responses



- Excellent / उत्कृष्ट
- Very Good / खुप छान
- Good / छान
- Average / सरासरी
- Below average / सरासरीपेक्षा कमी

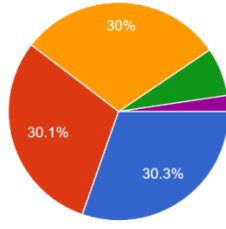
Sports and cultural activities / खेळ आणि सांस्कृतिक उपक्रम  
1,760 responses



- Excellent / उत्कृष्ट
- Very Good / खुप छान
- Good / छान
- Average / सरासरी
- Below average / सरासरीपेक्षा कमी

Use of Information and communication technology in the college / महाविद्यालयात माहिती व संप्रेषण तंत्रज्ञानाचा वापर

1,760 responses

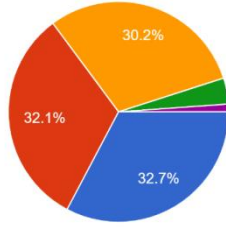


- Excellent / उत्कृष्ट
- Very Good / खुप छान
- Good / छान
- Average / सरासरी
- Below average / सरासरीपेक्षा कमी



Student's counseling and guidance / विद्यार्थ्यांचे समुपदेशन व मार्गदर्शन

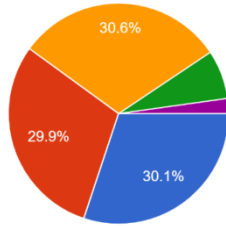
1,760 responses



- Excellent / उत्कृष्ट
- Very Good / खुप छान
- Good / छान
- Average / सरासरी
- Below average / सरासरीपेक्षा कमी

Use of Information and communication technology in the college / महाविद्यालयात माहिती व संप्रेषण तंत्रज्ञानाचा वापर

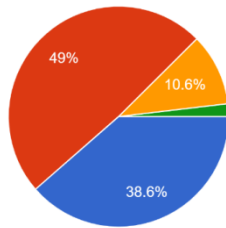
1,760 responses



- Excellent / उत्कृष्ट
- Very Good / खुप छान
- Good / छान
- Average / सरासरी
- Below average / सरासरीपेक्षा कमी

Academic atmosphere (i. e timely conduct of lectures, practical and related activities) observed by the college / शैक्षणिक वातावरण (तसिका प्रात्यक्षिक व अभ्यास संबंधित कार्यक्रम वेळेवर होतात.)

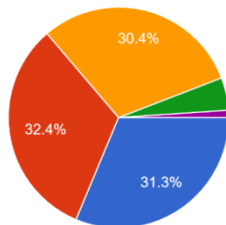
1,760 responses



- Excellent / उत्कृष्ट
- Very Good / खुप छान
- Average / सरासरी
- Below average / सरासरीपेक्षा कमी

Improvement in soft skills, knowledge, ethics, morality, observed by you/your ward while studying in college / महाविद्यालयीन शिक्षण घेत असताना आपल्या पाल्यात ज्ञान, नीतिशास्त्र, नैतिकतेमध्ये सुधारणा

1,760 responses

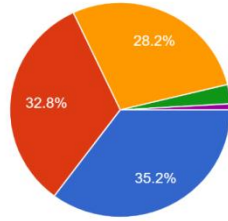


- Excellent / उत्कृष्ट
- Very Good / खुप छान
- Good / छान
- Average / सरासरी
- Below average / सरासरीपेक्षा कमी



Examination system adopted by the college: / महाविद्यालयीन परीक्षा प्रणाली

1,760 responses

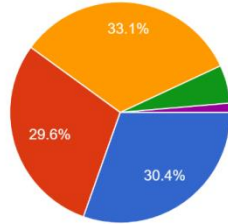


- Excellent / उत्कृष्ट
- Very Good / खुप छान
- Good / छान
- Average / सरासरी
- Below average / सरासरीपेक्षा कमी



Evaluation and Feedback mechanism / मूल्यांकन आणि अभिप्राय यंत्रणा

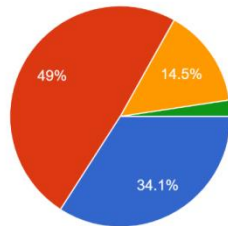
1,760 responses



- Excellent / उत्कृष्ट
- Very Good / खुप छान
- Good / छान
- Average / सरासरी
- Below average / सरासरीपेक्षा कमी

Placements / स्थाननिश्चिती

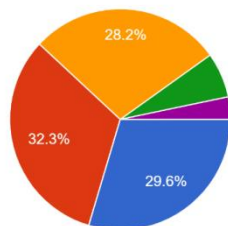
1,760 responses



- Excellent / उत्कृष्ट
- Very Good / खुप छान
- Average / सरासरी
- Below average / सरासरीपेक्षा कमी

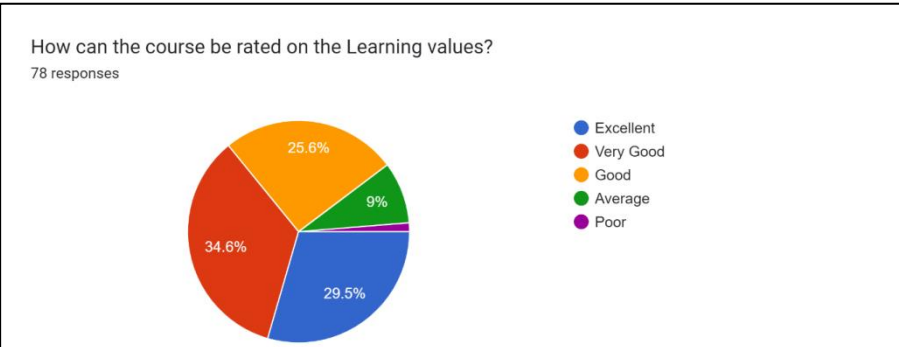
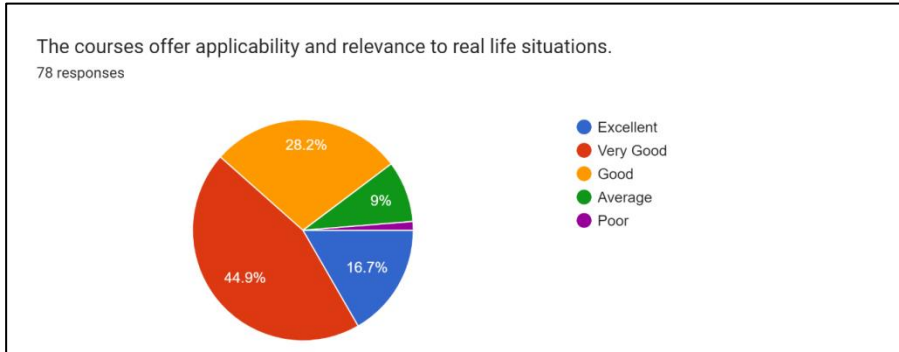
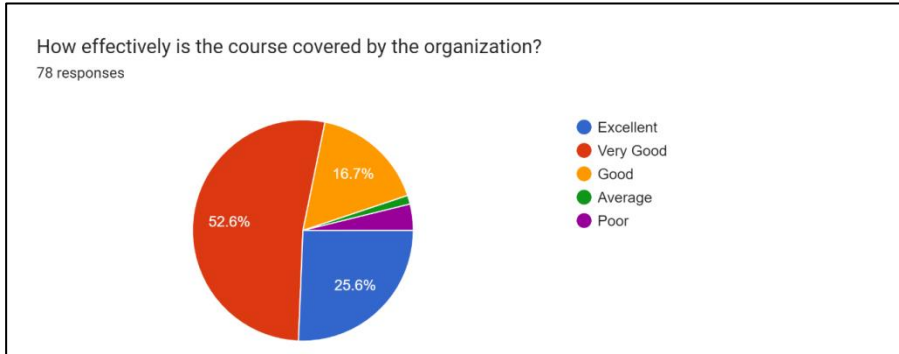
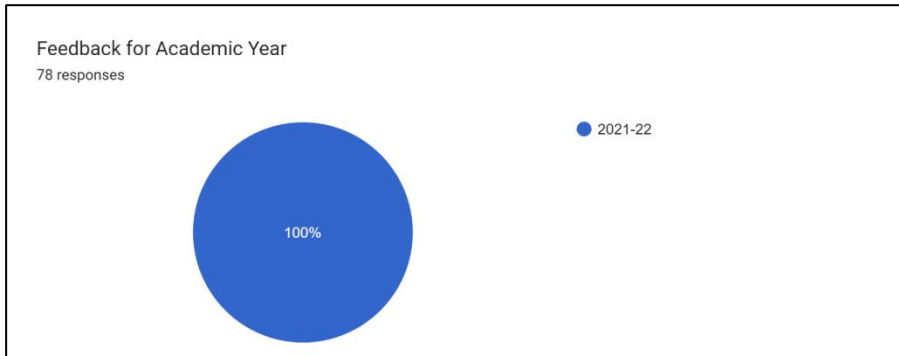
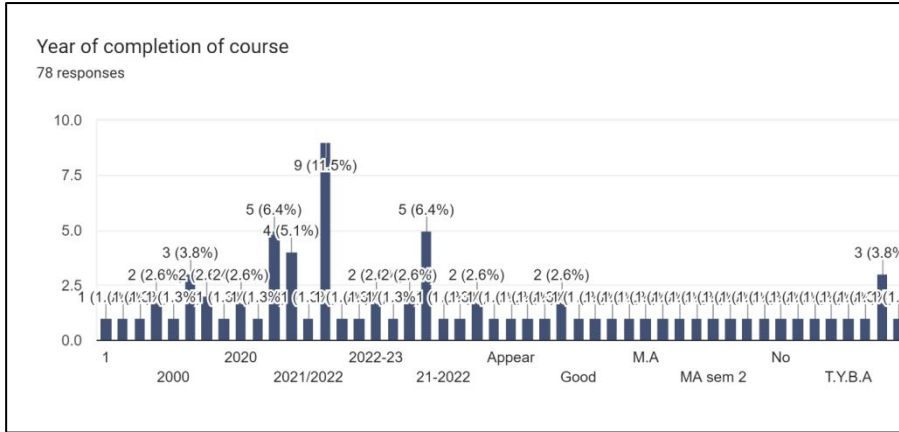
Other facilities provided by the college / महाविद्यालयाने पुरविलेल्या इतर सुविधा

1,760 responses



- Excellent / उत्कृष्ट
- Very Good / खुप छान
- Good / छान
- Average / सरासरी
- Below average / सरासरीपेक्षा कमी

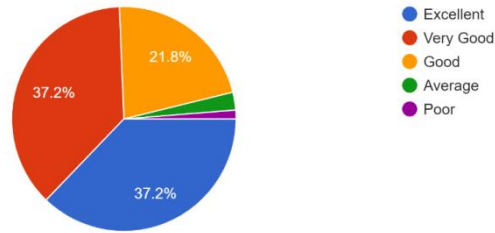
# Feedback form for Alumni





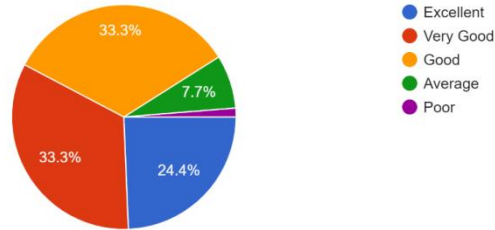
How are the teaching abilities of the teachers in delivering the curriculum?

78 responses



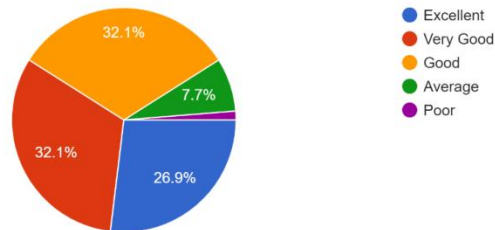
Ability of the organization in making the curriculum better

78 responses



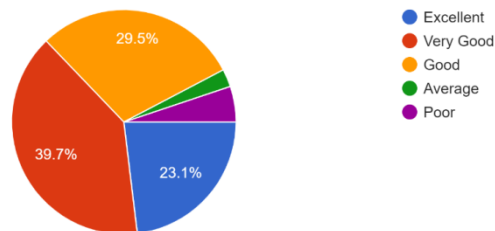
How is the learning environment of the organization?

78 responses



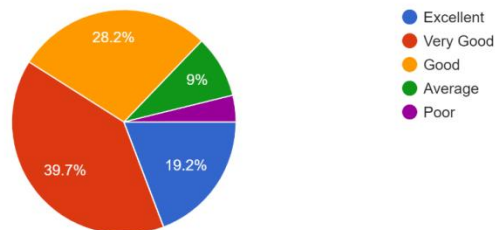
How do you rate the courses that you have learnt in the college in relation to your current job / occupation?

78 responses



Infrastructure and lab facilities of the Institute/ College.

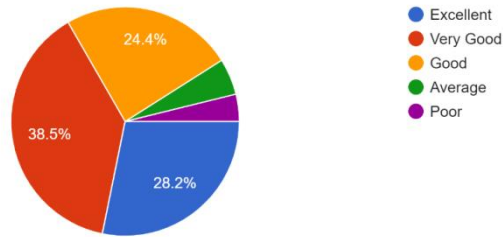
78 responses





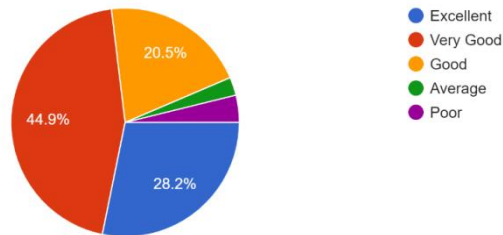
### Teaching Faculty

78 responses



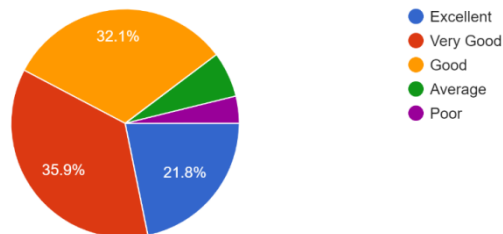
### Library

78 responses



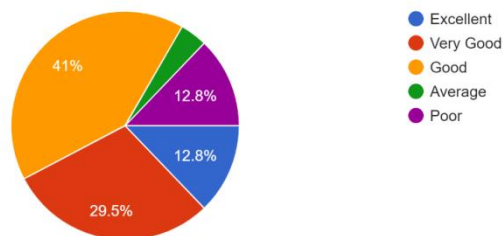
### Office Staff

78 responses



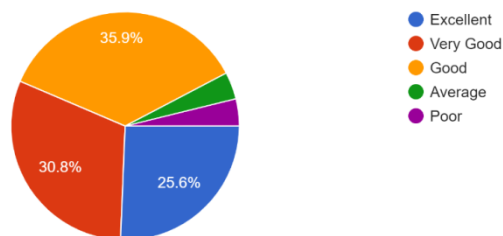
### Hostel facilities

78 responses



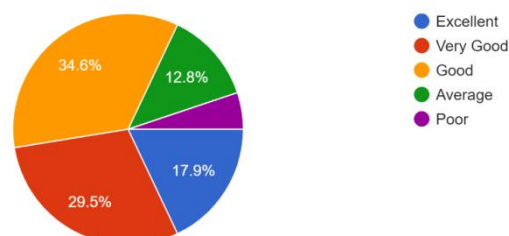
### Educational resources

78 responses



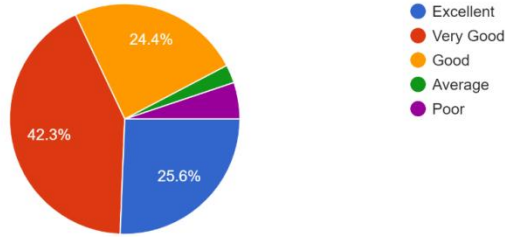
### Admission procedure

78 responses



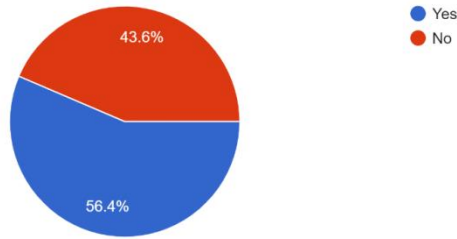
Overall rating of the college

78 responses



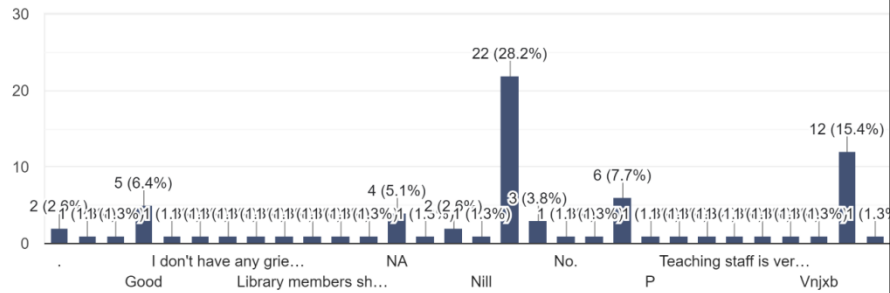
Do you have any grievances with the College ?

78 responses



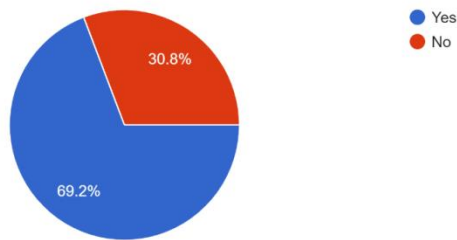
If Yes then please specify / indicate the grievance.

78 responses



Are you a member of Alumni Association of our college?

78 responses



*[Signature]*  
**IQAC Co-ordinator**  
 GTP College, Nandurbar



*[Signature]*  
**PRINCIPAL**  
 G.T. Patil College  
 Nandurbar

# **Perspective Plan & ATR**



Nandurbar Taluka Vidhayak Samiti's  
**G. T. PATIL ARTS COMMERCE AND SCIENCE COLLEGE,**  
**NANDURBAR – 425412**  
 NAAC ACCREDITED 'A' GRADE

Prof. M. J. Raghuwanshi  
Principal

Email: gtpcollege@rediffmail.com  
 Ph: 2564-222293  
 Website: ntvsgtpcollege.org

SN	Perspective Plan	ATR
1	<p><b>A] Curricular Aspects</b></p> <ol style="list-style-type: none"> <li>1) Introducing certificate programmes to enhance the curriculum</li> <li>2) Students' access to field trips should be improved.</li> <li>3) To create an organised approach for collecting feedback on the curriculum from all interested parties.</li> </ol>	<ol style="list-style-type: none"> <li>a. 03 certificate programmes have been started</li> <li>b. Field visits have been arranged</li> <li>c. Feedback collection on the curriculum followed by Corrective measures have been performed yearly.</li> </ol>
2	<p><b>B] Teaching Learning and Evaluation</b></p> <ol style="list-style-type: none"> <li>1) ICT for teaching must be used more effectively. modern tools, such as PowerPoint presentations</li> <li>2) To evaluate the results of the learning process, a continuous internal evaluation system must be developed.</li> <li>3) To enhance the quality of teaching and learning, the feedback system must be expanded.</li> <li>4) Field trips, outings, and visits to businesses will be planned to promote experiential learning.</li> </ol>	<ol style="list-style-type: none"> <li>a. ICT tools like PowerPoint presentations and Google Classrooms have been followed effectively</li> <li>b. Continuous internal evaluation system has been involved</li> <li>c. Regular and transparent feedback system has been implemented</li> <li>d. Regular Field trips, outings, and visits to businesses followed by project works have been introduced to provide experiential learning to students.</li> </ol>
	<p><b>C] Research, Consultancy and Extension</b></p> <ol style="list-style-type: none"> <li>1) Reason for holding workshops, seminars, and training programmes.</li> <li>2) creating proposals for both small-scale and large-scale research projects, seminars, and conferences</li> <li>3) For conducting research activities, academic infrastructure such as tools, labs, ICT facilities, libraries, and other necessities must be provided.</li> <li>4) To improve the NSS/NCC units for outreach initiatives.</li> <li>5) The society will profit from rallies and awareness campaigns</li> </ol>	<ol style="list-style-type: none"> <li>a. Workshops, seminars, and training programmes have been arranged to inculcate skills and current trends among the faculty members.</li> <li>b. 08 faculty members have been working on minor research projects supported by government agencies.</li> <li>c. Institute has state of art research facilities at departments and recognized research laboratories.</li> <li>d. Institute has vibrant and active NSS/NCC units which is evident from the vigorous activities conducted by the respective units. With pride generated Hon'ble President Awardee of Best NSS volunteer for Year 2020.</li> <li>D. Many rallies and awareness campaigns have been organized by the units of the institute in</li> </ol>



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		various aspects including COVID-19. Vibrantly Mission Yuva Swastha – Vaccination drive conducted for youth and localities.
4	<p><b>D] Infrastructure and Learning Resources</b></p> <ol style="list-style-type: none"> <li>1) The ICT infrastructure will be improved, and LCD projectors will be installed in classrooms.</li> <li>2) The restrooms for men and women will be updated.</li> <li>3) Library resources will be improved, and stakeholders will have access to e-learning materials including INFLIBNET, e-journals, and e-books.</li> <li>4) The LAN, Internet, and wi-fi facilities must be improved.</li> <li>5) The office must be computerised and use the most recent software.</li> <li>6) Facilities for sports must be improved.</li> </ol>	<ol style="list-style-type: none"> <li>a. Laboratories and classrooms have been facilitated with LCD projectors.</li> <li>b. Restrooms for men and women have been maintained.</li> <li>c. A well-staked library with more than 1,00,000 books have been maintained with library management system (LMS) software. Besides, INFLIBNET, e-journals, and e-books facilities have been made available through telegram Channel for staff and students.</li> <li>d. All the departments have been provided with LAN, Internet, and wi-fi facilities.</li> <li>e. Administrative office has been computerised with recent software.</li> <li>f. Institute has updated and furnished sports facilities, indoor stadium and gym facilities. In addition, Students have presented Institute at University, State and National Level.</li> </ol>
	<p><b>E] Student Support and Progression</b></p> <ol style="list-style-type: none"> <li>1. The college website must be updated and made more interactive.</li> <li>2. The college website will be made available with information on government scholarships.</li> <li>3. To organise a programme for students to strengthen their soft skills.</li> <li>4. Students will receive financial aid to participate in Avishkar, sporting events, etc.</li> <li>5. The students' involvement in district-level and</li> </ol>	<ol style="list-style-type: none"> <li>a. College website is updated and made available with information on government scholarships.</li> <li>b. Institute organise counselling, soft skills development and bridge course through guest lectures on regular basis.</li> <li>c. Students are provided with financial support to participate in Avishkar, Yuvarang and sport events.</li> <li>d. The students' involvement in district-level and national youth festivals is encouraged. Institute</li> </ol>





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	<p>national youth festivals will be encouraged, enhancing the cultural activities.</p> <p>6. Financial aid for students in need.</p> <p>7. To launch alumni involvement for college development.</p>	<p>has independent committee for cultural events. Student from the institute has secured SILVER MEDAL in mimicry at University Level.</p> <p>e. Financial support to the students has been provided through Poor boy's fund and Earn-Learn Scheme.</p> <p>f. Active alumni involvement is there for college development.</p>
	<p><b>F] Governance, Leadership &amp; Management</b></p> <p>1. The institute will explain its vision and mission to all parties involved.</p> <p>2. For the institute's growth, all stakeholders will collaborate.</p> <p>3. The IQAC will work together to create the perspective plan.</p> <p>4. The college must plan professional training and development initiatives.</p> <p>5. Faculty will have an established annual performance appraisal system.</p> <p>6. Faculty meetings held regularly to ensure effective planning and deployment.</p> <p>7. Regular conduction of internal and external audits.</p>	<p>a. Vision mission is reflective through various activities at institute level.</p> <p>b. IQAC motivated to start with certificate courses, research laboratory establishment and ICT based teaching learning at institute level.</p> <p>c. Institute organize regular conferences/workshops/expert sessions for teaching and non-teaching staff regularly.</p> <p>d. Regular review of PBAS and promotion process has been carried out at institute level.</p> <p>e. Regular internal and external audits have been carried out by institute.</p>
	<p><b>G] Innovations and best practices</b></p> <p>The college will arrange more initiatives to promote</p> <p>1. Gender equity.</p> <p>2. Environmental awareness should be improved.</p> <p>3. Renewable energy sources that are not conventional will be strengthened.</p> <p>4. Eco-friendly procedures.</p> <p>6. Interaction with the neighbourhood.</p> <p>7. Awareness of national identities, symbols, and other constitutional duties.</p>	<p>f. Regular activities like expert lecture, rally, day celebrations have been carried out to promote gender equity, environmental awareness, national identities, symbols, and other constitutional duties.</p>



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Prof. M. J. Raghuwanshi  
Principal

Email: [gtpcollege@rediffmail.com](mailto:gtpcollege@rediffmail.com)  
Ph: 2564-22293  
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**Dr. V.Z. Chaudhari**  
Co-ordinator, IQAC  
GTP College, Nandurbar

  
(Prof. Dr. M.J. Raghuwanshi)  
**PRINCIPAL**  
GT Patil College,  
Nandurbar-425412

# **Memoranda of Understanding**

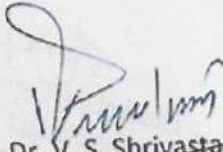
# Collaboration/Linkage Certificate

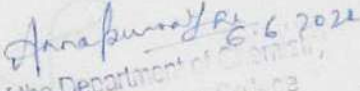
## TO WHOM IT MAY CONCERN

This is to certify that **Dr. Manohar Rajendra Patil** Department of Chemistry NTVS's G.T. Patil Arts, Commerce and Science College, Nandurbar-425412 has research collaboration (since 2017) with **Dr. Annapurna Jha, Head, Department of Chemistry, Jamshedpur Womens College, Jamshedpur, Jharkhand** for sharing the research ideas, exchange of reprints of our research papers and for the sample characterizations. We have jointly worked on research topics related to the application of nanoparticles and have published the research work in reputed international journals.

We have further extended this linkage with both the Chemistry departments to review the curriculum, teaching practices and discuss ways in which courses could be revised to promote scientific knowledge among the students.

Date: 01/09/2017

  
(Prof. Dr. V. S. Shrivastava)  
Principal  
PRINCIPAL  
G.T. Patil Arts, Commerce &  
Science College  
NANDURBAR - 425 412 (M.S.)

  
Head of the Department of Chemistry,  
Jamshedpur Women's College  
Jamshedpur.

# Journal of the Indian Chemical Society

## Enhance catalytic performance of lipase immobilized on Polyaniline (PANI)–Fe<sub>3</sub>O<sub>4</sub> magnetic nanocomposite and its application in biodiesel synthesis from waste cooking oil

--Manuscript Draft--

<b>Manuscript Number:</b>	JINCS-D-21-00661
<b>Full Title:</b>	Enhance catalytic performance of lipase immobilized on Polyaniline (PANI)–Fe <sub>3</sub> O <sub>4</sub> magnetic nanocomposite and its application in biodiesel synthesis from waste cooking oil
<b>Article Type:</b>	Full Length Article
<b>Section/Category:</b>	Analytical & Environmental Chemistry
<b>Keywords:</b>	PANI-Fe <sub>3</sub> O <sub>4</sub> magnetic nanocomposites; Lipase; Immobilization; Thermostability; Biodiesel
<b>Corresponding Author:</b>	Annapurna Jha Jamshedpur Women's College Jamshedpur, Jharkhand INDIA
<b>Corresponding Author Secondary Information:</b>	
<b>Corresponding Author's Institution:</b>	Jamshedpur Women's College
<b>Corresponding Author's Secondary Institution:</b>	
<b>First Author:</b>	Annapurna Jha
<b>First Author Secondary Information:</b>	
<b>Order of Authors:</b>	Annapurna Jha Manohar Patil, Ph.D
<b>Order of Authors Secondary Information:</b>	
<b>Abstract:</b>	<p>Biodiesel is recently used as a substitute for petroleum based diesel due to environmental considerations and depletion of vital resources like petroleum and coal. In the present work biodiesel was synthesized by immobilized lipase to make the process cost effective. Lipase was immobilized on magnetic nanocomposite which can be easily separated from the reaction medium by magnetic separation. In the present investigation lipase was immobilized on modified polyaniline (PANI)–Fe<sub>3</sub>O<sub>4</sub> magnetic nanocomposite. SEM images demonstrate the morphology of modified nanocomposite with and without immobilized lipase. The modified nanocomposites with and without immobilized lipase were further characterized with Thermogravimetric analysis (TGA) and Fourier Transform Infrared (FTIR) Spectroscopy. At higher temperature the immobilized lipase was more stable in comparison to its free form. Immobilized lipase retained 84% of its initial activity on incubation at 90 °C whereas free form became inactive at this temperature. The optimum pH shifted from 7 for free lipase to 8 for the immobilized lipase. The conversion yield of biodiesel was found to be 80% with the immobilized lipase while it was only 28% with free lipase. Immobilized lipase can be reused for 5 cycles with 90% retained activity for biodiesel synthesis. Immobilization of lipase on polyaniline (PANI)–Fe<sub>3</sub>O<sub>4</sub> magnetic nanocomposite improved its stability towards denaturation by heat and pH. Moreover it has quite efficiently catalyses the biodiesel synthesis with good operational stability.</p>
<b>Suggested Reviewers:</b>	Hari Shirish Sonawane, Ph.D Professor, National Institute of Technology Warangal shirish@nit.ac.in  K M Garadkar, Ph.D Professor, Shivaji University Kolhapur: Shivaji University kmg_chem@unishivaji.ac.in

	<p>Francisco Valero, Ph.D  Professor, University of Southern California  francisco.valero@uab.cat  He has work in the field of enzyme catalysed biodiesel synthesis</p>
	<p>Maria Dolors Benaiges Massa, Ph.D  Professor, Universitat Autònoma de Barcelona  mariadolrs.benaiges@uab.cat</p>
	<p>Attasak Jaree, Ph.D  Professor, Kasetsart University  fengasj@ku.ac.th</p>
<b>Additional Information:</b>	
<b>Question</b>	<b>Response</b>

To,

Editorial-in-Chief

Journal of the Indian chemical Society

**Subject:** - Submission of an original research article

Dear editor,

I would like to submit the manuscript entitled “Enhance catalytic performance of lipase immobilized on Polyaniline (PANI)-Fe<sub>3</sub>O<sub>4</sub> magnetic nanocomposite and its application in biodiesel synthesis from waste cooking oil” to be considered for publication as original article in your esteemed journal the “Journal of the Indian chemical Society”.

We declare this submission has not been previously published in English or in other language.

We declare that this manuscript is original and is not currently being considered for publication elsewhere.

The authors do not have any conflict of interests to declare.

This article is not based on a conference paper.

As corresponding author I confirm that manuscript has been read and approved for submission by all the authors.

Please address all correspondence concerning this manuscript to me at annujha05@gmail.com.

Thank you for your consideration of this manuscript.

Sincerely,

Dr. Annapurna Jha

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7 **Enhance catalytic performance of lipase immobilized on Polyaniline (PANI)–**  
8 **Fe<sub>3</sub>O<sub>4</sub> magnetic nanocomposite and its application in biodiesel synthesis from**  
9 **waste cooking oil**  
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14 **Annapurna Jha<sup>a\*</sup>, Manohar Patil<sup>b</sup>**

15  
16  
17 a. Jamshedpur women's college, Jamshedpur-831004, INDIA

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20 b. Nano-Chemistry Research Laboratory, G.T.P. College, Nandurbar-425412, INDIA

21  
22 **\*Corresponding author. Both the authors have equal contribution**  
23  
24

25 **Abstract**

26  
27 Biodiesel is recently used as a substitute for petroleum based diesel due to environmental  
28 considerations and depletion of vital resources like petroleum and coal. In the present work  
29 biodiesel was synthesized by immobilized lipase to make the process cost effective. Lipase was  
30 immobilized on magnetic nanocomposite which can be easily separated from the reaction  
31 medium by magnetic separation. In the present investigation lipase was immobilized on modified  
32 polyaniline (PANI)–Fe<sub>3</sub>O<sub>4</sub> magnetic nanocomposite. SEM images demonstrate the morphology  
33 of modified nanocomposite with and without immobilized lipase. The modified nanocomposites  
34 with and without immobilized lipase were further characterized with Thermogravimetric analysis  
35 (TGA) and Fourier Transform Infrared (FTIR) Spectroscopy. At higher temperature the  
36 immobilized lipase was more stable in comparison to its free form. Immobilized lipase retained  
37 84% of its initial activity on incubation at 90 °C whereas free form became inactive at this  
38 temperature. The optimum pH shifted from 7 for free lipase to 8 for the immobilized lipase. The  
39 conversion yield of biodiesel was found to be 80% with the immobilized lipase while it was only  
40 28% with free lipase. Immobilized lipase can be reused for 5 cycles with 90% retained activity  
41 for biodiesel synthesis. Immobilization of lipase on polyaniline (PANI)–Fe<sub>3</sub>O<sub>4</sub> magnetic  
42 nanocomposite improved its stability towards denaturation by heat and pH. Moreover it has quite  
43 efficiently catalyses the biodiesel synthesis with good operational stability.  
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59 **Keywords:** PANI–Fe<sub>3</sub>O<sub>4</sub> magnetic nanocomposites, Lipase, Immobilization, Thermostability, Biodiesel  
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4 **1.Introduction:**  
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7 Biodiesel syntheses from vegetable oils have immense potential as a renewable source of energy.  
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9 A number of processes have been developed for biodiesel production involving chemical or  
10 enzyme catalysis or supercritical CO<sub>2</sub> medium [1][2][3]. Enzymatic transesterification of  
11 triglycerides is a good alternative to chemical process as it is a green approach of producing  
12 renewable fuel. Enzyme catalysis has shown high purity of products due to its ecofriendly,  
13 selective nature and low temperature requirement <sup>2</sup>.  
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19 In many countries biodiesel synthesized using edible and non-edible oil; however because of the  
20 high cost of the vegetable oils biodiesel cost 1.5 times higher than fossil diesel and it limited its  
21 wide application[3]. Therefore in the present study, waste oils chosen as the raw materials for  
22 biodiesel synthesis.  
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27 There are many reports on biodiesel production using enzyme catalysis by free or immobilized  
28 lipase. Immobilized lipase in particular is suitable for continuous biodiesel production because of  
29 its ease of recovery from the reaction mixture. A great variety of lipase immobilisation methods  
30 such as adsorption, covalent immobilization, entrapment and whole-cell biocatalyst have been  
31 reported [4][5]. Among the various immobilization methods adsorption and covalent  
32 immobilization methods are the most cost effective and efficient means of immobilization.  
33  
34 Adsorption is one of the easiest methods but the bonding of the enzyme to the matrix is often  
35 weak and such biocatalysts generally lack the degree of stabilization achieved by covalent  
36 attachment. Covalent immobilization methods have the strongest enzyme-support bonding  
37 compared with other methods. The lipase needs both firmness and flexibility, as the flexible  
38 active center enhances its endurance towards distortions without losing activity. But strong  
39 multipoint covalent bonding will lead to the irreversible distortion of active center and the risk of  
40 losing function. So in the present investigation an intermediate process between adsorption and  
41 covalent attachment has been utilized for immobilization of *Aspergillus niger* (RM1265) lipase  
42 to enhance the immobilization efficiency and stability of enzyme.  
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56 Lipases immobilized on nanoparticles are an excellent catalyst for biodiesel synthesis [6]. The  
57 magnetic nanocomposite has been utilized for immobilization as the smaller size particles will  
58 increase the total acting surface of reacting particles in reaction mixture, moreover magnetic  
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4 isolation of lipase make the processes is advantageous from an economic point of view. In the  
5 present investigation, *Aspergillus niger* (RM1265) lipase was first immobilized on activated  
6 nanocomposite then it was utilized for methanolysis of waste oil.  
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## 10 **2. Experimental:**

### 11 **2.1. Chemicals**

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13 Lipase from *Aspergillus niger* (RM1265) was purchased from HiMedia and *p*-nitrophenol  
14 palmitate was purchased from Sigma aldrich. Waste cooking oil was collected from local  
15 restaurants. All other solvents and reagents were AR grade.  
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### 20 **2.2. Modification of nanocomposite**

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22 Polyaniline (PANI)-Fe<sub>3</sub>O<sub>4</sub> magnetic nanocomposite has been utilized for immobilization of  
23 lipase which was synthesized in situ through self-polymerization of monomer aniline [7]. 5g  
24 magnetic nanocomposites were modified by refluxing it in 25 ml ethanolamine. After 3 h of  
25 reflux nanocomposite were washed thrice with 60 ml acetone and air dried. Magnetic  
26 nanocomposites were then activated using 25 ml 4% (w/v) glutaraldehyde in 50 mM phosphate  
27 buffer (pH 8.0) with gentle agitation at 4 °C for 2 h. The activated magnetic nanocomposites  
28 were washed with phosphate buffer to make it glutaraldehyde free.  
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### 35 **2.3. Immobilization of lipase**

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37 About 25 ml lipases in 50 mM phosphate buffer (pH 8.0) was mixed with 0.1 ml of Tween 80  
38 and stirred for 5 min followed by the addition of 5 g of magnetic nanocomposite. Hundred  
39 milliliter of chilled acetone was added and the mixture was stirred for 30 min at 4 °C. Magnetic  
40 nanocomposite immobilized lipase was filtered, washed with 25 ml of chilled acetone and  
41 lyophilized.  
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### 46 **2.4. Lipase assay**

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48 Lipase assay was done spectrophotometrically using *p*-nitro phenyl palmitate as the substrate[8].  
49 One unit (U) of lipase was defined as the amount of enzyme that liberates 1 μmol of *p*-nitro  
50 phenol per min under the assay conditions.  
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### 53 **2.5. Characterizations of immobilized lipase**

#### 54 **2.5.1. SEM analysis**

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56 SEM analysis of modified nanocomposite and lipase immobilized modified nanocomposite were  
57 carried out on using HITACHI-S- 4800(type II) instrument, Japan.  
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4 **2.5.2. Thermo Gravimetric Analysis:** TGA of modified nanocomposite and lipase immobilized  
5  
6 modified nanocomposite were carried out using Thermal analyser -Perkin Elmer Pyris -1 TGA.  
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9 **2.5.3. FTIR Analysis:** FTIR analysis of modified nanocomposite and lipase immobilized modified  
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11 nanocomposite were carried out on FT-IR Spectrometer Perkin Elmer Spectrum GX 10,000 cm<sup>-1</sup>  
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13 to 370 cm<sup>-1</sup>.  
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#### 15 16 **2.5.4. Effect of temperature and Thermostability**

17  
18 The effect of temperature on the free and immobilized lipase activity was determined for *p*-NPP  
19  
20 hydrolysis. The hydrolysis of *p*-NPP was observed at various temperatures (20–70°C), where the  
21  
22 *p*-NPP solution was preincubated to reach the desired temperature before the addition of lipase.  
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#### 24 **2.5.5. pH stability and Thermostability**

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26 The effect of pH on the free or immobilized enzymes was examined after pre-incubating the  
27  
28 enzyme samples at 30°C for 60 min at pH 4–11 [50 mM sodium acetate buffer (pH 4, 5), 50 mM  
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30 potassium phosphate buffer (pH 6,7), 50 mM Tris–HCl buffer (pH 8, 9), and 50 mM glycine–  
31  
32 NaOH buffer (pH 10, 11)]. Then the residual activity was assayed under the standard conditions.  
33  
34 Thermostability of the free and immobilized lipase activity was observed by incubating in  
35  
36 phosphate buffer (50 mM, pH 7.0) at temperatures ranging from 30°C to 90°C for 60 min,  
37  
38 followed by measurement of the residual enzyme activity at 37°C. The enzyme activity of the not  
39  
40 incubated lipase was taken as 100%.  
41

## 42 **2.6. Biodiesel synthesis**

### 43 **2.6.1. Reaction setup for transesterification reaction**

44  
45 Transesterification reaction for biodiesel synthesis was carried out at 30°C in screw-capped vials  
46  
47 placed inside a reciprocal shaker. The initial reaction mixture consisted of oil: methanol molar  
48  
49 ratio of 1:2, *t*-butanol:oil volume ratio of 0.2, immobilized lipase 50 U and 200 rpm along with  
50  
51 the respective controls (samples without enzyme).  
52

### 53 **2.6.2. Sampling and Analysis**

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55 Synthesis of fatty acid methyl ester was analyzed by method was modified based on hydroxamic  
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57 acid test [9].  
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4 **2.7. Operational stability of nanocomposite bound lipase**  
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6 Operational stability of immobilized lipases was also observed for biodiesel synthesis. After the  
7 completion of reaction, the immobilized lipases were collected by centrifugation at 5,000 rpm for  
8 10 min and washed with hexane in order to remove the reactants adsorbed on matrix. Then the  
9 immobilized lipases were resuspended in the same composition of freshly prepared reaction  
10 mixture to start a new run and the supernatant was assayed for biodiesel synthesis.  
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18 **3. Result and discussion:**  
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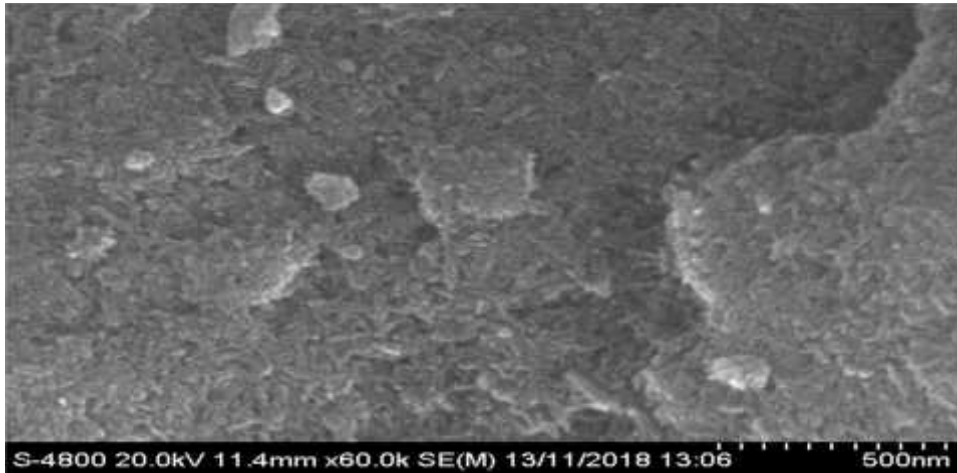
20 **3.1. Immobilization of enzyme**  
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22 Immobilization of lipase was carried out on modified crosslinked nanocomposite, where the  
23 immobilization yield of lipase on was estimated by calculating the specific activity of respective  
24 lipases before and after binding to nanocomposite. Lipase showed 85% immobilization on  
25 modified cross linked aminated nanocomposite. Lipase showed 85% immobilization on  
26 modified cross linked aminated nanocomposite. The present result of immobilization yield is  
27 higher than those earlier reports [10][11]. Covalent attachment is the most efficient method of  
28 enzyme immobilization, but because of strong multi-interactions between the enzyme and  
29 support, sometimes distortions of enzymes occur that lead to denaturation and loss of enzyme  
30 activity. In the present immobilization process first ethanolamine was adsorbed on  
31 nanocomposite and then it was treated with glutaraldehyde followed by enzyme immobilization.  
32 So this process is not completely covalent attachment therefore lipase is efficiently immobilized  
33 on activated nanocomposite without losing its enzyme activity. It was observed that the activated  
34 nanocomposite enhances the immobilization yield and thermostability of lipase.  
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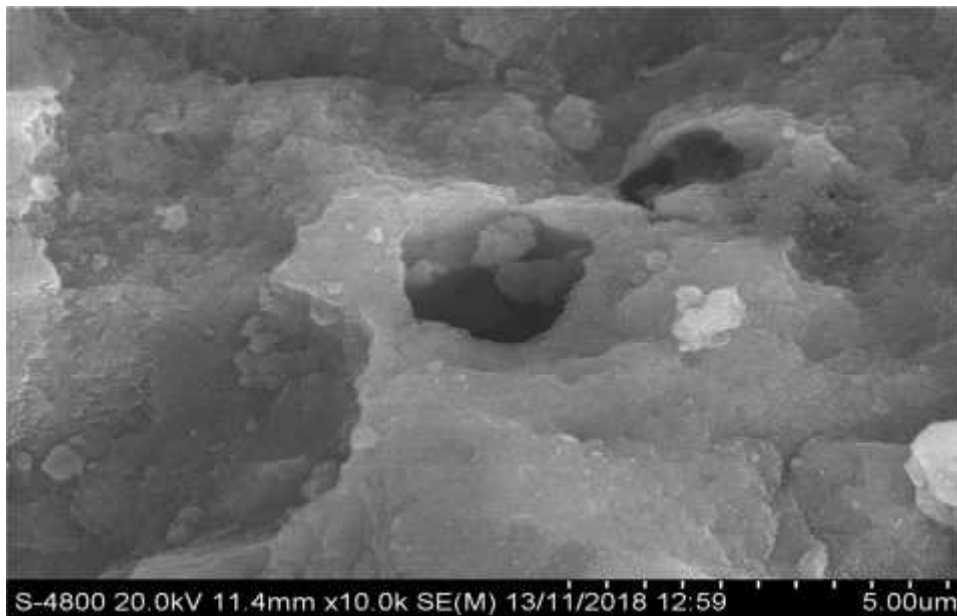
44 **3.2. SEM analysis of modified nanocomposite and lipase immobilized on modified**  
45 ***nanocomposite***  
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48 Scanning electron microscopy is widely used to study the morphological features and surface  
49 characteristics of catalyst surface. The magnetic nanocomposite of Polyaniline/Fe<sub>3</sub>O<sub>4</sub> are  
50 analyzed by SEM after activation with ethanolamine and glutaraldehyde as shown in Figure(1a).  
51 In Figure(1a) polyaniline-Fe<sub>3</sub>O<sub>4</sub> has heterogeneous surface, there is whitish cluster of Fe<sub>3</sub>O<sub>4</sub>  
52 nanoparticles on the dark greyish surface of polyaniline that we have used earlier for degradation  
53 of dyes[7]. The SEM micrographs of magnetic nanocomposite of polyaniline/Fe<sub>3</sub>O<sub>4</sub> also showed  
54 surface texture and porosity in figure 1(a).The magnetic nanocomposite of polyaniline/Fe<sub>3</sub>O<sub>4</sub> are  
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4 analyzed by SEM after the enzyme immobilisation as shown in Figure 1b. The figure 1(b) shows  
5 increased in surface texture and porosity, that's mainly due to successfully binding of the  
6 enzyme substrate with the surface. So, we easily distinguished figure 1(a) and 1(b) from their  
7 porosity and concluded successful enzyme immobilisation on modified polyaniline/  $\text{Fe}_3\text{O}_4$   
8 catalyst nanocomposite.  
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35 Figure 1a: SEM of magnetic nanocomposite of polyaniline/ $\text{Fe}_3\text{O}_4$  modified after treatment with  
36 ethanolamine and glutaraldehyde  
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60 Figure 1b: SEM of lipase immobilized modified magnetic nanocomposite of polyaniline/ $\text{Fe}_3\text{O}_4$ .  
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### 3.3. TGA of activated nanocomposite and lipase immobilized on activated nanocomposite

Thermogravimetric analysis (TGA) is very practical tool to extract structure-related information of the materials. In present investigation thermal analyses reveal that the modified polyaniline and enzyme immobilized polyaniline are thermally labile materials, as shown in figure 2a and 2b. The initial weight loss around 200 °C was mainly due to evaporation of water and low molecular weight species. The second weight loss 220 to 300 °C was associated with the doping agent degradation. The weight loss around 400 to 500 °C was associated with degradation of polyaniline. Beyond 500 °C Fe<sub>3</sub>O<sub>4</sub> was decomposed from covalently bonded Polyaniline. This trend was observed in both the Figure 2a (Polyaniline- Fe<sub>3</sub>O<sub>4</sub>) and Figure 2b (Polyaniline- Fe<sub>3</sub>O<sub>4</sub> enzyme nanocomposite). But weight loss is slightly more in Figure 2b that is due to use of enzyme in a reaction.

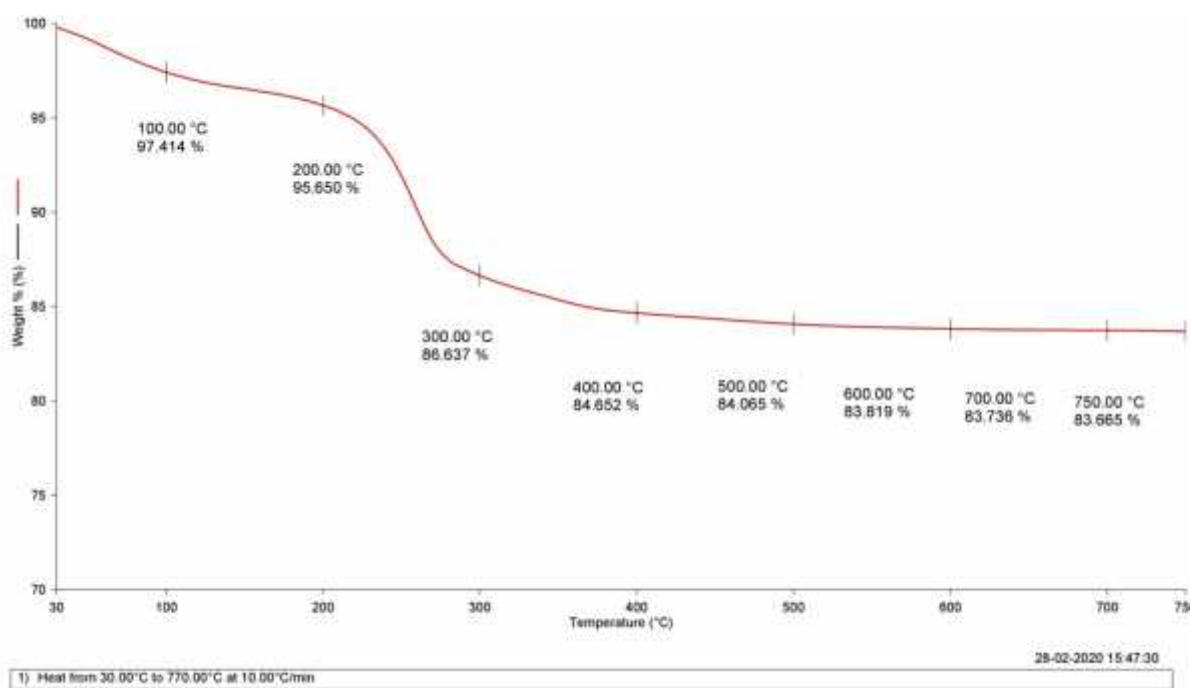


Figure 2a: TGA curve of magnetic nanocomposite of polyaniline/Fe<sub>3</sub>O<sub>4</sub> modified after treatment with ethanolamine and glutaraldehyde

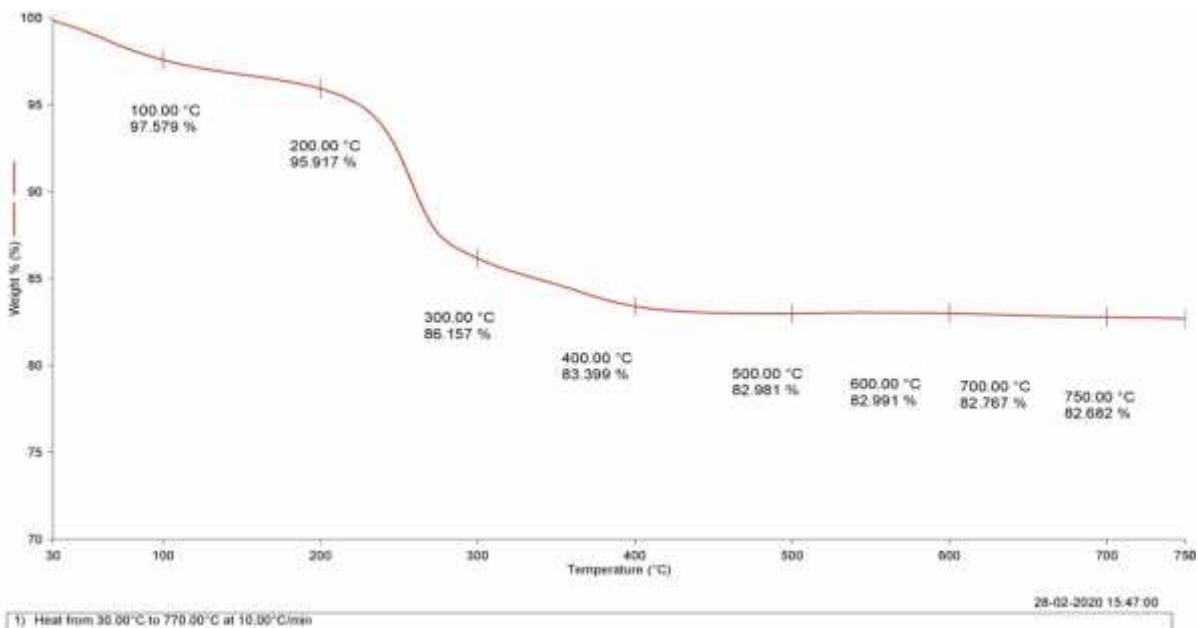


Figure 2b: TGA curve of lipase immobilized modified magnetic nanocomposite of polyaniline/Fe<sub>3</sub>O<sub>4</sub>.

### 3.4. FT-IR analysis of activated nanocomposite and lipase immobilized on activated nanocomposite

The FT-IR spectra of activated PANI-Fe<sub>3</sub>O<sub>4</sub> nanocomposite and enzyme immobilized PANI-Fe<sub>3</sub>O<sub>4</sub> nanocomposite are shown in figure 3a and 3b respectively. It shows absorption band at 468 cm<sup>-1</sup>, due to Fe-O stretching vibration. The peaks found at 3408, 1112 and 1070 may be assigned to N-H stretching and C-N stretching vibration respectively. The peak appeared at 1633 and 1620 cm<sup>-1</sup> are due to C=C stretching vibration in aromatic ring of aniline. Almost all the peaks are common in both the Figure 3a and Figure 3b except for peak at 2854 cm<sup>-1</sup> which may assigned to C-H stretching vibration of aldehyde group. This is because activated PANI-Fe<sub>3</sub>O<sub>4</sub> nanocomposite has free aldehyde group which is utilized for lipase immobilization in enzyme immobilized PANI-Fe<sub>3</sub>O<sub>4</sub> nanocomposite. So FTIR analysis showed the efficient enzyme immobilization on PANI-Fe<sub>3</sub>O<sub>4</sub> nanocomposite.

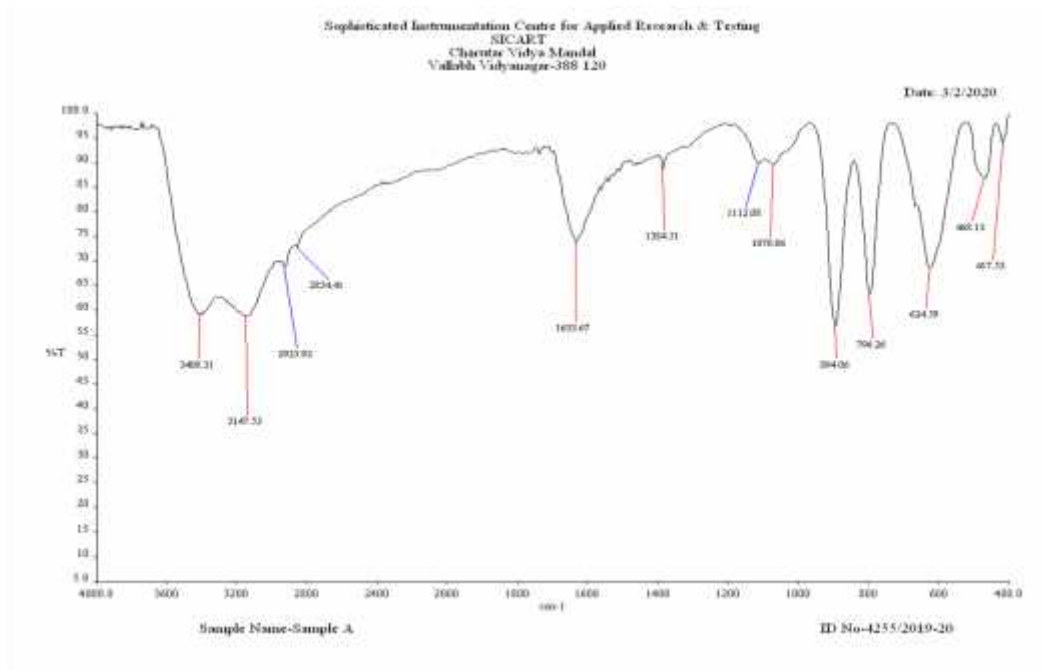


Figure 3a: FTIR spectrum of magnetic nanocomposite of polyaniline/Fe<sub>3</sub>O<sub>4</sub> modified after treatment with ethanolamine and glutaraldehyde.

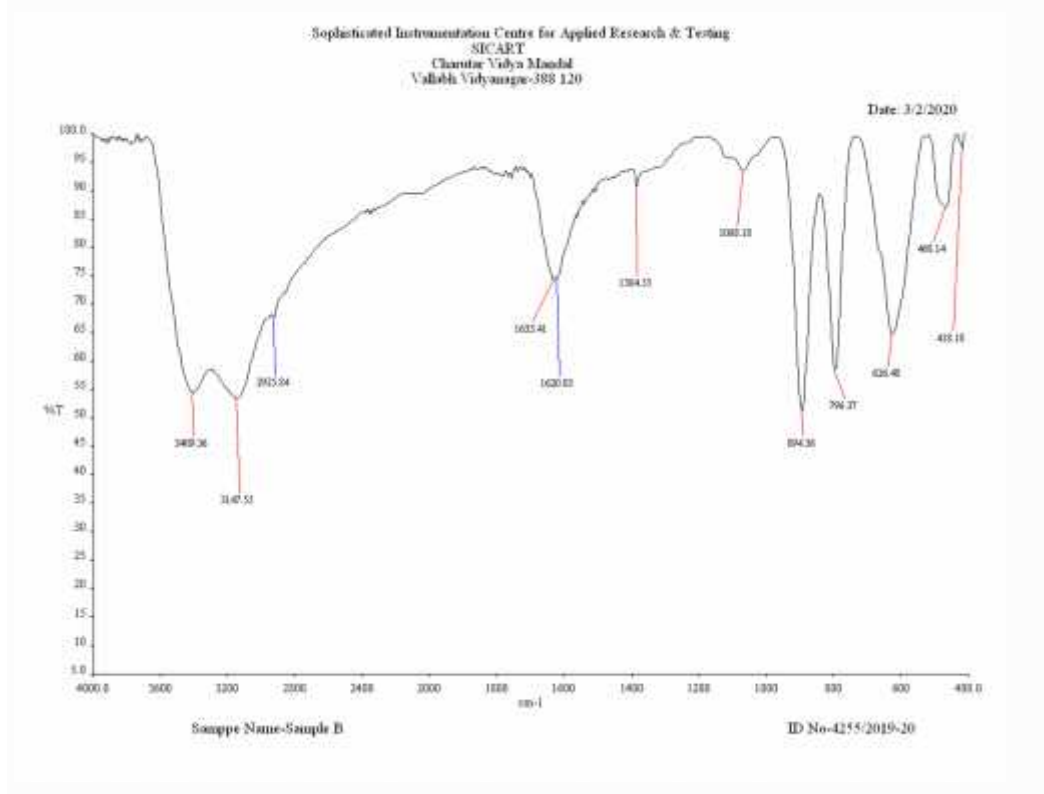


Figure 3b: FTIR spectrum of lipase immobilized modified magnetic nanocomposite of polyaniline/Fe<sub>3</sub>O<sub>4</sub>.



### 3.5. Effect of temperature on lipase activity

Application of lipases in chemical synthesis, especially biodiesel production, often leads to thermal inactivation due to denaturation of the protein. Figure 4 illustrates the effect of temperatures on free as well as immobilized enzyme. It has been observed that the free and immobilized lipases had almost same activity up to 40 °C while at higher temperature the immobilized lipases were more stable and showed a slight increase in activity. This may be because immobilization of enzymes by multiple point binding resulted in an increase of enzyme rigidity, which is commonly reflected by increase in stability towards thermal denaturation. This result is in consistent with earlier reports [11].

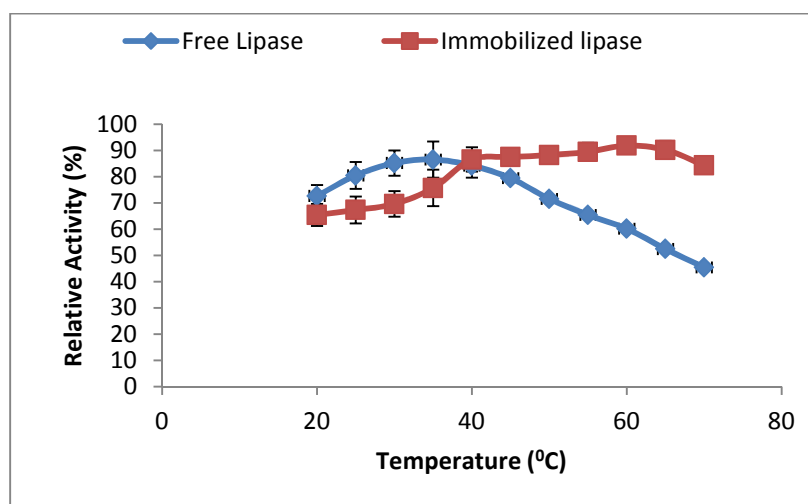


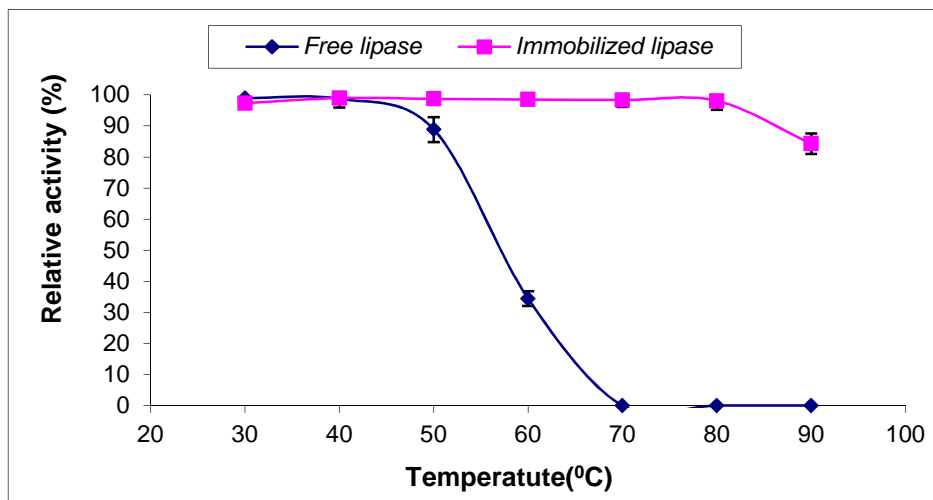
Figure 4: Effect of temperature on free and immobilized lipase. Data are represented as the mean  $\pm$  standard deviation of three replications.

### 3.6. Thermostability of free and immobilized lipases

Thermal stability of an enzyme has immense importance for its potential industrial applications. The thermal stability of immobilized enzymes used to increase on attachment to a rigid support. In the present study thermal stability of the soluble and immobilized lipase was studied at various temperatures from 30°C to 90°C (Figure 5). It was observed that free lipase activity decreased after 40°C and became inactive beyond 60°C while the immobilized lipase was completely retained its activity. It has been observed that even at 90°C, after one hour of incubation, the immobilized lipase retained 84% of its initial activity, whereas the free lipase

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4 became inactive far before this temperature. Although there are several previous reports where  
5 immobilized lipase was stable in comparison to its free form but the thermal stability observed in  
6 the present study was found to be very much improved than the earlier reports [12] [13].  
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10 Thermal stability depends on the strength of bonds formed between the enzyme and the support  
11 which prevent its unfolding at higher temperature. The thermal stability of immobilized enzymes  
12 might be drastically increased due to its strong attachment to activated magnetic nanocomposite.  
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35 Figure 5: Thermostability of free and immobilized lipase. Data are represented as the mean  $\pm$   
36 standard deviation of three replications.  
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### 40 **3.7. Effect of pH on lipase activity**

41  
42 Immobilization of enzyme may attribute to the conformational changes of enzyme resulting in a  
43 variation of optimum pH. According to the present observation free as well as immobilized  
44 lipases remained stable in the pH range from 4 to 7. pH 8 onwards immobilized lipase retained  
45 activity, while free lipase started deactivating (Figure 6). This higher stability of immobilized  
46 lipase may be due to the bonding between enzyme and activated magnetic nanocomposite, which  
47 prevent the denaturation of enzyme at basic pH [14].  
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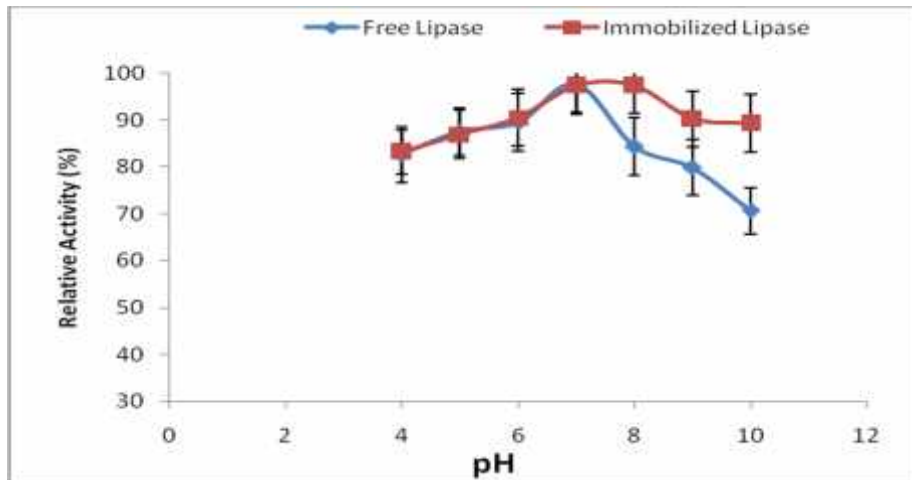


Figure 6: Effect of pH on free and immobilized lipase. Data are represented as the mean  $\pm$  standard deviation of three replications.

### 3.8. Kinetic parameters of free and immobilized lipases

The kinetic constants  $V_{max}$  and  $K_m$  were calculated from the double reciprocal plots shown in Figure 7. Free lipase showed  $K_m$  values of 0.4mM and  $V_{max}$  1.5 U/mg, while immobilized lipase had  $K_m$  value of 0.27 mM and  $V_{max}$  1.4 U/mg. The decrease in  $k_m$  value showed that immobilization had increased the affinity of enzyme for the substrate, which was in agreement with those obtained previously [15][16]. In general,  $V_{max}$  values of enzymes exhibit a decrease on immobilization; which is in accordance with the other similar results [15].

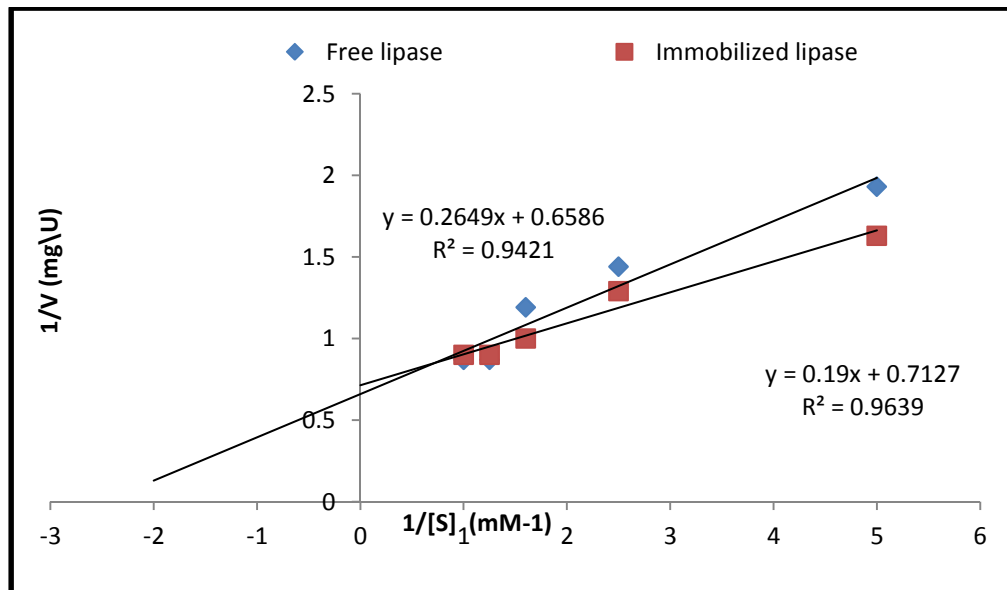


Figure 7: Lineweaver-Burk plots for free and immobilized lipase

### 3.9. Synthesis of biodiesel by free and immobilized lipases

The capacity of the immobilized and the free lipases to catalyze biodiesel synthesis in solvent free system was investigated (Figure 8). The results showed that a higher percentage conversion of 80% was obtained with the immobilized lipase; however, the conversion percentage does not exceed 28% using the free lipase after 30h of reaction time. This result was found to be improved than those earlier reported ones [17]. The enhanced efficiency of immobilized lipase for biodiesel synthesis may result from multipoint attachment between lipase and the activated nanocomposite, which prevents distortions of enzymes in reaction mixture.

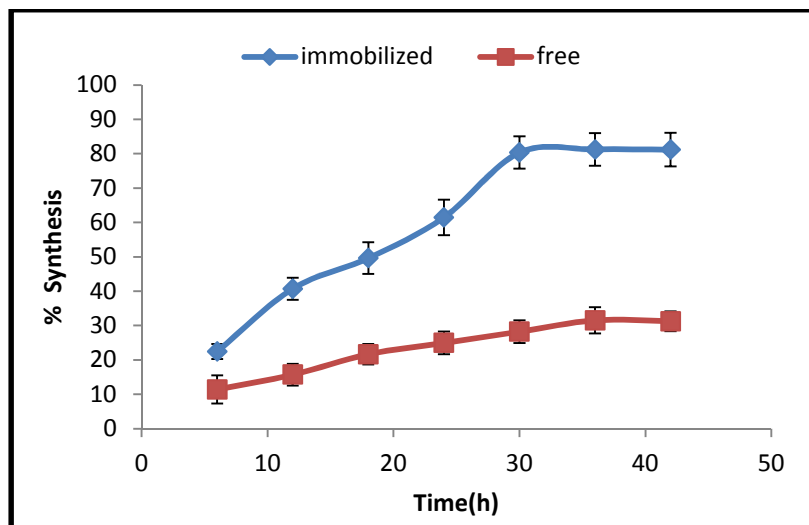


Figure 8: Biodiesel synthesis with free and immobilized lipase. Data are represented as the mean  $\pm$  standard deviation of three replications.

### 3.10. Operational stability of immobilized lipases

As a potential industrial enzyme, operational stability of the immobilized lipase is very important parameter for the economy of the process. Immobilized lipase could be reused up to five cycles, with almost 90% retention of its original activity (Figure 9), which is found to be improved when compared with the other reports[18][19][20]. The good operational stability may be due to the strong interaction between enzyme and the matrix. The strong interaction can be further attributed to the formation of Schiff's base between free aldehyde groups of glutaraldehyde treated nanocomposite and the side-chain amino groups of the enzyme. Significant stability of lipase immobilized on nanocomposite in organic solvent ensured good reuse capacity for biodiesel synthesis.

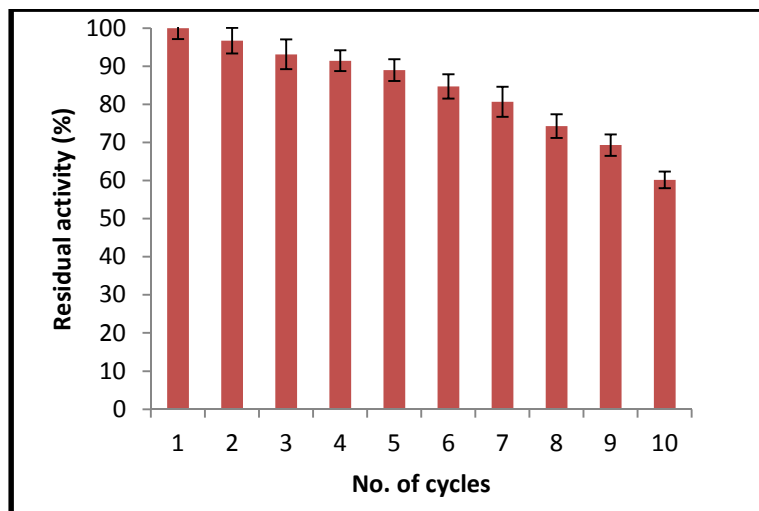


Figure 9: Operational stability of immobilized lipases for biodiesel synthesis. Data are represented as the mean  $\pm$  standard deviation of three replications.

### **Conclusion:**

Immobilization of lipase has been attempted successfully on polyaniline (PANI)- $\text{Fe}_3\text{O}_4$  magnetic nanocomposite activated with ethanolamine followed by cross linking with glutaraldehyde. Immobilization has been carried out using adsorption technique that causes less damage to the catalytic activity of the enzyme. In the present investigation it has been seen that the immobilized lipases exhibited quite improved tolerance against thermal denaturation than free forms. The use of thermostable enzymes in chemical reactions to be performed at higher temperature leads to completion of reaction in shorter times. The immobilized lipases also showed enhanced activities for biodiesel synthesis than free forms, which undoubtedly explain the rationale for using immobilized lipase in organic synthesis. Furthermore, the immobilized lipase also exhibited quite well operational stability for biodiesel synthesis. Altogether, these results confirmed that the polyaniline (PANI)- $\text{Fe}_3\text{O}_4$  magnetic nanocomposite is a potential support in the enzyme immobilization technology especially for catalyzing reactions in organic media.

### **Consent for publication**

Not applicable.

### **Funding**

None.

### **Conflict of interest**

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4 The author declares that there is no conflict of interest, financial or otherwise.  
5

### 6 **Acknowledgements**

7  
8 Authors Dr. Annapurna Jha and Manohar Patil are greatly thankful to the Department of  
9  
10 Chemistry, Jamshedpur Women's College, Jamshedpur and Nano-Chemistry Research  
11  
12 Laboratory, G.T.P. College, Nandurbar respectively for providing the necessary facilities.  
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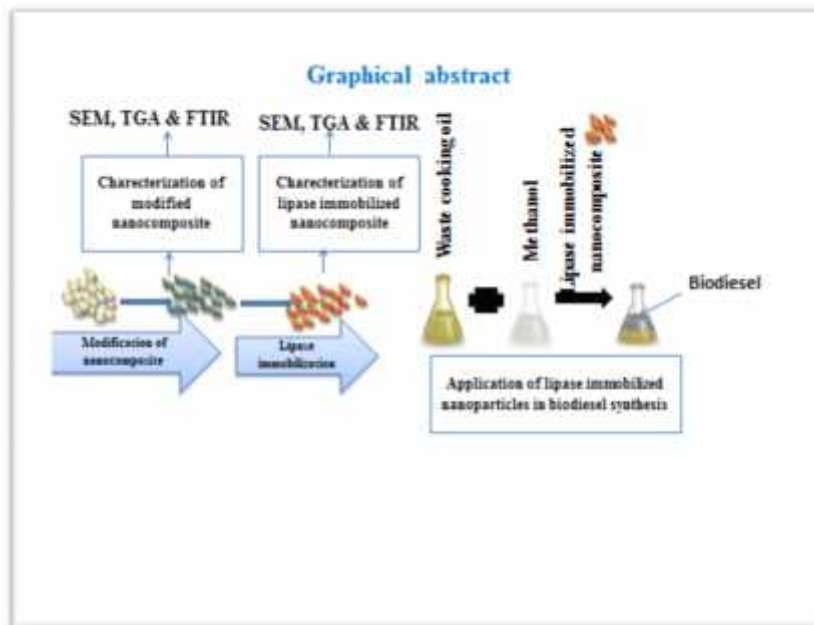
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Declaration of interests.pdf



## Research Highlights

- Lipase has been immobilized on magnetic nanocomposite (modified polyaniline (PANI)-Fe<sub>3</sub>O<sub>4</sub> magnetic nanocomposite) which can be easily separated from the reaction medium by magnetic separation.
- SEM was carried out to study the morphology of modified nanocomposite with and without immobilized lipase.
- Modified nanocomposites with and without immobilized lipase were also characterized with Thermogravimetric analysis (TGA) and Fourier Transform Infrared (FTIR) Spectroscopy.
- Immobilized lipase was found to be more thermostable than its free form.
- The optimum pH and temperature for the immobilized lipase on modified polyaniline (PANI)-Fe<sub>3</sub>O<sub>4</sub> magnetic nanocomposite were also studied.
- The conversion yield of biodiesel was found to be 80% with the lipase immobilized on modified polyaniline (PANI)-Fe<sub>3</sub>O<sub>4</sub> magnetic nanocomposite while it was only 28% with free lipase.



**Synthesis of Magnetic Nano Sized Cobalt Ferrite Thin Film by  
Chemical Bath Deposition Method and their Photocatalytic  
Application for Removal of Congo red Dye**

**Manohar R. Patil<sup>1\*</sup> and Annapurna Jha<sup>2</sup>**

1. Nano-Chemistry Research Laboratory, G.T.P. College, Nandurbar-425412, **INDIA**

2. Jamshedpur women's college Bistupur Jamshedpur-831004, **INDIA**

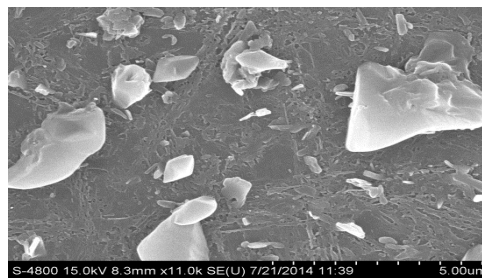
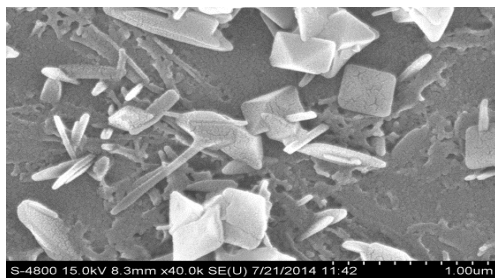
Email: [profmanoharpatil@gmail.com](mailto:profmanoharpatil@gmail.com)

Accepted on 1<sup>st</sup> July, 2018

**ABSTRACT**

The present investigation report is a novel method for the removal of Congo red (CR) dye from an aqueous solution. In present investigation cobalt ferrite ( $\text{CoFe}_2\text{O}_4$ ) thin film was deposited on glass substrate by using chemical bath deposition method. It was successfully prepared while nanostructure of thin film was confirmed by SEM and XRD characterization method. The magnetic property of the film was confirmed by VSM (Vibrating sample magnetometer). The average crystal size calculated by Scherrer formula from XRD analysis is 28 nm. Prepared thin film was then applied for photocatalytic degradation of Congo red dye by dipping it in aqueous solution. Different parameters like contact time, different initial conc. and pH have been studied to optimize reaction condition. The optimum conditions for the removal of the dye are initial concentration  $30 \text{ mg L}^{-1}$ , contact time 120 min and pH 7.

**Graphical Abstract**



SEM micrograph of prepared  $\text{CoFe}_2\text{O}_4$  thin film

**Keywords:** Congo red dye, cobalt ferrite, SEM and XRD, VSM.

## INTRODUCTION

Azo dyes are synthetic dyes, having an azo group (-N=N-) in the structure. Azo dyes are commonly utilized for dyeing textiles and leather. Some azo dyes may engender carcinogenic aromatic amines under certain conditions [1]. Most of those colored dyes are synthetic in nature and are conventionally composed of aromatic rings in their molecular structure, which makes them carcinogenic, mutagenic, inert, and non-biodegradable when discharged into aqueous streams without felicitous treatment. Therefore, the abstraction of such colored agents from the polluted aqueous stream is very exigent predicated on the point of human health and environmental resource auspice [2, 3].

Chemical bath deposition (CBD) is a very simple method has been used for preparation of Nano thin films. In this method only important thing is to maintain proper condition for the preparation of thin films. Several researchers have been using this method for the preparation of Nano thin films [4-10].

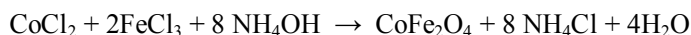
Photocatalytic degradation of organic pollutants especially dyes are carried out using catalyst in powder form. But during the recovery of this catalyst after experiment loss takes place. To overcome this shortcoming best alternative is use of thin film for the degradation of dyes. By using thin films several researchers have carried photocatalytic removal of pollutants [11-16]. But in this report we have used magnetic nano thin film which is very different from other researcher work.

## MATERIALS AND METHODS

All chemicals used were analytical grade. The stock solution 1000 mgL<sup>-1</sup> of dye was prepared in distilled water. 100 mL of dye solution of the desired concentration was prepared from stock solution. In 100 mL of Congo red dye solution of a different concentration prepared thin film is dipped. Then dipped thin film, dye solution was irradiated with mercury lamp to provide energy to excite CoFe<sub>2</sub>O<sub>4</sub> thin film molecule in the reactor. At specific time intervals suitable aliquot of the sample is withdrawn and analyzed after centrifugation. The changes of dye concentration are determined by UV-Visible double beam spectrophotometer (Systronics model-2203) at λ max 510 nm in our laboratory.

**Synthesis:** Alkaline bath for cobalt ferrite thin films was prepared by A.R. grade chemicals using double distilled water. Bath consist of 0.1 M solution of CoCl<sub>2</sub> 6H<sub>2</sub>O and 0.2 M solution of FeCl<sub>3</sub> 6H<sub>2</sub>O. These salts were used as source of Co<sup>+2</sup> and Fe<sup>+3</sup> ions by adding NH<sub>4</sub>OH solution made the bath alkaline up to pH-11. The deposition of film was carried out on glass substrate. The glass substrate etched with 2 % dilutes HCl for approximately 20 Sec and ultrasonically cleaned with double distilled water. Finally substrate was dried in air.

The washed and dried glass substrate was immersed in combined alkaline cobalt (II) chloride and iron (III) chloride solution bath. When bath attains the temp of 70°C the precipitate of mixed solution was settled. During the precipitation heterogeneous reaction occurred on the substrate and deposition of cobalt ferrite takes place on the substrate. The film formation started after about 10 min and completed in 120 min at 70°C. Cobalt and iron hydroxides adsorbed onto the substrate during the process.



Then this film is dried in hot air and annealed at 500° C for 4 h to form pure cobalt ferrite with cubic Spinel phase, removing any hydroxide content and complete crystallization of the film takes place.

## RESULTS AND DISCUSSION

**X-ray Diffractometry (XRD):** The XRD diagram of  $\text{CoFe}_2\text{O}_4$  is as shown in fig-1. It shows main peak at  $35.58^\circ$  and subsidiary peak at  $43.73^\circ$ ,  $64.45^\circ$ . It shows match scan with JCPDS card NO-221086 at radiation of  $1.54 \text{ \AA}$ . The intensity of peaks indicates the crystallinity of  $\text{CoFe}_2\text{O}_4$ . The average particle size of  $\text{CoFe}_2\text{O}_4$  is estimated by Scherer formula is 28 nm.

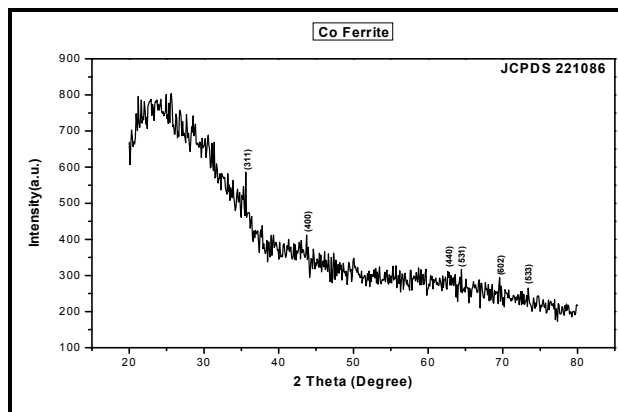


Figure 1. XRD analysis of prepared  $\text{CoFe}_2\text{O}_4$  thin film.

**Scanning electron microscopy (SEM):** The  $\text{CoFe}_2\text{O}_4$  Nano thin film is analyzed by SEM before fig 2(a) and after photocatalytic degradation of CR dye is shown in the fig 2(b). It shows SEM micrographs of  $\text{CoFe}_2\text{O}_4$ . Fig-2(a) shows surface texture and whitish cluster on  $\text{CoFe}_2\text{O}_4$  thin film. It has homogeneous surfaced, some microspores as seen from its surface micrographs. It is black-whitish in color, Fig-2 (b) shows after photo degradation of CR on  $\text{CoFe}_2\text{O}_4$  surface. The thin film surface is similar to before photocatalytic degradation.

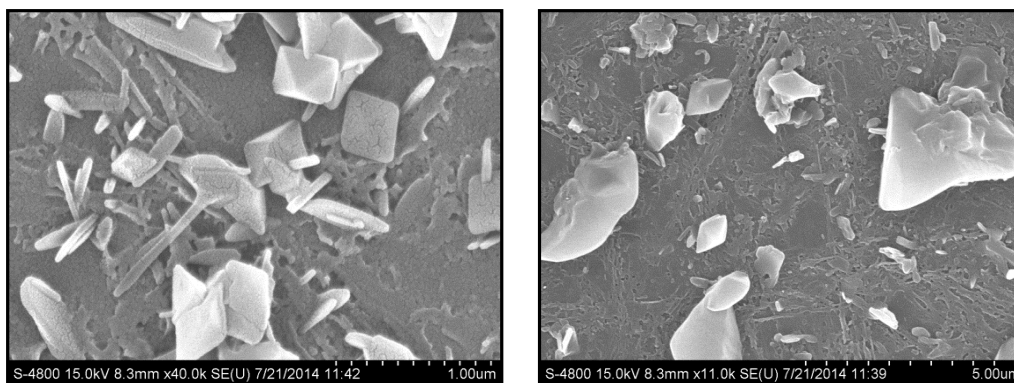


Figure 2. (a) and (b) SEM micrograph of prepared  $\text{CoFe}_2\text{O}_4$  thin film

**Vibrating sample magnetometer (VSM) Analysis:** The magnetic property of  $\text{CoFe}_2\text{O}_4$  Nano thin film was analyzed at R.T by VSM (Vibrating sample magnetometer) at an applied field of 10,000 Gauss. The value of saturation magnetization is  $36.5 \text{ emu g}^{-1}$ . It is shown in the curve of the fig 3. So this magnetization curve of the sample shows a ferromagnetic behavior, with hysteresis. The magnetic property of nanocomposite is dependent on the sample shape, crystallinity; therefore it can be adjusted to obtain optimum property.

**Parametric Studies:** The photocatalytic degradation of Congo red dye was studied at  $\lambda$  max 510 nm. The utmost condition for removal of dyes is  $30 \text{ mg L}^{-1}$ , pH 7 and prepared  $\text{CoFe}_2\text{O}_4$  thin film. The results obtained during this study are represented in (Fig 4-6).

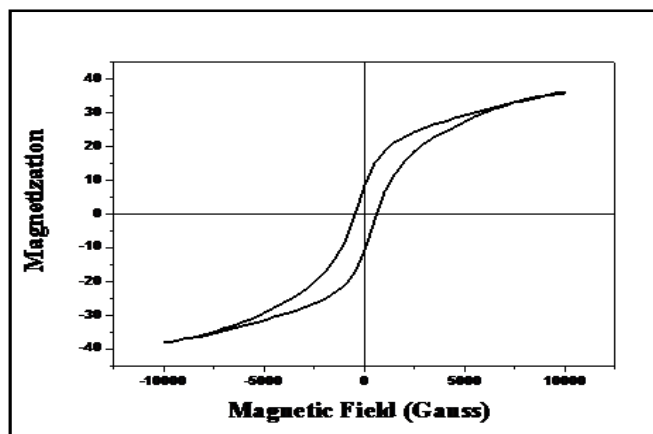


Figure 3. VSM analysis of  $\text{CoFe}_2\text{O}_4$  Nano thin films (Hysteresis loop).

**Effect of pH:** The photocatalytic degradation of Congo red dye was studied at different pH values as it is an important parameter for reaction taking place on the particular surface. The role of pH in photocatalytic degradation of dye was studied in the pH range 0-11 at dye concentration  $30 \text{ mg L}^{-1}$ . It is observed that the rate of photocatalytic degradation enhanced with an increase in pH up to 7 as shown in the (Fig-4). As the pH increases, dye surface becomes basic. In this basic form it forms a bond with  $\text{CoFe}_2\text{O}_4$  thin film. When the pH increases onwards 7 the repulsion of the dye molecules by  $\text{CoFe}_2\text{O}_4$  surface would result in reduction in efficiency of degradation of CR.

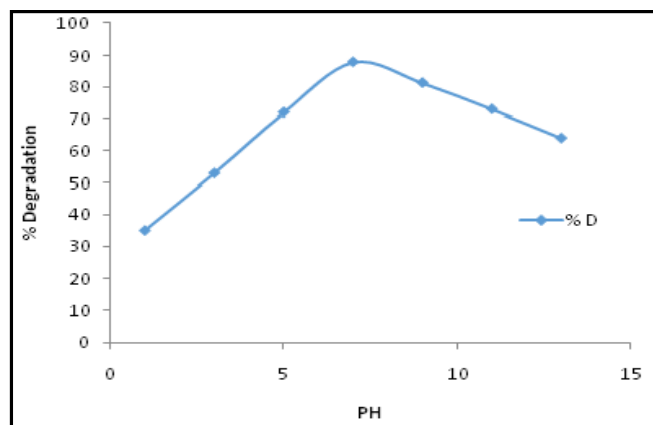


Figure 4. Effect of pH on removal of Congo red dye by  $\text{CoFe}_2\text{O}_4$  thin film.

**Effect of initial dye concentration:** The rate of degradation of Congo red dye was studied by varying the dye concentration from 10 to  $100 \text{ mg L}^{-1}$  because of fixed catalyst concentration active sites remains the same. With the increase of the initial Congo red concentrations, the Congo red molecules get accumulated on the surface of  $\text{CoFe}_2\text{O}_4$  thin film. However, quenching between these excited Congo red molecules irradiated by visible light will takes place. The quenching probability could also increase with the increase of the initial Congo red concentrations. Consequently, the photocatalytic efficiency of the Congo red dye solution was decreased with the increase of the initial Congo red concentrations is shown in the (Fig 5).

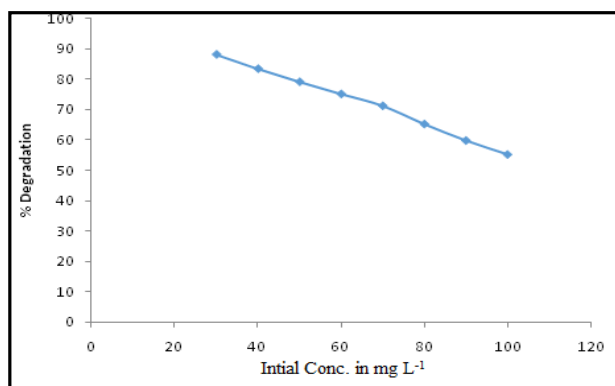


Figure 5. Effect of initial concentration of Congo red dye on % degradation at pH 7.

**Effect of contact time:** The effect of contact time for the photocatalytic degradation of CR dye by  $\text{CoFe}_2\text{O}_4$  thin film as shown in the (Fig 6). The dye is slowly degraded in first 30 min and then degradation rate increases rapidly and reaches equilibrium in about 130 min. The rate of degradation of dye is initially slow because the surface of  $\text{CoFe}_2\text{O}_4$  thin film is not efficiently activated, as the thin film surface get activated rate of degradation of dye increases rapidly.

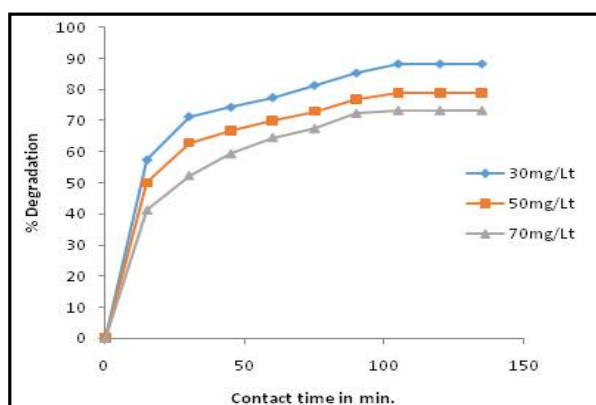


Figure 6. Effect of contact time on % degradation of Congo red at pH 7.

## APPLICATION

The results indicate that this magnetic nano thin film has great potentials to be used as water purification media, where the potential of this material can be further modified to increase its degradation capacity towards targeted compounds. So this magnetic nano thin film can be successfully applied for the removal carcinogenic Congo red dye from an aqueous solution.

## CONCLUSIONS

Azo dyes are one of the major contaminants present in industrial wastewater. It enters the environment when released through waste water and exerts detrimental effects on flora and fauna. The proposed nanomaterial found to be useful for the waste water purification. The prepared magnetic nano thin film was successfully applied for the removal carcinogenic Congo red dye from an aqueous solution. This magnetic nano thin film has great potentials to be used as water purification media, where the potential of this material can be further modified to increase its degradation capacity towards targeted compounds.



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NANDURBAR TALUKA VIDHAYAK SAMITI'S  
**G. T. PATIL ARTS, COMMERCE AND SCIENCE COLLEGE,**  
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DST FIST Identified College

Awarded "Excellent College" By North Maharashtra University, Jalgaon 2014

● **GOLDEN JUBILEE YEAR 2014-15** ●

Prof. Dr. V. S. Shrivastava  
Ph.D. Post. Doct. (S.America)

**Principal**

Office: (02564) 222293, 226534  
E-mail: gtpcollege@rediffmail.com  
drvinod\_shrivastava@yahoo.com  
Web: www.nvsgtpcollege.org

Date: 05/03/2018

To,  
The Personnel Manager,  
Neelikon Food Dye and Chemical Ltd.  
Dhatav, Dist- Raigad.

**Subject : About Industrial Visit....**

Dear Sir

With reference to above mentioned subject, I request you to kindly permit our T.Y.B.Sc. (Chemistry) students to visit your industry as it is included in their syllabus.

Please do the needful.

No. of students: 33

No. of Faculty: 03

Yours Sincerely

  
(Principal)



G. T. Patil , College Nandurbar.

INDUSTRIAL TOUR REPORT

T.Y.B.Sc. Chemistry 2017-18

Student Name : PATIL GAURAV PRALHAD

Roll No. : 132

Seat No. : 351803

Guided By : Prof. P.S.Patil

Dr. S.P.Patil

21.3.18

# **NEELIKON FOOD DYES AND CHEMICALS LTD.**

## **OVERVIEW OF THE TRIP**

**G. T. PATIL COLLEGE NANDURBAR** had organized an industrial visit on 8<sup>th</sup> March 2018 to **NEELIKON FOOD DYES AND CHEMICALS LTD. ROHA** 120 km from Mumbai for the students of **T. Y. B. Sc. Chemistry**.

### History

Neelikon Dyestuffs was founded in 1983 by Mukund Turakhia and was incorporated into the present company in 1994, as Neelikon Food Dyes and Chemicals Ltd. Neelikon manufactures colours from its plants in Dhatav, ( roha around 120 km from Mumbai (formerly Bombay) and manages its business from its head office in Mumbai, India.

Neelikon has emerged as a prime manufacturer of high quality dyes, pigments & lakes for food, pharmaceutical, cosmetic, personal care, home care, stationary and inkjet ink industries. It also produces specialty fluorescent dyes used in manufacturing of daylight fluorescent pigments and other specialty industrial applications. The majority of its production is exported around the world. Neelikon is regarded as one of the top three producers in the world for food colours, cosmetic pigments and fluorescent dyes.

- Neelikon colours are sold in more than 100 countries.
- Neelikon is an ISO 9001 : 2008, FSSC 22000 (ISO 22000 + PAS220) & GMP Certified Company
- Neelikon colours are: Halal, Kosher, ISI & Non-GMO certified.
- Neelikon is REACH compliant.

### People

Neelikon's emergence as a major dye producer is attributed to its Managing Director, Mukund Turakhia. Mr. Turakhia is a renowned Chemical Engineer, with a 50-year association in the dyestuffs and chemical industry. He was responsible for introducing indigenous technology for the production of food dye in India in 1973-1974. For this, he was presented a National Award from the President of India. He has also received the Highest Export Award from CHEMEXCIL - A Government of India Export Promotion Council, for the export of Synthetic Indigo Dye (1977-1978).

### Research

At Neelikon, Research & Development is a continuous process, for better quality and a wider product range. The R&D drive at Neelikon has borne rich fruits. It has enabled Neelikon to introduce many products for the first time from the Asian market. In-house technology and manufacturing allows Neelikon to provide:

- Consistent quality and regular supply
- Technical back-up to meet specific customer requirements
- A product that anticipates potential regulatory changes and meets regulatory requirements, by constantly exceeding quality and purity standards
- Constant new product development, to meet specific customer requirements
- Competitive prices

Neelikon has also made the quantum leap in becoming a major producer of lake and US FDA certified FD&C and D&C dyes and lakes. It is one of the few companies outside of North America that produces food, pharmaceutical and cosmetic colours that meet the regulations laid down by the US Food & Drug Administration (FDA). Neelikon has a very successful record of certification from US FDA since more than 25+ years.

## Achievements

Neelikon is regarded as one of the top three producers in the world for food colours, cosmetic pigments and fluorescent dyes. The company is awarded by SICOM and Lalit Doshi Memorial Additional Award for outstanding performance for year 2004-2005.

The company has also been awarded as the Best Manufacturer-Exporter Award at the ECGC – D&B Indian exporters Excellence Award 2012.

## Quality

Along with pursuing technological excellence, it is Neelikon's philosophy to never compromise on quality. The company has a state-of-the-art laboratory with highly qualified and experienced chemists. Neelikon maintains strict quality checks for all its products. Every order has highly specialized product features and may differ to a varying degree in physical appearance, powder size, pH of 1% solution, etc. The company maintains proper records for each of its clients and ensures that the products meet such specific customer requirements. For the Lakes, Neelikon has developed an in-house testing procedure, which allows each batch to be accurately matched with standards for shade and colour strength.

Testing parameters and procedures are in concurrence with the legislation of the different countries e.g.

- Europe (EC),
- US FDA (CFR),
- JECFA (WHO),
- FCC (Food chemical CODEX),
- Japan,
- BIS (India),
- EN 71/3 for 19 trace elements
- and any country whose specifications may be different than the ones stated.

Neelikon has a state of the art instrumentation laboratory with latest instruments like

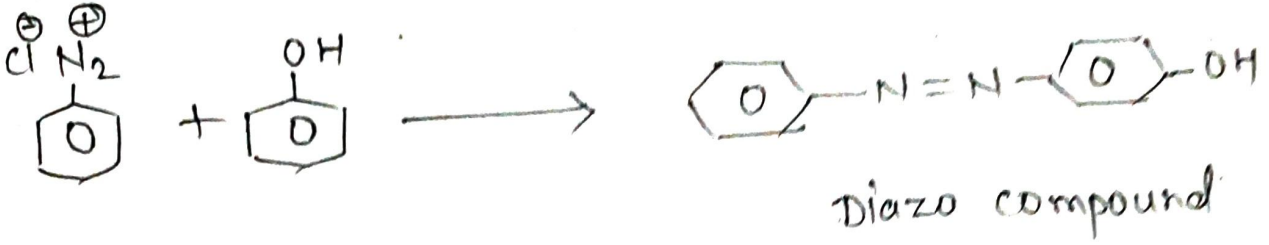
- HPLC (High Performance Liquid Chromatography),
- ICP-OES (Inductively Coupled Plasma Optical Emission Spectrometer),
- UV Visible Spectrophotometer,
- Colour Matching Spectrophotometer,
- Particle Size Analyser,
- Gas Chromatography,
- Ion Chromatography.

The Company has a well-equipped micro biological laboratory with all the latest equipment. Thus the company has all required laboratory facilities in house to test all physical, chemical and micro-biological parameters. Neelikon has an enviable track record with US FDA for 25+ years.

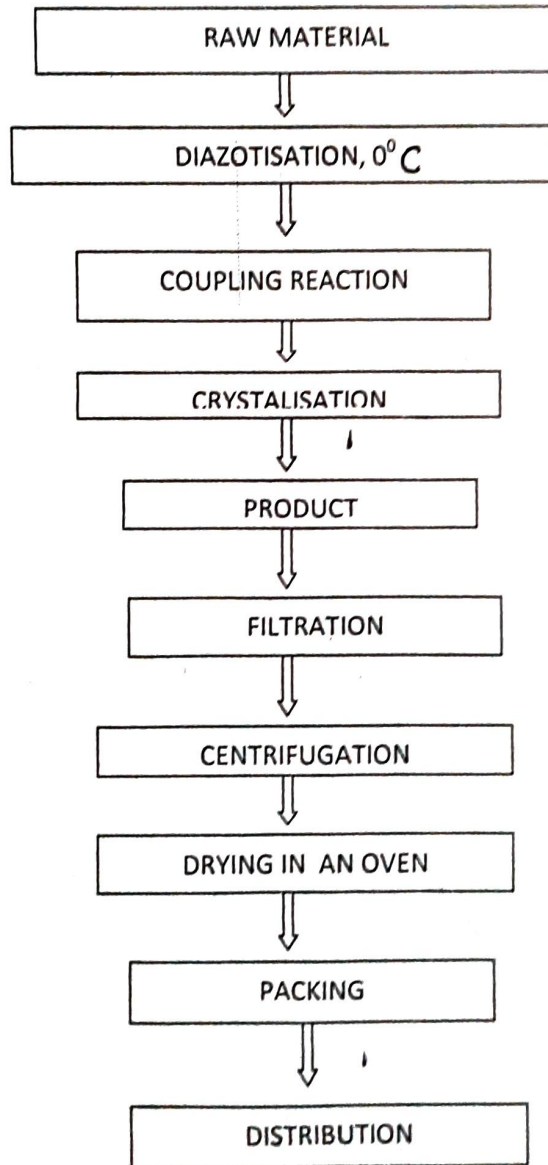
## Distribution

In 1990, Neelikon began colouring the globe, when it started exporting 'Neelicol' brandwater-soluble food Colours. Neelikon is strengthening its presence in India and the world market by associating with organizations, which have shared ideals and aspirations. Today, the majority of its production is exported all around the world. In order to broaden its base, Neelikon has established a network of agents and distributors in many international markets and is expanding its home market in India. Every agent and distributor is carefully chosen to serve customer requirements effectively and efficiently.

B) COUPLING



3) FLOW SHEET



## 4) DESCRIPTION

### a) Raw materials

Raw materials used for azo dye are phenol, aniline,  $\text{NaNO}_2$ ,  $\text{HCl}$ , Ice.

Raw materials are stored in store room.

### b) Diazotization reaction

Aniline is treated with sodium nitrite and  $\text{HCl}$  at  $0$  to  $5^\circ\text{C}$  to form diazo salt.

### c) Coupling reaction

Diazo salt is coupled with phenol to form corresponding dye as shown above in reaction.

### d) Crystallization

The product is allowed to crystallize of a suitable size crystals.

### e) Filtration

The crystals are filtered from mother liquor by centrifugation technique.

### f) Drying

The crystals are dried in an oven and then pulverised to powdered form. The iron impurities in powdered form are removed by magnetic separation method.

### g) Packaging

Neelikon Colours are available in a variety of packaging options, all made from the finest quality material, in order to ensure that they are sea-worthy and safe for export as well as local transportation.

Packaging options vary from 0.50 (half) kg, 1 kg, 5 kg, 12.50 kg, 25 kg.

Neelikon is flexible to support distributors and customers with convenient packing options in terms of weight and type of packaging material.

Neelikon can also supply colours pre-packed into specific weighed packs which are ready for direct use into the final product formulation.

## h) Distribution

In 1990, Neelikon began colouring the globe, when it started exporting 'Neelicol' brandwater-soluble food Colours. Neelikon is strengthening its presence in India and the world market by associating with organizations, which have shared ideals and aspirations. Today, the majority of its production is exported all around the world. In order to broaden its base, Neelikon has established a network of agents and distributors in many international markets and is expanding its home market in India. Every agent and distributor is carefully chosen to serve customer requirements effectively and efficiently.

# Thank you

  
Student sign.

  
**D.D.C.P. Sawant**  
Head  
P.G. Department (HOD)istry,  
G.T.P. College Nandurbar



Jorbiale

Students Name	Parents Name.	S.No.
(16) palit Bharti vasant	palit vasant ratan	S.No. 88860
		P.No. 9612890
(17) more Rahul ashok	Ashok	S.No. 91466
		P.No.
(18) Talvi Chandrasing magya	magya	S.No. 94209
		P.No.
(19) padvi Arvind fulsing	fulsing	S.No. 70267
		P.No.
(20) Bonamane Krishna		
21) Tapase Jayesh Ananda		
22) Mali Dipak Bhagwan		
23) Masathe Peakash Nimba		

Industrial Tone 2017-18  
Dept. of Chemistry

Page No.

Date:

mobile no.

Students Name	parent's name	mobile no.
1) Girase Vaadhman j	gaising Chandrasing Girase	S.No. 8380871724 P.No. 9657304717
2) sunil Dhanraj patil	Dhanraj Govinda patil	S.No. 8412842217 P.No. 9168297902
3) Girase pravin Chhotu	Chhotising gulabising girase	S.No. 8600939208 P.No. 9960093957
4) Maithal Rahul vijay	vijay Jaxman maithal	S.No. 9822206541 P.No. 8390260226
5) suyandashi Dnyaneshwar totan	totan Devidas suyandash	S.No. 8698936825 P.No. 7798028950
6) kalpesh madhav mali	madhav dalpat mali	S.No. 8190935122 P.No. 7020154033
7) Girase mayuresing phalati	Bhatrasing Rajesing Girase	S.No. 7083914699 P.No. 99750058699
8) <del>swapnil</del> swapnil patil Bharat	Bharat hilal patil	S.No. 83087900702 P.No. 89657520349
9) Thatat Nilesh Devidas	devidas Dashrath Thatat	P.No. 9767815347 P.No. 7588102296
10) patil gaurav pralhad	patil pralhad Rajaram	S.No. 8806781091 P.No.
11) patil manish aijun	Aijun vitthal patil	S.No. 7507307879 P.No.
12) Soni Vijay Suresh	Soni Prathibha Aeus	S.No. 9764178084 P.No. 9421281118
13) Muralthe sagar Rajesh	Rajesh sudam muralthe	S.No. 8275348963 P.No. 9420100150
14) Valvi asvind dasu	dasu paasha Valvi	S.No. 7066567538 P.No. 8788618672
15) patil Chandrakant Rajendra	Rajendra Chaitram patil	S.No. 7882857819 P.No. 8698881016

# Industrial tour 2017-18

T.Y. BSc (Chemistry)

Page No.

Date:

Name	Father Name	Mob. No.
i) Patil Swati Chandu	Chandru Motiram Wase	8552986090 (Father) 967380084
ii) Patil Bhagyshri Suresh	Suresh Bhiram Patil	8308452945 (Father) 9552833141
iii) Desai Trupti Babau	Babau Naudev Desai	8275590425 (Father) 9637097809
iv) Patil Gayatri Rajendra	Rajendra Motiram Patil	9922426062 (Father) 7057862535
v) Patil Savana Navnath	Navnath Patil	7507210097
vi) Patil Chaitali Ravindra	Ravindra Patil	8007138711
vii) Rathod Jyoti Dilip Singh	Dilip Singh Rathod	7038766654
viii) Patil Priti Sureshram	Sureshram Rajaram Patil	9657050226 (Father) 8007305956
ix) Patil Pratishtha Bhagat	Bhagat Kashinath Patil	<del>9657050226 (Father)</del> 9168327703 9763373881
x) Kapade Ujjwala Kailas	Kailas Jaynath Kapade	7212556559 9420852471

## RESEARCH COLLABORATION

This **RESEARCH COLLABORATION** is entered into, on this date 30 /09/2019.

### BETWEEN

**NTVS's G. T. Patil Arts, Commerce and Science College, Nandurbar-(425412)** represented herein by Principal, Prof. V. S. Shrivastava (hereinafter, referred as '**First Party**', include its successors – in-office, administrators and assigns).

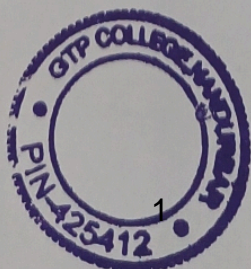
### AND

**Bhusawal Arts, Science and P.O. Nahata Commerce College Bhusawal-425201**, represented herein by Principal, Prof. Minakshi V. Waykole (hereinafter, referred as '**Second Party**', include its successors – in-office, administrators and assigns).

(First Party and Second Party are hereinafter jointly referred to as '**Parties**' and individually as '**Party**')

**NOW THEREFORE, IN CONSIDERATION OF THE MUTUAL PROMISES SET FORTH IN THIS MoU, THE PARTIES HERETO AGREE AS FOLLOWS:**

- **Project-Based Learning**: First Party shall design project-based activities especially for Science, Technology, Engineering and Mathematics (STEM) subjects for students of Second Party helping them excel in these subjects.
- **Training**: First Party shall design modules for training on recent technologies and share knowledge with teachers and students of Second Party.
- **Career Counseling**: First Party shall conduct exclusive sessions with students of Second Party on futuristic careers in the fields of Science & Engineering, Commerce & Management, Pharmacy, etc.
- **Student Connect**: Second Party shall share student details with First Party for one-to-one interaction and guidance on projects, models, skill development, career enhancement etc.
- **College Tour**: Get students of Second Party to experience a guided tour to campus, colleges, classrooms, laboratories, libraries, etc. of First Party.




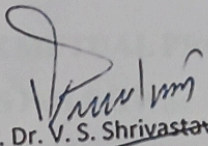
- **Newsletters:** Students of Second Party shall have access to newsletters of First Party.
- **Events:** Students of Second Party will be regularly invited to be part of knowledge-based events and activities of First Party.
- **Resource Sharing:** Teachers and Students of Second Party will have access to online repositories of First Party for educational purpose.
- **Partner:** Parties may mention as Partner on their website.
- **Alumni Connect:** First Party shall help to connect Alumni of both Parties.
- **Validity:** This Collaboration shall be valid for 5 years from the September 2019 and each party shall be at full liberty to terminate the collaboration with mutual consent.
- **Free of Cost:** The services herein are free of cost for education purpose.

For  
Bhusawal Arts, Science and P.O. Nahata  
Commerce College Bhusawal-425201

For  
NTVS's G. T. Patil Arts, Commerce and  
Science College, Nandurbar-425412

Signature:

  
**PRINCIPAL**  
Bhusawal Arts, Science and P.O. Nahata  
Commerce College, Bhusawal

  
(Prof. Dr. V. S. Shrivastava)  
Principal  
**PRINCIPAL**  
G.T.Patil Arts, Commerce &  
Science College  
MANDURBAR - 425 412 (M.S.)

Name: Prof. Minakshi V. Waykole

Name: Prof. V. S. Shrivastava

Designation: Principal

Designation: Principal

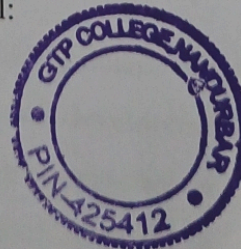
Date:30/09/2019

Date:30/09/2019

Seal:



Seal:





**NANDURBAR TALUKA VIDHAYAKSAMITI'S**  
**G.T.PATIL ARTS, COMMERCE AND SCIENCE COLLEGE,**  
**NANDURBAR, DIST-NANDURBAR-425412 (M.S.)**

NAAC Re-Accredited 'A' Grade (CGPA 3.10)

DST FIST Identified College, ISO 9001:2008 Certified

Awarded "Excellent College, 2014" By North Maharashtra University, Jalgaon

**Prof. Dr. V. S. Shrivastava**  
Principal

Office: (02564) 222293

E-Mail: gtpcollege@rediffmail.com

Web: www.ntvsgtpcollege.org



### Activity / Programme Report

Academic Year: 2018-2019

1	Name of Activity/Programme	field work/Study Tour
2	Date And Time	26 <sup>th</sup> and 27 <sup>th</sup> February, 2019
3	Visit Place	Devmogra, Sardar Sarovar Dam, Kuber Bhandar and Poicha, Gujarat, India
4	Site Description	Field trips serve one vital function as far as education is concerned. Field trips link the classroom experience with the outside world in so doing they not only improve learning, but also give both the students and educators valued practical experience. The field trip we took the students was an interesting one judging by the varied lessons that we had to receive.
5	Aims of the Activity	Field visit helps in understanding various geographical concepts elements and process through direct experiences. It improves the process of information gathering, as students are able to step outside their imagined perceptions to collect their experiences as the data for the knowledge founded on interpretation. The trips deal with the spatial relations among data and the time relationships like the cultural history or geological processes.
6	No of students and teachers present	Boys: 21 Girls: 18 Faculty: 02 Total: 43
7	Detail report of the programme /activity	The department of Geography had arranged an educational tour for completing the field work of second and third year B.A / B.Sc students as per kbcnmu curriculum. A few members of our team went to collect some Sardar Sarover data from along with the teacher. The teachers of our college discussed the historical and cultural aspects of Devmogra and Nilkanthdam.Devmogra is a Village in Sagbara Taluka in Narmada District of Gujarat State, India. It is located 46 KM towards South from District head quarters Rajpipla. 14 KM from Sagbara. 249 KM from State capital Gandhinagar Devmogra Local Language is Gujarati. The statue and its surroundings occupy more than 2 hectares (4.9 acres),[citation needed] and are surrounded by a 12 km (7.5 mi) long artificial lake formed by the Garudeshwar weir downstream on the Narmada river.



**NANDURBAR TALUKA VIDHAYAKSAMITI'S  
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Office: (02564) 222293

E-Mail: [gtpcollege@rediffmail.com](mailto:gtpcollege@rediffmail.com)

Web: [www.ntvsgtpcollege.org](http://www.ntvsgtpcollege.org)



**Prof. Dr. V. S. Shrivastava**  
Principal

Photograph of the activity / programme:



**Dr. R. R. Devre**  
Name & Sign of  
organizing Teacher

**Head**  
Department of geography

**Principal**  
G.T.Patil College, Nandurbar



**NANDURBAR TALUKA VIDHAYAKSAMITI'S  
G.T.PATIL ARTS, COMMERCE AND SCIENCE COLLEGE,  
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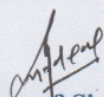
**Prof. Dr. V. S. Shrivastava  
Principal**

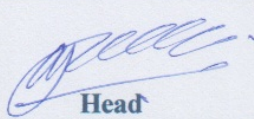
**Office:** (02564) 222293  
**E-Mail:** gtpcollege@rediffmail.com  
**Web:** www.ntvsgtpcollege.org

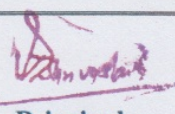
8	<b>Conclusions and Recommendations</b>	The fieldwork enabled the students to understand the topography of the geographical area in conjunction with the population dynamics. It gave a firsthand experience to young geographers in handling and extrapolating geographical data with local realities. It improves the process of information gathering, as students are able to step outside their imagined perceptions to collect their experiences as the data for the knowledge founded on interpretation. Awareness programme should be brought to the local people of the area concerning the agricultural practices and allied activities to safeguard the health of the stream.
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Photograph of the activity / programme:

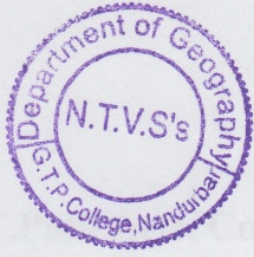


  
**Name & Sign of  
organizing Teacher**

  
**Head  
Department of geography**

  
**Principal  
G.T.Patil College, Nandurbar**





**KAVAYITRI BAHINABAI CHAUDHRI NORTH MAHARASHTRA UNIVERSITY,  
JALGOAN**



**Nandurbar Taluka Vidhayak Samiti's  
G.T.Patil Arts, Commerce And Science College  
Nandurbar, Dist. Nandurbar**

**Department of Geography  
Study Tour Report  
Of**

**Devmogra, Sardar Sarovar Dam, Kuber Bhandar and Poicha,  
Gujarat, India.  
On 26<sup>th</sup> February, 2019**



**Name of Student:-**.....

**Class:-**.....

**Exam, Seat No:-**.....

**Under the Guidance: 1.Prof. S.D.Borse  
2.Prof.R.R.Deore**

*[Signature]*  
Dr. N.S. Pawar  
Head  
Department of Geography

*[Signature]*  
**HEAD**

**Department of Geography & Research Center  
Gajmal Tulshiram Patil College  
Nandurbar - 425412.**

**G.T.Patil Arts, Commerce and Science College Nandurbar, Dist.  
Nandurbar**

**Year:- 2018-2019**

**Department of Geography**

## **CERTIFICATE**

**This is to verify that appreciated Tour Work on the Subject of  
Geography is Completed by**

.....

**As a Partial Fulfillment of the Course**

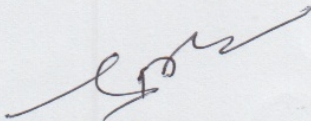
**S.Y./T.Y.B.A S.Y.B.Sc**

**The Tour Report has been completed**

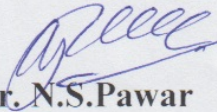
**Under the guidance of**

**Dr. N.S. Pawar & Prof. S.D. Borse**

**During the Academic Year -2018-2019**



**Prof. S.D. Borse**  
(Subject Teacher & Tour in charge)



**Dr. N.S. Pawar**  
Head  
Department of Geography

**G.T.Patil Arts, Commerce and Science College Nandurbar, Dist. Nandurbar**

**Department of Geography**

**Year -2018-2019**

### **PREFACE**

We are very glad to submit this tour report, after excursion in Devmogra, Sardar Sarovar Dam, Kuber Bhandar and Poicha, Gujarat, India. Excursion is a part of Geography study. Field work and observation help to us understanding Geographical facts and their relation with our life.

The excursion is very successful and beneficial because of the guidance and planning of our teacher in charge Prof. S.D. Borse, Prof. R.R. Deore Assistant Professor, Department of Geography.

We are very grateful to Prin. Dr. Prof. V.S. Shrivastav, Dr. N.S.Pawar, Head, Department of Geography, Prof. S.D. Borse , Prof. .F.R. Khandekar, Prof. A.R. Buyar, Prof. M.B. Patil, Prof. R.R. Deore, Prof. K.M. Warude, Dr. S.S. Bhavsar and non teaching staff for their valuable coordination.

Place: Nandurbar

Date: / /2019

**Student Name:** \_\_\_\_\_

**Roll No.** \_\_\_\_\_

**Class:** S.Y.B.Sc

## INDEX

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## **INTRODUCTION**

Geography is fundamental to the study of tourism, because tourism is geographical in nature. Tourism occurs in place, it involves movement and activities between places and it is an activity in which both place characteristics and personal self-identities are formed, through the relationships that are created among places, landscapes and people. Physical geography provides the essential background, against which tourism places are created and environment impacts and concerns are major issues that must be considered in managing the development of tourism places.

Our civilization is greatest in the world because our country is only an example of the unity in diversity. It has also an example of secularism. Men and Women of many religions, castes, sects, living together. So we are proud of its rich and various heritages. It is also glimpses of the cultural variety dressing, food, Language, tradition and custom. All these things are observed and analyzed geographically.

### **Devmogra:**

Devmogra is a Village in Sagbara Taluka in Narmada District of Gujarat State, India. It is located 46 KM towards South from District head quarters Rajpipla. 14 KM from Sagbara. 249 KM from State capital Gandhinagar. Devmogra Local Language is Gujarati. Devmogra Village Total population is 668 and number of houses are 106. Female Population is 50.4%. Village literacy rate is 74.0% and the Female Literacy rate is 36.4%. Devmogra Pin code is 393050 and postal head office is Sagbara. Amiyar ( 7 KM ), Chopadvav ( 7 KM ), Patvali ( 8 KM ), Sagbara ( 9 KM ), Gangapur ( 9 KM ) are the nearby Villages to Devmogra. Devmogra is surrounded by Dediypada Taluka towards west, Akkalkuwa Taluka towards East, Umarpada Taluka towards west, Nandod Taluka towards North. Rajpipla, Songadh, Nandurbar, Vyara are the nearby Cities to Devmogra.

### **Minavada Dashama Temple, Kathlal :**

The temple is situated at minavada kathlal Gujarat. The temple of dashama very much famous in locals. Many devotees visit this temple every year. People have faith on this temple. The temple is situated at minavada kathlal Gujarat. The temple of dashama very much famous in locals. Many devotees visit this temple every year. People have faith on this temple. The temple is famous in locals. Many devotees visit this temple every year. During festival season its best time to visit this temple.

### **About Nilkanth Dham Swaminarayan Temple:**

Nilkanth Dham Swaminarayan Temple is located at Poicha village on the bank of river Narmada which is about 80 kms from Bharuch and 60KM from Vadodara. It is beautiful swaminarayan temple constructed in large area and one of the most amazing pilgrimage attracts people around Gujarat.

You can have divine experience by visiting Sahjanand universe, Nilkanth dham and surrounding. The place is very well connected from Vadodara (Baroda) or Bharuch and can be reached from any of the below routes: The Nilkanthdham Swaminarayan Temple is located in Poicha village near Rajpipla Narmada District in Gujarat. This temple was built in 2013 and built under taken shree vadtal Swaminarayan temple. In The Evening time Nice and attractive Lighting Decoration is most beautiful View temple. Many visitors visit this temple daily. Now a day's Nilkanthdham Dham Built a New Sahjanand University .It is Very Interesting and attractive Place. In this sahjanand University.

A Big Idol of Lord Swaminarayan .The Idol's height is 152Ft.Sahjanand University is Spread 24 Acers land .Sahjanand University Timing is 11:00 Am to 8:00 Pm. The water surrounding the temple makes it outstanding and eye soothing. Aarti and light decoration in the evening makes the place surreal and divine. completely beautiful and the Nilkanth Dham Swaminarayan and to all God's will be in the morning 108 avtar To100% very good condition.

All around the year you can go for visit the Temple. Make sure before you go please conform that the temple is open for visitor incase the temple closed for the any reason.The Statue of Unity is a colossal statue of Indian statesman and independence activist Sardar Vallabhbhai Patel (1875–1950) who was the first Home minister of independent India and the chief adherent of Mahatma Gandhi during the non-violent Indian Independence movement; highly respected for his leadership in uniting the 562 princely states of India to form the single large Union of India. It is located in the state of Gujarat, India. It is the world's tallest statue with a height of 182 metres (597 ft). It is located on a river island facing the Sardar Sarovar Dam on river Narmada in Kevadiya colony, 100 kilometres (62 mi) southeast of the city of Vadodara.



#### FEATURES:

The project was first announced in 2010 and the construction of statue started in October 2013 by Larsen & Toubro, who received the contract for ₹2,989 crore (US\$420 million). It was designed by Indian sculptor Ram V. Sutar, and was inaugurated by Indian Prime Minister Narendra Modi on 31 October 2018, the 143rd anniversary of Patel's birth. The Statue of Unity is the world's tallest statue at 182 metres (597 ft).

It rises 54 metres (177 ft) higher than the previous record holder, the Spring Temple Buddha in China's Henan province.[30] Within India, the record was earlier held by the 41 m (135 ft) statue of Hanuman at the Paritala Anjaneya Temple near Vijayawada in the state of Andhra Pradesh. The statue can be seen within a 7 km (4.3 mi) radius. The monument is constructed on a river island named Sadhu Bet, 3.2 km (2.0 mi) away from and facing the Narmada Dam downstream.

The statue and its surroundings occupy more than 2 hectares (4.9 acres),[citation needed] and are surrounded by a 12 km (7.5 mi) long artificial lake formed by the Garudeshwar weir downstream on the Narmada river. The statue is divided into five zones of which only three are accessible to the public. From its base to the level of Patel's shins is the first zone which has three levels and includes an exhibition area, mezzanine and roof. Zone 1 contains a memorial garden and a museum. The second zone reaches up to Patel's thighs at 149 metres, while the third extends up to the viewing gallery at 153 metres. Zone 4 is the maintenance area while the final

zone comprises the head and shoulders of the statue. The museum in zone 1 catalogues the life of Sardar Patel and his contributions. An adjoining audio-visual gallery provides a 15 minute presentation on Patel and also describes the tribal culture of the state. The concrete towers which form the statue's legs contain two elevators each. Each lift can carry 26 people at a time to the viewing gallery in just over 30 seconds. The gallery is located at a height of 153 metres (502 ft) and can hold up to 200 people

### **Sardar Sarovar Dam**

The Sardar Sarovar Dam is a gravity dam on the Narmada river near Navagam, Gujarat in India. Four Indian states, Gujarat, Madhya Pradesh, Maharashtra and Rajasthan, receive water and electricity supplied from the dam. The foundation stone of the project was laid out by Prime Minister Jawaharlal Nehru on 5 April 1961.

The project took form in 1979 as part of a development scheme to increase irrigation and produce hydroelectricity. The dam was inaugurated by Prime Minister Modi on 17 September 2017. One of the 30 dams planned on river Narmada, Sardar Sarovar Dam (SSD) is the largest structure to be built. It is one of the largest dams in the world.

It is a part of the Narmada Valley Project, a large hydraulic engineering project involving the construction of a series of large irrigation and hydroelectric multi-purpose dams on the Narmada River. Following a number of controversial cases before the Supreme Court of India (1999, 2000, 2003), by 2014 the Narmada Control Authority had approved a series of changes in the final height and the associated displacement caused by the increased reservoir, from the original 80 m (260 ft) to a final 163 m (535 ft) from foundation. The project will irrigate more than 18,000 km<sup>2</sup> (6,900 sq mi), most of it in drought prone areas of Kutch and Saurashtra. The dam's main power plant houses six 200 MW Francis pump-turbines to generate electricity and include a pumped-storage capability. Additionally, a power plant on the intake for the main canal contains five 50 MW Kaplan turbine-generators.

The total installed capacity of the power facilities is 1,450 MW. The dam irrigates 17,920 km<sup>2</sup> (6,920 sq mi) of land spread over 12 districts, 62 talukas, and 3,393 villages (75% of which is drought-prone areas) in Gujarat and 730 km<sup>2</sup> (280 sq mi) in the arid areas of Barmer and Jalore districts of Rajasthan. The dam also provides flood protection to riverine reaches measuring 30,000 ha (74,000 acres) covering 210 villages and Bharuch city and a population of 400,000 in Gujarat.



Saurashtra Narmada Avataram Irrigation is a major program to help irrigate a lot of regions using the canal's water. In 2011, the government of Gujarat announced plans to generate solar power by placing solar panels over the canal, making it beneficial for the surrounding villages to get power and also help to reduce the evaporation of water. The first phase consists of placing panels along a 25 km length of the canal, with capacity for up to, 25 MW of power. The dam is one of India's most controversial, and its environmental impact and net costs and benefits are widely debated. The World Bank was initially funding SSD, but withdrew in 1994. The Narmada Dam has been the centre of controversy and protests since the late 1980.

### LIST OF THE STUDENT

SR. NO	NAME	CLASS		DATE OF BIRTH
1	MARATHE NEHA GOVIND	S.Y.B.A	FEMALE	29/07/1999
2	MALI VISHAKA VIJAY	S.Y.B.A	FEMALE	15/10/1999
3	MAHALE DAMINI SANJAY	S.Y.B.A	FEMALE	28/08/1999
4	NAIK DAKSHA SOMDEV	S.Y.B.A	FEMALE	21/05/1998
5	VALVI ANJALI RAMDAS	S.Y.B.A	FEMALE	01/11/1998
6	TADVI USHA DARMA	S.Y.B.A	FEMALE	10/11/1996
7	VASAVE ANITA RAVLYA	S.Y.B.A	FEMALE	10/09/1998
8	TADVI BHARAT BIRBYA	S.Y.B.A	MALE	20/05/1998
9	NAIK GAMIRSING GIMBALYA	S.Y.B.A	MALE	29/04/1998
10	VASAVE KANTILAL BASYA	S.Y.B.A	MALE	02/04/1998
11	SAVALE ROHIT SANTSH	S.Y.B.SC	MALE	23/03/2000
12	VASAVE SEGA MOGYA	S.Y.B.A	MALE	
13	TADVI SURESH PANCI	S.Y.B.A	MALE	
<b>T.Y.B.A</b>				
14	PADVI RAMESH VAIRYA	T.Y.BA	MALE	02/04/1996
15	WADILE GOPAL BHAGWAN	T.Y.BA	MALE	20/05/1998
16	KOLEKAR KISHOR DHAKU	T.Y.BA	MALE	01/08/1998
17	GAVIT VISHAL VASU	T.Y.BA	MALE	03/09/1998
18	VALVI GURUCHAND RAJU	T.Y.BA	MALE	03/08/1995

19	MAGARE FRAFULLA WAMAN	T.Y.BA	MALE	10/5/1996
20	JADHAV BHAVESH ASHOK	T.Y.BA	MALE	30/09/1998
21	MAHIRE NETRADEEPAK MAHENDRA	T.Y.BA	MALE	01/01/1998
22	THELARI JAGAN BHIKA	T.Y.BA	MALE	8/02/1998
<b>S.Y.B.Sc</b>				
23	CHAVAN SHRIKANT AMRUT	S.Y.B.Sc	MALE	13/05/1999
24	RAJPUT MADHUSUDAN GOPALSING	S.Y.B.Sc	MALE	29/11/1999
25	MALI JAYESH DIGAMBAR	S.Y.B.Sc	MALE	13/06/1998
26	PATIL PANKAJ DAGAJI	S.Y.B.Sc	MALE	01/12/1999
27	PATIL SHUBHAM VASUDEV	S.Y.B.Sc	MALE	08/03/1997
28	CHAUDHARI HARSHA ANIL	S.Y.B.Sc	FEMALE	21/11/1999
29	PATIL PRIYANKA PRABHAKAR	S.Y.B.Sc	FEMALE	22/04/1999
30	PAMNANI PAYAL RAMESHLAL	S.Y.B.Sc	FEMALE	21/03/1999
31	MALI SAPNA GOPAL	S.Y.B.Sc	FEMALE	
32	BORSE NEHA MAHENDRA	S.Y.B.Sc	FEMALE	
33	PATIL NAMRATA S.	S.Y.B.Sc	FEMALE	03/05/1999
34	VASAVA SMITA	S.Y.BSC	FEMALE	01/06/1998
35	CHAVHAN HIRAL KANTILAL	S.Y.BSC	FEMALE	28/03/1999
36	VASAVE RITA HONARY	S.Y.BSC	FEMALE	
37	VALVAI PALAVI	S.Y. BSC	FEMALE	05/04/1998
38	PADVI HARSHDA PRADIP	F.Y.BSC	FEMALE	03/05/2000
39	HARSHAL ASHOK SHINDE	F.Y.BSC	MALE	20/08/1998
40	NIKITA KHNDERO PATIL	F.Y.BSC	FEMALE	10/08/2000
41	KRISHNA RAVINDRA PATIL	F.Y.BSC	MALE	14/03/2000
42	PROF.S.D BORSE	FACULTY	MALE	
43	PROF.R.R DEORE	FACULTY	MALE	

सावित्रीबाई फुले पुणे विद्यापीठ

(पूर्वीचे पुणे विद्यापीठ)

भौतिकशास्त्र विभाग

गणेशखिंड पुणे-४११००७

दुरध्वनी क्र. १०२०) २५६९२६७८, २५६९९०७२, २५६९१७०९

विस्तारीत क्र. २०२/२०६/२२२

फॅक्स (१०२०) २५६९१६८४



Savitribai Phule Pune University

(Formerly University of Pune)

Department of Physics

Ganeshkhind, Pune-411007

Tel. No. (020) 25691676, 25691677, 25691678

Fax (020) 25691688

E-mail - pathan@physics.sppu.ac.in

Website - <http://physics.sppu.ac.in>

To,

Date: 10/1/2020

Dr. Anil N. Kulkarni

Assistant Professor,

Department of Physics,

G.T. Patil ACS College,

Nandurbar- 425412.

Subject: Research Collaboration

Dear Anil,

I am writing this letter to express my support for your upcoming research work at Department of Physics, G.T. Patil ACS College, Nandurbar- 425412. At **Advanced Physics Laboratory, SPPU, Pune**, we work in the area of Materials science including synthesis, characterization and optoelectronic applications. Beyond this, our laboratory can provide a variety of characterization facilities such as Cyclic Voltammeter, Hall effect Measurement, Conductivity Measurement, Solar Cell JV Characteristics, UV-Visible Spectroscopy, Optical Microscopy and so on. Finally, our laboratory group would be delighted to help your group with any necessary advice or training required to implement your planned studies.

Best wishes for future endeavours.

Dr. Habib M. Pathan



# Chemical Solution Deposition of $\text{Sb}_2\text{Se}_3$ Films to Study their Structural, Morphological and Optical Properties

Anil N. Kulkarni,<sup>1,\*</sup> Yogesh V. Marathe,<sup>2</sup> Anil Pandurang Marale,<sup>7</sup> Prafulla S. Patil,<sup>2</sup> Sunil D. Marathe,<sup>3</sup> Subhash D. Khairnar,<sup>4</sup> Habib M. Pathan<sup>5</sup> and Rajendra S. Patil<sup>6</sup>

## Abstract

At room temperature chemical solution deposition technique has been employed for the deposition of  $\text{Sb}_2\text{Se}_3$  thin films. Solution based deposition of  $\text{Sb}_2\text{Se}_3$  crystals with variation in reaction time was found to be playing a significant role in controlling the reaction rate during the deposition of  $\text{Sb}_2\text{Se}_3$  films. Temporal evolution of structural, morphological and optical properties of deposited  $\text{Sb}_2\text{Se}_3$  films was investigated using X-ray diffraction (XRD), scanning electron microscopy and UV-visible spectroscopy, respectively. Solution deposition of  $\text{Sb}_2\text{Se}_3$  films involves two steps: initial nucleation and crystal formation followed by growth to form final films. Increased reaction time from 30 to 120 min, deposited films showed morphological evolution for  $\text{Sb}_2\text{Se}_3$  nanocrystals from dense spheres to self-assembled flower-like morphology. In addition, optical energy band gap variation from 1.60 to 1.63 eV suggested the possibility of crystal size optimization with energy band gap tunability of  $\text{Sb}_2\text{Se}_3$  crystals in the visible region. This is also evident from the photoluminescence studies, which reveal the luminescence intensity variation with crystal size of  $\text{Sb}_2\text{Se}_3$  as a function of deposition time. Optical and morphological response of  $\text{Sb}_2\text{Se}_3$  crystals to the reaction conditions suggests it is a suitable and potential candidate for optoelectronic applications such as photovoltaic cells, electronic nano-devices, fuel cells, etc.

**Keywords:**  $\text{Sb}_2\text{Se}_3$ ; Chemical solution deposition; XRD; Strain broadening; Photoluminescence.

Received: 16 March 2021; Accepted: 15 July 2021.

Article type: Research article.

## 1. Introduction

Recently, metal chalcogenides like CdS, PbS, PbSe, HgS,  $\text{In}_2\text{S}_3$ ,  $\text{In}_2\text{Se}_3$ ,  $\text{Bi}_2\text{S}_3$ ,  $\text{Bi}_2\text{Se}_3$ ,  $\text{Bi}_2\text{Te}_3$ ,  $\text{Sb}_2\text{S}_3$  and  $\text{Sb}_2\text{Se}_3$ , have attracted considerable attraction of researchers as promising materials in thermoelectric cooling and optical devices.<sup>[1-4]</sup> Among these materials, in recent time stibnite family members viz.,  $\text{Bi}_2\text{Se}_3$ ,  $\text{Bi}_2\text{Te}_3$ ,  $\text{Sb}_2\text{S}_3$  and  $\text{Sb}_2\text{Se}_3$  have been immersed out as promising candidates.<sup>[5,6]</sup> This is possibly due to their

alluring optical and electrical properties in the nano regime. However, in the case of stibnite family based chalcogenides,  $\text{Sb}_2\text{Se}_3$  is expected to stand better in various applications like advanced energy conversion and storage (ECS) devices including fuel cells, photo-electrochemical water splitting cells, solar cells, Li-ion batteries and supercapacitors. This is because of higher absorption and broad spectral response of metal chalcogenides.<sup>[7-12]</sup>

Literature reveals that, the performance of these energy devices relies strongly on the properties of the nanostructured material. Such wide exposure to various applications of metal chalcogenides has been profited due to the employed variations in the synthesis methods materials resulting in the different crystal sizes and surface morphologies. In view of the above, development in the field of nanomaterial synthesis is believed to play a key role in future advances of the device grade applications.<sup>[13-16]</sup>

Therefore, to explore complete optical properties of  $\text{Sb}_2\text{Se}_3$ , it becomes very necessary to characterize the variation of the optical absorption including photoluminescence (PL) as function of deposition conditions. Numerous reports are available on the synthesis of nanocrystalline  $\text{Sb}_2\text{Se}_3$ .<sup>[17-20]</sup>

<sup>1</sup> Department of Physics, G. T. Patil, Arts, Commerce and Science College, Nandurbar-425412, Maharashtra, India.

<sup>2</sup> Department of Chemistry, G. T. Patil, Arts, Commerce and Science College, Nandurbar-425412, Maharashtra, India.

<sup>3</sup> University Institute of Chemical Technology, KavayitriBahinabai Chaudhari North Maharashtra University, Jalgaon (MH), India.

<sup>4</sup> Nano-Chemistry Research Laboratory, G. T. Patil, Arts, Commerce and Science College Nandurbar, Maharashtra 425412, India.

<sup>5</sup> Advanced Physics Laboratory, Department of Physics, SavitribaiPhule University, Pune, India.

<sup>6</sup> Department of Physics, PSGVPM's ASC College, Shahada, India.

<sup>7</sup> Department of Chemistry, Rajaram College, Kolhapur, India.

\*Email: [kulkarni.may29@gmail.com](mailto:kulkarni.may29@gmail.com) (A.N. Kulkarni)

However, countable communications deal with the chemical solution deposition of  $\text{Sb}_2\text{Se}_3$  followed by the studies on the optical properties including PL.<sup>[21,22]</sup>

Thus, in this work,  $\text{Sb}_2\text{Se}_3$  nanocrystals have been synthesized using chemical solution deposition and an attempt has been made to explain the evolution of their morphology. Phase identification and structural analysis of the prepared samples were carried out systematically. Optical properties including photoluminescence studies of the prepared nanocrystals were conducted and the probable reasons for the resultant spectra were explained.

## 2. Experimental

In the present synthesis, solutions of  $\text{SbCl}_3$  (0.01 M) and  $\text{Na}_2\text{SeO}_3$  (0.01 M) were prepared in acetone and double distilled water, respectively in two different beakers, wherein  $\text{SbCl}_3$  acts as a precursor of  $\text{Sb}^{3+}$  and  $\text{Na}_2\text{SeO}_3$  that of  $\text{Se}^{2-}$ . The deposition process is discussed in the following steps. First, the bath for  $\text{Sb}^{3+}$  was prepared by adding 1 gm of  $\text{SbCl}_3$  to 10 ml of acetone and stirred for 5 minutes until a uniform mixture was formed. Further, 10 ml of triethanolamine (TEA) (20%), a complexing agent was then prepared in double distilled water and added to the first bath containing antimony source to obtain  $\text{Sb}^{3+}$ -TEA complex. In the next event, a 2M  $\text{Se}^{2-}$  precursor solution was prepared in double distilled water under constant stirring of 10 minutes and slowly introduced into the  $\text{Sb}^{3+}$ -TEA complex precursor solution under constant stirring. TEA, a complexing agent helps for obtaining soluble species of  $\text{Sb}^{3+}$  in acidic medium during the reaction. The pH of the combined bath was adjusted to be around 8–10 by dropping 2-3 pellets of NaOH through vigorous stirring. Finally, previously cleaned glass slides were introduced into the beaker for further deposition. The colour of the mixture solution was observed to be changing from milky white to orange indicating the formation of  $\text{Sb}_2\text{Se}_3$  species. Each sample was taken out after completing the desired reaction time of 30, 60 and 120 m, respectively. The samples deposited at room temperature were named as A, B and C, in the increasing order of reaction time of 30, 60 and 120 m, respectively.

The analysis of crystal structural, morphological and elemental properties of crystalline  $\text{Sb}_2\text{Se}_3$  films were carried out using X-ray Diffractometry (XRD) (model: XRD, Rigaku “D/B max -2400”,  $\text{Cu K}\alpha = 0.154$  nm), Scanning Electron Microscope (SEM) (model: JEOL-JSM 6360-A) and energy-dispersive X-ray spectroscopy (EDX), respectively. A UV-Vis spectrophotometer (model: JASCO V-670) was used to record optical absorption spectra of crystalline  $\text{Sb}_2\text{Se}_3$  films in the range of 200-800 nm at room temperature. The emission spectrum was obtained by using photoluminescence spectroscopy technique.

## 3. Results and discussions

### 3.1 The phase identification and structural analysis of $\text{Sb}_2\text{Se}_3$ films

Figure 1 shows the XRD patterns of samples A-C, respectively. XRD patterns for films show defined diffraction signatures around 21.50, 23.72, 27.13, 31.06, 34.42, 43.79, and 50.90°, indexed to (220), (101), (021), (211), (420), (440) and (351) hkl planes. The observed peaks were compared with the JCPDS card No. 72-1184, which confirms the orthorhombic phase for deposited  $\text{Sb}_2\text{Se}_3$  crystals. The average crystallite size in each film sample was calculated using a standard method in the literature after incorporating due corrections for the strain induced broadening in the diffraction peaks.<sup>[23-24]</sup>

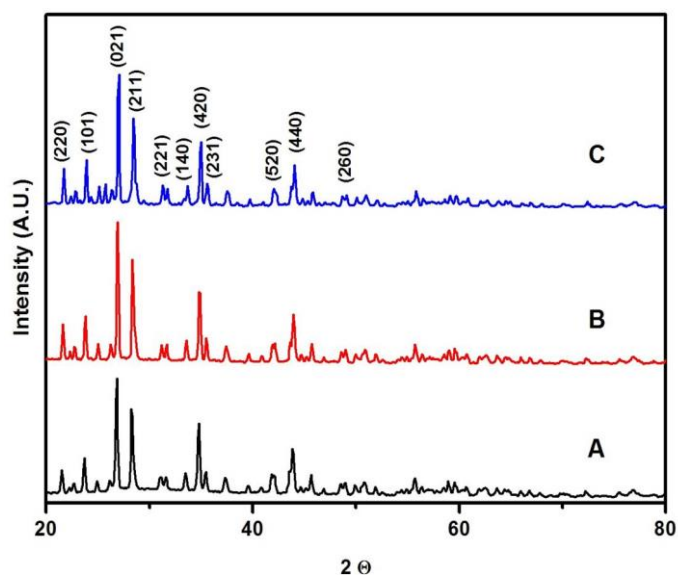


Fig. 1 Structural properties of  $\text{Sb}_2\text{Se}_3$  films A, B and C.

Three main peaks of the obtained XRD pattern corresponding to (111), (230) and (221) planes were considered individually for each sample for the crystal size calculation. The average crystallite size was found to be in the range of 47-58 nm for the three samples considered. As known from the literature, the Equation 1,<sup>[16]</sup>

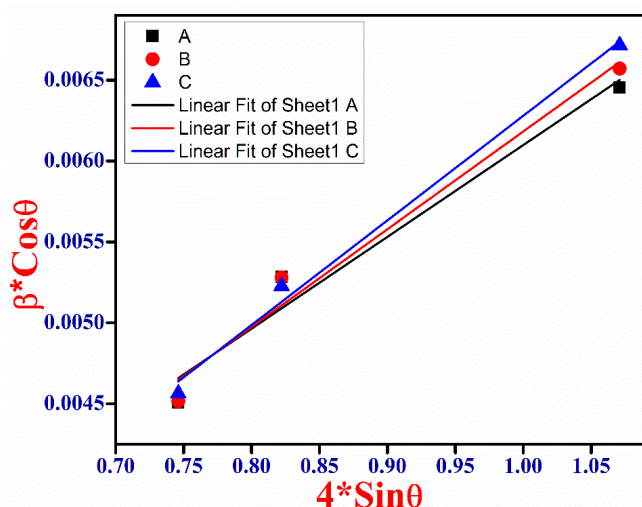
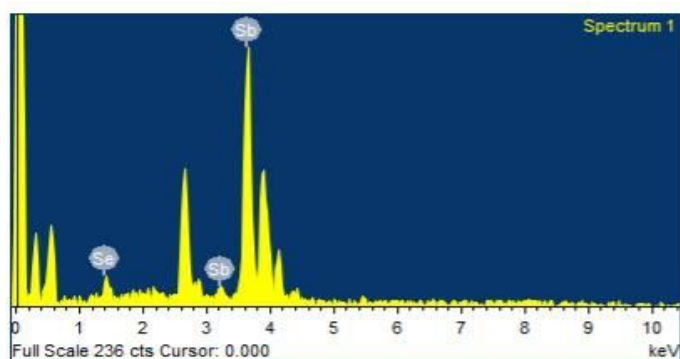
$$\beta \cos\theta = \frac{K\lambda}{D} + \eta \sin\theta \quad (1)$$

where  $\beta$  is the full width at half maximum in radians of the diffraction peak under consideration after instrumental broadening correction,  $\theta$  is the angle of diffraction,  $D$  is the size of the crystallite,  $\eta$  is the strain in the material), and the plot about  $\beta \cos\theta$  Vs  $\eta \sin\theta$  is shown in Fig. 2. The Y-intercept of the plot corresponds to zero strain and so eliminates the strain induced line broadening. The average crystallite size  $D$  was then directly calculated from the Y-intercept ( $=\frac{K\lambda}{D}$ ) for each sample. The results are tabulated in Table 1.

In addition, to further prove the deposition of  $\text{Sb}_2\text{Se}_3$  films, compositional analysis and elemental mapping were performed with the help of energy dispersive X-ray spectroscopy (EDXS) system as shown in Fig. 3. As illustrated in Fig. 2, composition mapping for  $\text{Sb}_2\text{Se}_3$  films reveals the presence of Sb and Se in ~ 2:3 ratio, confirms the formation of  $\text{Sb}_2\text{Se}_3$ .

**Table 1.** Physical Parameters of all prepared samples.

Sample	$2\theta^\circ$	$\text{Sin}\theta$	$\beta_r(\text{rad}) \times 10^{-3}$	$\beta_r \text{COS}\theta \times 10^{-3}$	D (nm)
Film-A	21.50	0.1865	4.08	4.00	47
	23.72	0.2055	5.48	5.35	
	31.06	0.2677	6.7	6.45	
Film-B	21.50	0.1865	4.19	4.11	50
	23.72	0.2055	5.6	5.47	
	31.06	0.2677	6.82	6.56	
Film-C	21.50	0.1865	4.34	4.26	58
	23.72	0.2055	5.75	5.62	
	31.06	0.2677	6.97	6.71	

**Fig. 2** Williamson-Hall plot for the estimation of crystallite size.**Fig. 3** Energy dispersive spectroscopic analysis of  $\text{Sb}_2\text{Se}_3$  film A.

### 3.2 Morphological analysis of $\text{Sb}_2\text{Se}_3$ films

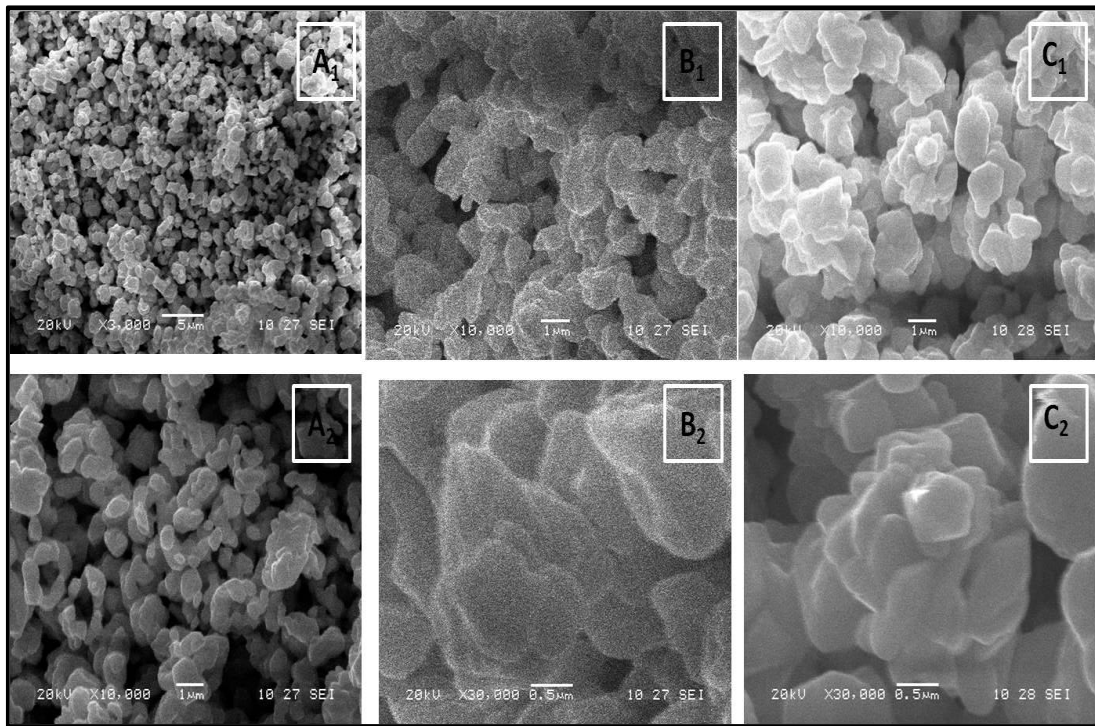
Figure 4 represents the SEM images for the samples A-C, respectively. At the initial stage of deposition *i.e.* for the first 30 minutes of reaction, the low magnification SEM image of sample A shown in (Fig. 4A<sub>1</sub>) reveals the uniform and dense pinots-like morphology. However, higher magnification SEM images of sample A clearly represent the formation of self-assembled ring-like morphology for sample A (Fig. 4A<sub>2</sub>). This may be due to the controlled nucleation of the  $\text{Sb}_2\text{Se}_3$  species resulting into the observed morphology.

For the prolonged deposition time to 60 minutes *i.e.* sample B, the pinots are observed to be attached to rings (Fig. 4B<sub>1</sub>). However, it is clearly seen from the higher magnification image (Fig. 4B<sub>2</sub>) that, the pinots are getting interconnected and resulting into the thick petal-like morphology. Finally, for the deposition time of 120 minutes *i.e.* sample C, the temporal growth has resulted in the flower-like morphology (Figs. 4C<sub>1</sub> and C<sub>2</sub>).

Observed morphological evolution in the present study, may be explained on the basis of the nucleation and growth kinetics of nanocrystals during the chemical solution deposition of the films. It appears that, reaction time has influenced the nucleation and growth of  $\text{Sb}_2\text{Se}_3$  nanocrystals. During the initial deposition, reaction rate may have been driven by the Sb-TEA complex, which leads to control the release of  $\text{Sb}^{3+}$  in the reaction bath. As a result of this, in the initial phase of the deposition, the cationic and anionic species in the solution to be deposited get adsorbed over the embryo or nuclei and start growing into a crystal to give pinots like morphology. However, literature suggests that, during chemical solution deposition, the resultant morphology is the function of balance between surface and thermodynamic equilibrium. Thus, with prolonged deposition time early formed crystals start to self-organize in order to have minimum surface free energy. This is evident from the emergence of the different morphologies such as ring-like, petals and flower-like morphologies observed in the present study. This is in agreement with the numerous varieties of morphologies like nano-ribbons, nano-wires, hollow nanospheres and solid nanospheres of  $\text{Sb}_2\text{Se}_3$  reported in literature.<sup>[25-27]</sup>

### 3.4 Optical absorption Studies

Figure 5a shows the wavelength dependent absorption spectra of the samples A-C recorded in the range 350-850 nm. The UV-visible absorption spectra for samples A-C showed panchromatic absorbance behaviour with spectral response in the extended visible region. However, there is no significant difference in the absorption edge for samples from A to C, indicating no later variation in the crystallite size over



**Fig. 4** Morphological analysis of films A, B and C.

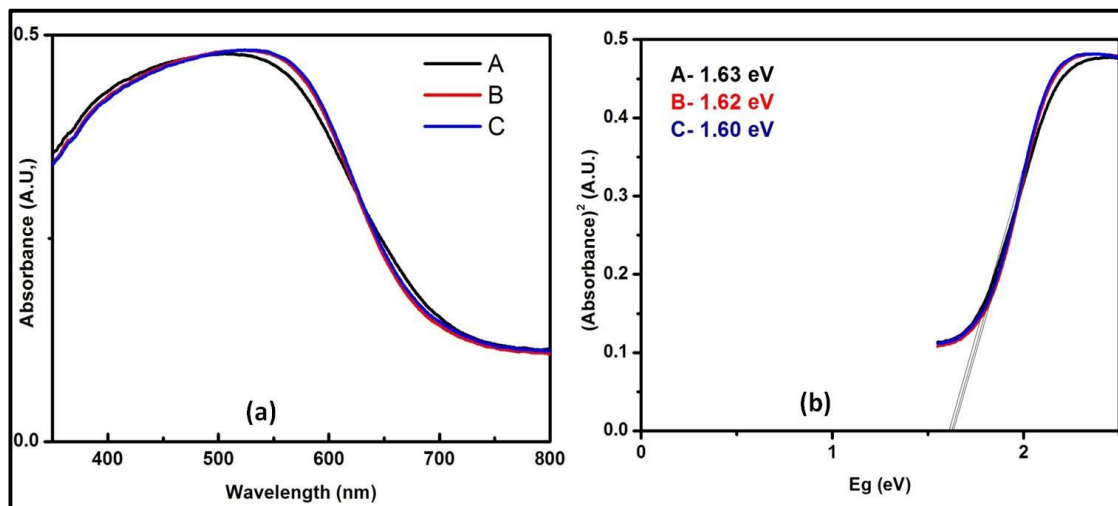
prolonged reaction time, respectively. This is in agreement with the earlier discussion in XRD analysis. This is also in close with the optical results discussed in previous reports.

Figure 5b shows the optical band gap calculations for samples from A-C using optical absorption spectra using Equation 2.<sup>[19]</sup> Band gap plots depict the optical energy band gap ( $E_g$ ) values in the range of 1.60 to 1.63 eV, respectively.<sup>[28]</sup> These values of  $E_g$  are quite greater than the bulk band gap value *i.e.* 1.2 eV of  $Sb_2Se_3$  crystals, which can be attributed to the size reduction of the  $Sb_2Se_3$  crystals during temporal deposition. This is in agreement with the earlier reports discussing the optical properties of metal chalcogenides.<sup>[29-31]</sup>

$$\alpha h\nu = \beta (h\nu - E_g)^n \quad (2)$$

### 3.5 Photoluminescence studies

Photoluminescence (PL) spectra of the samples A-C, recorded at room temperature with an excitation wavelength of 350 nm, has been presented in Fig. 6. The emission spectrum for all samples exhibits one distinct peak centred on 602 nm. The emission peaks in the present study for chemically deposited crystalline  $Sb_2Se_3$  showed increase in intensity with the increase in reaction time.<sup>[1]</sup> This may be due to the prolonged reaction time resulting into the variation in morphology. According to literature, the morphological geometry controls the amount of scattering of light from the surfaces of the film. This may be evident from the variation into the PL intensities for different morphologies in the present work.<sup>[32,33]</sup> Thus, the observed enhancement of the PL emission can also be attributed to a low light scattering due to the reduction in the surface defects for  $Sb_2Se_3$  crystals in the present study.<sup>[33]</sup>



**Fig. 5** Optical absorption spectra of films A, B and C.

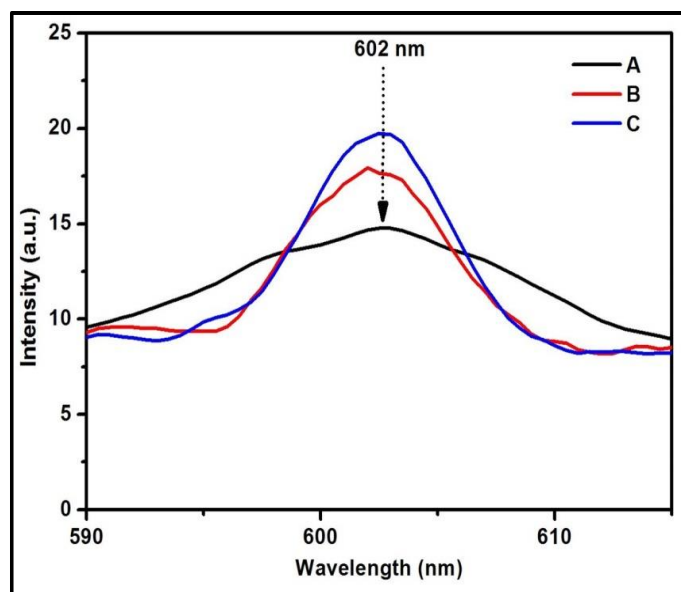


Fig. 6 Spectroscopy of films A, B and C.

### 3.6 Contact angle measurement

Measuring contact angles is a simple means to analyze wettability of thin film surfaces.<sup>[34]</sup> In the present study, in order to measure the contact angle, the water droplet was added on the copper surface by means of a syringe and the image of the drop was captured with a video camera. It was found that water droplets rest on the surface of  $\text{Sb}_2\text{Se}_3$  films with a contact angle of about  $60^\circ$  revealing the hydrophilic nature of the deposited films (Fig. 7). This is in agreement with earlier report for different chemically deposited semiconducting material in the literature.<sup>[12]</sup> Such a hydrophilic nature of deposited  $\text{Sb}_2\text{Se}_3$  finding applications in heterojunction based optical devices.

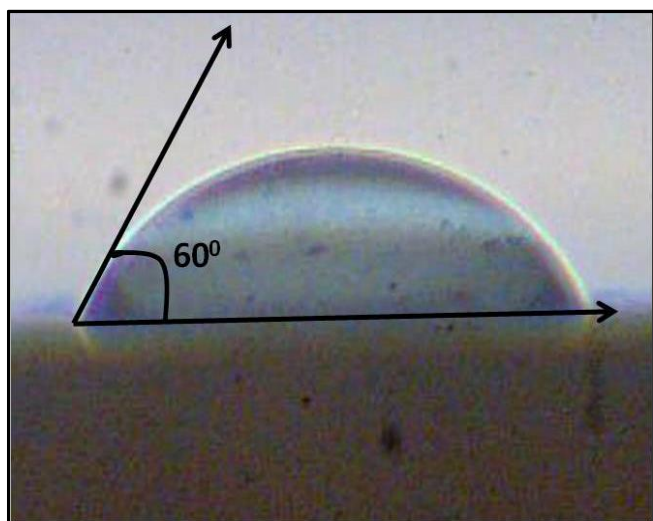


Fig. 7 Contact angle measurement of films A, B and C.

### 4. Conclusions

Role of the deposition time during the solution deposition of  $\text{Sb}_2\text{Se}_3$  crystals through systematic experiments with its significance has been studied orderly. The deposition time was found to be playing an important role in the structural,

morphological and optical properties of  $\text{Sb}_2\text{Se}_3$  nanocrystals. The temporal growth of  $\text{Sb}_2\text{Se}_3$  nanocrystals resulting into the variation in morphologies has been observed. This is been attributed to the super saturation factor and reaction rate during the deposition of crystals. Optical properties including PL found to be driven by size and shape of  $\text{Sb}_2\text{Se}_3$  crystals. Observed morphological and optical properties reveal  $\text{Sb}_2\text{Se}_3$  a promising absorber material in opto-electronic applications including photovoltaic devices.

### Acknowledgement

HMP is thankful to Departmental Research Development Program (DRDP) for partial financial support. ANK is grateful to the Management, NTVS's G.T. Patil College Nandurbar for encouragement and support. Authors are thankful to Savitribai Phule Pune University, Pune for characterization facilities.

### Conflict of Interest

There is no conflict of interest.

### Supporting Information

Not applicable.

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#### Author Information



**Dr. Anil N. Kulkarni** is presently working as Assistant Professor at the Department of physics at G. T. Patil College, Nandurbar-425412, (M.S), India. He received his Ph.D. degree in Physics (Materials Science) from Kavayitri Bahinabai Chaudhari, North Maharashtra University, Jalgaon-4250001, (M.S), India in 2016. His current research interests are in the field of synthesis and characterization of Nanomaterials for Solar cell and photocatalytic applications.

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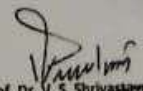
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(Prof. Dr. V. S. Shrivastava)


Principal  
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# Electrodeposition of Bi<sub>2</sub>Te<sub>3</sub> thin films for thermoelectric applications: effect of electrolyte pH

Vinod S. Khairnar<sup>1,\*</sup> , Anil N. Kulkarni<sup>2</sup>, Vishal V. Lonikar<sup>3</sup>, Anil B. Gite<sup>4</sup>, Mirtunjay Kumar<sup>5</sup>, Dipak P. Patil<sup>6</sup>, and Deepak P. Kadam<sup>1</sup>

<sup>1</sup>Department of Engineering Sciences, METs Institute of Engineering, MET Bhujbal Knowledge City, Nashik, India

<sup>2</sup>Department of Physics, NTVS's Patil Arts, Science and Commerce College, Nandurbar, India

<sup>3</sup>Department of Physics, Bhujbal Academy of Science and commerce, MET Bhujbal Knowledge City, Nashik, India

<sup>4</sup>Department of Physics, SNJB's Arts and Science College, Nashik, India

<sup>5</sup>Department of Materials, University of Manchester, Manchester, UK

<sup>6</sup>Department of Electronics and Telecommunication, Sandip Institute of Engineering and Management, Nashik, India

Received: 9 January 2023

Accepted: 19 March 2023

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## ABSTRACT

Modern materials like Bi<sub>2</sub>Te<sub>3</sub> nanostructures are one of the most promising thermoelectric materials since they show a high value of the thermoelectric figure of merit. This paper reports the effect of electrolyte pH (in a low pH range starting from 0.25 to 1.50) on the structural, electrochemical, and thermoelectric properties of the electrodeposited Bi<sub>2</sub>Te<sub>3</sub> films. Two of the samples showed significantly high values of Seebeck coefficient (49.28 μV/T and 45.26 μV/T, respectively), which are comparable to the Si (42 μV/T), SiC nanowires (40 μV/T), and Ge (47 μV/T) thermoelectric materials. Also, the observed crystallinity and electrochemical behavior are in agreement with the thermoelectric results for electrodeposited Bi<sub>2</sub>Te<sub>3</sub> films. In nutshell, a lower range of pH of electrolytes has been found to be a significant control parameter in the present study. Such Plausible tailoring of properties would be helpful for the systematic study of complex and multi-composite materials for various applications.

## 1 Introduction

There are many thermoelectric materials being studied in the form of thin films. Materials like Bismuth Chalcogenides [1], Lead tellurides [2, 3], Inorganic Clathrates [4, 5], Mg-B<sup>IV</sup> compounds [6, 7], Homologous oxides [8, 9], Half-Heusler alloys [10, 11] etc.

Among these materials, in the current thread of research, Bi<sub>2</sub>Te<sub>3</sub> has been studied extensively. This is

due to its high value of thermoelectric figure of merit at room temperature. In addition, out of many methods of synthesis, electrodeposition method has been explored by the researchers. Electrodeposited Bi<sub>2</sub>Te<sub>3</sub> nanowire arrays (12–33 μV/K), pulse electrodeposited Bi<sub>2</sub>Te<sub>3</sub> thin films (– 65 μV/K), and *n*-type Bi<sub>2</sub>Te<sub>3</sub> films (– 51.6 μV/K) had shown Seebeck coefficient ranging from 12 to 65 μV/K [12–14].

Address correspondence to E-mail: vinodk\_ioe@bkc.met.edu

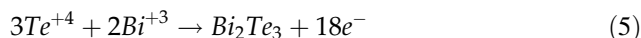
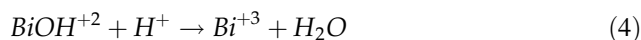
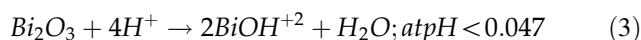
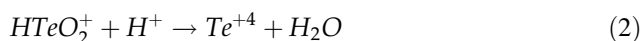
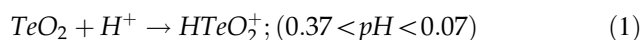
Electrodeposited thin films exhibit excellent thermoelectric properties as a function of reaction parameters [15–21]. In addition, the deposition rate of various phases followed by crystallite sizes can be controlled via electrodeposition parameters. And hence, this method is suitable for depositing thin films for the purpose of thermoelectric applications.

Theoretically, a material has better thermoelectric properties if electrical conductivity of the material is high and thermal conductivity of the material is low. A conductor or a semiconductor material shows thermal conductivity on account of two major phenomena viz. transport of heat through charge carriers and transport of kinetic energy through particle like behavior of lattice vibrations known as phonons. Transport of charge carriers contributes to both thermal and electrical conductivity. Thus, higher electrical conductivity by virtue of charge carrier transport also increases the thermal conductivity by this route. However, the amount of heat transported through phonons is decided by the crystal structure and crystallite size in case of crystalline solids [22, 23]. Thus, for a thermoelectric material, we need to optimize the crystallite size for optimal electric and thermal conductivities. Many studies have been reported for the deposition of  $\text{Bi}_2\text{Te}_3$  films. However, the tailoring of the structural, electrochemical, and thermoelectric properties as a function of lower range of pH has not been explored in detail. Thus, it is indeed necessary to investigate such dependence of different properties over a reaction parameter(s). And, it may be helpful, since nowadays even more complex and multi-composite materials (like perovskite) are being studied not only for thermoelectric but also for other properties like semiconducting, photoelectric, and supercapacitive actions.

The purpose of setting the parameters is to achieve thermodynamically optimal conditions for electrochemical deposition of ions on to the substrate as well as nucleation and growth of material in the electrolyte. For this purpose, under potential deposition method was used to ensure a uniform and thin deposition of the material. The stainless-steel plates were chosen to be the deposition substrate. According to literature review, mutually induced co-deposition of  $\text{Bi}^{3+}$  and  $\text{Te}^{2+}$  ions happens if correct electrochemical parameters are set [15, 18]. The ions will be deposited together at a potential more positive than both the deposition potentials of individual ions. It is also required that formation of the said ions

must occur when the precursors are dissolved into the solvent. With these conditions in place, optimized deposition potential was explored earlier and found out to be  $-400$  mV/SCE at room temperature [20]. To optimize thermal and electrical properties as function of crystallinity through exploring the lower range of pH for electrodeposition of  $\text{Bi}_2\text{Te}_3$  thin film is the aim of present study.

In this article, we report the properties of 6 films that were deposited at the optimum deposition potential of  $-400$  mV/SCE with pH varying from 0.25 to 1.5 in the interval of 0.25 and designated as P1 to P6, respectively. The range for pH parameter is selected as per the Pourbaix diagram for electrodeposition carried out with the route as stated below [15]



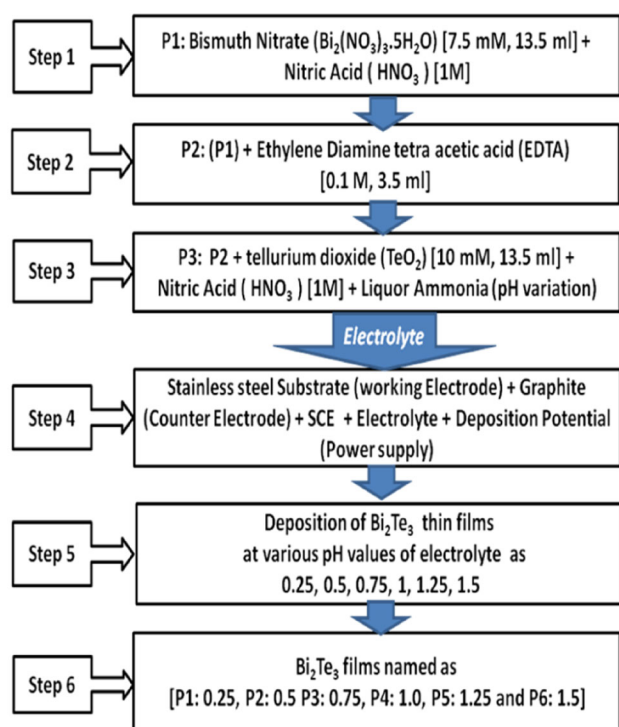
For Eqs. 1–4, the rate of the reaction will be decided by the  $\text{H}^+$  ion concentration, i.e., pH of the solution. Since pH of the electrolytes decides the deposition rates of Bi and Te, the quality of co-deposited product is in turn impacted. Quality parameters include purity (relative amounts of  $\text{Bi}_2\text{Te}_3$ , Te, Bi, and other compounds) and crystallinity (phases and crystallite size). These parameters affect the electrical and thermal properties of the deposited material which is to be used for thermoelectric applications.

## 2 Experimental procedures

In the present synthesis, solutions of A.R. grade bismuth nitrate ( $\text{Bi}_2(\text{NO}_3)_3 \cdot 5\text{H}_2\text{O}$ ) and tellurium dioxide ( $\text{TeO}_2$ ) were prepared in nitric acid ( $\text{HNO}_3$ ), respectively, in two different beakers, wherein  $\text{Bi}_2(\text{NO}_3)_3 \cdot 5\text{H}_2\text{O}$  acts as a precursor of  $\text{Bi}^{3+}$  and  $\text{TeO}_2$ , that of  $\text{Te}^{2+}$  explained in the following steps as shown in Fig. 1 [15, 18, 20].

First, the bath of 7.5 mM  $\text{Bi}^{3+}$  was prepared by adding 0.90 gm of bismuth nitrate in 250 ml of 1 M nitric acid and kept for 15 min until a uniform mixture was formed. Second, 0.1 M ethylene diamine

tetra acetic acid (EDTA), a complexing agent, was then prepared in 100 ml double distilled water. Third, 3 ml of 0.1 M EDTA then added to the first bath containing bismuth source to obtain  $\text{Bi}^{3+}$  EDTA complex. Fourth, 10 mM solution was prepared in 1 M (250 ml) of nitric acid under constant stirring at 80 °C temperature for 30 min. Fifth, 13.5 ml of  $\text{Te}^{2-}$  precursor solution was slowly introduced into the 16.5 ml that of  $\text{Bi}^{3+}$  EDTA complex precursor solution under constant stirring. The pH of prepared electrolyte was varied from 0.25 to 1.5 with increase of 0.25 using liquor ammonia. The reaction is considered to be based on slow release of  $\text{Bi}^{3+}$  and  $\text{Te}^{2+}$  ions in the presence of EDTA, which helps for obtaining the soluble species of the  $\text{Bi}^{3+}$  in acidic medium during the synthesis process [4]. The electrodeposition was carried out for different pH [P1–P6] of electrolyte mixture of 7.5 mM  $\text{Bi}^{3+}$  and 10 mM  $\text{TeO}_2$  at  $-400$  mV/SCE at room temperature for the deposition time of 40 min and named as P1–P6, respectively. The flowchart in Fig. 1 shows the stepwise process involved in the electrodeposition of  $\text{Bi}_2\text{Te}_3$  thin films as function of pH [15, 18, 20].



**Fig. 1** Stepwise process involved in the electrodeposition of  $\text{Bi}_2\text{Te}_3$  thin film of samples (P1–P6)

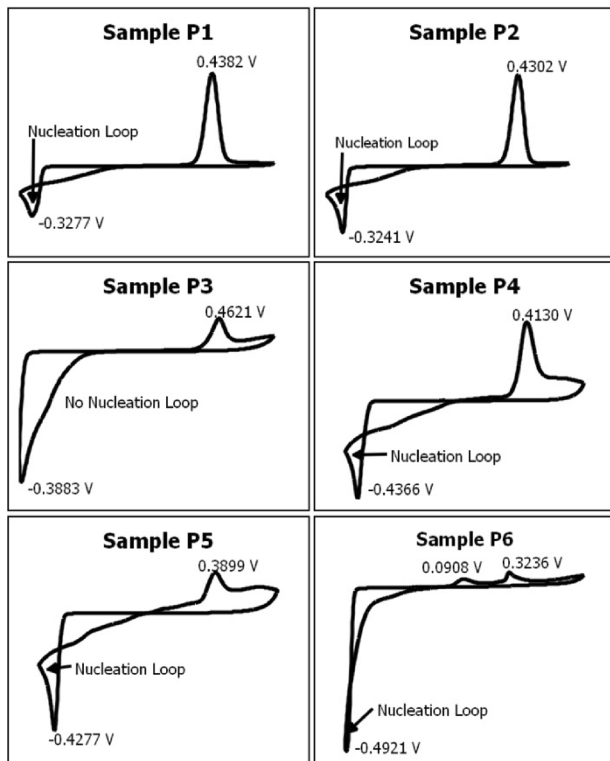
### 3 Results and discussion

The prepared films were characterized to determine the properties viz. elemental composition, crystal structure, phase, crystallite size, morphology, thickness, and thermoelectric properties (Seebeck Coefficient, Power Factor and Figure of merit). These results are presented and discussed below.

Cyclic voltammetry (CV) analysis for precursors and their mixture at various pH and concentration was carried out using Potentiostat Interface model 1000 (IFC100004015, Garmry). Thicknesses of the all the deposited films were measured with weighing balance made by Shimadzu (AUX220) having least count of 10 mg. Structural analysis and phase detection of the  $\text{Bi}_2\text{Te}_3$  crystals in the electrodeposited films were carried out with the help of Panalytical Xpert PRO X-ray diffractometer (XRD) with  $\text{Cu K}\alpha$  radiation ( $\lambda = 1.5405$  Å). Surface morphology and compositional analysis were carried out using a scanning electron microscope (JEOL-JSM 6360) (SEM) with energy-dispersive X-ray spectroscopy (EDXS) Hitachi High (S 4800 Type II) with acceleration voltage at 20 kV. Electronic properties were studied using Hall probe method ECOPIA hall effect measurement system (HMS-3000). Seebeck coefficient measurement was carried out with the laboratory made setup (Two K type thermocouples, Rishabh multimeter (Multi 14S), HTC (DT302) Thermometer). Thermal conductivity was measured with the Nano-flash (LFA 447) Netzsch instrument. The phase analysis of samples using XRD patterns has been made using Xpert Highscore package with Reference Intensity Ratio (RIR) method (more confident).

#### 3.1 Cyclic voltammetry

Cyclic voltammetry curves were recorded during deposition process and are shown in Fig. 2 for the films P1–P6 (7.5 mM  $\text{Bi}^{3+}$ , 10 mM  $\text{TeO}_2^{2+}$ , and 0.1 M EDTA). The curves show distinct oxidation and reduction peaks within the potential range of  $-400$  mV/SCE to 700 mV/SCE. For P1 film, we see an oxidation peak at 432.0 mV and reduction peaks at  $-343.9$  mV and  $-250$  mV. The reduction peaks indicate the deposition of Te ions through two different modes [15]. Single oxidation peak for P1, P2, and P3 CV curves indicates that deposited material indeed is  $\text{Bi}_2\text{Te}_3$ . However, in case of P1 and P2, the presence of Nucleation loop indicates irreversible Te–



**Fig. 2** Cyclic voltammograms  $\text{Bi}_2\text{Te}_3$  with different pH values from (P1–P6)

Te deposition [15], while in case of P3, large reduction peak indicates dominant but reversible Te–Te deposition. While in case of P4, P5, and P6 films, there is additional small oxidation peak after the Bi oxidation peak. This may correspond to decomposition of Te or Bi atoms. In case of P4 and P5, the nucleation loop similar to that in P1 and P2 indicates irreversible Te–Te deposition. In addition to the major reduction and oxidation peaks, there are other oxidation and reduction peaks present in case of Samples P4 and P5 which again may correspond to decomposition of the deposited Bi and Te.

Another major aspect of the CV analysis is regarding movement of the oxidation and reduction peaks with the pH parameter. P2 shows dominant deposition of Bi at moderate oxidation potential of 4.302 V while P1, P3, and P4 show such deposition at higher potential and P5 and P6 at lower potential.

In case of deposition of Te by reduction, P2 shows lowest negative potential of (– 0.3241) for deposition while all other samples show reduction peaks of Te at a larger negative potential [12].

### 3.2 Thickness

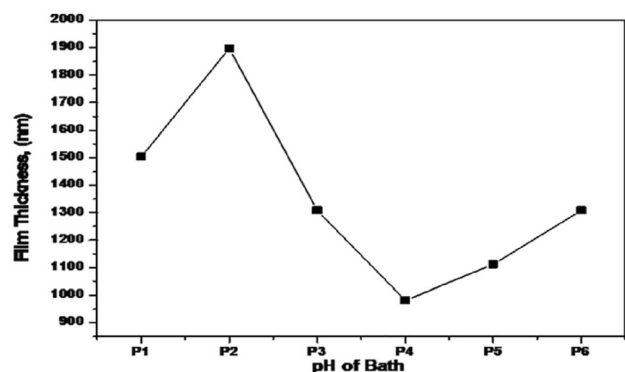
Thicknesses of the films were measured using indirect weighting difference method. The average thicknesses of the films are plotted in Fig. 3. P2 sample shows the largest average thickness while P4 shows the smallest. This parameter indicates the rate of deposition of the material since the films are deposited within the same amount of time interval. Thickness of the material was assumed to be uniform as we are using electrochemical method for deposition.

Any parameter that is calculated here onward is intrinsic parameter. It is desirable to have thinner films so that the parameters will be better since the parameters are usually calculated per unit volume or mass.

### 3.3 X-ray diffraction

X-ray diffraction patterns for all the samples are shown in Fig. 4. The XRD patterns show the presence of polycrystalline structure. Signature peaks of  $\text{Bi}_2\text{Te}_3$  around  $2\theta \sim 27.74^\circ$ ,  $41.02^\circ$ ,  $44.32^\circ$ , and  $50.44^\circ$  corresponding to (h k l) planes (0 1 5), (1 1 0), (0 0 15), and (2 0 5) [24], respectively, are seen in all the samples. Intensities of the most prominent peak (0 1 5) can be seen to have different intensities relative to other peaks for different samples.

Further, Table 1 shows the average crystallite sizes, micro-strains, and dislocation densities for the films P1 to P6 obtained using the full width at half-maximum (FWHM) from XRD patterns.



**Fig. 3** Thickness variation of the samples (P1–P6) for deposition time of 40 min

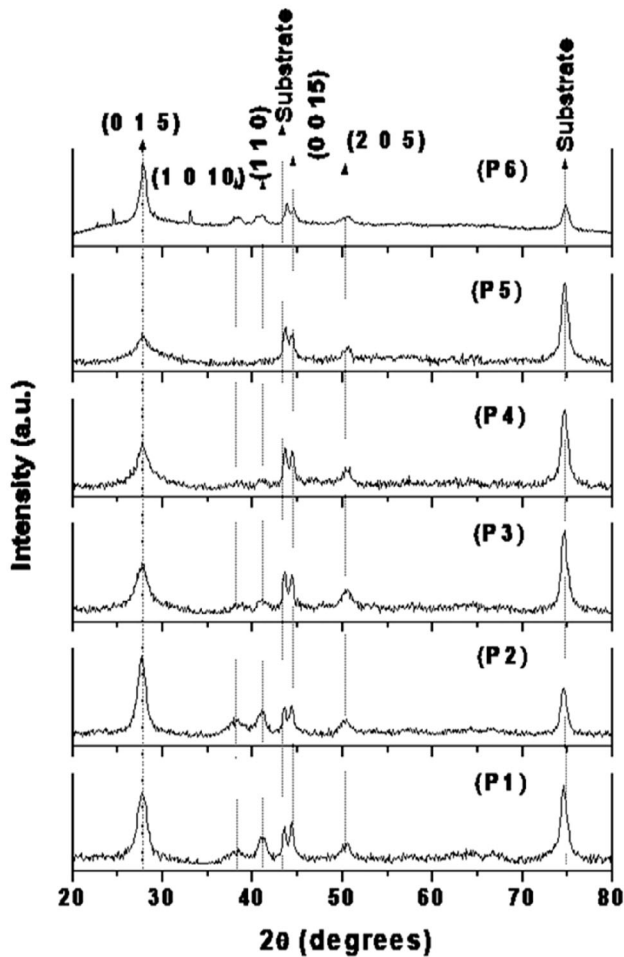


Fig. 4 X-ray diffraction patterns of samples (P1–P6)

Table 1 XRD analysis for [0 1 5] plane

#	2θ	a	β	D	ε	δ
P1	27.74	3.21	1.122	7.61	47.53	231.77
P2	27.54	3.23	1.108	7.71	46.61	171.82
P3	27.68	3.22	1.124	6.89	52.53	261.17
P4	27.72	3.21	1.565	5.46	66.30	415.94
P5	27.72	3.21	1.702	5.02	72.10	491.95
P6	27.81	3.20	0.871	9.81	36.84	128.78

# sample number, 2θ Bragg’s Angle in degrees, a lattice parameter in angstroms, β FWHM in degrees, D crystallite size in nanometres, ε microstrain in 10<sup>16</sup> linesm<sup>-2</sup> and δ dislocation density in 10<sup>-4</sup>line<sup>-2</sup> m<sup>-4</sup>

For the analysis, Scherer’s equation and standard JCPDS card No: 15-0863 [24] for Bi<sub>2</sub>Te<sub>3</sub> were used.

Scherer’s equation is given below:

$$\tau = \frac{K\lambda}{\beta\cos(\theta)}$$

where, τ is the mean crystalline domains size, K is the shape factor, λ is the X-ray wavelength, β is the FWHM, and θ is the Bragg angle.

Samples P1, P2, and P6 show narrower and larger (0 1 5) peak while P3, P4, and P5 show wider and smaller (0 1 5) peaks. Widening of the peaks is due to small crystallite size (in nanometres) as well as due to induced microstrain in the films. Larger intensities of the material compared to peaks of the substrate indicate larger phase percentage. (1 0 10) and (1 1 0) peaks are present prominently in only P1, P2, and P3 samples. (0 0 15) peak is present in all the samples but for P6, the peak is smaller as compared to other samples. Note that the samples P2 and P6 show all the peaks and larger (0 1 5) peak as compared to the substrate peak. From this analysis, we conclude that P2 and P6 must have significant amount of Bi<sub>2</sub>Te<sub>3</sub> crystallites. This is further confirmed by phase analysis performed using RIR method from XRD data as indicated in Fig. 5.

The crystallite size analysis indicates that P6 followed by P2 has the largest crystallite size and thus the lowest microstrain.

### 3.4 Elemental analysis

Elemental analysis performed using EDAX is shown in Table 2. Samples P2, P3, and P4 are relatively closer to the actual stoichiometric ratio of 0.67 for the compound. However, it has been proved before that this material can exist in same phase with different

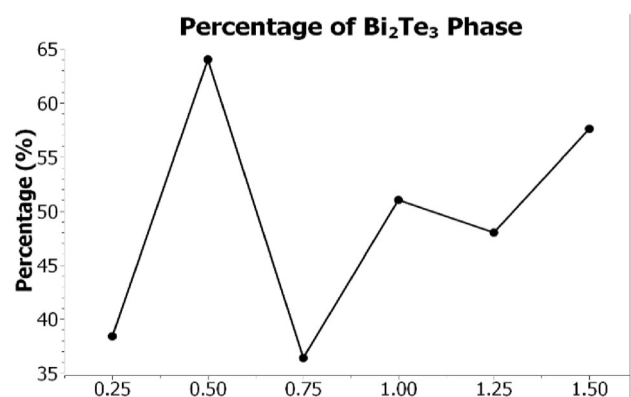


Fig. 5 Bi<sub>2</sub>Te<sub>3</sub> Phase amount for the samples (P1–P6) using XRD data

**Table 2** Elemental analysis for samples (P1–P6)

Sample	Bi%	Te%	Bi/Te
P1	54.28	45.72	1.19
P2	49.31	50.69	0.97
P3	46.43	53.57	0.87
P4	48.94	51.06	0.96
P5	57.11	42.84	1.33
P6	57.90	42.10	1.38

stoichiometric ratios [15]. Samples P1, P5, and P6 are quite Bi rich as compared to other 3.

### 3.5 Scanning electron microscopy

Figure 6 shows the SEM images morphology of the samples. All samples exhibit dendritic masses fused together to various degrees (refer to high resolution figures located at the insets of the SEM images). SEM images show a fused mass of dendrites for P1 sample, relatively separated dendritic masses in the form of aggregated balls for P2. While P3 shows morphology similar to P2 but for P2, the balls have more clear boundaries than P3. The SEM image for P3 also shows two different areas, light and dark, which may be interpreted as follows. Dark area refers to a flatter morphology with less dense mass, while light areas refer to balls shaped areas. P4 shows morphology with dendrites forming a continuous mass similar to P1 but with larger voids which are in the case of this particular snap is all oriented along same direction. P5 and P6 both again show aggregated balls type morphology. But P6 has the dendritic structures more separated than P5.

Morphology of the structure is an important parameter since thermal as well as electrical conductivities depend on the morphology. One can conclude that, more fused dendritic structures results in to the good thermal conductivity. Such large values of conductivity are detrimental to the thermoelectric effect as per the obtained figure of merit (ZT) in the present work [25–27]. Thus, we expect P2 and P6 to perform better as a thermoelectric material provided they show good electrical conductivity.

### 3.6 Thermal conductivity

Thermal conductivities of the samples were measured and are plotted in the Fig. 7.

High thermal conductivity of P3 brings down the performance of the film, while P2 has relatively high but still low enough thermal conductivity in addition to the co-deposition-favored crystal structure which is favorable for better thermoelectric performance. For all other samples, the thermal conductivity is very low. If the electrical conductivities of these samples are high enough the samples will perform better as thermoelectric materials [22, 23].

### 3.7 Four probe

The electrical conductivities of the samples shown in Fig. 8 are measured using four probe methods. Highest conductivity was shown by the P3 sample while others show significantly lower conductivities. P2 exhibits second best value for conductivity. However, as stated, earlier to large value of thermal conductivity may become detrimental for a thermoelectric material. We may expect P2 to be one of the best thermoelectric materials from all the samples since it shows the combination of favored co-deposition, moderate thermal conductivity, as well as moderate electric conductivity.

Low conductivity despite large crystallite size of samples P1, P5, and P6 may be due to the Bi richness which was discussed in elemental analysis section.

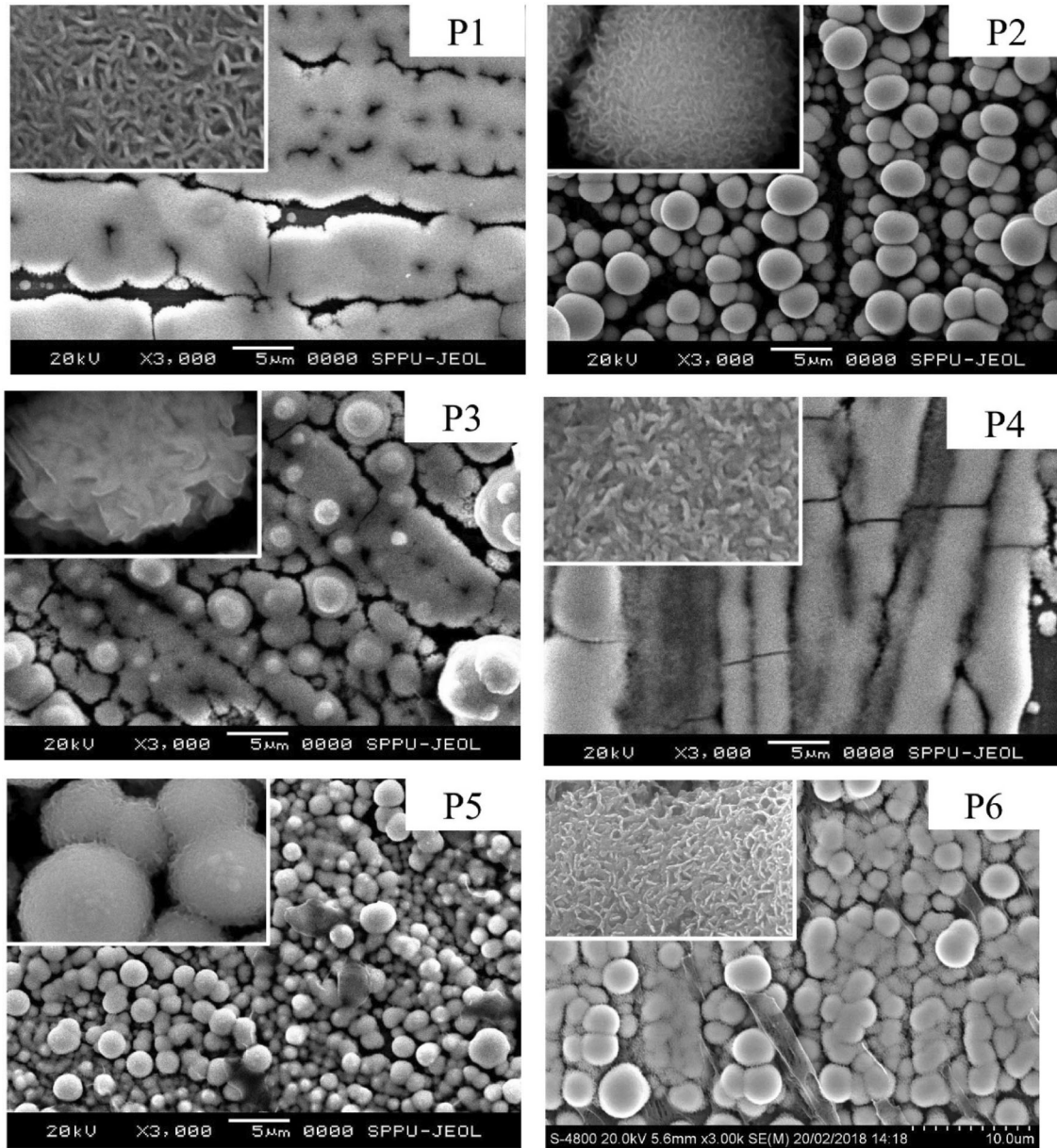
Which means though these samples show larger crystallites, the crystallites may be surrounded by Bi-rich phases. Hence, such deposition shows lower conductivity despite of larger crystallite size, whereas samples P2 and P3 show large conductivity despite smaller crystallite size. In short, not only the amount of crystal boundaries but also the ease of conduction of charge carriers across a boundary will also affect the electrical and thermal conductivity.

### 3.8 Seebeck coefficient and figure of merit

The Seebeck coefficients plotted in Fig. 9 for the samples are calculated using a laboratory made setup. The best Seebeck coefficient as shown in Fig. 9 was exhibited by P2 sample followed by P6, P1, and P3. As mentioned earlier, the reason for the best performance of P2 may be the combination of moderate electrical conductivity, low thermal conductivity, and co-deposition dominated phase. This agrees with the phase analysis discussed in XRD section.

Figure of merit is a performance indicator used to compare the performance of the materials. In this





**Fig. 6** Scanning Electron Images of samples (P1–P6): 3000 × main images and 6000 × (higher resolution) images in inset

case, figure of merit to measure thermoelectric performance of a material is given by [25, 26, 28]

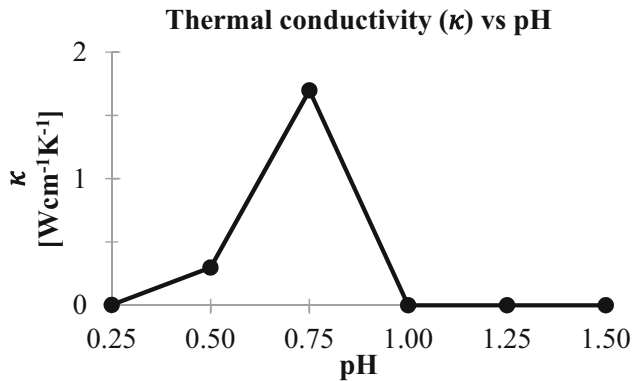
$$ZT = \frac{\sigma S^2}{\kappa} T$$

where  $\sigma$  is electrical conductivity,  $S$  is Seebeck coefficient,  $\kappa$  is the thermal conductivity, and  $T$  is the absolute temperature.

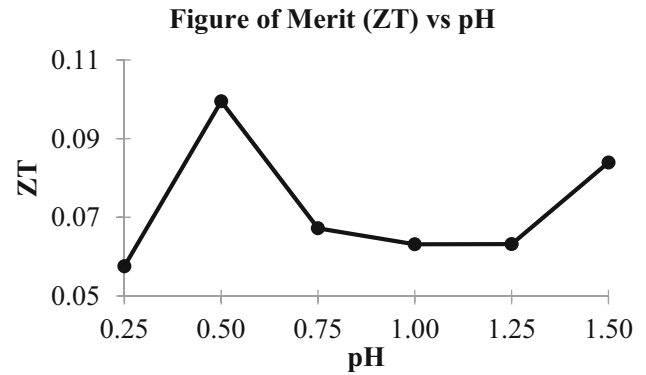
Hence, to achieve better thermoelectric properties, the material must have high electrical conductivity, Seebeck coefficient, and low thermal conductivity [15, 25, 28, 29].

Thermoelectric figure of merits for samples (P1–P6) are plotted in Fig. 10 and are calculated using the electrical conductivities, thermal conductivities, and Seebeck coefficient of the samples.

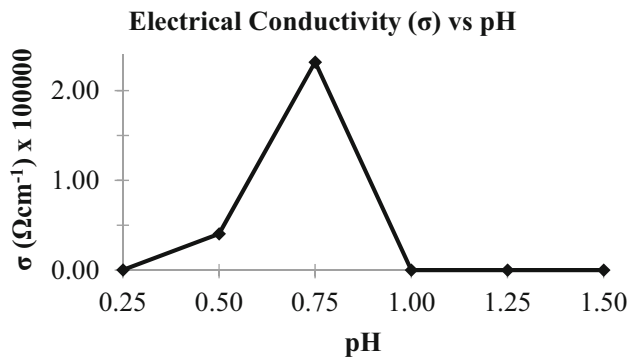
Taking into account all electrical conductivity (large for P3 and moderate for P2), Seebeck coefficient (large for P2 and moderate for P1, P3, and P6), and thermal conductivity (large for P3 and moderate for P3 while others have low thermal conductivities), P2 performs as the best thermoelectric material followed by P6, P3, P4–P5, and P1 as per the figure of merit (ZT).



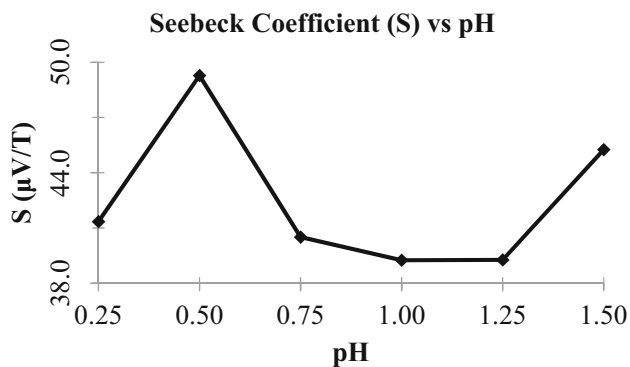
**Fig. 7** Variation of thermal conductivity with pH for samples (P1–P6)



**Fig. 10** Variation of figure of merit with pH for samples (P1–P6)



**Fig. 8** Variation of electrical conductivity with pH for samples (P1–P6)



**Fig. 9** Variation of Seebeck coefficient with pH for samples (P1–P6)

## 4 Conclusion

The paper reports successful electrodeposition of Bi<sub>2</sub>Te<sub>3</sub> films for thermoelectric applications using lower pH as a control parameter. XRD and CV spectra revealed that pH has significant control over the rate of all redox reactions that are possible in

given electrolyte. Hence, pH in turn controls the rate of deposition of various phases of the substance on to the substrate. Thus, variation of the pH causes variation of thermal and electrical conductivities that in turn vary the thermoelectric properties of the deposited material. This is evident from the CV and structural results that complement the thermoelectric observations.

Sample P2 found to yield better Bi<sub>2</sub>Te<sub>3</sub> as a thermoelectric material ( $S = 49.28 \mu\text{V/T}$ ,  $ZT = 0.099$ ) than the Si ( $\sim 42 \mu\text{V/T}$ ) and Ge ( $\sim 47 \mu\text{V/T}$ ) thermoelectric materials. This performance is exhibited on account of moderate electrical conductivity and low thermal conductivity due to optimal crystallite size and phase amount. This suggests that optimization of other reaction parameters in combination with pH would open an interesting way out to study complex or multi-composite materials for various applications.

## Acknowledgements

This research did not receive any specific grant from any funding agencies in the public, commercial, or not-for-profit sectors. VSK is thankful to the Department of Engineering Physics, MET's Institute of Engineering, Nasik, for support and encouragement. VSK is grateful to Dr. V. P. Wani, Principal, MET's Institute of Engineering, Nashik. ANK is grateful to Management and Principal, NTVS's G T Patil Arts, Science and Commerce College, Nandurbar. VVL is thankful to the Management MET Bhujbal Knowledge City.

## Author contributions

All authors contributed to the study conception and design. Material preparation, data collection, and analysis were performed by VSK and ANK. Phase amount analysis from XRD was performed by MK<sup>5</sup>. The first draft of the manuscript was written by VVL and all authors commented on the previous versions of the manuscript. All authors read and approved the final manuscript.

## Funding

The authors declare that no funds, grants, or other support were received during the preparation of this manuscript.

## Data availability

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

## Declarations

**Competing interest** The authors have no relevant financial or non-financial interests to disclose.

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**NANDURBAR TALUKA VIDHAYAKSAMITI'S**  
**G.T.PATIL ARTS, COMMERCE AND SCIENCE COLLEGE,**  
**NANDURBAR, DIST-NANDURBAR-425412 (M.S.)**

NAAC Re-Accredited 'A' Grade (CGPA 3.10)  
DST FIST Identified College, ISO 9001:2008 Certified  
Awarded "Excellent College, 2014" By North Maharashtra University, Jalgaon



Prof. Dr. V. S. Shrivastava  
Principal

Office: (02564) 222293  
E-Mail: gtpcollege@rediffmail.com  
Web: www.ntvsgtpcollege.org

### Activity / Programme Report

Academic Year: 2020-2021

1	Name of Activity/Programme	field work/Study Tour
2	Date And Time	27/02/2020
3	Visit Place	Mandhavgarh, Maheshwer, Ujjain and Indor
4	Site Description	Field trips serve one vital function as far as education is concerned. Field trips link the classroom experience with the outside world in so doing they not only improve learning, but also give both the students and educators valued practical experience. The field trip we took the students was an interesting one judging by the varied lessons that we had to receive.
5	Aims of the Activity	Field trip reports improve the educational value of a trip. The trips deal with the spatial relations among data and the time relationships like the cultural history or geological processes.
6	No of students and teachers present	Boys: 40 Girls: 66 Faculty: 12 Total: 118
7	Detail report of the programme /activity	The department of Geography had arranged an educational tour for completing the field work of third year B.A students as per kbcnmu curriculum. A few members of our team went to collect some socio-economic data from Lataguri GP along with the teacher. The most interesting thing was Mandavgad fort, Ujjain Mahakaleshwar temple to see the Indor museum. The teachers of our college discussed the historical and cultural aspects of Mandahvghad.
8	Conclusions and Recommendations	The fieldwork enabled the students to understand the topography of the geographical area in conjunction with the population dynamics. It gave a firsthand experience to young geographers in handling and extrapolating geographical data with local realities. Awareness programme should be brought to the local people of the area concerning the agricultural practices and allied activities to safeguard the health of the stream.



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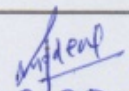


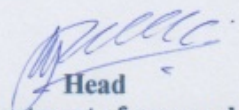
Prof. Dr. V. S. Shrivastava  
Principal


Office: (02564) 222293  
E-Mail: [gtpcollege@rediffmail.com](mailto:gtpcollege@rediffmail.com)  
Web: [www.ntvs-gtpcollege.org](http://www.ntvs-gtpcollege.org)

Photograph of the activity / programme:



  
Dr. R. R. Deore  
Name & Sign of  
organizing Teacher

  
Head  
Department of geography

  
Principal  
G.T.Patil College, Nandurbar

**“MANDAVGAD. UJJAIN. MAHESHWAR AND INDOR”**

*A*

TOUR REPORT  
SUBMITTED TO THE



**KAVAYITRI BAHINABAI CHAUDHRI NORTH MAHARASHTRA UNIVERSITY,  
JALGOAN**



**Nandurbar Taluka Vidhayak Samiti's  
G.T.Patil Arts, Commerce And Science College  
Nandurbar, Dist. Nandurbar**

**FOR THE DEGREE  
OF**

**B.A. M.A. /M.Sc.**

IN

**Department of Geography**

BY

Roll No. \_\_\_\_\_

Seat No. \_\_\_\_\_

UNDER THE GUIDANCE OF

**Dr. N.S. Pawar**

DEPARTMENT OF GEOGRAPHY

G.T. Patil Arts Science and Commerce Collage Nandurbar, Dist.Nandurbar

**2020**



1

HEAD

Department of Geography & Research Center  
Gajmal Tulshiram Patil College  
Nandurbar - 425412.



नंदुरबार तालुका विधायक समिती

जी.टी. पाटील कला, वाणिज्य व विज्ञान महाविद्यालय नंदुरबार जि. नंदुरबार

## प्रमाणपत्र



## भूगोल विभाग

प्रमाणित करण्यात येते की \_\_\_\_\_ बी.ए. व  
एम.ए. भूगोल बैठक क्रमांक \_\_\_\_\_ याने/हिने कवयित्री बहिणाबाई चौधरी उत्तर  
महाराष्ट्र विद्यापीठाने ठरवून दिल्याप्रमाणे भौगोलिक सहलीत भाग घेवून "सहल वृत्तांत" सन  
२०१९ - २०२० मध्ये पूर्ण केला आहे.

डॉ. एन.एस.पवार

विभाग प्रमुख



## प्रस्तावना

भूगोल या विषयाचा अलिकडील काळात विशेष महत्व प्राप्त झाले आहे. या विषयामध्ये पर्यावरणातील विविध घटकांचा अभ्यास केला जातो. भूगोल हा विषय अत्यंत व्यापक आहे. त्याच प्रमाणे भूगोलशास्त्र हे गतीमान शास्त्र आहे. भूगोल या विषयाच्या दिवसेंदिवस वाढत चाललेली ज्ञानशाखा ही मानव नैसर्गिक पर्यावरणाचा देखील अभ्यास करते. उपलब्ध संसाधनाचा उपयोग मानवाने आपली वैज्ञानिक प्रगती साधण्यासाठी केली आहे.

भूगोलाच्या अनेक शाखा आहेत. जसे मानवी भूगोल, प्राकृतिक भूगोल, पर्यावरण भूगोल, सागर विज्ञान, हवामानशास्त्र, लोकसेख्या भूगोल, पर्यटन भूगोल, असे अनेक शाखा आहेत. भूगोल शास्त्रामध्ये पृथ्वीवरील सर्व घटकांचा अभ्यास केला जातो. त्यामध्ये पर्यटन भूगोल ही एक नवीन शाखा निर्माण झाली आहे. अलिकडील काळात पर्यटन या शब्दाला बरेच महत्व प्राप्त झाले आहे. काही विषय मानवाला कलाटणी देऊन जाणारे असतात तर काही विभाग हे जीवनाला आनंदमयी प्राप्त करणारे एक विभाग आहे.

पृथ्वीला जलग्रह म्हणून संबोधले जाते. या पृथ्वीवर अनेक नद्या, नाले, सागर लाभले आहेत. त्यामुळे पर्यटनस्थळाची निर्मिती ही वाढत आहे. गतिमान मानव अस्थिर पर्यावरण यामुळे भूगोलाची व्याप्ती सतत वाढत आहे.

## सहलीचा उद्देश

सहल म्हणजे जीवनातील नऊ रसांचा संगम. ती हवीहवीसी वाटते. त्याचे कारण म्हणजे आपण वर्गात चार भिंतीच्या आत शिक्षण घेत असतो. पण पुस्तकी ज्ञानापेक्षा प्रत्यक्षात घेतलेला अनुभव हा फार महत्वाचा असतो. एखाद्या विषयाच्या खोलवर जायचे असेल तर यासाठी चार भिंतीत राहून चालणार नाही. तर त्यासाठी प्रत्यक्ष डोळ्याने अनुभव घेणे महत्वाचे असते. सहल ही विद्यार्थ्यांना आवड निर्माण करणारी गोष्ट आहे. सहलीमध्ये एक वेगळाच आनंद वाटायला लागतो.

सहलीमुळे विद्यार्थ्यांना प्रत्यक्षात अनुभव घेवून संशोधन करण्यास फायदा होतो. तसेच प्रत्यक्षात भूगोल आणि इतर शास्त्रांशी कसे संबंध आहे हे कळते. सहल ही प्रतिष्ठीत ठिकाणी तसेच जेथे निसर्गरम्य ठिकाण आहे व जेथे मानवनिर्मित किंवा जलाशय, निसर्गनिर्मित स्थळांची निवड करतात.

सहलीचा मुख्य उद्देश म्हणजे एखाद्या आध्यात्मिक, ऐतिहासिक व नैसर्गिक ठिकाणी जाणे. सहलीमुळे बरेच वेगळे अनुभव येतात. सहलीमध्ये रोजच्या जीवनापेक्षा वेगळाच आनंद मिळतो. सहलीच्या प्रवासात रस्त्यांनी जातांना लोकांचे उद्योग, व्यवसाय आपल्यापेक्षा काहीतरी वेगळे असते हे पाहण्यास मिळते. तसेच पर्यटनस्थळी गेल्यावर तेथील विदेशी पर्यटकांची वेगळीच वेशभूषा पाहण्यास मिळते.

शैक्षणिक सहलीमुळे आपले ज्ञान वाढते. व त्यामुळे एक प्रवासाची उत्सुकता व गोडी निर्माण होते. सहल ही एक आनंद देणारी गोष्ट असते. सहलीमुळे मानवी जीवनाचे वर्तन हे बदलतांना दिसते.

सहलीची निवड ही धार्मिक नैसर्गिक किंवा ऐतिहासिक स्थळ हे प्राचीन काळातील माहिती प्राप्त करून देणारी असते. तर आध्यात्मिक सहल ही गेल्या दशकातील. महाराष्ट्रातील विविध देवदेवतांची महंती जाणून घेण्यासाठी असते.

एकंदरीत सहलीचा उद्देश तेथील स्थळीची आवड निर्माण होणे, काहीतरी शोध घेणे किंवा ज्ञान घेणे होय.



## इंदोर

इंदोर शहराला फार मोठा इतिहास आहे. या संस्थानाचे संस्थापक मल्हारराव होळकर (१६९४ ते १७६६) यांनी आपल्या मामाच्या मदतीने पेशव्यांच्या सन्यात प्रवेश केला. इंदोर हे मध्य प्रदेशातील एक मोठे संस्थान. इंदोर म्हटले की, मराठी इतिहासातील कितीतरी जुन्या आठवणी जाग्या होतात. इंदोर हे नाव इंद्रेश्वर मंदिरावरून पडलेले आहे. हे मंदिर १७ व्या शतकातील आहे. सरदार मल्हारराव होळकर, अहिल्याबाई यांच्यामुळे इंदूर महाराष्ट्राला जवळचे वाटते. भौगोलिकदृष्ट्याही इंदूर महाराष्ट्राला जवळ आहे. इंदोर च्या उत्तरेला ग्वाल्हेर, पूर्वेला देवास व भोपाळ, दक्षिणेला पूर्वीचा मुंबई इलाखा आणि पश्चिमेला बडवानी व धार ही शहरं आहेत.

त्याने पेशव्यांकडून मनसब, माळव्याची जहांगीर व नर्मदेच्या उत्तरेकडील मराठ्यांच्या हालचालींचं सेनापतीपद हे अधिकार क्रमाक्रमाने मिळवले. त्याच्या हयातीतच त्याचा मुलगा खंडेराव मृत्यू पावल्याने खंडेरावाचा मुलगा मालेराव यास गादीवर बसवण्यात आले. तथापि मालेरावाच्या अकाली निधनामुळे खंडेराव यांच्या पत्नी अहिल्याबाई यांनी १७५४ ते १७९५ पर्यंत इंदोर संस्थानाची जबाबदारी सांभाळली. धार्मिकता, औदार्य, देवळांचे जीर्णोद्धार, न्याय व राज्यकारभाराची उत्तम व्यवस्था यासाठी अहिल्याबाई इतिहासात प्रसिद्ध झाल्या. अहिल्याबाईंनीच इंदूर शहराची भरभराट केली. २० एप्रिल १९४८ रोजी हे संस्थान मध्य भारत संघात विलीन झाले.

इंदोरची खाद्यसंस्कृती तर प्रसिद्ध आहे. इथले लोक खाण्यासाठी जगतात, असं म्हटलं तर वावगं ठरणार नाही. इंदोरच्या खवय्येपणाचे किस्से सर्वदूर पसरले आहेत आणि त्यात कणभरही अतिशयोक्ती नाही, हे इथे आल्या आल्या कळतं. त्याचबरोबर खाणं हे वेळेला बांधील नाही, त्यामुळे खायचं केव्हा हा प्रश्न पडायचं कारण नाही. इंदुरी लोकांचा दिवस सुरू होतो (आणि संपतोही) तो पोहे आणि जिलबीने. जिथे जाल तिथे पोहे दिसतात. केव्हाही गेलात तरी गरम पोहे मिळतात. या पोह्यावर विविध प्रकारची शेव, मसाला घालून ते दिले जातात. काही ठिकाणी जिलेबीही मिळते. सकाळी नाश्टा म्हणजे पोहे, हे इथं समीकरण आहे. एवढ्या प्रचंड प्रमाणात पोहे खपणारं हे भारतातील एकमेव शहर असावं. या विधानात कणभरही अतिशयोक्ती नाही.

इंदोर मध्ये आलात आणि बडा सराफ्याला गेला नाहीत तर तुम्ही इंदोर पाहिलंच नाही, असं म्हटलं जातं. कारण सराफा हा इंदोरच्या खाद्यसंस्कृतीचं जिवंत प्रतीक आहे. इथं 'जिवंत' या शब्दाला फार अर्थ आहे. इंदोर शहराच्या मधोमध होळकरांचा जो राजवाडा आहे त्याच्या मागच्या भागात अतिशय दाटीवाटीने असलेली दुकानं आहेत. यात कपडे, सराफांची दुकानं अर्थातच जास्त आहेत. थोडं पुढे गेल्यास सराफ बाजारच लागतो. या बाजारालाच सराफा म्हणतात. पण हा सराफा सोन्यापेक्षाही तेथील खाद्यसंस्कृतीसाठीच जास्त प्रसिद्ध आहे.

सराफी दुकानं बंद झाली की, रात्री साडेनऊनंतर विविध खाद्यपदार्थांची दुकानं लागण्यास सुरुवात होते. ही दुकानं रात्रभर उघडी असतात. तिथली स्पेशालिटी असलेले गराडू, साबुदाणा खिचडी, कचोरी, दहीवडा, गुलाब जाम, गोलगप्पा अशी यादी न संपणारी आहे. पोटात जेवढी जागा असेल आणि विविध चवी घेण्याची जिभेची तयारी असेल तेवढे विलक्षण चवींचे पदार्थ इथं मिळतात. या

भागात रात्रभर चहलपहल असते आणि ही काही यात्रेतल्यासारखी एका रात्रीची दुकानं नसतात, तर वर्षातील ३६५ दिवस हे चित्र असंच असतं. सराफा कधीही झोपत नाही. छप्पन भोग नावाच्या एका भागात मिठायांची दुकाने आहेत.

## इंदोरचे प्रेक्षणीय स्थळे

**गीताभवन** - ही वास्तू शहरातच आहे .सिंधमधून फाळणीच्या वेळी भारतात आलेल्या एका सिंधी गृहस्थाने ही वास्तू उभारली आहे . हे मंदिर भव्य आणि सुंदर आहे .प्रवेशद्वार दक्षिणेतील गोपुराच्या पद्धतीचे आहे. अनेक देवतांच्या सुंदर मूर्तीची मंदिरे आहेत .सभागृहात इतिहासकालीन दृश्यांची तैलचित्रे रंगवलेली आहेत. प्रवेशद्वार चार पूर्णाकृती दगडांवर उभारलेले आहेत .

**जुना राजवाडा** - हा वाडा होळकर घराण्याचा असून सात मजली आहे.

**लालबाग महाल** - हा खूप मोठ्या विस्ताराचा राजवाडा आहे.पण बाहेरून अतिशय सामान्य अशी वास्तू वाटते. आता होळकर घराण्यातील कोणीही व्यक्ती तेथे राहत नाही .शेवटच्या वंशज (उषा राजे मल्होत्रा)विवाहानंतर मुंबईला १९६० च्या सुमारास स्थायिक झाल्या .त्यांनंतर महालाची देखभाल पुरातन तत्व विभागाकडे आली आहे .

**काच मंदिर** - संपूर्ण इमारत बाहेरच्या बाजूला रस्त्यावरून( आत येण्याच्या भाग सोडून)प्रवेशद्वारापासून आत सर्वत्र रंगीत काचांच्या तुकड्यांची बांधलेली आहे. हुकूमचंद शहा या गृहस्थाने ती बांधली आहे. यात भिंतीवर, छतावर मूर्ती आहेत. त्यातून महाविराच्या जैन धर्मातील दृश्ये आहेत. चित्रात बारकावे स्पष्ट दिसतात. (फोटो काढायला परवानगी नाही )ही वास्तू गावातच भर वस्तीत आहे.

## उज्जैन महाकालेश्वर मंदिर

महाकालेश्वर मंदिर मधील मूर्तीस बरेचदा दक्षिण मूर्ती म्हणून ओळखले जाते. कारण ती दक्षिण मुखी मूर्ती आहे. परंपरेनुसार महाकालेश्वर हे १२ ज्योतिर्लिंगांपैकी एक आहे. व सर्वात जास्त आस्थेचे मानले जाते. येथील लिंग महादेव तीर्थ स्थळाच्या वर स्थापित केले आहे. येथे गणेश पार्वती आणि कार्तिकेय देव यांच्या प्रतिमा पण आहेत. दक्षिण दिशेस प्रिय नांदी स्थापित केले आहे. असे म्हटले जाते कि, येथे बनविलेले नागचंद्रेश्वर मंदिर चे कपाट फक्त नागपंचमीस उघडले जातात.

महाकालेश्वर मंदिर एका विशाल बागीच्याच्या मध्यभागी आहे. हे मंदिर पाच मजली असून त्यातील खालील पहिला मजला हा जमिनीत आहे. या शेजारी रुद्रसागर सरोवर आहे. याच्या भिंतीवर पितळी दिवे स्थापित केले आहेत. येथे सोमवारी भक्तांची फार गर्दी असते. दररोज विधिवत पूजा केली जाते. महाकालेश्वर लिंगास सजवले जाते. नित्य नियमाने प्रसादाचे वाटप होते.

येथे महाशिवरात्रीस एका मोठ्या महोत्सवाचे रूप पाहायला मिळते. या मंदिराच्या प्रांगणात स्वप्नेश्वर महादेव मंदिर सुद्धा आहे. येथे महाकाल रूपी भगवान शंकरांची पूजा केली जाते. अशी मान्यता आहे कि येथे पूजा केल्यास आपले स्वप्न पूर्ण होते. हे एक सदाशिव मंदिर आहे. येथे भक्त

मोट्या भक्ती भावाने स्वप्नेश्वरांची पूजा करतात. असे म्हटले जाते कि येथे माता स्वप्नेश्वरींचा हि वास आहे. त्यामुळे माता भगिनी आपल्या मनोकामनाचे साकडे. त्यांच्या कडे घालतात.

### महाकालेश्वर ज्योतिर्लिंग

शिव पुराणानुसार एकदा त्रिदेव ब्रम्हा, विष्णू आणि महादेव यांच्यात चर्चा सुरु होती. तेव्हा भगवान शंकराच्या मनात ब्रम्हदेव आणि महादेव यांची परीक्षा घेण्याचा विचार आला. त्यांनी त्या दोघांना प्रकाशाचा अंत कोठे आहे. हे शोधन्यास सांगितले.

ब्रम्हा व विष्णू दोघांसाठी शिवांनी एक मोठा स्तंभ उभारला ज्याचा अंत कोठे होतो दिसेना. दोघेही त्या स्तंभाचे टोक शोधू लागले. पण तो सापडे ना श्रीविष्णू थकले व आपली हर मान्य केली तर ब्रम्हा खोट बोलले कि त्यांना त्याचे टोक सापडले.

यावरून क्रोधीत होवून शिवांनी त्यांना श्राप दिला कि लोक तुमची पूजा कधीच करणार नाही तर विष्णूची सर्वच पूजा करतील. तेव्हा क्षमा मागत ब्रम्हानी शिवाची विनवणी केली तेव्हा या स्तंभात शिव स्वतः विराजमान झाले. हे स्तंभ महाकालेश्वर ज्योतिर्लिंग मानले जाते. स्तंभाचे रुपांतर लिंगात झाले तेव्हा पासून या ज्योतिर्लिंगास खास महत्व प्राप्त झाले आहे.

### 'महेश्वर'

महेश्वर हे मराठी मनांसाठी अभिमानस्पद असं गाव आहे. मध्य प्रदेशात नर्मदेच्या किनारी वसलेल्या या गावातच अहिल्याबाई होळकर यांची राजधानी होती. इथे बसूनच त्यांनी माळव्यातील मराठी दौलतीचा कारभार हाकला. पण त्याचबरोबर सम्राट कार्तवीर्य अर्जुन याची राजधानी म्हणूनही महिष्मती अर्थात महेश्वरची ओळख आहे. पहाण्यासारखं इथे बरंच काही आहे. किल्ला, मंदिरे, नर्मदेचा किनारा आणि महेश्वरी साड्या हे येथे येण्याचे आकर्षण बिंदू आहेत.

महेश्वरला कवेत घेऊन नर्मदा येथून जाते. या नदीवर बांधलेले घाट देखणे आहेत. पेशवा घाट, फणसे घाट, अहिल्या घाट हे प्रसिद्ध घाट आहेत. या घाटावर फारशी लगबग दिसत नाही. नदीच्या एकाच बाजूला घाट असल्याने तिथे बसून पत्नीकडचे ग्रामीण जीवन अतिशय छानपैकी बघता येते.

राजगादी आणि राजवाडा नर्मदेच्या तीरावरच किल्ला आहे. त्यातील राजगादीवर अहिल्याबाईची मूर्ती आहे. ही राजगादी पाहिल्यावर तो सगळा काळ जिवंत होऊन आपल्यासमोर ठाकतो. या किल्ल्यावरूनच संथ वाहत जाणाऱ्या नर्मदेचे धीरगंभीर पात्र दिसते. याच किल्ल्यात महेश्वरी साड्या तयार करण्याची केंद्रे आहेत. या विणकरांना अहिल्याबाईंनी त्यावेळी सूरत वगैरे शहरातून बोलवले होते. त्यांच्या पुढच्या पिढ्याही येथे हेच काम करत आहेत. किल्ल्यातील छोट्या मंदिरातूनच येथील प्रसिद्ध दसरा उत्सवाची सुरवात केली जाते.

### मंदिरे

महेश्वरातील मंदिरेही प्रसिद्ध आहेत. कालेश्वर, राजराजेश्वर, विठ्ठलेश्वर व अहिल्येश्वर ही मंदिरे खासकरून पाहण्यासारखी आहेत. मंदिरावरची नक्षी, त्यामागील कल्पना या सगळ्या गोष्टी खरोखरच देखण्या आहेत. अहिल्याबाई या जनतेप्रती कनवाळू व गुन्हेगारांप्रती कठोर शासक म्हणून

प्रसिद्ध होता. आपल्या मुलालाही त्याच्या गुन्ह्याबद्दल त्यांनी हतीच्या पायी देऊन मारले होते, अशी कथा आहे. त्याचे मंदिरही येथे उभारण्यात आले आहे.

अनेक चित्रपटांचे चित्रीकरण महेश्वरच्या सुरेख घाटांवर झालेले आहे. आदी शंकराचार्य या पहिल्या संस्कृत चित्रपटाचे चित्रीकरण या भागात झाले आहे. २०१८ साली प्रदर्शित झालेल्या पॅडमॅन या अक्षयकुमार अभिनीत चित्रपटाचे बरेचसे चित्रीकरण महेश्वर येथे झाले राणी अहिल्याबाई होळकरांचा राजवाडा आणि नर्मदेकाठी बांधलेले महेश्वराचे मंदिर यामुळे अनेक पर्यटक महेश्वरला भेट देत असतात.

## मांडवगड

ऐतिहासिक पार्श्वभूमी लाभलेले पण नागरी वस्तीपासून एका बाजूस पडलेले मध्य हिंदुस्थानातील मांडवगड हे प्रेक्षणीय स्थळ आहे. राजा भोजपासून अनेक परकीय आक्रमणे पाहिलेला आणि त्यांच्या राजकीय काळाचा साथीदार असलेला दगडी आणि कलात्मक बांधणी असलेला हा भारदस्त किल्ला पर्यटकांचे आकर्षण बनलेला आहे.

सातपुडा पर्वत हा महाराष्ट्र, गुजरात, मध्य प्रदेश यांच्या सीमा आहेत. तच उत्तर पश्चिमेस हा मांडवगड किल्ला आहे. येथे येताना खांडवा (मध्य प्रदेश), शिरपूर (महाराष्ट्र), इंदूर (मध्य प्रदेश) असून मांडव गडकडे येताना हिरवागार घाटरस्ता लागतो. पावसाळत तर हे दृश्य फारच बहारदार दिसते. मधूनच इंदूर खांडवा दरम्यान जाणाऱ्या रेल्वेगाडीचे दर्शनदेखील घडते. मांडवगड या भव्य वास्तूचे ढोबळमनाने तीन भाग पडतात. दिल्ली द्वाराकडून उत्तरेकडील 'रॉयल एनक्लेव्ह' आहे आणि पुढे मांडू गाव आहे. किल्ल्याच्या दक्षिणेकडे रेवाकुंड आहे. रॉयल एनक्लेव्ह भागात बऱ्याच इमारती आहेत,



**हिंदोळा महाल :** रॉयल एनक्लेव्हमध्ये असलेल्या इमारतींना महाल म्हणतात. या वास्तूजवळ दोन जलाशय आहेत. महमद शाहच्या मुलाने ही वास्तू बांधली. या महालाच्या उत्तरेस एक घुमट आणि चर्चसदृश भाग दिसतो. त्यास हिंदोळा महल म्हणतात.

**अशरफी महाल :** अशरफी महाल ही मूळची मदारसा (धर्मपीठ) होती. नंतर महंमद शहाने त्याची कबर बनविली.

**जामा मशीद :** अफगाणी स्थापत्य शास्त्राचे उत्तम उदाहरण म्हणजे त्याच्या परिसरातील जामा मशीद होय. एकूण 80 चौ. मीटर्सचा परिसर व्यापलेली ही भव्य वास्तू.

रूपमती महाल हा रूपमती राणीसाठी होता. तिच्यासाठी अकबर बादशहा मांडवगडावर चालून आला. तेथे दर्याखान कबर, हाथी महाल अशा दोन वास्तू आहेत. इंदूरपासून 115 कि.मी. अंतरावर मांडवगड आहे. इंदूर मध्यवर्ती ठेवून हे ठिकाण पाहणे सोयीचे पडते.

आज मांडू एक पर्यटनस्थळ म्हणून प्रसिध्द असले तरी या गावाचे धागेदोरे थेट इसवीसनपूर्व सहाव्या शतकापर्यंत जातात. इथे मिळालेल्या पाचव्या शतकातील संस्कृत शिलालेखात ६ व्या शतकातील या गावाचा उल्लेख आहे. अकराव्या शतकात इथे परमारांची सत्ता होती. त्यावेळी या ठिकाणाचा उल्लेख मांडवगड या नावाने केलेला आढळतो. इसवीसन १३०५ मध्ये अल्लाउद्दीन खिलजीने मांडवगड जिंकून त्याच नाव शबिदाबाद ठेवले. चौदाव्या शतकात दिल्लीची सत्ता तिमुरच्या हाती गेल्यावर माळव्याचा सुभेदार दिलावर खान याने मांडव्याची सत्ता ताब्यात घेतली. या घौरी घराण्याच्या काळात मांडव्याची राजधानी धार येथून मांडूला हालवण्यात आली. घौरी घराण्याच्या अस्तानंतर सत्ता खिलजी घराण्याच्या ताब्यात गेली. या घराण्यातील घियासुद्दीन याने ३१ वर्ष सत्ता उपभोगली. संगित आणि कलेच्या रसिक असलेल्या या सुलतानाच्या काळात बांधल्या गेलेल्या जहाज महाल, हिंदोळा महाल इत्यादी अनेक वास्तू आज मांडूच आकर्षण ठरलेल्या आहेत.

मांडू किल्ला तेथिल निसर्ग आणि वास्तू वैभव पाहाण्यात दोन दिवस पटकन संपून जातात. मांडू सोबत ३ दिवसांचा कार्यक्रम केल्यास उज्जैन, धार, महेश्वर आणि ओंकारेश्वर पाहात येईल.

## अभिप्राय

प्रत्येकाला आपल्या आयुष्यात अनेक संधी मिळत असतात. त्या संधीचा फायदा घेऊन आपल्या संपूर्ण आयुष्यात एका अविस्मरणीय क्षणाची नोंद व्हावी असे नेहमी वाटत असते. ती वेळ आमच्या मांडवगड, उज्जैन, महेश्वर व इंदोर येथील विलोभनिय स्थळे पाहून तेथील नैसर्गिक भागातील मानवी जीवन, वनस्पती जीवन, भूप्रदेश, लोकजीवन इ. विषयी माहिती आम्हाला मिळाली. तेथील सर्व दृश्याचा आम्ही अंतकरणांत एक सुंदर असा देखावा जतन करून ठेवला आहे.

निसर्गाबद्दल मानवाला नेहमीच आकर्षण वाटते याचा विश्वास आम्हाला या सहलीतून आला. बघितलेल्या स्थळांचे तेथील संस्कृतीचे जवळून दर्शन घ्यावयाचे असेल तर प्रत्यक्ष तेथे जावून भेट देणे गरजेचे असते व त्यासाठी प्रवास करावा लागतो.

प्रवासातून विविध प्रदेश पहावयास मिळतात. वेगवेगळे अनुभव अनुभवयास मिळतात. त्यातून नवनवीन माहिती आपल्याला मिळत असते. व आपल्या बौद्धिक ज्ञानात नवीन माहितीची भर पडत असते.

त्याचप्रमाणे या सहलीतून सर्वच मित्रांचा सहवास आम्हाला लाभला. तसेच काही मित्रास असलेले सुप्त गुणांची माहिती मिळाली. त्यांच्यामध्ये असलेल्या कलागुणांची माहिती होऊन त्यांच्यात एक कलाकार पहावयास मिळाला.

त्याचप्रमाणे डॉ. एन.एस.पवार, डॉ अमोल आर भुयार, प्रा. एफ. आर, खांडेकर, प्रा. मनोहर बी. पाटील व प्रा. रूपेश आर.देवरे यांचे सर्वांचे आम्हाला अनमोल असे मार्गदर्शन लाभले.

SR.N O	NAME	CLASS	DATE OF BIRTH
1	TADVI RAMESH OJAMA	S.Y.B.A	
2	VALVI RUPSING HANYA	S.Y.B.A	
3	RAUT SHILA MOTYA	S.Y.B.A	
4	WASAVE DILIP GAMA	S.Y.B.A	
5	PATIL ASHWINI HIMMAT	S.Y.B.A	
6	PAWARA MANISHA AALIM	S.Y.B.A	
7	PUNDE GAURAV ARJUN	S.Y.B.A	
8	THELARI SANTOSH ARJUN	S.Y.B.A	
9	VASAVE DAJYA DHARMA	S.Y.B.A	
10	VASAVE SNEHAL VINODKUMAR	S.Y.B.A	
11	PADVI SUNIL KIRTA	S.Y.B.SC	
12	CHAUDHARI ANIL SAVALU	S.Y.B.A	
13	MALI DIPIKA EKANATH	S.Y.B.A	
14	RAUT GANESH RAJU	S.Y.B.A	
15	PATLE PRIYANKA BARKYA	S.Y.B.A	
16	VASAVE BABITA JEGALA	S.Y.B.A	
17	PADVI SAGAR ARJUN	S.Y.B.A	
18	VASAVE KANTILAL	T.Y.B.A	
19	TADVI TUMLYA	T.Y.BA	
20	VASAVE SEGA	T.Y.BA	
21	NAIK GAMERSINGH.G	T.Y.B.A	
22	VALVI BHAGYSHRI	M.A/M.Sc	
23	TADVI SURESH PANSHI	T.Y.B.A.	
24	NAIK DAKSHA SOMDEV	T.Y.B.A.	
25	Shinde Bhushan sumil	T.Y.B.A.	
26			
27	DR. N.S. PAWAR	HOD	
28	DR. A.R.BHUYAR	ASSIT. PROF.	
29	PROF R.R.DEORE	ASSIT. PROF.	

# RESEARCH COLLABORATION

This RESEARCH COLLABORATION is entered into, on this date 01/07/2021

BETWEEN

NTVS's G. T. Patil Arts, Commerce and Science College, Nandurbar-(425412) represented herein by Principal, Prof. V. S. Shrivastava (hereinafter, referred as 'First Party', include its successors – in-office, administrators and assigns).

AND

Dadasaheb Devidas Namdeo Bhole College, Bhusawal-425201 represented herein by Principal, Prof. Dr. R. P. Phalak (hereinafter, referred as 'Second Party', include its successors – in-office, administrators and assigns).

(First Party and Second Party are hereinafter jointly referred to as 'Parties' and individually as 'Party')

NOW THEREFORE, IN CONSIDERATION OF THE MUTUAL PROMISES SET FORTH IN THIS MoU, THE PARTIES HERETO AGREE AS FOLLOWS:

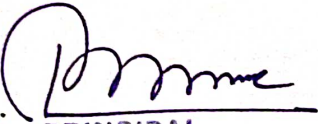
- **Project-Based Learning**: First Party shall design project-based activities especially for Science, Technology, Engineering and Mathematics (STEM) subjects for students of Second Party helping them excel in these subjects.
- **Training**: First Party shall design modules for training on recent technologies and share knowledge with teachers and students of Second Party.
- **Career Counseling**: First Party shall conduct exclusive sessions with students of Second Party on futuristic careers in the fields of Science & Engineering, Commerce & Management, Pharmacy, etc.
- **Student Connect**: Second Party shall share student details with First Party for one-to-one interaction and guidance on projects, models, skill development, career enhancement etc.
- **College Tour**: Get students of Second Party to experience a guided tour to campus, colleges, classrooms, laboratories, libraries, etc. of First Party.

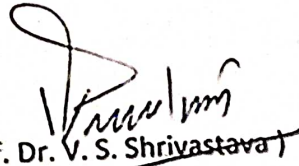


- **Newsletters**: Students of Second Party shall have access to newsletters of First Party.
- **Events**: Students of Second Party will be regularly invited to be part of knowledge-based events and activities of First Party.
- **Resource Sharing**: Teachers and Students of Second Party will have access to online repositories of First Party for educational purpose.
- **Partner**: Parties may mention as Partner on their website.
- **Alumni Connect**: First Party shall help to connect Alumni of both Parties.
- **Validity**: This Collaboration shall be valid for 5 years from the July, 2021 and each party shall be at full liberty to terminate the collaboration with mutual consent.
- **Free of Cost**: The services herein are free of cost for education purpose.

For  
**Dadasaheb Devidas Namdeo Bhole**  
 College, Bhusawal-425201

For  
**NTVS's G. T. Patil Arts, Commerce and**  
**Science College, Nandurbar-425412**

Signature:   
 PRINCIPAL  
 Dadasaheb Devidas Namdev Bhole  
 Mahavidyalaya, Bhusawal

  
 (Prof. Dr. V. S. Shrivastava)  
 Principal  
 PRINCIPAL  
 G.T.Patil Arts, Commerce &  
 Science College  
 NANDURBAR - 425 412 (M.S.)

Name: Prof. Dr. R. P. Phalak

Signature:  
 Name: Prof. V. S. Shrivastava

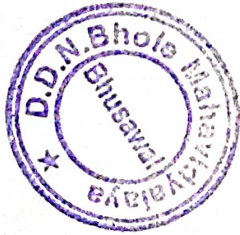
Designation: Principal

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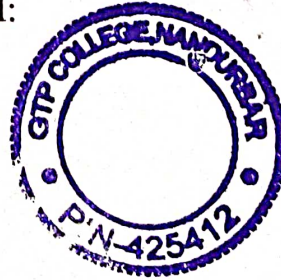
Date: 01/07/2021

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## Thermo-physical Investigations of oils, N-(2-aminoethyl)-oleamide and Resulting Gels using TGA-DSC

NARENDRA S. JOSHI<sup>1,2</sup>, GOVINDA P. WAGHULDE<sup>2\*</sup> and GAURAV R. GUPTA<sup>3\*</sup>

<sup>1</sup>Department of Chemistry, Arts, Commerce & Science College, Bodwad-425310, Maharashtra, India.

<sup>2</sup>Department of Chemistry, D. D. N. Bhole College, Bhusawal-425201, Maharashtra, India.

<sup>3</sup>Department of Chemistry, GTP College, Nandurbar-425412, Maharashtra, India.

\*Corresponding author E-mail: grgupta83@gmail.com, drgpwaghulde@gmail.com

<http://dx.doi.org/10.13005/ojc/370632>

(Received: November 28, 2021; Accepted: December 30, 2021)

### ABSTRACT

Edible vegetable oils were gelled by using N-(2-aminoethyl)-oleamide. Oils in their free state were subjected to differential scanning calorimetry (DSC) and thermogravimetric analysis (TGA) analysis. The gels of these oils were prepared by using N-(2-aminoethyl)-oleamide as gelator and similar thermal analysis of the gels was carried out. The thermal analysis data obtained was used to determine specific heat capacity at constant pressure ( $C_p$ ). The values were compared with the reported values of heat capacities. It is observed that the thermal properties and transitions of oils and gels, specific heat capacity is helpful parameter to understand the fundamentals of gels and gelation strategies.

**Keywords:** Organo-gelator, Gelation, Heat capacity, Thermal analysis, TGA, DSC.

### INTRODUCTION

The vegetable oils and fats are composed of different triacylglycerols (TAG), i.e., esters of fatty acids and glycerol. The chemical as well as physical properties of oils and fats are related to their fatty acid and triacylglycerol composition.<sup>1</sup> In many food products, crystallization and melting behavior of the oils are important properties for functionality. These thermal properties are important for identification of vegetable oils and can be used in quantitative and qualitative ways.<sup>2-6</sup> In confectionery, dairy and margarine industries, some of these vegetable

fats like milk fat, hydrogenated fats, cocoa butter, etc. exhibits specific thermal behavior, relating to their useful properties in food formulations and their enormous use. It is necessary to know the physical properties, chemical composition and thermal behavior of the edible vegetable oils for a sufficient control of processes and for framing standard parameters for each desired use.<sup>7</sup> The specific heat capacity at constant pressure ( $C_p$ ) can be considered as one of the important and useful physical properties. The information of the specific heat capacities of the oils is very useful to determine their behavior during different industrial processes.



## EXPERIMENTAL

### Materials

The oils viz., sesame oil, mustard oil, citriodora oil were purchased from local market. All the chemicals (extra pure) used for synthesis of gelator were purchased from Fisher Scientific.

### Instrumentation

#### TGA-DSC analysis

The TGA-DSC analysis of the synthesized gelator was carried out at Central Instrumentation Facility, Shivaji University, Kolhapur and is reported in our previous communication.<sup>8</sup>

### Synthesis of gelator and the gels

As reported in our earlier communication, several amide-based gelators were synthesized by using oleic acid as the precursor. Characterization of the synthesized gelator was done by using FTIR, <sup>1</sup>H-NMR, <sup>13</sup>C-NMR and Mass Spectral Analysis. A weighed quantity of the synthesized organo-gelators was added to the oil and the mixture was heated until all the gelator dissolves completely. The solution was then cooled to room temperature. Opaque gel forms slowly on cooling which was confirmed by inverting the tube.<sup>8</sup>

## RESULTS AND DISCUSSION

Oils derived from wide variety of plants are an essential part of almost all the food products, and their structure related properties play a vital role in the production. The state-of-the-art exploration of these materials makes it essential to understand the complex structures and properties of these valuable materials. In addition to that, thermal analysis is the key tool in the arsenal of analytical chemistry for the elucidation of the structure related properties of these materials.<sup>9-10</sup>

Although, a systematic thermal analysis of variety of oils and food materials using TGA-DSC has already been reported very aptly in the literature and the results have been discussed very systematically.<sup>11-14</sup> However, adequate reports have not been found on the detailed thermal analysis of the gels of oils, in particular the specific heat capacity measurements of such gel using thermal methods. In the following pages, thermal profiles of citriodora oil, mustard oil, sesame oil and their corresponding

gels with N-(2-aminoethyl)-oleamide have been discussed thoroughly.

### Thermal analysis of Citriodora oil, N-(2-aminoethyl)-oleamide and gel

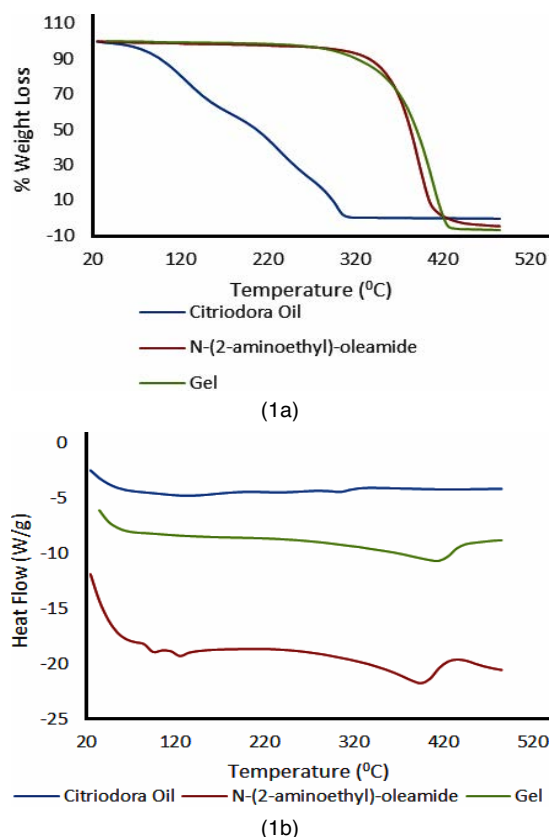


Fig. 1. TGA-DSC analysis of citriodora oil, N-(2-aminoethyl)-oleamide and gel

The closer scrutiny of the Fig. 1a, TGA of N-(2-aminoethyl)-oleamide and gel reveals a very sharp single stage decomposition over 300°C. The citriodora oil, a blend of triglycerides and free fatty acids, shows measurable pattern of decomposition as a function of temperature and possibly it is attributed to the composition and structural mesophasic changes occurred in such type of blends.<sup>1</sup> In Fig. 1b, the heat flow response and the formation of endothermic pattern for citriodora oil, N-(2-aminoethyl)-oleamide and their gel provides sound information about the smectic or mesophasic changes encountered in the oil and the gel. To our delight, it is to be observed that the resulting gel have transitory response between oil and gel.

### Thermal analysis of Mustard oil, N-(2-aminoethyl)-oleamide and gel

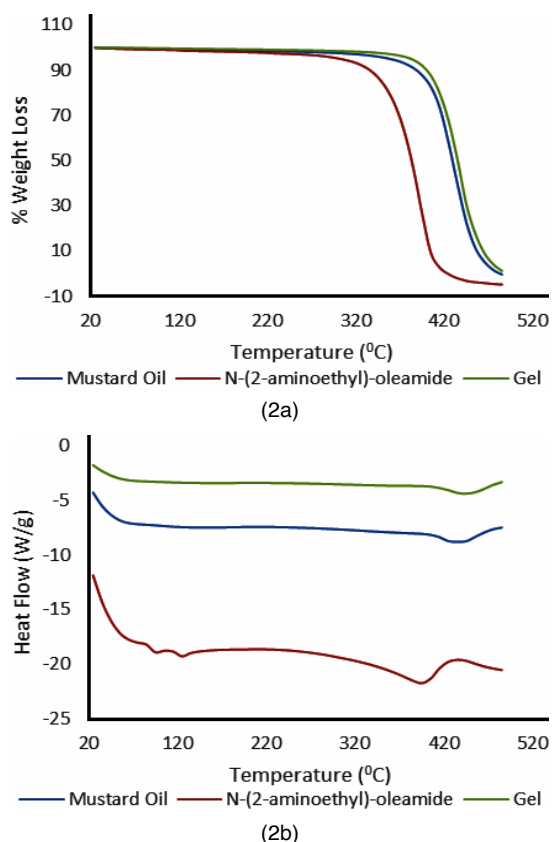


Fig. 2. TGA-DSC analysis of mustard oil, N-(2-aminoethyl)-oleamide and gel

The closer scrutiny of the Fig. 2a, TGA of mustard oil, N-(2-aminoethyl)-oleamide and gel reveals a very sharp single stage decomposition over 300°C. In Fig. 2b, the heat flow response and the formation of endothermic pattern for mustard oil, N-(2-aminoethyl)-oleamide and their gel provides sound information about the smectic or mesophasic changes encountered in the oil and the gel.

As mentioned earlier, all oils are blend of triglycerides and free fatty acids, and exhibited measurable pattern of decomposition as a function of temperature and possibly it is attributed to the composition and the structural mesophasic changes occurred in such type of blends.<sup>1</sup> It is to be noted that in case of mustard oil and its gel with N-(2-aminoethyl)-oleamide, interesting pattern of heat flow and endo-peaks have been observed in which the oil have a transitory response between gel and a gelator.

#### Thermal analysis of Sesame oil, N-(2-aminoethyl)-oleamide and gel

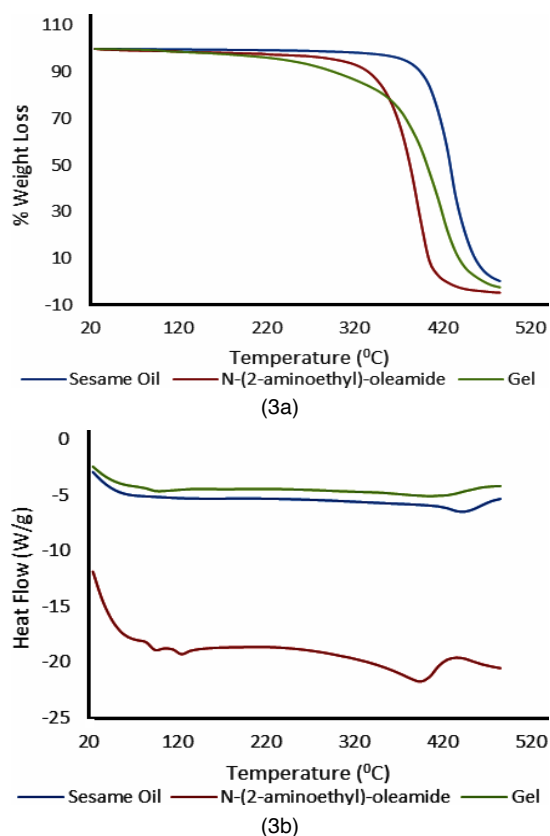


Fig. 3. TGA-DSC analysis of sesame oil, N-(2-aminoethyl)-oleamide and gel

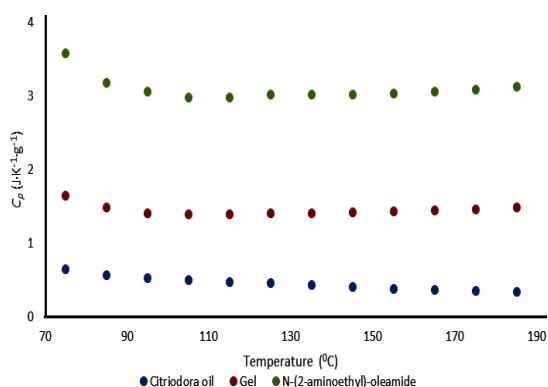
The closer scrutiny of the Fig. 3a and 3b, TGA-DSC of sesame oil, N-(2-aminoethyl)-oleamide and gel reveals quite a similar pattern of decomposition as well as heat flow as a function of temperature with the previous mustard oil systems.

The utility of thermal methods towards the determination of thermal properties of oils or fats is one of the major areas of the application of thermal analysis (TGA-DSC). Till date, the thermal properties of quite a large number of oils and fats have extensively been studied using thermal methods like TGA and DSC. It is to note that the properties of oils and fats are intensely influenced by physico-chemical interactions, specifically among triglycerols (the fundamental species in oils and fats). The present literature also reveals that the physicochemical interactions present in the oils and the fats are very complicated, and a complete information and knowledge of their thermal properties requires a thorough examination of such interactions. As it is fact that we cannot have any first-hand information about the chemical composition of oils and fats

based on these experiments. However, we can have a sound information about the science of the key thermodynamic changes that are associated with the phase transformation in the oil. Furthermore, these thermodynamic features are strongly depending on the general chemical composition of oils and fats and hence can be used for identification and full scope exploration of oils and fats, in qualitative and quantitative ways.

Thermal method (DSC) is particularly useful for studying the structure related interactions within the triglycerol components, because these techniques provide fundamental of the phase equilibrium diagrams for the studied systems, which provide a prowess of structure related information. It is also fact that beyond the compositional variation and their structure related interactions, the temperature-dependent polymorphic behavior of triglycerols in oils is responsible for their complicated thermal properties. On the other hand, DSC has advantage not only for thermodynamic analysis, but also for isothermal analysis of the system. Notably, the DSC profiles can also be explored towards the determination of one of the most important thermodynamic properties, i.e., specific heat capacity very systematically<sup>15-17</sup>. In the following pages, the specific heat capacity data for the studied systems are presented and discussed.

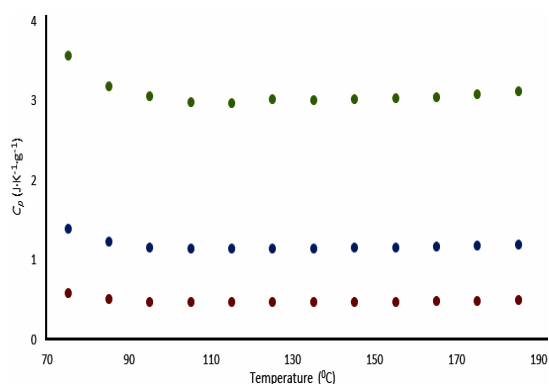
#### Specific heat capacity ( $C_p$ ) of Citriodora oil, N-(2-aminoethyl)-oleamide and gel



**Fig. 4.** Variation of specific heat capacity ( $C_p$ ) of citriodora oil, N-(2-aminoethyl)-oleamide and gel as a function of temperature

From the Fig. 4, it is to be said that citriodora oil is the stable blend of triglycerols and have low specific heat capacity values than the corresponding gel.

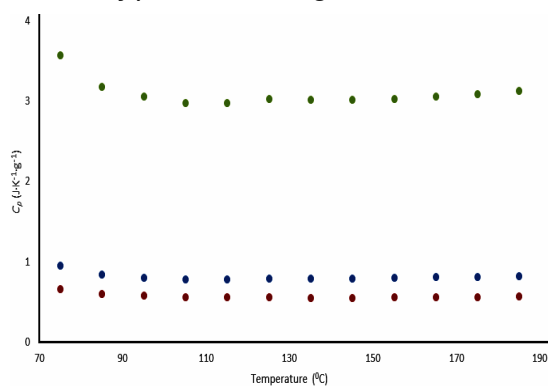
#### Specific heat capacity ( $C_p$ ) of Mustard oil, N-(2-aminoethyl)-oleamide and gel



**Fig. 5.** Variation of specific heat capacity ( $C_p$ ) of mustard oil, N-(2-aminoethyl)-oleamide and gel as a function of temperature

The closure scrutiny of Fig. 5 reveals that the gel of the mustard oil is quite stable as compared to the mustard oil.

#### Specific heat capacity ( $C_p$ ) of Sesame oil, N-(2-aminoethyl)-oleamide and gel



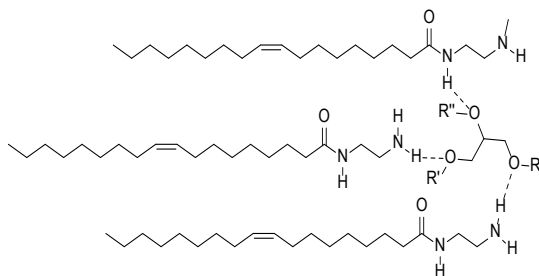
**Fig. 6.** Variation of specific heat capacity ( $C_p$ ) of sesame oil, N-(2-aminoethyl)-oleamide and gel as a function of temperature

From the above Fig. 6, it is to be said that the gel of sesame oil is comparatively stable than the corresponding gel.

As we know, DSC is one of the widely used instrumental techniques for determination of the structure related properties of oils and other biomaterials, and it is to be applied very aptly in the field of oils and fats to understand wide variety of complex reactions viz., phase transitions, crystallization and melting processes, and lipid oxidation in the oils. Notably, all the structure related changes in oils and fats involve endothermic or

exo-thermic reactions. However, DSC is considered as a non-specific analytical technique in order to measure the various structure related changes in oils and fats.

As specific heat capacity curves of the studied oils and their corresponding gels differ considerably, there is a basis for qualitative detection of adulteration or the presence of gelator from the perspectives of pure oils as noticed in the DSC curves (Fig. 1b, 2b, and 3b) as well as in specific heat capacity curves (Fig. 4–6). However, based on the characteristic composition, i.e., triglycerols of individual oils, the attempts have been made to comprehend the possible mechanism for the H-bonding interactions between oil and the gelator (Scheme 1).



**Scheme 1: Possible H-bonding interactions between triglycerol part of the oil and N-(2-aminoethyl)-oleamide**

### CONCLUSION

The use of thermal analysis for

understanding the gelation mechanism for the gel formation between oils and N-(2-aminoethyl)-oleamide on the basis of the chemical components is attempted here. The influence of triglycerols may find more information on further detailed investigation. Considering the huge global market in oils and gels, DSC could indeed be a useful technique for understanding thermal properties of oils and gels through characterization of the curves. In addition to that, new perspectives in the application of thermal methods to extract quality information about the studied systems are desirable. In the present study, it is found that the thermal properties and transitions of oils and gels, specific heat capacity is a benchmark parameter to understand the fundamentals of gels and gelation strategies. The DSC and thermal techniques are found to be very interesting for its application in food and related technology for academicians, researchers and industries in different sectors of food manufacture.

### ACKNOWLEDGEMENT

We acknowledge the analytical services of CIF, Shivaji University, Kolhapur and the support from Dadasaheb Devidas Namdeo Bhole college, Bhusawal and Arts, Commerce and Science College, Bodwad for this work.

### Conflict of Interest

The authors declare that we have no conflict of interest.

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पी.आर. हायस्कूल सोसायटीचे

कला, वाणिज्य आणि विज्ञान महाविद्यालय,  
धरणगांव जि. जळगांव पिन ४२५१०५

(वरिष्ठ महाविद्यालय)

(नेक, बेंगलुरु द्वारा पुनर्मुल्यांकित B श्रेणी)

दूरध्वनी क्रमांक : ०२५८८-२५१३७९

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(Senior College)

(Reaccredited by NAAC, Bangluru - 'B'Grade)

Phone No. - 02588-251371

Email : [principal@acscollegedharangaon.org](mailto:principal@acscollegedharangaon.org)

Date: 20/02/2021

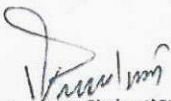
## Collaboration/Linkage Certificate

To whomsoever it may be concern

This is to certify that **Dr. Manohar RajendraPatil** Department of Chemistry **NTVS's G.T. Patil Arts, Commerce and Science College, Nandurbar-425412** has research collaboration (since 2020)with **P.R.High School Societie's Arts , Commerce and Science College, Dharangaon, Dist. Jalgaon-425105** for sharing the research ideas, exchange of reprints of our research papers and for the sample characterizations. We have jointly worked on research topics related to the application of nanoparticles and have published the research work in reputed international journals.

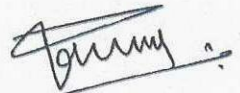
We have further extended this linkage with both the Chemistry departments to review the curriculum, teaching practices and discuss ways in which courses could be revised to promote scientific knowledge among the students.

Place: *Dharangaon*

  
(Prof. Dr. V. S. Shrivastava  
Principal

PRINCIPAL  
G.T.Patil Arts, Commerce &  
Science College  
NANDURBAR - 425 412 (M S 1)



  
Yours Sincerely

for **PRINCIPAL**  
Arts, Commerce & Science College  
Dharangaon, Dist. Jalgaon

## महाराष्ट्र शासन

### पाणी पुरवठा व स्वच्छता विभाग

भूजल सर्वेक्षण आणि विकास यंत्रणा  
(GSDA), नंदुरबार व न.ता.वि.स.

गजमल तुळशिराम पाटील महाविद्यालय,  
नंदुरबार यांच्या संयुक्त विद्यमाने  
आयोजित "भूजल पुनर्भरण काळाची गरज"



वरिष्ठ भूवैज्ञानिक कार्यालय, भूजल सर्वेक्षण आणि विकास यंत्रणा, नंदुरबार व न.ता.वि.स. गजमल तुळशिराम पाटील महाविद्यालय, नंदुरबार यांच्या संयुक्त विद्यमाने "जिल्ह्यातील भूजल स्थिती आणि भूजल पुनर्भरण" या विषयावर वेबिनार च्या माध्यमातून भूगोल विषयाच्या विद्यार्थ्यांसाठी मार्गदर्शन व प्रशिक्षण आयोजित केले असून आपल्या उपस्थितीसाठी / सहभागी होणेसाठी खालील (लिंक)दुवा चा उपयोग करू शकतात.

"भूजल पुनर्भरण काळाची गरज"

Thursday, Jul 8 2021 • 11:00 AM – 12:30 PM  
Google Meet joining info Video call link:  
<https://meet.google.com/ens-skxp-goj>

**पार्श्वभूमी :** भूजल सर्वेक्षण आणि विकास यंत्रणेच्या (GSDA) स्थापनेला ५० वर्षे पूर्ण होत असल्याने, सुवर्ण महोत्सव साजरा करण्याच्या अनुषंगाने विविध कार्यक्रम राबविण्यात येत आहे. त्या अंतर्गत जिल्हा भूजल सर्वेक्षण आणि विकास यंत्रणा व न.ता.वि.स. गजमल तुळशिराम पाटील महाविद्यालय, नंदुरबार यांच्या संयुक्त विद्यमाने मार्फत "जिल्ह्यातील भूजल स्थिती आणि भूजल पुनर्भरण" या विषयावर वेबिनार द्वारे तांत्रिक माहिती व प्रत्यक्ष उपाययोजना करण्यासाठी मार्गदर्शन करणे असा कार्यक्रम आयोजित करण्यात आला आहे.

जिल्ह्यात शेती, पिण्याचे पाणी व लहान मोठे व्यवसाय मुख्यत्वे भूजलावर अवलंबून आहेत. जिल्ह्यातील काही भाग हा पहाडी क्षेत्राने व्यापलेला असल्याने या भागामध्ये भूजलाची उपलब्धता मुबलक प्रमाणात नसल्यामुळे पाण्याची टंचाई सतत असते. ह्यावर उपाय म्हणून जिल्ह्यातील भूशास्त्र समजून घेणे व भूजलाचा उपसा नियंत्रित करण्यासोबतच भूजलाचे योग्य ठिकाणी पुनर्भरण झाल्यास सततच्या पाणी टंचाईचे निवारण करणे सोपे होईल.

### वेळापत्रक

वेळ	सत्र	सादरकर्ता
स.११.०० - ११.०५	स्वागत परिचय व प्रस्तावना	श्री. रमेश बागमार, वरिष्ठ भूवैज्ञानिक, नंदुरबार
११.०५ - ११.१५	भूजल पुनर्भरण काळाची गरज	श्री. दिवाकर धोटे, मा. उपसंचालक, भूजल सर्वेक्षण आणि विकास यंत्रणा, नाशिक.
११.१५ - ११.४५	भूजल आणि आपण	प्रा.डॉ. व्ही.एम. रोकडे, सहयोगी प्राध्यापक, क.ब.चै.उ.म.वि. जळगांव
११.४५ - १२.००	पाणलोट क्षेत्र विकास व व्यवस्थापन	प्रा.आर.आर.देवरे, ग.तु.पाटील महाविद्यालय, नंदुरबार
१२.०० - १२.३०	भूजल पुनर्भरण-छतावरिल पाउस पाणी संकलन	डॉ. सुजित सुरेश शिंपी, सहाय्यक भूवैज्ञानिक, नंदुरबार
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# Collaboration/Linkage Certificate

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This is to certify that **Department of Chemistry NTVS's G.T. Patil Arts, Commerce and Science College, Nandurbar-425412** has research collaboration (since March 2021) with name of company ..... **M/s. Mascot Organic.....** for sharing the research ideas and for the sample characterizations. We have jointly worked for Post graduate students projects and sample analysis.

Place: Nandurbar



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Date:21/03/2021

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Prof. Dr. V. S. Shrivastava  
Principal

Office: (02564) 222293

E-Mail: gtpcollege@rediffmail.com

Web: www.ntvsgtpcollege.org



### Activity / Programme Report

Academic Year: 2021-2022

1	Name of Activity/Programme	field work/Study Tour
2	Date And Time	06/04/2022
3	Visit Place	Sardar Sarovar And The Statue Of Unity,Rajpipla
4	Site Description	Field trips serve one vital function as far as education is concerned.This makes it a notorious destination both for students, Geographers and researchers. Sardar sarovar is situated under the Gujrat State.. The distance from Nandurbar to Sardar Sarovar dam,Nilkanth Dham is approximately 170 kms and will take around an four hour to reach. Field area experiences a climate ranging from tropical to sub-tropical type. .Nilkanth Dham Swaminarayan Temple is located at Poicha village on the bank of river Narmada which is about 80 kms from Bharuch and 60KM from Vadodara. It is beautiful swaminarayan temple constructed in large area and one of the most amazing pilgrimages attracts people around Gujarat
5	Aims of the Activity	Field visit helps in understanding various geographical concepts elements and process through direct experiences. Field trip reports improve the educational value of a trip. The trips deal with the spatial relations among data and the time relationships like the cultural history or geological processes.
6	No of students and teachers present	Boys:18 Girls: 16 Faculty: 4 Total: 38
7	Detail report of the programme /activity	The department of Geography had arranged an educational tour for completing the field work of third year B.A students as per kbcnmu curriculum. A few members of our team went to collect some socio-economic data from Lataguri GP along with the teacher. The most interesting thing was Nilkanth Dham Swaminarayan Temple is located at Poicha village on the bank of river Narmada. It is beautiful swaminarayan temple constructed in large area and one of the most amazing pilgrimages attracts people around Gujarat. The teachers of our college discussed the historical and cultural aspects of The Statue of Unity is the world's tallest statue at 182 metres (597 ft). The project took form in 1979 as part of a development scheme to increase irrigation and produce hydroelectricity. The dam was inaugurated by Prime Minister Modi on 17 September 2017.One of the 30 dams planned on river Narmada, Sardar Sarovar Dam (SSD) is the largest structure to be built. It is one of the largest dams in the world.



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Principal

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E-Mail: gtpcollege@rediffmail.com  
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<p>8 <b>Conclusions and Recommendations</b></p>	<p>The fieldwork enabled the students to understand the geographical, social economic, historical, cultural etc. types of information of a field can be collected by field visit..It gave a firsthand experience to young geographers in handling and extrapolating geographical data with local realities. Awareness programme should be brought to the local people of the area concerning the agricultural practices and allied activities to safeguard the health of the stream. vi</p>
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Photograph of the activity / programme:





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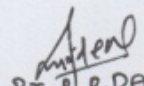
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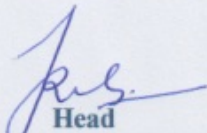


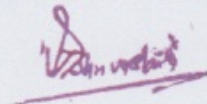
### भूगोल विभागाचा सरदारसरोवर येथे दौरा

नंदुरबार, ता. १७ : येथील जी.टी. पाटील महाविद्यालयातील भूगोल विभागाच्यावतीने या शैक्षणिक वर्षातील पदवी व पदव्युत्तर वर्गातील विद्यार्थ्यांकरिता अभ्यासक्रमाचा भाग म्हणून सरदार सरोवर प्रकल्पाची अभ्यास क्षेत्र म्हणून निवड करण्यात आली. या उपक्रमात द्वितीय व तृतीय वर्षातील पदवी व पदव्युत्तर वर्गातील ३२ विद्यार्थ्यांनी सहभाग घेतला. विद्यार्थ्यांना प्रकल्पातील घटकांची ओळख करून देण्यात आली. यात प्रकल्पातील पाण्याची क्षमता, नियोजन व व्यवस्थापन या बाबींची माहिती स्थानिक प्रशासनाकडून मिळविण्यात आली. महाविद्यालयाचे प्राचार्य डॉ. ज्ही. एस. श्रीवास्तव, उपप्राचार्य प्रा. डॉ. एम. जे. रघुवंशी यांनी शुभेच्छा दिल्या. या शैक्षणिक उपक्रमाचे संयोजन भूगोल विभाग प्रमुख प्रा. एफ. आर. खांडेकर, प्रा. डॉ. आर. आर. देवरे, प्रा. जयश्री नायका व डॉ. संजय कपले यांनी केले. प्रा. डॉ. अमोल भुयार, प्रा. एम. बी. पाटील आदींनी सहकार्य केले.

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Dr. A. R. Devere  
Name & Sign of  
organizing Teacher

  
Head  
Department of geography

  
Principal  
G.T.Patil College, Nandurbar



KAVAYITRI BAHINABAI CHAUDHRI NORTH MAHARASHTRA UNIVERSITY,  
JALGOAN



Nandurbar Taluka Vidhayak Samiti's  
G.T. Patil Arts, Commerce And Science College  
Nandurbar, Dist. Nandurbar

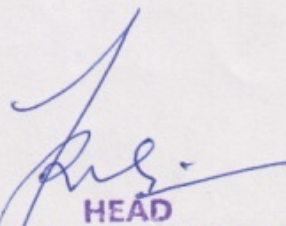
Department of Geography  
Study Tour Report  
Of  
Sardar Sarovar Dam And Poicha,  
Gujarat, India.  
On 06<sup>th</sup> April, 2022



Name of Student:-.....  
Class:-.....  
Exam, Seat No:-.....  
Under the Guidance: 1. Prof. F.R. Khandekar  
2 Dr. R.R. Deore  
3 Dr. S.N. Kaple

1



  
HEAD  
Department of Geography & Research Center  
Gajmal Tulshiram Patil College  
Nandurbar - 425412.

**G.T.Patil Arts, Commerce And Science College**

**Nandurbar, Dist. Nandurbar**

**Year:- 2021-2022**

**Department of Geography**

## **CERTIFICATE**

**This is to verify that appreciated Tour**

**Work on the Subject of Geography**

**Is Completed by**

.....  
**As a Partial Fulfillment of the Course**

**S.Y.B.Sc/T.Y.B.A/M.A/M.Sc I-II**

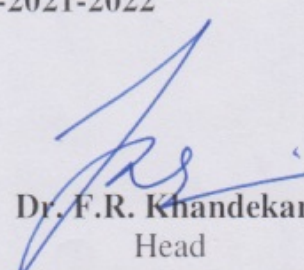
**The Tour Report has been completed**

**Under the guidance of**

**Prof. F.R.Khandekar & Dr. Rupesh Deore**

**During the Academic Year -2021-2022**

**Dr,Rupesh Deore**  
(Subject Teacher & Tour in charge)  
P.G.Department of Geopraphy  
G.T.P. College,Nandurbar 425412

  
**Dr. F.R. Khandekar**  
Head  
Department of Geography

**HEAD**  
Department of Geography  
G.T.Patil College,Nandurbar

**G.T.Patil Arts, Commerce and Science College Nandurbar, Dist. Nandurbar**

**Department of Geography**

**Year -2021-2022**

**PREFACE**

We are very glad to submit this tour report, after excursion in Devmogra, Sardar Sarovar Dam, Kuber Bhandar and Poicha, Gujarat, India. Excursion is a part of Geography study. Field work and observation help to us understanding Geographical facts and their relathion with our life.

The excursion is very successful and beneficial because of the guidance and planning of our teacher in charge Prof. F.R.Kahndekar and Prof. R.R.Deore. Assistant Professor, Department of Geography.

We are very grateful to Prin. Dr. Prof. V.S.Shrivastav, Prof.F.R. Khandekar, Head, Department of Geography, Dr. A.R.Buyar, Prof. M.B.Patil, Dr Sanjay kaple, Dr. S.S. Bhavsar ,Prof. Pramod Borse, Prof. lalsing Valvi, Prof. Suresh Valvi and non teaching staff for their valuable coordination.

Place: Nandurbar

Date: / / 2022

Student Name: \_\_\_\_\_

Roll No. \_\_\_\_\_

Class: S.Y.B.Sc / T.Y.B.A / M.A

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## **INTRODUCTION**

Geography is fundamental to the study of tourism, because tourism is geographical in nature. Tourism occurs in place, it involves movement and activities between places and it is an activity in which both place characteristics and personal self-identities are formed, through the relationships that are created among places, landscapes and people. Physical geography provides the essential background, against which tourism places are created and environment impacts and concerns are major issues that must be considered in managing the development of tourism places.

Our civilization is greatest in the world because our country is only an example of the unity in diversity. It has also an example of secularism. Men and Women of many religions, castes, sects, living together. So we are proud of its rich and various heritages. It is also glimpses of the cultural variety dressing, food, Language, tradition and custom. All these things are observed and analyzed geographically.

### **About Nilkanth Dham Swaminarayan Temple:**

Nilkanth Dham Swaminarayan Temple is located at Poicha village on the bank of river Narmada which is about 80 kms from Bharuch and 60KM from Vadodara. It is beautiful swaminarayan temple constructed in large area and one of the most amazing pilgrimages attracts people around Gujarat.

You can have divine experience by visiting Sahajanand universe, Nilkanth dham and surrounding. The place is very well connected from Vadodara (Baroda) or Bharuch and can be reached from any of the below routes: The Nilkanthdham Swaminarayan Temple is located in Poicha village near Rajpipla Narmada District in Gujarat. This temple was built in 2013 and built under taken shree vadval Swaminarayan temple. In The Evening time Nice and attractive Lighting Decoration is most beautiful View temple. Many visitors visit this temple daily. Now a days Nilkanthdham Dham Built a New Sahjanand University .It is Very Interesting and attractive Place. In this sahjanand University.

A Big Idol of Lord Swaminarayan .The Idol's height is 152Ft. Sahjanand University is Spread 24 Acres land .Sahjanand University Timing is 11:00 Am to 8:00 Pm. The water surrounding the temple makes it outstanding and eye soothing. Aarti and light decoration in the evening makes the place surreal and divine. completely beautiful and the Nilkanth Dham Swaminarayan and to all God's will be in the morning 108 avtar To 100% very good condition.



All around the year you can go for visit the Temple. Make sure before you go please conform that the temple is open for visitor incase the temple closed for the any reason. The Statue of Unity is a colossal statue of Indian statesman and independence activist Sardar Vallabhbhai Patel (1875–1950) who was the first Home minister of independent India and the chief adherent of Mahatma Gandhi during the non-violent Indian Independence movement; highly respected for his leadership in uniting the 562 princely states of India to form the single large Union of India. It is located in the state of Gujarat, India. It is the world's tallest statue with a height of 182 metres (597 ft). It is located on a river island facing the Sardar Sarovar Dam on river Narmada in Kevadiya colony, 100 kilometres (62 mi) southeast of the city of Vadodara.

#### **FEATURES:**

The project was first announced in 2010 and the construction of statue started in October 2013 by Larsen & Toubro, who received the contract for ₹ 2,989 crore (US\$420 million). It was designed by Indian sculptor Ram V. Sutar, and was inaugurated by Indian Prime Minister Narendra Modi on 31 October 2018, the 143rd anniversary of Patel's birth. The Statue of Unity is the world's tallest statue at 182 metres (597 ft).

It rises 54 metres (177 ft) higher than the previous record holder, the Spring Temple Buddha in China's Henan province.[30] Within India, the record was earlier held by the 41 m (135 ft) statue of Hanuman at the Paritala Anjaneya Temple near Vijayawada in the state of Andhra Pradesh. The statue can be seen within a 7 km (4.3 mi) radius. The monument is constructed on a river island named Sadhu Bet, 3.2 km (2.0 mi) away from and facing the Narmada Dam downstream.

The statue and its surroundings occupy more than 2 hectares (4.9 acres),[citation needed] and are surrounded by a 12 km (7.5 mi) long artificial lake formed by the Garudeshwar weir downstream on the Narmada river. The statue is divided into five zones of which only three are accessible to the public. From its base to the level of Patel's shins is the first zone which has three levels and includes an exhibition area, mezzanine and roof. Zone 1 contains a memorial garden and a museum. The second zone reaches up to Patel's thighs at 149 metres, while the third extends up to the viewing gallery at 153 metres. Zone 4 is the maintenance area while the final zone comprises the head and shoulders of the statue. The museum in zone 1 catalogues the life of Sardar Patel and his contributions. An adjoining audio-visual gallery provides a 15 minute

presentation on Patel and also describes the tribal culture of the state. The concrete towers which form the statue's legs contain two elevators each. Each lift can carry 26 people at a time to the viewing gallery in just over 30 seconds. The gallery is located at a height of 153 metres (502 ft) and can hold up to 200 people

### **Sardar Sarovar Dam**

The Sardar Sarovar Dam is a gravity dam on the Narmada river near Navagam, Gujarat in India. Four Indian states, Gujarat, Madhya Pradesh, Maharashtra and Rajasthan, receive water and electricity supplied from the dam. The foundation stone of the project was laid out by Prime Minister Jawaharlal Nehru on 5 April 1961.

The project took form in 1979 as part of a development scheme to increase irrigation and produce hydroelectricity. The dam was inaugurated by Prime Minister Modi on 17 September 2017. One of the 30 dams planned on river Narmada, Sardar Sarovar Dam (SSD) is the largest structure to be built. It is one of the largest dams in the world.

It is a part of the Narmada Valley Project, a large hydraulic engineering project involving the construction of a series of large irrigation and hydroelectric multi-purpose dams on the Narmada River. Following a number of controversial cases before the Supreme Court of India (1999, 2000, 2003), by 2014 the Narmada Control Authority had approved a series of changes in the final height and the associated displacement caused by the increased reservoir, from the original 80 m (260 ft) to a final 163 m (535 ft) from foundation. The project will irrigate more than 18,000 km<sup>2</sup> (6,900 sq mi), most of it in drought prone areas of Kutch and Saurashtra. The dam's main power plant houses six 200 MW Francis pump-turbines to generate electricity and include a pumped-storage capability. Additionally, a power plant on the intake for the main canal contains five 50 MW Kaplan turbine-generators.

The total installed capacity of the power facilities is 1,450 MW. The dam irrigates 17,920 km<sup>2</sup> (6,920 sq mi) of land spread over 12 districts, 62 talukas, and 3,393 villages (75% of which is drought-prone areas) in Gujarat and 730 km<sup>2</sup> (280 sq mi) in the arid areas of Barmer and Jalore districts of Rajasthan. The dam also provides flood protection to riverine reaches measuring 30,000 ha (74,000 acres) covering 210 villages and Bharuch city and a population of 400,000 in Gujarat.

Saurashtra Narmada Avataram Irrigation is a major program to help irrigate a lot of regions using the canal's water. In 2011, the government of Gujarat announced plans to generate solar

power by placing solar panels over the canal, making it beneficial for the surrounding villages to get power and also help to reduce the evaporation of water. The first phase consists of placing panels along a 25 km length of the canal, with capacity for up to, 25 MW of power. The dam is one of India's most controversial, and its environmental impact and net costs and benefits are widely debated. The World Bank was initially funding SSD, but withdrew in 1994. The Narmada Dam has been the centre of controversy and protests since the late 1980.

### LIST OF STUDENTS

SR.NO	NAME	CLASS
1	More Deepak Shukla	T.Y.B.A
2	Pavra Pragati Ratilal	T.Y.B.A
3	Paura Jayshree Maka	T.Y.B.A
4	Mohammed Maaz Abdul Majid	T.Y.B.A
5	Kokani Archana Bhivarlal	T.Y.B.A
6	Gavit Sonali Rajesh	T.Y.B.A
7	Thakre Vilas Anil	T.Y.B.A
8	Pawara Mosambi N.	T.Y.B.A
9	Gawali Khushal Krishna	T.Y.B.A
10	Gavit Rohit Vantu	T.Y.B.A
11	Valvi Vilesh Udesing	T.Y.B.A
12	Vasave Anil Vanya	T.Y.B.A
13	Padavi Bahadursing Vikramsing	T.Y.B.A
14	Shewale Hitesh Mohan	T.Y.B.A
15	Valvi Rahul Tedy	S.Y.B.A
16	Naik daksha	M.A II
17	Naik Vandana	M.A II
18	Padavi Lakshmi Kalusing	M.A II
19	Padavi Kaveri Chhagan	M.A II
20	Ahire Yogita Shankar	M.A II
21	Mahire Netradipak	M.A II
22	Bhil Monika	M.A II
23	Vasave Prashant	M.A II
24	Naik Sanjay	M.A I
25	Vasave Manisha	M.A I
26	Tadvi Tumlya Ramjya	M.A II
27	Thakre Sachin	T.Y.B.A

28	Banjara Sachin	T.Y.B.A
29	Patil Ashwini	S.Y.B.Sc
30	Sonwane Ashwini	S.Y.B.Sc
31	Dhangar Gayatri	S.Y.B.Sc
32	Pimple Rushikesh B.	S.Y.B.Sc
33	Pimple Dipti B.	S.Y.B.Sc
34	Rahul Wadnere	S.Y.B.Sc
35	Prof. F.R.Khandekar ( HOD )	Assit.Prof
36	Prof.Dr. R.R.Deore	Assit.Prof
37	Prof Jayshri Nayaka	Assit.Prof
38	Prof.Dr.S.N.Kaple	Assit.Prof

To,

December 2022

The principal,

NTVSS.G.T.P. Collage, Nandurbar

*Applicant: Kirankumar Madhav Nehete*

*Subject: Request to facilitate lab for Research work.*

*Reference: Provisional registration No. for Ph. D*

*Guide Name: Dr. Gaurav Ramesh Gupta (KBCNMU/11/PGR/CHEMISTRY/1518/2020).*

Respected Sir,

Most respectfully I would like to state that myself Kirankumar Madhav Nehete currently seeking for admission of Ph. D in Chemistry (PET-2021) under the guidance of Dr.Gaurav Ramesh Gupta. Currently I am working in a paints and coating industry and taken alignment from my current employer to take admission in Kavayitri Bahinabai Chaudhari North Maharashtra University in the faculty of Chemistry. With the same context I want to proceed a research work in your collage lab under the guidance of Dr. Ramesh Gupta.

I would like to request you to allow me to work in your lab on PhD project. I will pay all the legal fees and other expenses required as per request and follow the rules and regulations of your college and university. I would like to request to you to kindly do needful.

Sincerely,



Kirankumar Madhav Nehete

Attachment:

1. Permission letter from respective authority of employer (Asian Paints)
2. MOU sign with employer for Ph. D related work.
3. University Provisional admission letter

=====



Asian Paints Limited  
Asian Paints House  
6A, Shantimarar,  
Santacruz (East),  
Mumbai 400055  
T: (022) 6218 1000  
F: (022) 6218 1111  
www.asianpaints.com

Ref. No.: 110891  
Date: October 04, 2022

## TO WHOMSOEVER IT MAY CONCERN

---

This is to certify that Mr. KIRANKUMAR NEHETE (Employee No. 110891) is in the employment of our Company since September 14, 2011 till date. Currently, Mr. KIRANKUMAR is working as ASSISTANT MANAGER - TECHNOLOGY at TURBHE, TURBHE.

This is to state on record that the company has no objection against Mr. Kirankumar Nehete pursuing the PhD program at Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon or against him being involved in any publications related to this PhD. In this regard, a suitable Non-Disclosure Agreement (NDA) has been signed between Mr. Kirankumar Nehete and the company in September 2022 and the same is enclosed with this letter.

For Asian Paints Limited

Abhishek Chopra  
Associate General Manager - Human Resources



## Asian Paints Limited

Asian Paints Limited  
Plot No. C - 3B/1, TTC Industrial Area  
MIDC Pawne, Thane - Belapur Road  
Turbhe, Navi Mumbai - 400 703

Tel : (+9122) 6250 3434 / 3535  
Fax: (+9122) 6250 3650  
www.asianpaints.com

### Non-Disclosure Agreement

THIS NON DISCLOSURE AGREEMENT (the "Agreement") is made and executed at Mumbai as on 1<sup>st</sup> day of September, 2022

### BETWEEN

**Asian Paints Limited**, a company incorporated under the Indian Companies Act, 1913 and governed under the Companies Act 1956 and the Companies Act, 2013, having its registered office at 6A, Shantinagar, Santa Cruz (East), Mumbai -400 055 (hereinafter referred to as "**APL**", which expression shall unless it be repugnant to the context or meaning thereof, be deemed to mean and include its successors in business and assigns) of the One Part

### AND

KIRANKUMAR NEHETE, 36 an Indian citizen, having Permanent Account Number: AICPN3645E and residing at 505 Sadguru Universal Set 17, Khanda Colony Panvel, 410206. having its registered office at, (hereinafter referred to as the "Company", which expression shall unless it be repugnant to the context or meaning thereof, be deemed to mean and include its successors in business and permitted assigns) of the Other Part.

### WHEREAS;

- A. APL has been inter alia carrying on the business of manufacturing, selling and distributing paints, varnishes, primers and the like as manufacturers, sellers and distributors throughout India.
- B. APL is desirous of NDA for employee (Kirankumar) who is pursuing further education (PHD).
- C. For the aforementioned purpose APL is desirous of engaging/evaluating some consultant/contractor who will provide the NDA for employee (Kirankumar) who is pursuing further education (PHD), (hereinafter for the sake of brevity referred to as "the Business Purpose").
- D. In the process; APL would be required to share certain Confidential information and intellectual property of APL. information. There could be a possibility that in this engagement, ~~APL may disclose APL's Proprietary as well. The said information and / or data received is~~

**Corporate Identification Number (CIN): L24220MH1945PLC004598**

For HR related queries, email to [careers@asianpaints.com](mailto:careers@asianpaints.com)

For Media related queries, email to [proffice@asianpaints.com](mailto:proffice@asianpaints.com)

For Shares related queries, email to [investor.relations@asianpaints.com](mailto:investor.relations@asianpaints.com)

For Consumer queries/complaints/Dealership enquiries, email to [customercare@asianpaints.com](mailto:customercare@asianpaints.com)



## Asian Paints Limited

Asian Paints Limited  
Plot No. C - 3B/1, TTC Industrial Area  
MIDC Pawne, Thane - Belapur Road  
Turbhe, Navi Mumbai - 400 703

Tel : (+9122) 6250 3434 / 3535  
Fax: (+9122) 6250 3650  
www.asianpaints.com

- x. Implement controls to safeguard confidentiality and integrity of indirect data arising of personal data processing required to be retained by law;
- xi. Not by any act or omission, cause APL or any authorized user to be in breach of any legal requirement of which APL has previously informed Company in writing

### 16. ENTIRE AGREEMENT:

This Agreement represents the entire agreement and understanding between the Parties with respect to its subject matter and supersedes any prior or contemporaneous discussions, representations, or agreements, whether written or oral, of the Parties regarding this subject matter.

### 17. SEVERABILITY:

If any provision of this Agreement or part thereof is rendered void, illegal or unenforceable in any respect under any law, the validity, legality and enforceability of the remaining provisions shall not in any way be affected or impaired thereby.

IN WITNESS WHEREOF, this Agreement is executed as of the date first above written.

**ASIAN PAINTS LIMITED**

**Kirankumar Nehete**

By: Rajeev Kumar Goel  
(Signature)

By: Kirankumar Nehete  
(Signature)

Corporate Identification Number (CIN): L24220MH1945PLC004598  
For HR related queries, email to [careers@asianpaints.com](mailto:careers@asianpaints.com)  
For Media related queries, email to [proffice@asianpaints.com](mailto:proffice@asianpaints.com)  
For Shares related queries, email to [investor.relations@asianpaints.com](mailto:investor.relations@asianpaints.com)  
For Consumer queries/complaints/Dealership enquiries, email to [customercare@asianpaints.com](mailto:customercare@asianpaints.com)





**KAVAYITRI BAHINABAI CHAUDHARI NORTH MAHARASHTRA UNIVERSITY, JALGAON**

KBCNMU/11/Ph.D./Chem./Online/2022

Date : 01-12-2022

To,

**Mr. KIRANKUMAR MADHAV NEHETE**

**Subject:- Provisional admission to Ph.D. Course in the Subject of Chemistry under the faculty of Science and Technology.**

**Dear Student,**

With reference to the above subject, it is to inform you that, based on your qualification/exemption for the PET 2021 examination, and allotment of guide, you are provisionally registered for Ph.D. course from the date as mentioned below. Your Ph.D. registration will be confirmed on successful completion of Pre-Ph.D. course work and presentation of research outline before RRC within a stipulated period as per rules ( Regarding the programme of conduct of the course work, you are requested to visit University's website <https://www.nmu.ac.in> ). The particulars of your admission are as under:-

Sr. No.	Particulars	
1.	Name of Guide	<b>Dr. Gupta Gaurav Ramesh</b>
2.	Name of Co-guide	
3.	Place of Research Work	Laboratory / Research Center recognized by KBCNMU, Jalgaon
4.	Provisional date of Registration	Guide Allocation Meeting <b>14-10-2022</b>
5.	Registration No.	KBCNMU/11/Ph.D./Chem./907/2022
6.	Application No.	<b>PHD-2021-NVAEQ1   Exemption  </b> .
7.	Fees Payment Details	<b>Paid Rs. 22750.00 on 12-12-2022 16:53:35</b>

Your attention is also invited to the following points regarding Ph.D. course admission :-

1. You will have to abide by the rules made by the University from time to time as per provision under Section 60 of the Maharashtra Public Universities Act, 2016 and the rules for the admission for Degree of Doctor of Philosophy (Ph.D.) as per the UGC (Minimum standards and procedure for awards of Ph.D. degree) Regulation 2009 and 2016 and revised Ph.D. rules from time to time.
2. You are requested to pay the following fees as prescribed by the University Authorities from time to time within one month from the date of issue of this letter. **The yearly fees will be charged every year from the date of registration.**

<b>A) To be deposited in the University</b>					
Sr. No.	Head	First Year (Fee) Rs.		Subsequent Years Fee Rs.	
		For Science & Technology	Other than Science & Technology	For Science & Technology	Other than Science & Technology
1.	Provisional Registration Fees	1000/-	1000/-	0	0
2.	Admission Fees	1500/-	1500/-	0	0
3.	Tuition Fees	8000/-	8000/-	8000/-	8000/-
4.	Library Fee	1500/-	1500/-	1500/-	1500/-
5.	Course Work Fee	3000/-	3000/-	--	--
6.	Coursework Examination Fees	1500/-	1500/-	--	--

7.	University Development Fund	1000/-	1000/-	1000/-	1000/-
8.	Student Welfare Fund	200/-	200/-	200/-	200/-
9.	Student Aid Fund	100/-	100/-	100/-	100/-
10.*	Laboratory Fee *	3000/-	0	3000/-	--
11.	Computer and Internet Charges	1000/-	1000/-	1000/-	1000/-
12.	e-Suvidha	50/-	50/-	50/-	50/-
13.	Extra Curricular Activities	250/-	250/-	250/-	250/-
14.	Magazine Fee	60/-	60/-	60/-	60/-
15.	Identity Card Fee	100/-	100/-	--	--
16.	Gymkhana, Sports Activities	200/-	200/-	200/-	200/-
17.	Ashwamedha Fee	50/-	50/-	50/-	50/-
18.	Yuva Mahotsav Fee	50/-	50/-	50/-	50/-
19.	Group Insurance Charges	40/-	40/-	40/-	40/-
20.	Disaster Management	100/-	100/-	100/-	100/-
21.	Medical Fee	50/-	50/-	50/-	50/-
<b>Total (without deposits)(A)</b>		<b>22750/-</b>	<b>19750/-</b>	<b>15650/-</b>	<b>12650/-</b>

\* The fees from Second year onwards shall be deposited at concerned Research Center.

<b>B) To be deposited at the concerned approved Research Center</b>					
22.	Library Deposit	3000/-	3000/-	0	0
23.	Laboratory Deposit	3000/-	0	0	0
<b>Total (B)</b>		<b>6000/-</b>	<b>3000/-</b>	<b>0</b>	<b>0</b>
<b>Grant Total (A+B)</b>		<b>28750/-</b>	<b>22750/-</b>	<b>15650/-</b>	<b>12650/-</b>

<b>Note :</b>	1. Rs. 100/- will be charged as late fee per month if the fees are not paid within the prescribed time limit.
	2. In case of revision of fee structure, the students will have to pay the revised fee accordingly.

- You are required to apply for eligibility certificate to the Research Section of this University after receipt of confirmed registration letter within six months from the date of issue of confirmed registration letter. The eligibility fee is Rs. 500/- and late fees of Rs. 1000/- will be charged if the candidate fails to apply for eligibility certificate within six months after confirmed date of registration.
- To obtain eligibility certificate within one year from the date of issue of confirmed registration letter is mandatory. otherwise your admission is liable to be cancelled..
- Foreign/NRI students will have to pay five time of the existing fees as mentioned in the above Table as mentioned in 2 & 3.
- The duration of Ph.D. course registration shall be valid upto six years from the date of Provisional registration.
- You will have to do your research (for Science, Pharmacy, Engineering & Technology) in the laboratory/Research Center of your guide recognized by Kavayitri Bahinabari Chaudhari North Maharashtra University, Jalgaon. If the laboratory/Research Center of your guide is not recognized, you have to work at another recognized laboratory/Research Center; however, in such case, you will have to take co-guide from that place. **You have to produce attendance certificate for working not less than 180 days with the concerned guide/co-guide with application of asking permission for submission of synopsis.**
- It is must to publish at least one research paper in referred journal and make two paper presentations in Conferences/Seminars and produce evidence for the same in the form of acceptance letter or the reprint.
- If the candidate wish to cancel his/her registration or if his/her admission is cancelled by the University then all fees payable to his account must be paid by the candidate.
- You will have to pay late fee and/or fine as per the rules made by the University authorities from time to time.
- You will have to produce original willingness letter received from guide at the time of document verification. If there is any discrepancy found in verification of original documents and documents attached with the application form (eg : Caste Certificate / Validity Certificate / Non-Creamy Layer which is applicable etc) your admission will liable to be cancelled.

Thanking you,

Yours faithfully,

sd/-

(V. V Talele)  
Deputy Registrar  
Research Section

----- This is a computer generated document hence does not require any signature. -----



Founder



Karmaveer Bhausaheb Hiray

**Mahatma Gandhi Vidyamandir's  
Loknete Vyankatrao Hiray  
Arts, Science & Commerce College**

Affiliated to S.P.P. Uni., Pune Id. No. PU/NS/ASC/018 [1971]  
Website : www.lvhcollege.com e-mail : lvhcollege@gmail.com

Re-Accredited by NAAC with 'A' Grade  
Best College Award 2017 (S.P. Pune University)

## Collaboration/Linkage Certificate

To whomsoever it may be concern

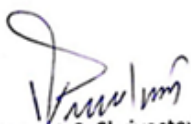
Date: 31/03/2022

This is to certify that **Dr. Manohar Rajendra Patil** Department of Chemistry **NTVS's G.T. Patil Arts, Commerce and Science College, Nandurbar-425412** has research collaboration (since 2017) with **LVH Arts , Commerce and Science College, Panchavati Nashik-03** for sharing the research ideas, exchange of reprints of our research papers and for the sample characterizations. We have jointly worked on research topics related to the application of nanoparticles and have published the research work in reputed international journals.

We have further extended this linkage with both the Chemistry departments to review the curriculum, teaching practices and discuss ways in which courses could be revised to promote scientific knowledge among the students.

Place : - Nashik

Yours Sincerely

  
(Prof. Dr. V. S. Shrivastava)  
Principal

**PRINCIPAL**  
G.T.Patil Arts, Commerce &  
Science College  
NANDURBAR - 425 412 (M.S.)



**PRINCIPAL**  
Loknete Vyankatrao Hiray  
Arts, Science & Commerce College,  
Panchavati, Nashik - 422 003.



# Solvent-free grindstone synthesis of four new (*E*)-7-(arylidene)-indanones and their structural, spectroscopic and quantum chemical study: a comprehensive theoretical and experimental exploration

Vishnu A. Adole<sup>a,b</sup>, Ravindra H. Waghchaure<sup>a,c</sup>, Sandip S. Pathade<sup>a,d</sup>, Manohar R. Patil<sup>e</sup>, Thansing B. Pawar<sup>a</sup> and Bapu S. Jagdale<sup>a,b</sup>

<sup>a</sup>Department of Chemistry, Loknete Vyankatrao Hiray Arts, Science and Commerce College Panchavati (Affiliated to SP Pune University, Pune), Nashik, India; <sup>b</sup>Department of Chemistry, Arts, Science and Commerce College (Affiliated to SP Pune University, Pune), Manmad, Nashik, India; <sup>c</sup>Department of Chemistry, Arts, Commerce and Science College Karanjali (Affiliated to SP Pune University, Pune), Nashik, India; <sup>d</sup>Department of Chemistry, Maharaja Sayajirao Gaikwad Arts, Science and Commerce College Malegaon (Affiliated to SP Pune University, Pune), Nashik, India; <sup>e</sup>Department of Chemistry, G. T. Patil Arts, Commerce and Science College (Affiliated to KBC NM University, Jalgaon), Nandurbar, India

## ABSTRACT

In the present examination, four new compounds of (*E*)-7-(arylidene)-indanone skeleton have been synthesised using a grindstone chemistry approach; environmentally viable protocol. For a detailed molecular structure description, some quantum-chemical calculations of (*E*)-7-(arylidene)-indanones were performed by using the density functional theory method with a basis set B3LYP/6-311G(d,p). The optimised molecular geometry, quantum and structural entities such as bond length, bond angle, total energy, electron density distribution in highest occupied molecular orbital (HOMO) and lowest unoccupied molecular orbital (LUMO), charge distribution, electronegativity, absolute hardness, softness, electrophilicity, chemical potential, charge transfer in molecules have been computed. All the compounds are well characterised using analytical methods; proton magnetic resonance (PMR) and carbon magnetic resonance (CMR) spectroscopy. Absorption energies, oscillator strength, and transitions of all four molecules have been calculated at TD-B3LYP/6-311G(d,p) level of theory for B3LYP/6-311G(d,p) optimised geometries. The molecular electrostatic surface potential plots have been computed for the better understanding of reactive sites. Some thermodynamic functions were also explored using theoretical calculations. All the calculations have been computed in the gas phase.

## ARTICLE HISTORY

Received 22 March 2020  
Accepted 17 July 2020

## KEYWORDS

DFT; B3LYP/6-311G (d,p); HOMO–LUMO; molecular electrostatic surface potential; grindstone synthesis

## 1. Introduction

The density functional theory based on theoretical quantum calculations has been effectively used in various fields of science [1–5]. Analysis of spectroscopic and quantum calculations is found to be very significant to envisage various quantum chemical parameters and thermodynamic aspects [6–10]. Some noteworthy examples of the application of Density functional theory (DFT) are equilibrium isotopic fractionation, cross-coupling reaction, pericyclic reaction, density-viscosity study, catalysis, and photoelectronic applications [11–16]. DFT calculations are dependable and significant for deciding the structure and various vital properties of molecules. Specifically, DFT calculations provide a good description of electronic and chemical bonding and give harmonic frequencies in the right agreement to experiment [17–19]. Quantum calculations based on DFT for FT-IR spectroscopy have stepped forward to the point where they could provide reliable vibrational spectra corresponding to the experiment [20–24]. Arylidene indanone scaffolds comprising of the characteristic indanone moiety with exocyclic double bond attached to an aryl/alkyl/heteroaryl group. Arylidene indanone scaffolds are found to exhibit an amazing profile of biological properties. Arylidene indanone motifs have been researched as inhibitors of monoamine oxidase [25], tubulin assembly inhibitors [26], acetylcholinesterase

inhibitors in Alzheimer's disease treatment [27], and inhibitors of dual specificity phosphatase [28]. Importantly 2-arylidene indanone structures have also been investigated as inhibitors of leukemia [29], lung cancer [30], and breast cancer [31]. Additionally, they have been also found to be active as antimicrobial [32], antioxidant [33], anti-inflammatory [34], and anti-malarial agents [35]. Donepezil is an outstanding medicine which contains indanone structure; used as an inhibitor of acetylcholinesterase in the Alzheimer's disease treatment. This medication improves neurocognitive function in patients suffering from Alzheimer's disease [36].

During the previous decade, there have been numerous green methodologies developed for the synthesis of a variety of organic compounds [37–47]. With the developing concern of environmental health by chemical waste, it becomes extremely appealing and important to imply green methods for the synthesis of organic compounds. With this viewpoint, the use of a solvent-free and grindstone chemistry approach for conducting organic synthesis is most vital in terms of green chemistry. Solvent-free processes are simple in terms of product isolation subsequently reducing waste production and ultimately cost also. In continuation of our previous work and by considering these vital aspects, a successful attempt has been made to apply a green strategy for the synthesis of arylidene indanone motifs and investigate structural parameters

such as total energy, the electron density in highest occupied molecular orbital and lowest unoccupied molecular orbital, charge density, absolute electronegativity, softness, hardness and electron transferred of previously synthesised arylidene indanones. Additionally, the quantum-chemical calculations were used for a better understanding of the various properties as well as for an analysis of the geometrical parameters in the title molecule.

## 2. Experimental

### 2.1. Methods and materials

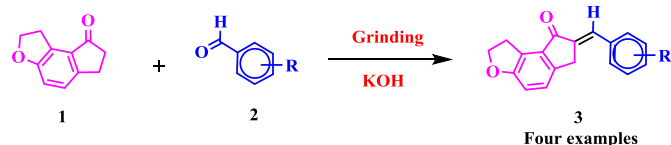
1,2,6,7-tetrahydro-8*H*-indeno[5,4-*b*]furan-8-one was purchased from Henan Tianfu Chemical Co., Ltd., Zhengzhou, China, and other chemicals (Make: Merck, Sigma Aldrich, and Avra synthesis) with high purity were purchased from sigma laboratory, Nashik. The chemicals were used as received without any further purification. Melting points were determined in open capillary and uncorrected. <sup>1</sup>H NMR and <sup>13</sup>C NMR spectra were recorded with a Bruker using CDCl<sub>3</sub> as a solvent. Reactions were monitored by thin-layer chromatography using aluminium sheets with silica gel 60 F254 (Merck).

#### 2.1.1. Experimental procedure for the synthesis of (*E*)-7-arylidene-1,2,6,7-tetrahydro-8*H*-indeno[5,4-*b*]furan-8-ones

The room temperature solvent-free Claisen–Schmidt reaction of 1,2,6,7-tetrahydro-8*H*-indeno[5,4-*b*]furan-8-one (**1**, 8 mmol) and aromatic aldehydes (2,10 mmol) in the presence of an equimolar quantity of solid KOH using mortar and pestle that resulted in the formation of corresponding (*E*)-7-arylidene-1,2,6,7-tetrahydro-8*H*-indeno[5,4-*b*]furan-8-ones (Scheme 1). The reaction was monitored by using thin-layer chromatography (hexane-ethyl acetate; 7:3). The products were isolated by adding ice-cold water and purified by using hot ethanol.

#### 2.1.2. Computational study

DFT calculations were performed using the Gaussian-03 program package without any constraint on the geometry [48]. The geometry of the molecules studied in this is optimised by DFT/B3LYP method using a 6-311G (d,p) basis set. The FMO analysis and quantum chemical study have performed using same basis set. Absorption energies ( $\lambda$  in nm), oscillator strength (*f*), and transitions of all four molecules have been calculated at TD-B3LYP/6-311G (d,p) level of theory for B3LYP/6-311G (d,p) optimised geometries. To investigate the reactive sites of the title molecules, the molecular electrostatic potential was computed using the same method. All the calculations were carried out for the optimised structure in the gas phase.



**Scheme 1.** (Colour online) Solvent-free synthesis of (*E*)-7-arylidene-1,2,6,7-tetrahydro-8*H*-indeno[5,4-*b*]furan-8-one at room temperature.

## 3. Results and discussion

### 3.1. Chemistry

As a model reaction when we performed solvent-free reaction of 1,2,6,7-tetrahydro-8*H*-indeno[5,4-*b*]furan-8-one with 4-methyl benzaldehyde, we ended up in the formation of corresponding 7-arylidene indanone within 12 min. Inspired by this fantastic outcome, we carried out a similar reaction with other aromatic aldehydes and to our credit, all the reactions yielded desired products in excellent yield and that within twelve minutes (Table 1). The synthesised products have been successfully characterised by using <sup>1</sup>H NMR and <sup>13</sup>C NMR spectroscopic methods.

### 3.2. Physical and spectral data

(*E*)-7-(4-methylbenzylidene)-1,2,6,7-tetrahydro-8*H*-indeno[5,4-*b*]furan-8-one (**3a**): Yield: 95%; yellow solid; m.p. 108 °C; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>)  $\delta$  (ppm): 2.40 (s, 3H), 3.55 (t, *J* = 8.8 Hz, 2H), 3.94 (d, *J* = 2.1 Hz, 2H), 4.67 (t, *J* = 8.9 Hz, 2H), 7.02 (d, *J* = 8.1 Hz, 1H), 7.31–7.22 (m, 3H), 7.59–7.52 (m, 3H); <sup>13</sup>C NMR (126 MHz, CDCl<sub>3</sub>)  $\delta$  (ppm): 28.54, 31.99, 72.51, 112.54, 116.15, 118.52, 125.06, 125.29, 130.78, 130.86, 132.57, 134.15, 138.91, 139.84, 141.22, 160.78, 194.04.

(*E*)-7-(2-methylbenzylidene)-1,2,6,7-tetrahydro-8*H*-indeno[5,4-*b*]furan-8-one (**3b**): Yield: 93%; yellow solid; m.p. 140 °C; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>)  $\delta$  (ppm): 2.49 (s, 3H), 3.58 (t, *J* = 8.9 Hz, 2H), 3.92 (d, *J* = 2.1 Hz, 2H), 4.70 (t, *J* = 8.9 Hz, 2H), 7.03 (d, *J* = 8.1 Hz, 1H), 7.30–7.25 (m, 4H), 7.65–7.61 (m, 1H), 7.87 (m, 1H); <sup>13</sup>C NMR (126 MHz, CDCl<sub>3</sub>)  $\delta$  (ppm): 20.14, 28.55, 31.70, 72.46, 115.54, 124.75, 125.17, 126.07, 128.62, 129.38, 130.82, 131.12, 134.21, 134.67, 136.48, 139.24, 141.95, 160.47, 194.64.

(*E*)-4-((8-oxo-1,2,6,8-tetrahydro-7*H*-indeno[5,4-*b*]furan-7-ylidene)methyl)benzotrile (**3c**): Yield: 84%; yellow solid; m.p. 179 °C; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>)  $\delta$  (ppm): 3.57 (t, *J* = 8.9 Hz, 2H), 4.02–3.98 (m, 2H), 4.71 (t, *J* = 8.9 Hz, 2H), 7.07 (d, *J* = 8.1 Hz, 1H), 7.32–7.27 (m, 1H), 7.56 (m, 1H), 7.74 (s, 4H); <sup>13</sup>C NMR (126 MHz, CDCl<sub>3</sub>)  $\delta$  (ppm): 28.54, 31.99, 72.51, 76.78, 77.04, 77.29, 112.54, 116.15, 118.52, 125.06, 125.29, 130.78, 130.86, 132.57, 134.15, 138.91, 139.84, 141.22, 160.78, 194.04.

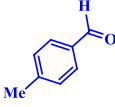
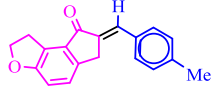

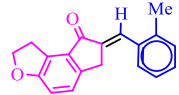
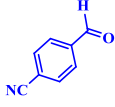
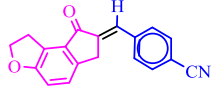
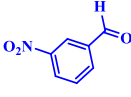
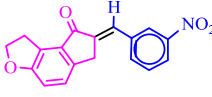
(*E*)-7-(3-nitrobenzylidene)-1,2,6,7-tetrahydro-8*H*-indeno[5,4-*b*]furan-8-one (**3d**):

Yield: 90%; yellow solid; m.p. 146 °C; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>)  $\delta$  (ppm): 3.58 (t, *J* = 8.4 Hz, 2H), 4.08–4.04 (m, 2H), 4.75–4.68 (m, 2H), 7.08 (m, 1H), 7.34 (m, 1H), 7.65 (m, 2H), 7.94 (d, *J* = 7.8 Hz, 1H), 8.25 (d, *J* = 8.4 Hz, 1H), 8.54 (m, 1H); <sup>13</sup>C NMR (126 MHz, CDCl<sub>3</sub>)  $\delta$  (ppm): 28.55, 31.86, 72.51, 116.17, 123.84, 124.33, 125.03, 125.38, 129.96, 130.34, 134.14, 136.47, 137.12, 138.46, 141.24, 148.66, 160.78, 194.03.

### 3.3. Computational study

The structures of the four new 7-arylidene indanones (**3a–3d**) are presented in Table 2. The optimised molecular structures obtained by using the density functional theory method with

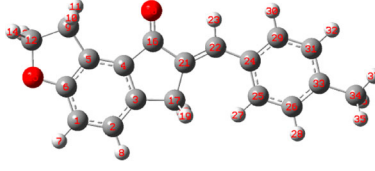
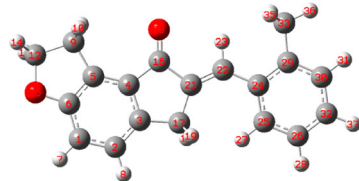
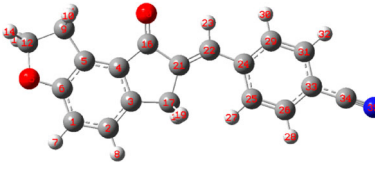
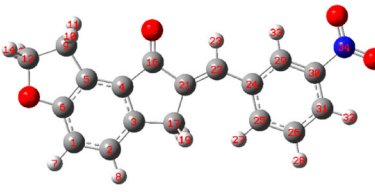
**Table 1.** Physicochemical data of (*E*)-7-arylidene-1,2,6,7-tetrahydro-8*H*-indeno[5,4-*b*]furan-8-one derivatives<sup>a</sup>.

Entry	Aromatic aldehyde	Product	Time (min)	Yield <sup>b</sup> (%)	M.P. (°C)
3a			12	95	108
3b			10	93	140
3c			7	84	179
3d			5	90	146

[a] Reaction conditions: 1 (8 mmol), 2 (10 mmol).

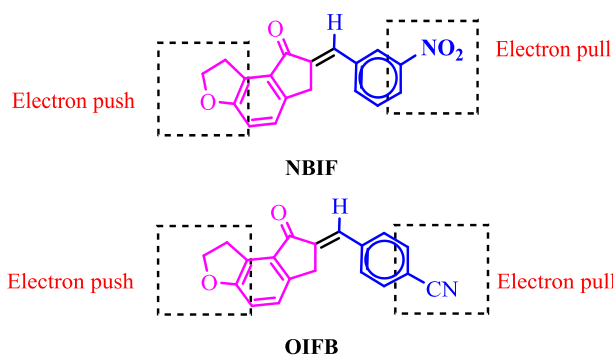
[b] Yield of pure isolated product.

**Table 2.** Optimised molecular structures with IUPAC names and abbreviations.

Entry	IUPAC name of the products	Abbreviations	Optimised molecular structure
3a	( <i>E</i> )-7-(4-methylbenzylidene)-1,2,6,7-tetrahydro-8 <i>H</i> -indeno[5,4- <i>b</i> ]furan-8-one	<b>MBIF-1</b>	
3b	( <i>E</i> )-7-(2-methylbenzylidene)-1,2,6,7-tetrahydro-8 <i>H</i> -indeno[5,4- <i>b</i> ]furan-8-one	<b>MBIF-2</b>	
3c	( <i>E</i> )-4-((8-oxo-1,2,6,8-tetrahydro-7 <i>H</i> -indeno[5,4- <i>b</i> ]furan-7-ylidene)methyl)benzonitrile	<b>OIFB</b>	
3d	( <i>E</i> )-7-(3-nitrobenzylidene)-1,2,6,7-tetrahydro-8 <i>H</i> -indeno[5,4- <i>b</i> ]furan-8-one	<b>NBIF</b>	

a basis set 6-311G (d,p). The point group symmetry for all four molecules is C<sub>1</sub>. The molecule **NBIF** has the highest polarity ( $\mu = 5.7058$  Debye) whereas the molecule **MBIF-2** has the lowest polarity ( $\mu = 1.7983$  Debye) amongst all four molecules. The large polarity difference is attributed to the presence of two substituents having an opposite electronic effect. In the molecule

**NBIF**, the high dipole moment is a consequence of the captodative effect type of phenomenon. From one side electron donor group is attached and from other side electron acceptor group is attached. A similar effect is present in the molecule **OIFB**. The captodative phenomenon is presented in [Figure 1](#).



**Figure 1.** (Colour online) Captodative type phenomenon in NBIF and OIFB.

The optimized geometrical parameters; bond lengths and bond angles for all four molecules have been computed and presented here in Tables 3–6. In the molecule **MBIF-1**, the C4–C5 bond length is 1.386 Å which is the lowest amongst all C=C bond lengths. On the contrary, the highest bond length amongst all C=C bond lengths is C24–C25 bond length which is 1.408 Å. The carbonyl bond (C16–O20) has 1.219 Å distance while the alkene double bond (C21–H22) is 1.346 Å long. The longest and shortest aromatic C=C bonds in the molecule **MBIF-2** are C24–C29 (1.421 Å) and C25–C26 (1.388 Å) respectively. The carbonyl bond (C16–O20) has

**Table 3.** Optimised geometrical parameters of MBIF-1 at B3LYP/6-311 (d,p).

Bond lengths (Å)					
C1–C2	1.399	C9–C12	1.547	C25–C26	1.387
C1–C6	1.394	C12–H13	1.094	C25–H27	1.081
C1–H7	1.083	C12–H14	1.089	C26–H28	1.086
C2–C3	1.391	C12–O15	1.458	C26–C33	1.401
C2–H8	1.085	C16–O20	1.219	C29–H30	1.085
C3–C4	1.402	C16–C21	1.499	C29–C31	1.388
C3–C17	1.388	C17–H18	1.097	C31–H32	1.085
C4–C5	1.386	C17–H19	1.097	C31–C33	1.398
C4–C16	1.480	C17–C21	1.515	C33–C34	1.508
C5–C6	1.392	C21–H22	1.346	C34–H35	1.093
C5–C9	1.507	C22–H23	1.089	C34–H36	1.096
C6–O15	1.362	C22–C24	1.458	C34–H37	1.092
C9–H10	1.095	C24–C25	1.408	–	–
C9–H11	1.091	C24–C29	1.406	–	–
Bond angles (°)					
C2–C1–C6	118.64	C9–C12–H13	111.55	C25–C24–C29	117.19
C2–C1–H7	121.35	C9–C12–H14	114.04	C24–C25–C26	120.97
C6–C1–H7	120.00	C9–C12–O15	106.99	C24–C25–H27	120.26
C1–C2–C3	119.91	H13–C12–H14	109.13	C26–C25–H27	118.78
C1–C2–H8	119.38	H13–C12–O15	107.48	C25–C26–H28	119.20
C3–C2–H8	120.70	H14–C12–C15	107.34	C25–C26–C33	121.52
C2–C3–C4	120.25	C6–O15–C12	107.28	H28–C26–C33	119.28
C2–C3–C17	128.80	C4–C16–O20	126.84	C24–C29–H30	118.87
C4–C3–C17	110.95	C4–C16–C21	106.30	C24–C29–C31	121.56
C3–C4–C5	120.56	O20–C16–C21	126.85	C30–C29–C31	119.56
C3–C4–C16	110.06	C3–C17–H18	111.35	C29–C31–H32	119.48
C5–C4–C16	129.38	C3–C17–H19	111.35	C29–C31–C33	120.99
C4–C5–C6	118.31	C3–C17–C21	103.74	H32–C31–C33	119.53
C4–C5–C9	133.13	H18–C17–H19	106.80	C26–C33–C31	117.76
C6–C5–C9	108.50	H18–C17–C21	106.80	C26–C33–C34	120.86
C1–C6–C5	122.32	C19–C17–C21	111.86	C31–C33–C34	121.37
C1–C6–O15	124.38	C16–C21–C17	108.94	C33–C34–H35	111.37
C5–C6–O15	113.29	C16–C21–H22	119.41	C33–C34–H36	110.94
C5–C9–H10	110.63	C17–C21–H22	131.65	C33–C34–H37	111.44
C5–C9–H11	113.08	C21–C22–H23	113.63	C35–C34–H36	107.21
C5–C9–C12	101.10	C21–C22–C24	131.56	C35–C34–H37	108.13
H10–C9–H11	107.08	H23–C22–C24	114.81	C36–C34–H37	107.56
H10–C9–C12	112.29	C22–C24–C25	124.85	–	–
H11–C9–C12	112.72	C22–C24–C29	117.96	–	–

**Table 4.** Optimised geometrical parameters of MBIF-2 at B3LYP/6-311 (d,p).

Bond lengths (Å)					
C1–C2	1.399	C9–C12	1.547	C25–C26	1.388
C1–C6	1.394	C12–H13	1.094	C25–H27	1.080
C1–H7	1.083	C12–H14	1.089	C26–H28	1.084
C2–C3	1.391	C12–O15	1.458	C26–C33	1.392
C2–H8	1.085	C16–O20	1.219	C29–C30	1.396
C3–C4	1.402	C16–C21	1.501	C29–C33	1.512
C3–C17	1.518	C17–H18	1.097	C30–H31	1.085
C4–C5	1.388	C17–H19	1.096	C30–C32	1.392
C4–16	1.479	C17–C21	1.515	C32–H37	1.084
C5–C6	1.392	C21–H22	1.348	C33–H34	1.094
C5–C9	1.507	C22–H23	1.086	C33–H35	1.094
C6–O15	1.362	C22–C24	1.460	C33–H36	1.091
C9–H10	1.095	C24–C25	1.408	–	–
C9–H11	1.091	C24–C29	1.421	–	–
Bond angles (°)					
C2–C1–C6	118.64	H11–C9–C12	112.71	C22–C24–C25	122.45
C2–C1–H7	121.34	C9–C12–H13	111.55	C22–C24–C29	119.20
C6–C1–H7	120.02	C9–C12–H14	114.05	C25–C24–C29	118.35
C1–C2–C3	119.92	C9–C12–O15	106.97	C24–C25–C26	121.74
C1–C2–H8	119.38	H13–C12–H14	109.13	C24–C25–H27	119.58
C3–C2–H8	120.70	H13–C12–O15	107.49	C26–C25–H27	118.67
C2–C3–C4	120.24	H14–C12–O15	107.34	C25–C26–H28	119.92
C2–C3–C17	128.79	C6–O15–C12	107.27	C25–C26–C32	119.65
C4–C3–C17	110.97	C4–C16–O20	126.83	H28–C26–C32	120.43
C3–C4–C5	120.57	C4–C16–C21	106.39	C24–C29–C30	118.90
C3–C4–C16	110.04	O20–C16–C21	126.78	C24–C29–C33	122.18
C5–C4–C16	129.38	C3–C17–H18	110.96	C30–C29–C33	118.92
C4–C5–C6	118.30	C3–C17–H19	111.72	C29–C30–C31	118.82
C4–C5–C9	133.15	C3–C17–C21	103.79	C29–C30–C32	121.82
C6–C5–C9	108.49	H18–C17–H19	106.77	H31–C30–C32	119.36
C1–C6–C5	122.31	H18–C17–C21	111.79	C26–C32–C30	119.54
C1–C6–O15	124.39	C19–C17–C21	111.91	C26–C32–H37	120.45
C5–C6–O15	113.30	C16–C21–C17	108.80	C30–C32–H37	120.01
C5–C9–H10	110.64	C16–C21–H22	118.82	C29–C33–H34	111.91
C5–C9–H11	113.10	C17–C21–H22	132.37	C29–C33–H35	111.94
C5–C9–C12	101.10	C21–C22–H23	112.46	C29–C33–H36	110.33
H10–C9–H11	107.09	C21–C22–C24	131.72	H34–C33–H35	107.11
H10–C9–C12	112.27	H23–C22–C24	115.81	H34–C33–H36	107.62
–	–	–	–	C35–C33–H36	107.71

1.219 Å bond length whereas the alkene double bond (C21–H22) length is 1.348 Å. In the case of the molecules **OIFB** and **NBIF**, the alkene C=C bond lengths are 1.345 and 1.344 Å respectively. In both the molecules, the longest aromatic C=C bond is C24–C25 whereas the shortest are C29–C31 (1.385 Å) and C4–C5 (1.389 Å) respectively. The CN bond is 1.155 Å long in the molecule **OIFB**. The C33–C34 bond in the molecule **OIFB** has acquired partial double bond character with 1.429 Å bond distance. This is due to the involvement of the CN group in resonance with the aromatic ring. The two NO bonds in the molecule **NBIF** (N34–O35 and N34–O36) are having nearly the same bond distance. The C=O bonds in **OIFB** and **NBIF** are 1.217 and 1.217 Å long respectively. All other bond lengths in all four molecules are also in good agreement. The C33–C34–N35 bond angle in the molecule **OIFB** is 179.93°. The O35–N34–O36 bond angle in the molecule **NBIF** is 124.97°. Remaining bond angle data is also found to be in good agreement.

The chemical reactivity of a molecule is administered by the charge density of HOMO and LUMO energy surfaces. The HOMO is known as an orbital that could go about as an electron contributor since it is the peripheral orbital containing electrons. The general structure with of 7-arylidene indanone with ring labelling is given in Figure 2. The pictorial illustration of the frontier molecular orbitals is given in Figure 3. The

**Table 5.** Optimised geometrical parameters of OIFB at B3LYP/6-311 (d,p).

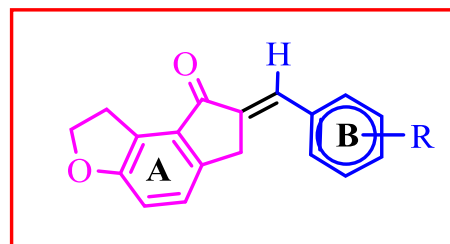
Bond lengths (Å)					
C1–C2	1.399	C9–H11	1.091	C24–C25	1.409
C1–C6	1.395	C9–C12	1.547	C24–C29	1.409
C1–H7	1.083	C12–H13	1.094	C25–C26	1.385
C2–C3	1.391	C12–H14	1.089	C25–H27	1.080
C2–H8	1.085	C12–O15	1.458	C26–H28	1.083
C3–C4	1.403	C16–O20	1.217	C26–C33	1.403
C3–C17	1.518	C16–C21	1.506	C29–H30	1.084
C4–C5	1.389	C17–H18	1.096	C29–C31	1.385
C4–16	1.477	C17–H19	1.096	C31–H32	1.083
C5–C6	1.392	C17–C21	1.514	C31–C33	1.402
C5–C9	1.507	C21–C22	1.345	C33–C34	1.429
C6–O15	1.361	C22–H23	1.089	C34–N35	1.155
C9–H10	1.095	C22–C24	1.459	–	–
Bond angles (°)					
C2–C1–C6	118.71	H10–C9–C12	112.68	C21–C22–C24	131.26
C2–C1–H7	121.32	H11–C9–C12	112.27	H23–C22–C24	114.91
C6–C1–H7	119.97	C9–C12–H13	111.63	C22–C24–C25	124.57
C1–C2–C3	119.86	C9–C12–H14	114.01	C22–C24–C29	117.73
C1–C2–H8	119.86	C9–C12–O15	106.97	C25–C24–C29	117.70
C3–C2–H8	120.73	H13–C12–H14	109.15	C24–C25–C26	121.10
C2–C3–C4	120.27	H13–C12–O15	107.44	C24–C25–H27	120.34
C2–C3–C17	128.65	H14–C12–O15	107.32	C26–C25–H27	118.56
C4–C3–C17	111.07	C6–O15–C12	107.37	C25–C26–H28	120.24
C3–C4–C5	120.59	C4–C16–O20	127.34	C25–C26–C33	120.31
C3–C4–C16	110.07	C4–C16–C21	106.29	H28–C26–C33	119.45
C5–C4–C16	129.34	O20–C16–C21	126.37	C24–C29–H30	120.52
C4–C5–C6	118.25	C3–C17–H18	111.39	C24–C29–C31	121.68
C4–C5–C9	133.18	C3–C17–H19	111.36	C30–C29–H31	119.39
C6–C5–C9	108.52	C3–C17–C21	103.73	C29–C31–C32	120.52
C1–C6–C5	122.31	H18–C17–H19	106.89	C29–C31–C33	119.78
C1–C6–O15	124.35	H18–C17–C21	111.77	H32–C31–C33	119.70
C5–C6–O15	113.34	C19–C17–C21	111.78	C26–C33–C31	119.44
C5–C9–H10	110.64	C16–C21–C17	108.84	C36–C33–C34	120.22
C5–C9–H11	113.08	C16–C21–H22	119.13	C31–C33–C34	120.35
C5–C9–C12	101.14	C17–C21–H22	132.03	C33–C34–N35	179.93
H10–C9–H11	107.09	C21–C22–H23	113.83	–	–

**Table 6.** Optimised geometrical parameters of NBIF at B3LYP/6-311 (d,p).

Bond lengths (Å)					
C1–C2	1.399	C9–H11	1.091	C24–C25	1.409
C1–C6	1.395	C9–C12	1.547	C24–C29	1.405
C1–H7	1.083	C12–H13	1.094	C25–C26	1.391
C2–C3	1.391	C12–H14	1.089	C25–H27	1.080
C2–H8	1.085	C12–O15	1.459	C26–H28	1.083
C3–C4	1.402	C16–O20	1.217	C26–C31	1.391
C3–C17	1.518	C16–C21	1.506	C29–H30	1.385
C4–C5	1.389	C17–H18	1.097	C29–C33	1.081
C4–16	1.478	C17–H19	1.097	C30–C31	1.390
C5–C6	1.392	C17–C21	1.514	C30–N34	1.483
C5–C9	1.507	C21–C22	1.344	C31–C32	1.081
C6–O15	1.361	C22–H23	1.089	N34–O35	1.223
C9–H10	1.095	C22–C24	1.461	N34–O36	1.222
Bond angles (°)					
C2–C1–C6	118.68	H11–C9–C12	112.70	C22–C24–C25	124.76
C2–C1–H7	121.33	C9–C12–H13	111.65	C22–C24–C29	117.50
C6–C1–H7	119.99	C9–C12–H14	114.01	C25–C24–C29	117.74
C1–C2–C3	119.88	C9–C12–O15	106.96	C24–C25–C26	121.23
C1–C2–H8	119.40	H13–C12–H14	109.15	C24–C25–H27	120.04
C3–C2–H8	120.72	H13–C12–O15	107.44	C26–C25–H27	118.72
C2–C3–C4	120.29	H14–C12–O15	107.32	C25–C26–H28	119.72
C2–C3–C17	128.63	C6–O15–C12	107.36	C25–C26–C31	120.73
C4–C3–C17	111.07	C4–C16–O20	127.30	H28–C26–C31	119.55
C3–C4–C5	120.57	C4–C16–C21	106.28	C24–C29–C30	119.98
C3–C4–C16	110.08	O20–C16–C21	126.41	C24–C29–H33	120.87
C5–C4–C16	129.35	C3–C17–H18	111.38	C30–C29–H33	119.14
C4–C5–C6	118.26	C3–C17–H19	111.33	C29–C30–C31	122.37
C4–C5–C9	133.18	C3–C17–C21	103.72	C29–C30–C34	118.78
C6–C5–C9	108.50	H18–C17–H19	106.93	H31–C30–C34	118.85
C1–C6–C5	122.31	H18–C17–C21	111.77	C26–C30–C30	117.94
C1–C6–O15	124.35	H19–C17–C21	111.80	C26–C31–H32	122.33
C5–C6–O15	113.33	C16–C21–C17	108.84	C30–C31–H32	119.73
C5–C9–H10	110.63	C16–C21–H22	119.09	C30–N34–O35	117.41
C5–C9–H11	113.09	C17–C21–H22	132.07	C30–N34–O36	117.62
C5–C9–C12	101.14	C21–C22–H23	113.94	O35–N34–O36	124.97
H10–C9–H11	107.08	C21–C22–C24	131.23	–	–
H10–C9–C12	112.25	H23–C22–C24	114.83	–	–

HOMO and LUMO energies are very essential as they relate to ionisation enthalpy and electron affinity respectively. As shown by these two parameters, the compound reactivity changes with the structural framework. The examination of the wave function shows that the electron absorption corresponds to the excitation from the ground state to the first excited state.

The HOMO is seen to be chiefly at ring A and on the contrary; LUMO is distributed over the enone framework and ring B in all four molecules. Due to the presence of the nitro group in the **NBIF** molecule, the LUMO is significantly situated at ring B. The **NBIF** molecule has the lowest HOMO–LUMO energy gap (3.403 eV) amongst all molecules. This is due to the captodative phenomenon present in the molecule. The lower HOMO–LUMO energy gap demonstrates the inevitable charge transfer interactions taking place within the molecule. This is attributed to the presence of the both acceptor and donor groups the **NBIF** molecule. Similar effect is present in the **OBIF** molecule; however, the effect is less powerful. The molecules **MBIF-1** and **MBIF-2** have electron releasing groups at the opposite sides which augments the energy gap and therefore both molecules would possess less chemical reactivity in terms of an electron transfer. The HOMO reactivity ( $E_{\text{HOMO}} = -5.988$ ) is the highest in the **MBIF-1** molecule while the LUMO reactivity ( $E_{\text{LUMO}} = -2.852$ ) is the highest in the molecule **OIFB**. The reason for this is the presence of two electron releasing groups (OR and Me) in the **MBIF-1** molecule and one electron releasing (OR) and one electron withdrawing group (CN) in the **OIFB** molecule.

**Figure 2.** (Colour online) General structure with ring labelling.

The electronic parameters of all four derivatives are tabulated in Table 7. From the HOMO–LUMO information, it is affirmed that the presence of electron releasing group on ring A and electron attracting group on ring D results in lowering of the energy gap. On the contrary, the presence of an electron releasing group on ring B augments the energy gap. The quantum chemical parameters are presented in Table 8 and have been calculated from molecular parameters using Koopmans' theorem. The parameters like electronegativity ( $\chi$ ), absolute hardness ( $\eta$ ), global softness ( $\sigma$ ), global electrophilicity index ( $\omega$ ), chemical potential ( $\mu$ ) maximum number of electron transferred ( $\Delta n_{\text{max}}$ ) have been established. All these parameters provide valuable insights into the chemical reactivity of molecules. The highest value of the electronegativity ( $\chi = 4.557$  eV) in the molecule **OIFB** suggests that it has the most powerful electron attracting property. The data of absolute



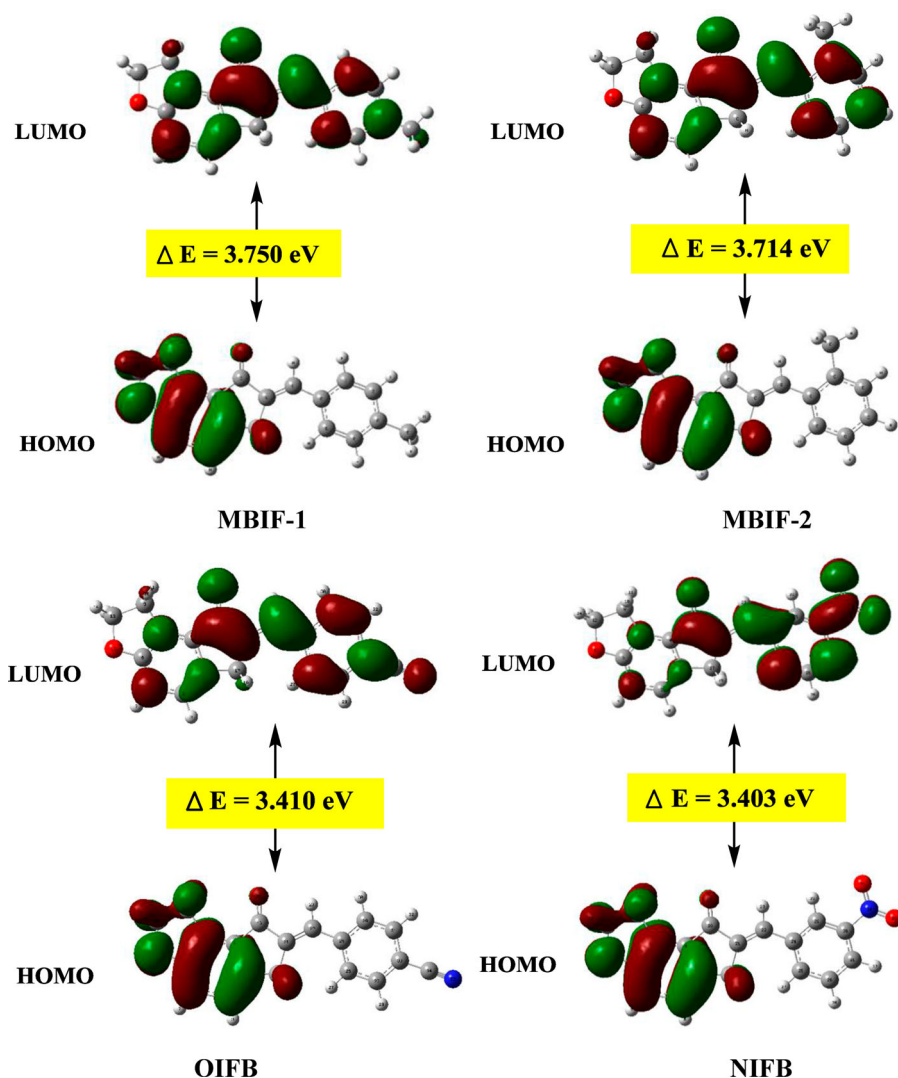


Figure 3. (Colour online) HOMO–LUMO pictures.

Table 7. Electronic parameters.

Name	E (a.u.)	$E_{\text{HOMO}}$ (eV)	$E_{\text{LUMO}}$ (eV)	I (eV)	A (eV)	$E_g$ (eV)
MBIF-1	–884.323	–5.988	–2.237	5.988	2.237	3.750
MBIF-2	–884.320	–6.017	–2.303	6.017	2.303	3.714
OIFB	–1049.549	–6.262	–2.852	6.262	2.852	3.410
NBIF	–958.887	–6.252	–2.849	6.252	2.849	3.403

Note: Abbreviations: I, ionisation potential; A, electron affinity; Note:  $I = -E_{\text{HOMO}}$  &  $A = -E_{\text{LUMO}}$ .

hardness and the global softness affirms that the molecule MBIF-1 ( $\eta = 1.875$  eV) is softer and the molecule NBIF ( $\sigma = 0.588$ ) is harder in comparison with each other. This data is very crucial to decide the chemical reactivity. All the four

molecules would undergo fast nucleophilic attacks; however, the molecule NBIF would prefer faster nucleophilic attacks as it has the highest value of global electrophilicity index ( $\omega = 6.101$ ). The maximum charge transfer is taking place within the OIFB molecule due to high value of maximum number of electron transfer ( $\Delta N_{\text{max}} = 2.6727$  eV). By employing TD-B3LYP/6-311G (d,p) level of theory for B3LYP/6-311G (d,p) optimised geometries, absorption energies ( $\lambda$  in nm), oscillator strength ( $f$ ), and transitions of all four molecules have been computed and depicted in Table 9. The  $S_0$  to  $S_1$  excitation energy data suggests that shifting from electron releasing to electron attracting group on ring B results in redshift. However, a molecule with a strong electron attracting nitro group has

Table 8. Global reactivity parameters.

Name	$\chi$ (eV)	$\eta$ (eV)	$\sigma$ (eV <sup>-1</sup> )	$\omega$ (eV)	Pi (eV)	$\Delta N_{\text{max}}$ (eV)	Dipole Moment (Debye)
MBIF-1	3.553	1.875	0.533	3.366	–3.553	1.8949	2.742
MBIF-2	4.160	1.857	0.538	4.660	–4.160	2.2404	1.798
OIFB	4.557	1.705	0.586	6.090	–4.557	2.6727	4.325
NBIF	4.551	1.702	0.588	6.101	–4.551	2.2738	5.706

Note:  $\chi = (I + A)/2$ ;  $\eta = (I - A)/2$ ;  $\sigma = 1/\eta$ ;  $\omega = \text{Pi}^2/2\eta$ ;  $\text{Pi} = -\chi$ ;  $\Delta N_{\text{max}} = -\text{Pi}/\eta$ . Abbreviations:  $\chi$ , electronegativity;  $\eta$ , absolute hardness;  $\sigma$ , global softness;  $\omega$ , global electrophilicity; Pi, chemical potential;  $\Delta N_{\text{max}}$ , maximum no. of electron transferred.

**Table 9.** Absorption energies ( $\lambda$  in nm), Oscillator strength ( $f$ ), and Transitions of all four molecules computed at TD-B3LYP/6-311G (d,p) level of theory for B3LYP/6-311G(d,p) optimised geometries.

Name	State	$\lambda^{\text{abs}}$	$f$	Configuration	Transition
<b>MBIF-1</b>	$S_0 \rightarrow S_1$	386.52	0.0116	73 $\rightarrow$ 74	H $\rightarrow$ L
<b>MBIF-2</b>	$S_0 \rightarrow S_1$	390.94	0.0170	73 $\rightarrow$ 74	H $\rightarrow$ L
<b>OIFB</b>	$S_0 \rightarrow S_1$	428.04	0.0120	75 $\rightarrow$ 76	H $\rightarrow$ L
<b>NBIF</b>	$S_0 \rightarrow S_1$	420.47	0.0103	80 $\rightarrow$ 81	H $\rightarrow$ L

**Table 10.** Mulliken atomic charges of MBIF-1 and MBIF-2 molecules computed for B3LYP/6-311G (d,p) optimised geometries.

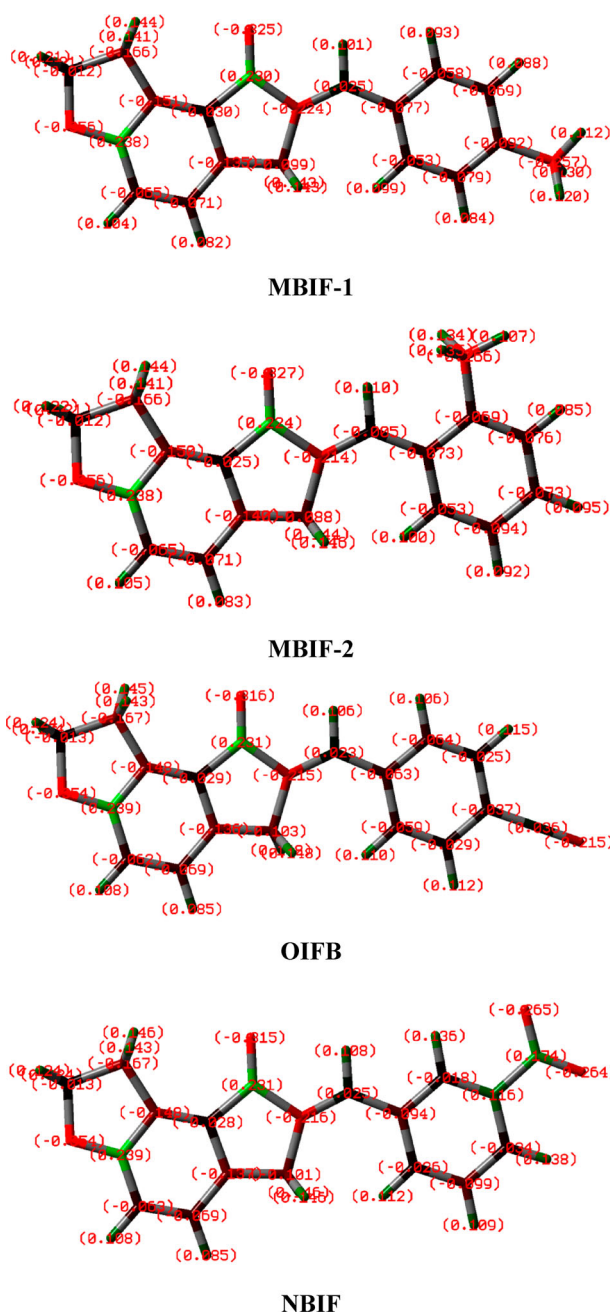
MBIF-1				MBIF-2			
Atom	Charge	Atom	Charge	Atom	Charge	Atom	Charge
1 C	-0.065	20 O	-0.327	1 C	-0.065	20 O	-0.326
2 C	-0.071	21 C	-0.222	2 C	-0.071	21 C	-0.211
3 C	-0.135	22 C	0.027	3 C	-0.141	22 C	-0.015
4 C	-0.030	23 H	0.101	4 C	-0.025	23 H	0.114
5 C	-0.152	24 C	-0.073	5 C	-0.151	24 C	-0.049
6 C	0.238	25 C	-0.057	6 C	0.238	25 C	-0.055
7 H	0.104	26 C	-0.075	7 H	0.105	26 C	-0.098
8 H	0.082	27 H	0.099	8 H	0.083	27 H	0.098
9 C	-0.166	28 H	0.086	9 C	-0.166	28 H	0.091
10 H	0.140	29 C	-0.061	10 H	0.141	29 C	-0.086
11 H	0.144	30 H	0.092	11 H	0.144	30 C	-0.073
12 C	-0.012	31 C	-0.065	12 C	-0.012	31 H	0.085
13 H	0.121	32 H	0.089	13 H	0.121	32 C	-0.070
14 H	0.121	33 C	-0.107	14 H	0.122	33 C	-0.274
15 O	-0.357	34 C	-0.249	15 O	-0.356	34 H	0.137
16 C	0.230	35 H	0.123	16 C	0.224	35 H	0.137
17 C	-0.099	36 H	0.131	17 C	-0.082	36 H	0.106
18 H	0.143	37 H	0.111	18 H	0.144	37 H	0.098
19 H	0.143	-	-	19 H	0.144	-	-

slightly less absorption wavelength as compared to moderately attracting the cyano group.

Mulliken atomic charges for the molecules **MBIF-1** and **MBIF-2** are given [Table 10](#) and for the molecules **OIFB** and **NBIF** in [Table 11](#). The Mulliken atomic charges of the title molecules are calculated by DFT/B3LYP method with a 6-311G (d,p) basis set in the gaseous phase. The pictorial representation of the Mulliken atomic charges given in [Figure 4](#) uncovers that all hydrogen atoms have a net positive charge. The C16 (carbonyl carbon) and C6 carbon are highly

**Table 11.** Mulliken atomic charges of OIFB and NBIF molecules computed for B3LYP/6-311G (d,p) optimised geometries.

OIFB				NBIF			
Atom	Charge	Atom	Charge	Atom	Charge	Atom	Charge
1 C	-0.071	19 H	0.143	1 C	-0.063	19 H	0.147
2 C	-0.060	20 O	-0.322	2 C	-0.069	20 O	-0.314
3 C	-0.077	21 C	-0.148	3 C	-0.137	21 C	-0.216
4 C	-0.033	22 C	0.027	4 C	-0.028	22 C	0.025
5 C	-0.157	23 H	0.114	5 C	-0.148	23 H	0.108
6 C	0.250	24 C	-0.102	6 C	0.239	24 C	-0.094
7 H	0.115	25 C	-0.069	7 H	0.108	25 C	-0.026
8 H	0.094	26 C	-0.028	8 H	0.084	26 C	-0.100
9 C	-0.142	27 H	0.133	9 C	-0.166	27 H	0.112
10 H	0.140	28 H	0.110	10 H	0.143	28 H	0.108
11 H	0.136	29 C	-0.044	11 H	0.146	29 C	-0.018
12 C	-0.031	30 H	0.105	12 C	-0.013	30 C	0.117
13 H	0.122	31 C	-0.033	13 H	0.124	31 C	-0.034
14 H	0.115	32 H	0.117	14 H	0.124	32 H	0.138
15 O	-0.383	33 C	-0.059	15 O	-0.353	33 H	0.136
16 C	0.236	34 C	0.050	16 C	0.231	34 N	0.173
17 C	-0.099	35 N	-0.210	17 C	-0.101	35 O	-0.264
18 H	0.172	-	-	18 H	0.146	36 O	-0.265



**Figure 4.** (Colour online) Mulliken atomic charge distribution.

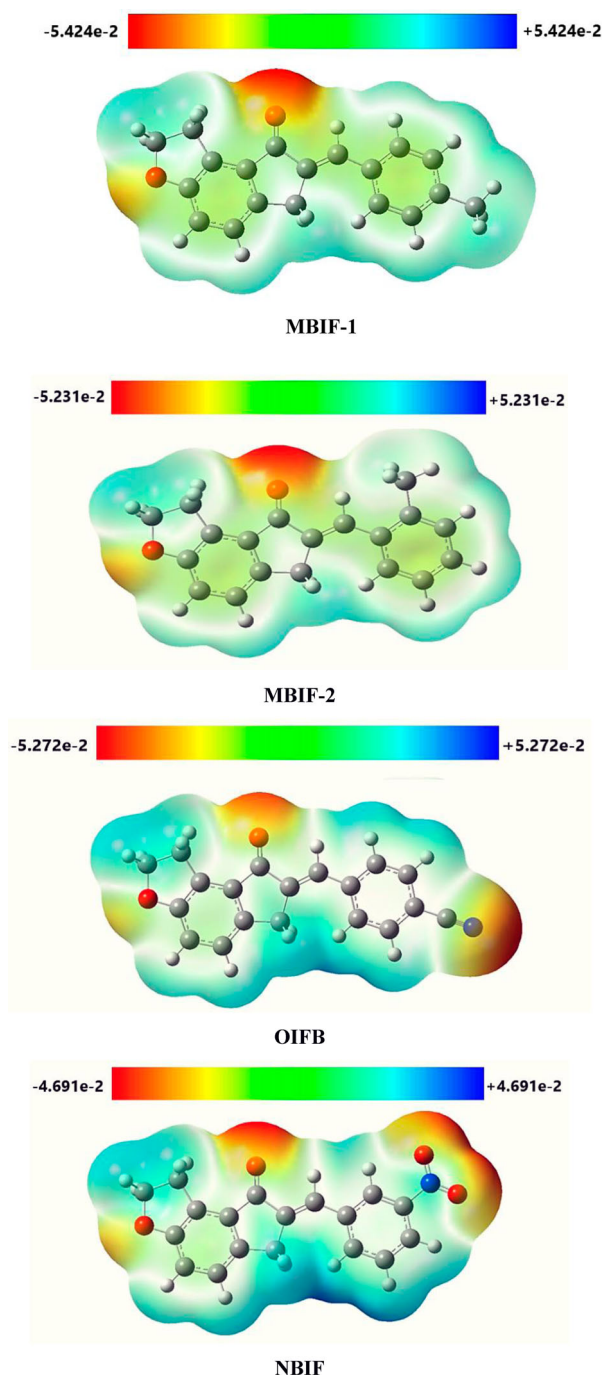
electropositive. The H10 and H11 hydrogen atoms in all four molecules are highly electropositive in nature. The high electropositive character is a consequence of the hyperconjugation effect. In light of the vibrational frequencies, the different thermodynamic properties like total thermal energy ( $E_{\text{total}}$ ), heat capacity at constant volume ( $C_v$ ), total entropy ( $S$ ), zero-point vibrational energy ( $E_{v_0}$ ), rotational constants were computed. These are given in [Table 12](#). It is evident from the data of  $E/B3LYP$  and  $E_{\text{total}}$  that the presence of electron releasing and electron attracting groups together augments the stability of the molecules. The **OIFB** molecule possesses highest stability. This is because of the presence of extended conjugation. The molecule **NBIF** has higher entropy amongst all the four molecules. This can be ascribed to the presence of more number of atoms in the molecule **NBIF**. The electron releasing groups (OR and

**Table 12.** Thermodynamic properties.

Parameter	Value			
	MBIF-1	MBIF-2	OIFB	NBIF
E total (kcal mol <sup>-1</sup> )	197.278	198.009	179.906	182.734
Translational	0.889	0.889	0.889	0.889
Rotational	0.889	0.889	0.889	0.889
Vibrational	195.501	196.232	178.129	180.956
Heat Capacity at constant volume, C <sub>v</sub> (cal mol <sup>-1</sup> K <sup>-1</sup> )	65.851	67.675	67.775	70.415
Translational	2.981	2.981	2.981	2.981
Rotational	2.981	2.981	2.981	2.981
Vibrational	59.889	61.713	61.813	64.453
Total entropy S (cal mol <sup>-1</sup> K <sup>-1</sup> )	132.255	136.519	136.881	142.423
Translational	42.746	42.953	42.862	43.062
Rotational	34.370	34.704	34.683	35.104
Vibrational	55.140	57.739	59.336	64.257
Zero point Vibrational Energy E <sub>v0</sub> (kcal mol <sup>-1</sup> )	186.926	187.295	169.078	171.378
Rotational constants (GHZ)	1.097	0.910	1.079	0.879
	0.120	0.138	0.103	0.093
	0.109	0.120	0.094	0.084

Me) together results in the decrease in the stability of the molecules. The molecules **MBIF-1** and **MBIF-2** have nearly same more zero-point vibrational energy. All the thermodynamic data revealed is also valuable for additional assessment and can be utilised to figure the other thermodynamic energies.

The molecular electrostatic surface potential (MESP) plots are plotted by using a 6-311G (d,p) basis set and presented in Figure 5 MESP is the three-dimensional representation that indicates charge distributions in molecules. The properties like nucleophilic and electrophilic sites, solvent effects, hydrogen bonding interactions, etc. could be anticipated by understanding molecular electrostatic potential surfaces. The various estimations of the electrostatic potential at the surface of the molecule are represented by distinct colours. The red and yellow regions indicate the region of high electron density and are linked to electrophilic reactivity. On the other side, the blue parts represent low electron density and susceptible to nucleophilic reactivity and green colours represent regions of zero potential, respectively. The colour gradient ranges from most electronegative to the most electropositive are also displayed in the MESP plots. The surface around oxygen atoms is found to be the most electronegative red part. The most electronegative red part around oxygen atom is present in the **MBIF-1** molecule. The MBIF-1 molecule has colour gradient range from most electronegative to the most electropositive part as  $-0.05424$  and  $+0.05424$  respectively. This due to the presence of electron releasing methyl group in the **MBIF-1** molecule. The NBIF molecule has colour gradient range from  $-0.04691$  to  $+0.04691$ . This is ascribed to the presence of powerful electron withdrawing group in the **NBIF** molecule. The electrophilic and nucleophilic sites give an idea regarding the area from where the compounds interact. The MESP suggests, in the title molecules, the aryl ring A connected to dihydrofuran ring is highly prone towards electrophilic attack. In the molecules **MIFB-1** and **MIFB-2**, ring A is more reactive towards electrophilic attack as compared to the ring A in molecules **OIFB** and **NBIF**. On the contrary, ring B in the

**Figure 5.** (Colour online) Molecular electrostatic potential surfaces.

molecules **OIFB** and **NBIF** are susceptible to the nucleophilic attack.

#### 4. Conclusions

In conclusion, four new (*E*)-7-(arylidene)-1,2,6,7-tetrahydro-8*H*-indeno[5,4-*b*]furan-8-one derivatives are synthesised by the green method and studied from a structural examination perspective by using the DFT method with a basis set 6-311G (d,p). We have investigated the structural parameters along with global reactivity parameters for a better understanding of the stability and chemical behaviour of four important

derivatives of the 7-arylidene indanone skeleton. Grindstone chemistry approach has been efficiently used for the synthesis of four new 7-arylidene indanones. The structures have been confirmed based on a  $^1\text{H}$  NMR and  $^{13}\text{C}$  NMR spectroscopic techniques. The geometry of the molecules was optimised by using a B3LYP/6-311G (d,p) basis set and the geometrical parameters like bond lengths and bond angles were computed at the same level of theory. The molecule NBIF has the highest polarity whereas the molecule MBIF-2 has the lowest polarity amongst all four molecules. The FMO study has been effectively presented to analyse the chemical reactivity of the molecules. The NBIF molecule has the lowest HOMO–LUMO energy gap amongst all molecules. By using HOMO–LUMO energies various electron and quantum chemical parameters have been established. The electron absorption energy information proposes that moving from electron releasing to electron attracting group on ring B brings about redshift. From the MESP analysis, it is evident that in the molecules MIFB-1 and MIFB-2, ring A is more reactive towards electrophilic attack as compared to the ring A in molecules OIFB and NBIF. In contrast, ring B in the molecules OIFB and NBIF are susceptible to the nucleophilic attack. The OBIF molecule possesses higher stability while NBIF molecule has higher entropy.

## Acknowledgements

Authors acknowledge Central instrumentation facility, Savitribai Phule Pune University, Pune for NMR spectral analysis. Authors are grateful to Prof. (Dr.) A. B. Sawant for his guidance in the Gaussian study. The authors would also like to thank Dr. Aapoorva Prashant Hiray, Co-ordinator, Mahatma Gandhi Vidyamandir Institute, Nashik for the research support.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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MARATHA VIDYA PRASARAK SAMAJ'S  
Karmveer Abasaheb Alias N. M. Sonawane

# ARTS, COMMERCE AND SCIENCE COLLEGE, SATANA

Tal. Baglan, Dist. Nashik (MS) INDIA. Pin - 423 301

NAAC Re-Accredited "A" Grade

**BEST RURAL COLLEGE AWARD OF SAVITRIBAI PHULE PUNE UNIVERSITY**

**Dr. Vijay J. Medhane**  
M.Sc., Ph.D.  
Principal

Affiliated to Savitribai Phule Pune University  
Id No. PU/NS/ACS/008 (1967)

College Code No.: 026  
Center Code No.: 052

Junior College Index No.  
13.12.002

## Collaboration/Linkage Certificate

To whomsoever it may be concern

This is to certify that **Dr. Manohar Rajendra Patil** Department of Chemistry NTVS's G.T. Patil Arts, Commerce and Science College; Nandurbar-425412 has research collaboration (since 2017) with **Karmveer Abasaheb Alias N.M. Sonawane Arts, Commerce and Science College, Satana (Maharashtra)** for sharing the research ideas, exchange of reprints of our research papers and for the sample characterizations. We have jointly worked on research topics related to the application of nanoparticles and have published the research work in reputed international journals.

We have further extended this linkage with both the Chemistry departments to review the curriculum, teaching practices and discuss ways in which courses could be revised to promote scientific knowledge among the students.

Place: Satana

Date: 20/01/2022



Yours Sincerely

**Principal**

Karm. Abasaheb Alias N. M. Sonawane  
Arts, Commerce & Science College  
SATANA, Tal. Baglan (Nashik)



Maratha Vidya Prasarak Samaj's



**Karmveer Abasaheb Alias N. M. Sonawane Arts, Commerce  
and Science College, Satana**

Sponsored by,  
BOD, Savitribai Phule Pune University, Pune  
National Level Seminar

on  
"National Education Policy 2020 with Special Reference to Research  
and Development"

15<sup>th</sup> & 16<sup>th</sup> February, 2023

# CERTIFICATE

This is to certify that, Mr./Miss./Prof./Dr. Patil... Manohar.....

Rajendra..... of G.T.P. College.....

Nandurbar..... College / Institute has worked as

Resource Person / Chaired a Session / Participated / Presented a Paper

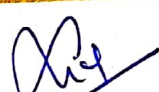
entitled Educational Policies of India : Past.....

present and future.....

In Oral / Poster Session in the National Seminar on "National Education

Policy 2020 with Special Reference to Research and Development"

held on 15<sup>th</sup> & 16<sup>th</sup> February, 2023.

  
Dr. Rajendra D. Vasait  
Co-ordinator

  
Prin. Dr. Vijay J. Medhane  
Convener



NAAC Re-Accredited A

॥ श्री ॥

NANDURBAR TALUKA VIDHAYAK SAMITI'S  
**G. T. PATIL ARTS, COMMERCE AND SCIENCE COLLEGE,**  
**NANDURBAR, DIST- NANDURBAR-425412 (M.S.)**

DST FIST Identified College

Awarded "Excellent College" By North Maharashtra University, Jalgaon 2014

● GOLDEN JUBILEE YEAR 2014-15 ●



Prof. Dr. V. S. Shrivastava  
Ph.D. Post. Doct. (S.America)

Principal

Office : (02564) 222293, 226534  
E-mail: gtpcollege@rediffmail.com  
drvinod\_shrivastava@yahoo.com  
Web: www.nivsgtpcollege.org

G.T.P.C. AINO. / 977 /

Date: 25/03/2022

Permitted  
29/03/2022

The principal,

SSBT'S College of Engineering,

Bambhori, Jalgaon

Date: 25/03/2022


**Subject:** Allowing our students to work with Dr. Kiran S. Patil in your esteemed Institute

Respected Sir,

It gives me an immense pleasure to inform you that two of our faculties namely **Dr. Gaurav R. Gupta** from Department of Chemistry GTP College, Namdurbar and **Dr. Kiran S. Patil** from your esteemed Institute having research collaboration and I am sure this collaboration definitely uplifts the standard of their research . In this regard, I am requesting you please allow four of our P.G Student [M.Sc.II: Organic Chemistry] namely **Shubham V. Patil, Rahul A. Chavan, Rohit D. Patil** and **Avinash More** for the research with **Dr. Kiran S. Patil** at your institute. Also, we continues such collaborative research for the upliftment of the standard of the research.

Thanking You.

Yours Sincerely,

  
Prof. Dr. V. S. Shrivastava  
PRINCIPAL  
Gajmal Tulshiram Patil  
College, Nandurbar



## MEMORANDUM OF UNDERSTANDING

This **Memorandum of Understanding** (hereinafter called as the 'MoU') is entered into, on this date 30/04/2022 (DATE).

### BETWEEN

**Shram Sadhana Bombay Trust's College of Engineering & Technology, Bambhori, Jalgaon-425001 (M.S.), on behalf of SSBT's Group of Institutions**, represented herein by Principal, Dr. Girish Kumar Patnaik (hereinafter referred as '**First Party**'), include its successors – in-office, administrators and assigns).

### AND

**NTVS's G. T. Patil Arts, Commerce and Science College, Nandurbar** (NAME OF SCHOOL) represented herein by Principal, Prof. V. S. Shrivastava (NAME) (hereinafter referred as '**Second Party**'), include its successors – in-office, administrators and assigns).

(First Party and Second Party are hereinafter jointly referred to as 'Parties' and individually as 'Party')

**NOW THEREFORE, IN CONSIDERATION OF THE MUTUAL PROMISES SET FORTH IN THIS MoU, THE PARTIES HERETO AGREE AS FOLLOWS:**

- **Project-Based Learning**: First Party shall design project-based activities especially for Science, Technology, Engineering and Mathematics (STEM) subjects for students of Second Party helping them excel in these subjects.
- **Training**: First Party shall design modules for training on recent technologies and share knowledge with teachers and students of Second Party.
- **Career Counseling**: First Party shall conduct exclusive sessions with students of Second Party on futuristic careers in the fields of Science & Engineering, Commerce & Management, Pharmacy, etc.
- **Student Connect**: Second Party shall share student details with First Party for one-to-one interaction and guidance on projects, models, skill development, career enhancement etc.

- **College Tour:** Get students of Second Party to experience a guided tour to campus, colleges, classrooms, laboratories, libraries, etc. of First Party.
- **Newsletters:** Students of Second Party shall have access to newsletters of First Party.
- **Events:** Students of Second Party will be regularly invited to be part of knowledge-based events and activities of First Party.
- **Resource Sharing:** Teachers and Students of Second Party will have access to online repositories of First Party for educational purpose.
- **Partner:** Parties may mention as Partner on their website.
- **Alumni Connect:** First Party shall help to connect Alumni of both Parties.
- **Validity:** This MOU shall be valid for 3 years from the date 30/04/2022 (DATE) and each party shall be at full liberty to terminate the collaboration with mutual consent.
- **Free of Cost:** The services herein are free of cost for education purpose.

For

SSBT's College of Engineering & Technology,  
Bambhori, Jalgaon -425001(M.S.),  
on behalf of SSBT's Group of Institutions

Signature:



**PRINCIPAL**

SSBT's College of Engineering & Technology  
Bambhori, Jalgaon-425001(M.S.)

Name: Dr. Girish Kumar Patnaik

Designation: Principal

Date: 30/04/2022

Seal:



For

NTVS's G. T. Patil Arts, Commerce and  
Science College, Nandurbar-425412

Signature:



**PRINCIPAL**

Name: Prof. V. Gajjala Tulshiram Patil  
College, Nandurbar

Designation: Principal

Date: 30/4/2022

Seal:



To  
Principal  
COET, Bambhori  
Jalgaon

Date: 02/05/2022

**Subject: Need of hostel facility to the PG students [M.Sc. II]**

Dear sir,

As per above cited subject, the students of G.T Patil college Nandurbar are visiting to our college in applied science department for project related work. The MOU is done with this institute. The visit of the students is planned in between 02/05/2022 To 10/05/2022. kindly allowed them to stay at hostel on non-payment basis. (15/5/2022)

The details are as below,

College Name	Students Name	Mobile No.
G.T. Patil College Nandurbar [M.Sc. II]	1. Shubham V. Patil	9403698399
	2. Rohit. D. Patil	7768912265
	3. Rahul A. Chavan	9834707452
	4. Avinash H. More	8888927493
	5. Akshay Borse	8857032635

Kindly do the needful

Considering MoU signed and college/students from Nandurbar, single room in the hostel please be allotted with Rs 50/- per room per day (Rs 10/- per person, per room, per day) charges.

HOD, Applied Science  
Dr. Kiran Patil

P.D. 15/5/2022

SSBT's COLLEGE OF ENGINEERING AND TECHNOLOGY HOSTEL

Receipt Voucher

Name : G.T.Patil College Nandurbar

ID : 28666

Dated : 02/05/2022

Particulars	Amount	
Account		
HOSTEL GUEST CHARGES	700.00	
CASH		
On Account Of :		
Received from Shubham V Patil Rohit D Patil Rahul A Chavan Avinash H More and Akshay Borase against Hostel Guest Charges Rs.10 per person per room per day 14day G.T.Patil College Nandurbar		
Amounts (in words) :		
Rupees- Seven Hundred Only		
	₹ 700.00	

SSBT's College of Engineering  
& Technology, Bambhori, Jalgaon  
02 MAY 2022  
नकद प्राप्त/CASH RECEIVED  
CASHIER

Principal/Director

( )



KAVAYITRI BAHINABAI CHAUDHARI NORTH MAHARASHTRA UNIVERSITY, JALGAON

KBCNMU/11/Ph.D./Chem./Online/2022

Date : 01-12-2022

To,

Mr. PRAVIN NAMADEO MORE

Subject:- Provisional admission to Ph.D. Course in the Subject of Chemistry under the faculty of Science and Technology

Dear Student,

With reference to the above subject, it is to inform you that, based on your qualification/exemption for the PET 2021 examination, and allotment of guide, you are provisionally registered for Ph.D. course from the date as mentioned below. Your Ph.D. registration will be confirmed on successful completion of Pre-Ph.D. course work and presentation of research outline before RRC within a stipulated period as per rules ( Regarding the programme of conduct of the course work, you are requested to visit University's website <https://www.nmu.ac.in> ). The particulars of your admission are as under:-

Sr. No.	Particulars	
1.	Name of Guide	Dr. Gupta Gaurav Ramesh
2.	Name of Co-guide	
3.	Place of Research Work	Laboratory / Research Center recognized by KBCNMU, Jalgaon
4.	Provisional date of Registration	Guide Allocation Meeting 14-10-2022
5.	Registration No.	KBCNMU/11/Ph.D./Chem./932/2020
6.	Application No.	PHD-2021-SXAGZ6 [ Exemption ] .
7.	Fees Payment Details	Paid Rs. 22750.00 on 18-12-2022 12:31:06

Your attention is also invited to the following points regarding Ph.D. course admission :-

1. You will have to abide by the rules made by the University from time to time as per provision under Section 60 of the Maharashtra Public Universities Act, 2016 and the rules for the admission for Degree of Doctor of Philosophy (Ph.D.) as per the UGC (Minimum standards and procedure for awards of Ph.D. degree) Regulation 2009 and 2016 and revised Ph.D. rules from time to time.
2. You are requested to pay the following fees as prescribed by the University Authorities from time to time within one month from the date of issue of this letter. **The yearly fees will be charged every year from the date of registration.**

A) To be deposited in the University					
Sr. No.	Head	First Year (Fee) Rs.		Subsequent Years Fee Rs.	
		For Science & Technology	Other than Science & Technology	For Science & Technology	Other than Science & Technology
1.	Provisional Registration Fees	1000/-	1000/-	0	0

## AGREEMENT

THIS AGREEMENT is made on this 21<sup>st</sup> day of September 2022.

BETWEEN

**UPL Limited** a Company incorporated under the Companies Act of 1956 and having its Registered Office at 3-11, GIDC, Vapi -396 195, Gujarat and Corporate Office at UPL House, 610/B2, Bandra Village, Off Western Express Highway, Bandra (East), Mumbai 400 051 (hereinafter referred to 'the Company') of the ONE PART

AND

**Mr. Pravin Namadeo More** residing at **D-1, UPL colony-1 , Near Manav mandir, GIDC , Ankleshwar Gujrat 393002** (hereinafter referred to 'the Employee') of the OTHER PART.

WHEREAS the employee had joined the Company on 2<sup>nd</sup> February 2004. His current designation is Group lead Formulations.

AND WHEREAS on the request of the employee, Company has agreed to permit the employee to pursue higher studies in Ph.D. during the tenure of the employment and the detail of such course is mentioned in Schedule 'A' hereunder.

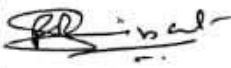
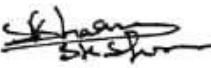
AND WHEREAS Employee and the Company have agreed on various terms and conditions as follows:  
NOW IT IS AGREED BY AND BETWEEN THE PARTIES HERETO AS FOLLOWS:

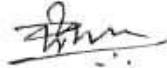

1. (a) The expression "the Company" in this Agreement shall mean and include the successors and assigns of as also any firm, person, or company subsidiary to or affiliated with, or having a controlling interest in, the Company.  
  
(b) The expression "he", "his" or other words imparting masculine gender shall be taken to include feminine gender, where the Employee is a female.
2. The Company has agreed to permit the employee to pursue higher studies and/or enhance the qualification as mentioned in Schedule 'A' of the employee during the tenure of his employment with the Company.
3. The employee has agreed to carry out such studies without affecting his regular working with the Company.
4. The employee is permitted to utilize the Laboratory, and/or the library and/or other facilities as may be made available to the employee from time to time with prior permission from HOD/Unit Head. However, in case of any damages to the property of the Company, it will be reimbursed by the employee.
5. The employee has agreed to continue working with the company at least for a period of **3 years** from the date of completion of the enhancement qualification/degree/doctorate. In case the employee leaves and/or cease to be an employee of the Company for any reason whatsoever, within a period of **3 years** from the date of completion of the course, the employee shall refund the entire amount paid by Company towards the program else, it will be recovered from the full and final settlement of the respective employee. In any event, the Company is at liberty to initiate any legal action/s against the employee as they deem fit and recover such monies paid by the company towards the program.

6. The employee has agreed not to resign and/or do any act which will make the company to terminate the employment of the employee with the Company.
7. The employee has agreed to pay 50% of the annual Fees each year for a period of 4 years Doctoral program.
8. Company has agreed to pay the balance 50% of the annual Fees under the UPL Philomath Doctoral Assistance Program ("program"), each year for a period of 4 years of the program.
9. During the tenure of program, if the employee leaves/ resigns voluntarily or if the employee is terminated for any reason whatsoever, the employee will have to refund the entire amount paid by the Company towards the said Doctoral program and/or it would be recovered from the full and final settlement of the respective employee.
10. During the tenure of this Doctoral program, if the institute suspends or expels the employee due to any kind of misconduct as per the Institutions internal policy, Company will have the right to terminate the employee from his/her services with immediate effect and the employee will have to refund the entire amount paid by the Company towards the said program and/or it will be recovered from the full and final settlement of the employee
11. In case the employee is unable to complete his/her Doctoral studies within the period of 4 years, employee will have to refund the entire amount paid by the Company towards the said Doctoral program. In any event, the Company is at liberty to initiate any legal action/s against the employee as they deem fit and recover such monies paid by the company towards the program
12. Employee agrees to indemnify the Company and keep it indemnified at all times against all or any costs, claims, damages or expenses incurred by the Company, or for which the Company may become liable, with respect to any intellectual property infringement claim or other claim relating to the Works or Inventions by the Employee during the course of this Agreement.
13. Employee agrees that this agreement, along with the employee's appointment letter together constitutes an entire agreement & understanding with the Company. All other terms of the Appointment letter are valid together with this Agreement and other subsequent agreement executed with the Company.
14. Employee acknowledges that in the course of studies he/she shall not share any confidential information with the institute. **Confidential Information** means any and all information in whatever form (including without limitation, in written, oral, visual or electronic form or on any magnetic or optical disk or memory and wherever located) relating to the business, customers, products, affairs and finances of the Company for the time being confidential to the Company and trade secrets including, without limitation, R&D data, technical data and know-how relating to the Business of the Company, its research, its products or any of its suppliers, customers, agents, distributors, shareholders, management or business contacts and including (but not limited to) information that the Employee creates, develops, receives or obtains in connection with his/her employment with the Company, whether or not such information is marked confidential.

15. No variation of this agreement shall be valid unless it is in writing and signed by or on behalf of each of the parties
16. This agreement stated in Clause 10 and any dispute or claim arising out of or in connection with it or its subject matter or formation (including non-contractual disputes or claims) shall be governed by and construed in accordance with the laws of India. The parties irrevocably agree that the courts of Mumbai shall have jurisdiction to settle any dispute or claim that arises out of or in connection with this agreement or its subject matter or formation.

**IN WITNESS WHEREOF** the parties have executed these presents the day, month and year first above written.

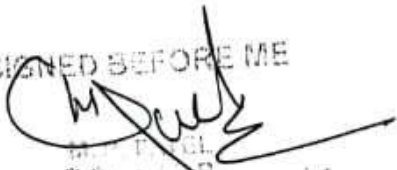
Signed and delivered by the )  
 Within named 'Company' )  
 Namely UPL Limited )  
 Through its Authorised Signatory )  
Rajan R. Shirsalkar )   
 In the presence of: )  
Shiv Kumar Sharma ) 

Signed and delivered by the )  
 Within named 'Employee' )  
 Namely Pravin N. More )   
 In the presence of: )  
Hemant Khatkekar ) 

**SCHEDULE A**

Name of the Doctoral Program	Institution	Probable Duration and Commencement Date	Probable Completion Date
Ph.D. in Chemical Sciences	Affiliated college under Kavayitri Bahinabai Chaudhari North Maharashtra University Jalgaon	4 years from October 2022	October 2026

SIGNED BEFORE ME

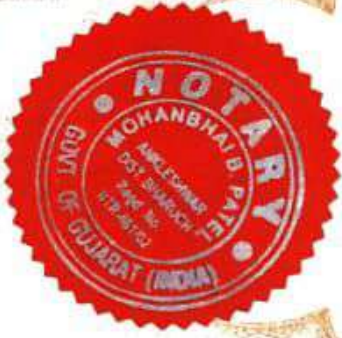
  
 ADVOCATE & NOTARY  
 (Govt. of Guj.)



Reg. No. 6922/22  
 Date 3 OCT 2022



INDIA NON JUDICIAL  
Government of Gujarat

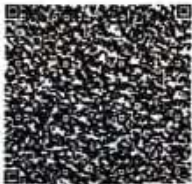


सत्यमेव जयते

Certificate of Stamp Duty



Certificate No. : IN-GJ31540102917695U  
Certificate Issued Date : 21-Sep-2022 12:21 PM  
Account Reference : IMPACC (AC)/ gj13380611/ ANKLESHWAR1/ GJ-BH  
Unique Doc. Reference : SUBIN-GJGJ1338061192590686165942U  
Purchased by : JAGDISHBHAI PATEL  
Description of Document : Article 5(g-a) Agreement - Construction / Development / Sale / Transfer (Imm. Property)  
Description : AGREEMENT  
Consideration Price (Rs.) : 0  
(Zero)  
First Party : UPL LIMITED UNIT 3  
Second Party : Not Applicable  
Stamp Duty Paid By : UPL LIMITED UNIT 3  
Stamp Duty Amount(Rs.) : 100  
(One Hundred only)



IN-GJ31540102917695U

JD 0010831626

Statutory Alert:

1. The authenticity of this Stamp certificate should be verified at [www.shclrestamp.com](http://www.shclrestamp.com) or using e-Stamp Mobile App of Stock Holding. Any discrepancy in the details on this Certificate and as available on the website / Mobile App renders it invalid.
2. The onus of checking the legitimacy is on the users of the certificate
3. In case of any discrepancy please inform the Competent Authority

the date of completion of the course, the