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

GTP COLLEGE,NANDURBAR PIN-425412

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

G.T. Patil Arts, Commerce and Science, Nandurbar, Nandurbar
INTERNAL QUALITY ASSURANCE CELL
MINUTES OF MEETING -2017-18

Sr. No.	Point of Discussion	Members	Action by	Time
1	Minutes of IQAC Meeting held on **16/07/17**	15	IQAC Coordinator	**03:30 PM**
	Agenda a) Review of previous meeting b) Discussion about preparation of recruitment of Assistant Professor c) Discussion on Result Analysis and Feedback Analysis d) Conducting Students Skill Based Workshop e) Review on CBCS Pattern f) Discussion on Orientation/Courses of Assistant professors. g) Discussion on Academic Calendar h) Any other points with permission of Chairman			
1	• Review of previous online IQAC meeting held on 27/04/2016 • It is decided that a team of Assistant professor will do scrutiny of applications for assistant professors against advertisement of the institute. • It is decided that a team of teachers will look into the result analysis of exam held in April 2017. • It is decided that the collection of feedback of students and its analysis will be done before the month of August. • It is discussed and decided to conduct DRUSHTI event in memory of Late. Dadasaheb B. K. Raghuwanshi which will include workshop on Competitive skills and Public Speaking to be organized for students. • Review taken on Choice Based Credit System to be implemented by the University for Affiliated Colleges and discussed about how to deal with it during teaching.			

dr

MINUTES OF MEETING -2017-18

	• The discussion held on orientation/ refresher courses to be done by the teachers before the deadline of CAS. • It is decided that the committee of teaching – learning evaluation will look into the prospective plan and finalize the academic calendar for the year 2017-18. • No other topic discussed by the suggestion of the Chairman			

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Coordinator, IQAC

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INTERNAL QUALITY ASSURANCE CELL

MINUTES OF MEETING -2017-18

Sr. No.	Point of Discussion	Members	Actionby	Time
2	Minutes of IQAC online Meeting held on **26/04/2018**	13	IQAC Coordinator	**04:00PM**
	Agenda a) Review of previous meeting b) Discussion on conducting Swachhata awareness Rally by student oriented units. c) Review on Newly appointed teachers and workload distribution and class conduct. d) Review on preparation of Youth Festival e) Review on Various schemes for students. f) Any other points with permission of Chairman			
2	• Review of previous IQAC meeting held on 16/07/2017 • A review is taken about newly appointed teachers in their concerned departments and implementing individual workload handling and their class control. • The Cultural committee will initiate about participation and preparation of students about Youth Festival of the University. • Discussion held on various schemes under Student Development Department such Earn and Learn and Economically backward students Support scheme. • No other topic discussed by the suggestion of the Chairman			

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MINUTES OF MEETING -2017-18

3	**Agenda** g) Review of previous meeting h) Review on successful completion of training of NCC officer at OTA, Kamptee. i) Review on First semester response of CBCS pattern j) Review of internal examination of students. k) Any other points with permission of Chairman			
3	• Review of previous IQAC meeting held on 16/12/2017 • A review is taken about training of NCC officer at OTA, Kamptee and is decided to conduct a piping ceremony on Maharashtra Day at auspicious hands of Chairman of NTVS, Nandurbar. • Discussed about newly implemented CBCS pattern and response of teachers and Students. • Discussion held on internal examination conducted by teachers separately displaying time table and decided to display marks on board. • No other topic discussed by the suggestion of the Chairman			

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MINUTES OF MEETING -2018-19

Sr. No.	Point of Discussion	Members	Action by	Time
1	Minutes of IQAC Meeting held on 05/07/2018	12	IQAC Co-ordinator	**04:00 PM**
	Agenda a) Review of previous meeting b) Result analysis of previous year c) Status of AQAR d) Preparation of Academic Calendar e) Status of Research f) Any other points with permission of Chairman			
1	a) Review of previous IQAC meeting held on 30/04/2018 b) Discussion regarding result analysis of all UG classes of last academic year c) Discussion regarding Preparation of AQAR of academic year 2017-18 d) Preparation of Academic Calendar of Academic year 2018-19 e) Motivated the faculty members regarding publication of research paper in UGC listed reputed journals f) Discussion regarding Amendment in IQAC committee.			

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MINUTES OF MEETING -2018-19

Sr. No.	Point of Discussion	Members	Action by	Time
2	Minutes of IQAC Meeting held on **25/10/2018**	**15**	IQAC Co-ordinator	**04:00 PM**
	Agenda a) Review of previous meeting b) Position of AQAR c) Status of Research Projects and Publications d) Status of Quality measures in Institute e) Status of Feedback analysis f) Status of CAS proposals g) Any other points with permission of Chairman			
2	**a)** Review of previous IQAC meeting held on 05/07/2018 **b)** Discussion regarding placing AQAR 2017-18 before governing body including modification and finalization **c)** Discussion regarding status of research projects, publication and future plans. **d)** Review of quality measures and quality improvement by each department **e)** Analysis of feedback reports **f)** Discussion about CAS proposals of faculty members **g)** Discussion regarding promoting and motivating students about participating in Avishkar			

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MINUTES OF MEETING -2018-19

Sr. No.	Point of Discussion	Members	Action by	Time
3	Minutes of IQAC Meeting held on 30-04-2019	**12**	IQAC Co- ordinator	**04:00 PM**
	Agenda a) Review of previous meeting b) Status of feedback analysis c) Review of CBCS pattern d) Review of academic achievements e) Position of curricula in institute f) Any other points with permission of Chairman			
3	a) Review of previous IQAC meeting held on 25/10/2018 b) Discussion regarding Result Analysis and feedback analysis c) Discussion regarding implementation of CBCS proposed by the University d) Review of research activities and departmental activities e) Review of students' academic and co-curricular achievement f) Review of syllabus faculty wise			

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MINUTES OF MEETING -2019-20

Sr. No.	Point of Discussion	Members	Action by	Time
1	Minutes of IQAC Meeting held on **16/07/19**	15	IQAC Coordinator	**03:30 PM**
	Agenda a) Review of previous meeting b) Discussion about Research Advisory Committee c) Discussion on Result Analysis and Feedback Analysis d) Conducting Students Skill Based Workshop e) Discussion about pay fixation of CAS promoted teachers f) Launching Add-on Courses g) Discussion on Academic Calendar h) Any other points with permission of Chairman			
	• Review of previous online IQAC meeting held on 30/04/2019 • It is decided that Research Advisory Committee is to be formed subject-wise recognition wise. • It is decided that a team of teachers will look into the result analysis of exam held in April 2019. • It is decided that the collection of feedback of students and its analysis will be done before the month of August. • It is discussed and decided to conduct a global skill based workshop should be organized for students. • It is decided that CAS promoted teacher's pay fixation proposals are to be sent to Joint Director Office for necessary action. • It is decided that add on course by Commerce Faculty should be initiated. • It is decided that the committee of teaching –learning evaluation will look into the prospective plan and finalize the academic calendar for the year 2019-20. • No other topic discussed by the suggestion of the Chairman			

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MINUTES OF MEETING -2019-20

Sr.No.	Point of Discussion	Members	Action by	Time
2	Minutes of IQAC Meeting held on **16/12/2019**	14	IQAC Coordinator	**04:00 PM**
	Agenda a) Review of previous meeting b) Sending students to Youth Festival c) Review of previous examination d) Organization of NSS Camp e) Review of preparation of Republic Day by NCC unit f) Any other points with permission of Chairman			
	• Review of previous IQAC meeting held on 16/7/2019 • It is decided that the students will selected by the cultural committee for Youth Festival of the University. • It is decided to do the result analysis of recently concluded exam and take necessary action about remedial course of low performance students. • It is decided that the organization of NSS winter camp will be held at Kevadipada and the preparation will be done accordingly. • It is decided to prepare a Republic Day parade by NCC cadets and will participate in government organized programme at S.P. Office, Nandurbar. • No other topic discussed by the suggestion of the Chairman			

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MINUTES OF MEETING -2019-20

Sr. No.	Point of Discussion	Members	Action by	Time
3	Minutes of IQAC online Meeting held on 24/04/2020	13	IQAC Coordinator	**04:00PM**
	Agenda a) Review of previous meeting b) Discussion on bringing awareness about Covid-19 appropriate behaviour. c) Discussion on Online Teaching d) Discussion of Online Examination e) Any other points with permission of Chairman			
3	• Review of previous IQAC meeting held on 16/12/2019 • It is decided to formulate effective strategies to bring about awareness for staff, students and society at large including sanitization, safe distance and using mask at public places as per government directives. • It is decided to search out the online teaching learning platforms like Google classroom, zoom, Google meet and create awareness about the same among students and staff to maintain the flow of teaching- learning process. • As per the guidelines of the University the training of IT coordinators for conducting online exams will be done. • No other topic discussed by the suggestion of the Chairman			

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MINUTES OF MEETING -2020-21

Sr.No.	Point of Discussion	Members	Action by	Time
1	Minutes of IQAC online Meeting held on **14/07/2020**	15	IQAC Coordinator	**03:30 PM**
	Agenda a) Review of previous meeting b) Discussion on online admission process c) Discussion on Result Analysis and Feedback Analysis d) Conducting online awareness programs including Quiz, webinars etc related to Covid-19 e) Discussion about pay fixation of CAS promoted teachers f) Discussion on Academic Calendar g) Any other points with permission of Chairman			
	• Review of previous online IQAC meeting held on 24/04/2020 • It is decided that the admissions in the new academic year will be done as per Government and the University directives. • It is decided that a team of teachers will look into the result analysis of exam held in April 2020 via online platforms. • It is decided that the different department will organize online awareness activities for society, staff and students. • It is discussed and decided to act on CAS promotions as Government and University directives. • Keeping Covid-19 situation at center a team of teachers will design the academic calendar for the year 2020-21. • No other topic discussed by the suggestion of the Chairman			

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MINUTES OF MEETING -2020-21

Sr.No	Point of Discussion	Members	Action by	Time
2	Minutes of IQAC Meeting held on **16/12/2020**	14	IQAC Coordinator	**04:00 PM**
	Agenda a) Review of previous meeting b) Review of online teaching-learning process. c) Review of first semester online exam d) Discussion on preparation of online platforms for effective teaching learning process e) Discussion on preparation of MCQs Question Bank appealed by the University to teachers. f) Any other points with permission of Chairman			
	• Review of previous IQAC meeting held on 14/7/2020 • Discussed about subscribing Google suit account for teaching learning process and finalized to adopt the same. • Discussed about issues of students regarding online exam and decided to provide additional support through IT coordinators to conduct online exam smoothly. • It is decided to make appeal to teachers about preparing YouTube channel for uploading recorded lecture to be used by the students. • It is decided to prepare MCQs as Question Bank as per the guidelines of the University by all the teachers. • No other topic discussed by the suggestion of the Chairman			

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MINUTES OF MEETING -2020-21

Sr.No	Point of Discussion	Members	Action by	Time
3	Minutes of IQAC online Meeting held on 26/04/2021	13	IQAC Coordinator	**04:00 PM**
	Agenda a) Review of previous meeting b) Review of second semester online/offline teaching learning process. c) Discussion on Organizing webinar/ seminar/Workshop by NSS, NCC, Student Development etc. d) Discussion on Covid-19 Vaccination camp. e) Any other points with permission of Chairman			
3	• Review of previous IQAC meeting held on 16/12/2020 • It is decided to take review of activities during the Covid period about online/offline teaching learning process. • It is decided conduct webinar by NSS, NCC, Student Development unit, English Department etc on various topics. • It is decided to conduct social awareness program about Covid-19 Vaccination and camp in the campus for students, staff and citizens. **a)** No other topic discussed by the suggestion of the Chairman			

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MINUTES OF MEETING -2021-22

Sr.No	Point of Discussion	Members	Action by	Time
1	Minutes of IQAC Meeting held on **21/09/21**	13	IQAC Coordinator	**04:00 PM**
	Agenda a) Review o f previous meeting b) Discussion about MoUs c) Conducting IPR Webinar d) Applications for VCRMS e) Launching Add on Courses f) Status of AQAR g) Any other points with permission of Chairman			
	• Review of previous online IQAC meeting held on 23/04/2021 • It is decided that the teachers of the college should take initiative to establish with Government and Non-Government Bodies. • Taking into consideration the importance of IPR, all the Departments are advised to conduct seminar/Webinar on IPR. • The College teachers are advised to apply for VCRMS (Vice Chancellor Research Motivation Scheme) • The Departments are recommended to start Career Oriented Add on Course affiliated to the University. • The preparation of AQAR is under process. • No other topic discussed by the suggestion of the Chairman			

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MINUTES OF MEETING -2021-22

Sr.No	Point of Discussion	Members	Action by	Time
2	Minutes of IQAC Meeting held on **17/01/2022**	13	IQAC Coordinator	**04:00 PM**
	Agenda a) Review of previous meeting b) Launching student adaptation Scheme c) Registration of Alumni d) Organising Sports events e) Recruitment of NCC Cadets f) Any other points with permission of Chairman			
	• Review of previous IQAC meeting held on 21/09/21 • In the beginning of academic year all the members decided that the student adoption scheme implemented and run successfully active participation of students. • The meeting marched towards discussion on registration of alumni and planning about it. • It has been decided to guide Director of Physical Education to organize various sports events. • It has been decided to recommend NCC unit about preparation of Cadets regarding Army recruitment. • No other topic discussed by the suggestion of the Chairman.			

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MINUTES OF MEETING -2021-22

Sr. No.	Point of Discussion	Members	Action by	Time
3	Minutes of IQAC Meeting held on 27 /04/2022	13	IQAC Coordinator	**04:00PM**
	Agenda a) Review of previous meeting b) Celebrating Azadi Ka Amrut Mohatsav c) Awareness about Career Katta d) Renovation of Laboratories e) Opening New research centers f) Any other points with permission of Chairman			
3	• Review of previous IQAC meeting held on 17/01/2022 • The meeting has set guidelines for National Service Scheme Unit (NSS) to celebrate Azadi ka Amrut Mohatsav. • The meeting recommended the committee of Career to create awareness among students regarding various online career guidance sessions and its implementation. • The committee decides to renovate science laboratories. • It is decided to prepare proposals for opening various research Centers in the college. • No other topic discussed by the suggestion of the Chairman			

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dr

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,

K.M. Nehete

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

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Asian Paints Limited
Asian Paints House
6A, Shantinagar,
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

asianpaints

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 1st 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

asianpaints

Asian Paints Limited

Asian Paints Limited
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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	**By:** K.m.Nehete
(Signature)	**(Signature)**

'A' Grade
NAAC Re-Accredited
(4th Cycle)

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	**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./907/2022**
6.	Application No.	**PHD-2021-NVAEQ1 [Exemption]** .
7.	Fees Payment Details	Paid **Rs. 22750.00** on **12-12-2022 16:53:35**

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
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/-
Total (without deposits)(A)		**22750/-**	**19750/-**	**15650/-**	**12650/-**

*** The fees from Second year onwards shall be deposited at concerned Research Center.**

B) To be deposited at the concerned approved Research Center					
22.	Library Deposit	3000/-	3000/-	0	0
23.	Laboratory Deposit	3000/-	0	0	0
Total (B)		**6000/-**	**3000/-**	**0**	**0**
Grant Total (A+B)		**28750/-**	**22750/-**	**15650/-**	**12650/-**

Note :

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.**

3. You are required to apply for eligiblity 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 eligiblity fee is Rs. 500/- and late fees of Rs. 1000/- will be charged if the candidate fails to apply for eligiblity certificate within six months after confirmed date of registration.
4. To obtain eligibility ceritifcate within one year from the date of issue of confirmed registration letter is mandatory. otherwise your admission is liable to be cancelled..
5. Foreign/NRI students will have to pay five time of the existing fees as mentioned in the above Table as mentioned in 2 & 3.
6. The duration of Ph.D. course registration shall be valid upto six years from the date of Provisional registration.
7. You will have to do your research (for Science, Pharamacy, 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.**
8. 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.
9. 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.
10. You will have to pay late fee and/or fine as per the rules made by the University authorities from time to time.
11. 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 Ceritcate / Validity Ceritificate / 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. ----------

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.

GTP COLLEGE NANDURBAR PIN-425412

- **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

Signature:

PRINCIPAL
Dadasaheb Devidas Namdev Bho
Mahavidyalaya,Bhusawal

Name: Prof. Dr. R. P. Phalak

Designation: Principal

Date:01/07/2021

Seal:

D.D.N.Bhole Mahavidyalaya Bhusawal

For

NTVS's G. T. Patil Arts, Commerce and Science College, Nandurbar-425412

(Prof. Dr. V. S. Shrivastava)
Principal
PRINCIPAL
G.T.Patil Arts,Commerce &
Science College
NANDURBAR - 425 412 (M.S.)

Signature:

Name: Prof. V. S. Shrivastava

Designation: Principal

Date: 01/07/2021

Seal:

GTP COLLEGE,NANDURBAR
PIN-425412

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Thermo-physical Investigations of oils, N-(2-aminoethyl)-oleamide and Resulting Gels using TGA-DSC

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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.[1] 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.[2-6] 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.[7] 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.[8]

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, ^{1}H-NMR, ^{13}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.[8]

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 stat-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.[9-10]

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.[11-14] 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

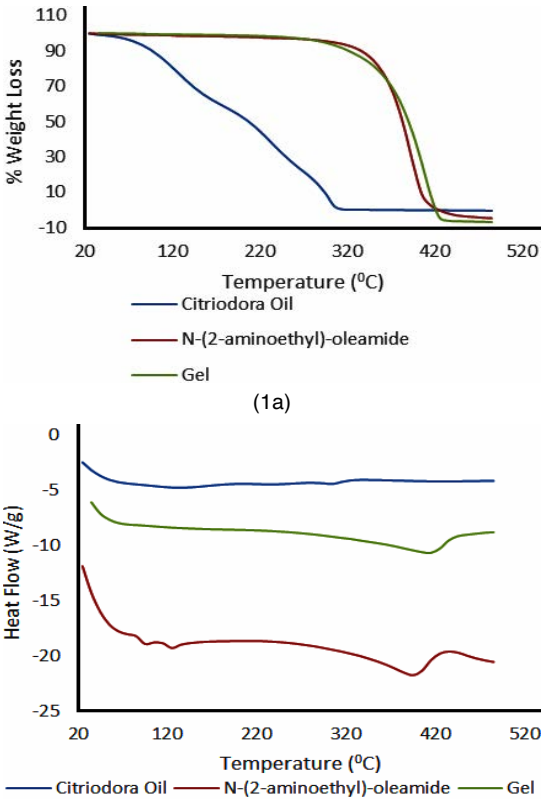
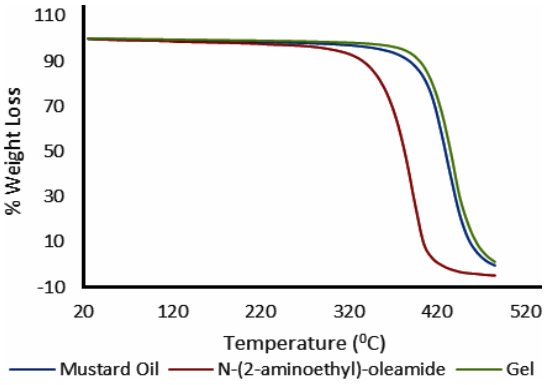


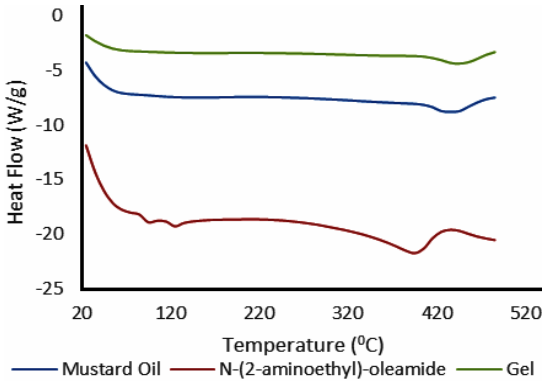
Fig. 1. TGA-DSC analysis of citriodora oil, N-(2-aminoethyl)-oleamide and gel

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.[1] 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

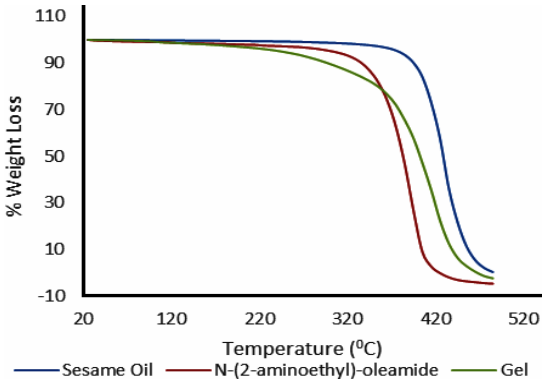


(2a)

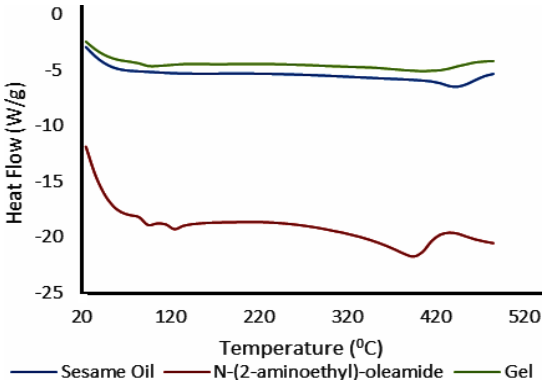


(2b)

Fig. 2. TGA-DSC analysis of mustard oil, N-(2-aminoethyl)-oleamide and gel



(3a)



(3b)

Fig. 3. TGA-DSC analysis of sesame 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.[1] 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

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 physio-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[15-17]. 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

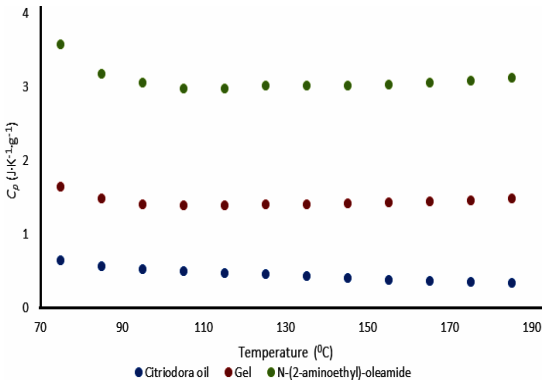


Fig. 4. Variation of specific heat capacity (C_p) of citriodora oil, N-(2-aminoethyl)-oleamide and gel as a function of temperature

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

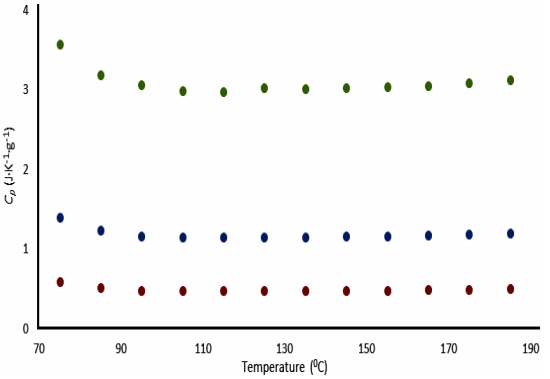


Fig. 5. Variation of specific heat capacity (C_p) of mustard oil, N-(2-aminoethyl)-oleamide and gel as a function of temperature

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

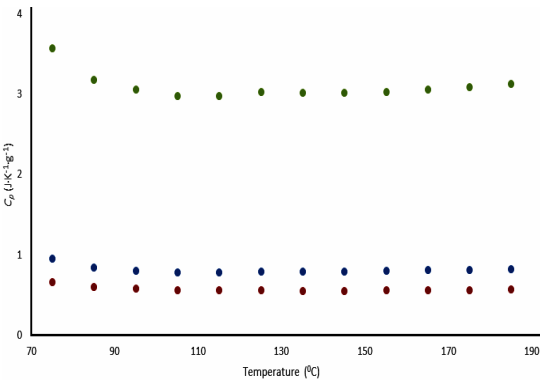


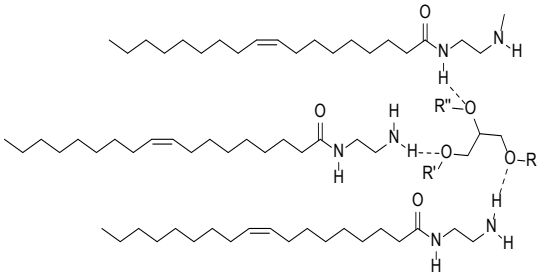
Fig. 6. Variation of specific heat capacity (C_p) of sesame oil, N-(2-aminoethyl)-oleamide and gel as a function of temperature

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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Principal

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E-mail: gtpcollege@rediffmail.com
drvsmod_shrivastava@yahoo.com
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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 8th 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

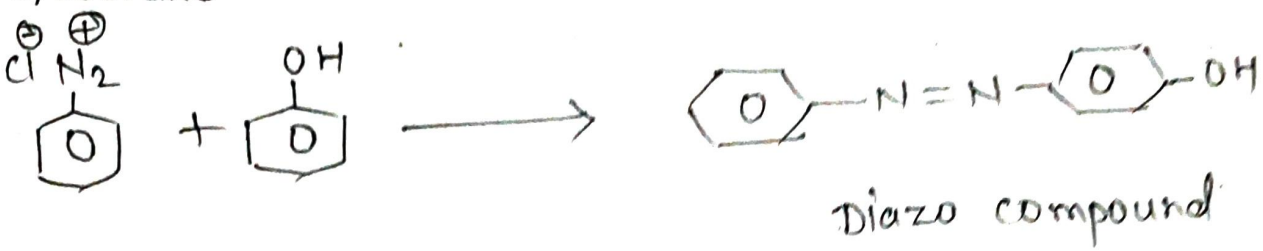
- HPLC (High Performance Liquid Chromatography),
- ICP-OES (Inductively Coupled Plasma Optical Emission Spectrometer),
- UV Visible Spectrophotometer,
- Colour Matching Spectrophotometer,
- Particle Size Analyser,
- Gas Chromatography,
- Ion Chromatography.

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

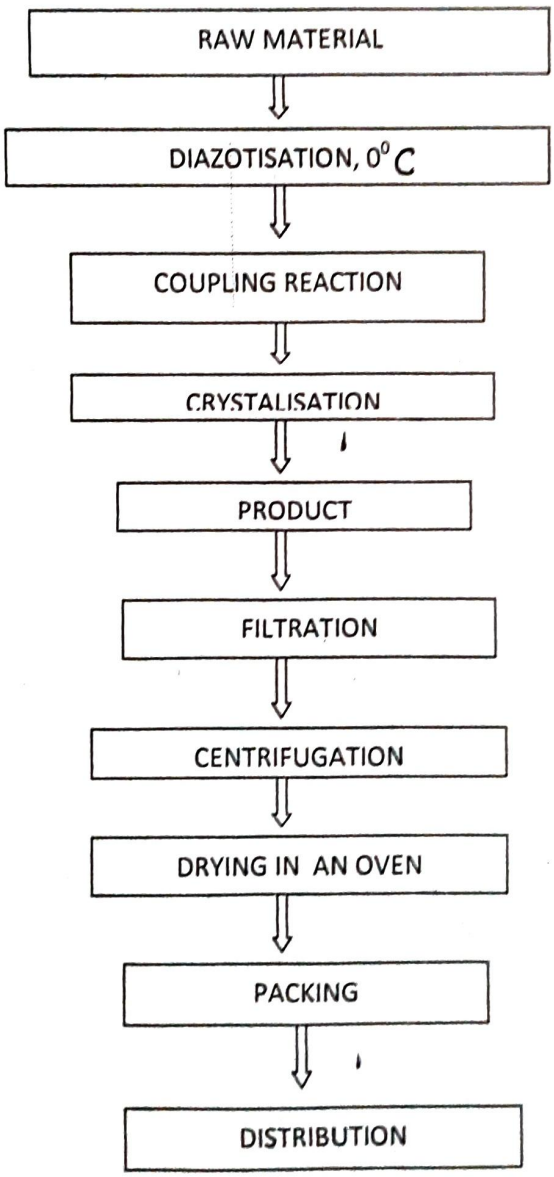
In 1990, Neelikon began colouring the globe, when it started exporting 'Neelicol' brandwater-soluble food Colours. Neelikon is strengthening its presence in India and the world market by associating with organizations, which have shared ideals and aspirations. Today, the majority of its production is 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



Diazo compound

3) FLOW SHEET



4) DESCRIPTION

a) Raw materials

Raw materials used for azo dye are phenol, aniline, $NaNO_2$, HCl , Ice.

Raw materials are stored in store room.

b) Diazotization reaction

Aniline is treated with sodium nitrite and Hcl at 0 to 5 ^{0}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.

Dr. C. P. Sawant
Head
P.G. Department of Chemistry
G.T.P. College Nandurbar

(HOD)

	Student's Name	parent's Name.	Mobile No.
(16)	palil Bhakti vasant	palil vasant ratan	S.NO. 58&860 P.NO. 961288
(17)	more Rahul ashok	Ashok	S.NO. 91466 P.NO.
(18)	Talvi chandrakant magya	magya	S.NO. 94209 P.NO.
(19)	padvi Arvind fulsing	fulsing	S.NO. 70367 P.NO.
(20)	Bonawane krisna		
21)	Tapase Jayesh Anand		
22)	Mali Dipak Bhagwan		
23)	Marathe Prakash Nimba		

Industrial Tour 2017-18
Dept. of Chemistry

Page No.
Date :

Student Name	Parent's name	Mobile no.
(1) Girase Vardhaman j	Jaising 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	Chhotusing gulabsing girase	S.No. 8600439208 P.No. 9960093957
(4) Maithal Rahul vijay	vijay laxman maithal	S.No. 9822206541 P.No. 8390260226
(5) suryawanshi Dnyaneshwar totan	totan Devidas suryawanshi	S.No. 8698936825 P.No. 7798028950
(6) kalpesh madhav mali	madhav dalpat mali	S.No. 8390935122 P.No. 7020154033
(7) Girase mayursing bharatsing	Bharatsing Rajesing Girase	S.No. 7083914699 P.No. 9975005869
(8) ~~soni swapnil~~ patil swapnil Bharat	Bharat hilal patil	S.No. 8308790702 P.No. 89657520349
(9) thakur nilesh Devidas	devidas Dashrath Thakur	S.No. 9767815347 P.No. 7588102296
(10) patil gaurav pralhad	patil pralhad Rayaram	S.No. 8806781091 P.No.
(11) patil manish arjun	Arjun vitthal patil	S.No. 7507337879 P.No.
(12) Soni Vijay Suresh.	Soni Prathibha Aeus	S.No. 9764178084. P.No. 9421281118
(13) Marathe sagar Rajesh	Rajesh sudam marathe	S.No. 8275348963 P.No. 9420100150
(14) valvi arvind dasu	dasu parsha valvi	S.No. 7066567538 P.No. 8788618672
(15) patil chandrakant. Rajendra	Rajendra chaitram patil	S.No. 7887357819 P.No. 8698881016

Industrial tour 2017-18

T.Y. B.Sc (Chemistry)

Page No.
Date :

	Name	Father's name	Mob. No.
	Pote Swati Chandu	Chandu Motiram More	8552986090 (Father's 9673800849
	Patil Bhagyashri Sunil	Sunil Bhimrao Patil	8308452945 (Father) 9552833141
	Deore Trupti Babau	Babau Navdev deore	8275590425 (Father 9637099809
	Patil Gayatri Rajendra	Rajendra Motiram Patil	9922426062 (Father 7057862535
	Patil Suvarna Navnath	Navnath Patil	7507810097
	Patil Chaitali Ravindra	Ravindra Patil	8007138711
	Rathod Jagruti dilipsingh	dilipsingh Rathod	7038766654
	Patil Priti Sudhirrao	Sudhirrao Raigonda Patil	9657050226 (Father 8007305956
	Patil Pratiksha Bharat	Bharat Kashinath Patil	~~9657050226~~ (Father 9168327703 9763373881
	Kapade Vijaya Kailas	Kailas Jagannath Kapade	7218556559 9420852471

पी.आर. हायस्कूल सोसायटीचे
कला, वाणिज्य आणि विज्ञान महाविद्यालय,
धरणगांव जि. जळगांव पिन ४२५१०५
(वरिष्ठ महाविद्यालय)
(नॅक, बेंगलुरू द्वारा पुनर्मुल्यांकित ब श्रेणी)
दूरध्वनी क्रमांक : ०२५८८-२५१३७१
वेबसाईट :- www.acscollegedharangaon.org,
acscdharangaon.in

P.R. High School Society's
ARTS, COMMERCE & SCIENCE COLLEGE
DHARANGAON (JALGAON) PIN 425105
(Senior College)
(Reaccredited by NAAC, Bangluru - 'B'Grade)
Phone No. - 02588-251371
Email : 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

Yours Sincerely

for PRINCIPAL
Arts. Commerce & Science College
Dharangaon, Dist. Jalgaon

(Prof. Dr. V. S. Shrivastava
Principal
PRINCIPAL
G.T.Patil Arts,Commerce &
Science College
NANDURBAR - 425 412 (M.S.)

P.R.H.S. Arts, Commerce & Sc. Dharangaon Dist-Jalgaon

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
Office: (02564) 222293
E-Mail: gtpcollege@redifmail.com
Web: www.ntvsgtpcollege.org

Prof. Dr. V. S. Shrivastava
Principal

Activity / Programme Report

Academic Year: 2018-2019

1	**Name of Activity/Programme**	**field work**/Study Tour
2	**Date And Time**	**26th and 27th 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.

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Prof. Dr. V. S. Shrivastava
Principal

Office: (02564) 222293
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Photograph of the activity / programme:

Dr. R. P. Deore
Name &Sign of organizing Teacher

Head
Department of geography

Principal
G.T.Patil College,Nandurbar

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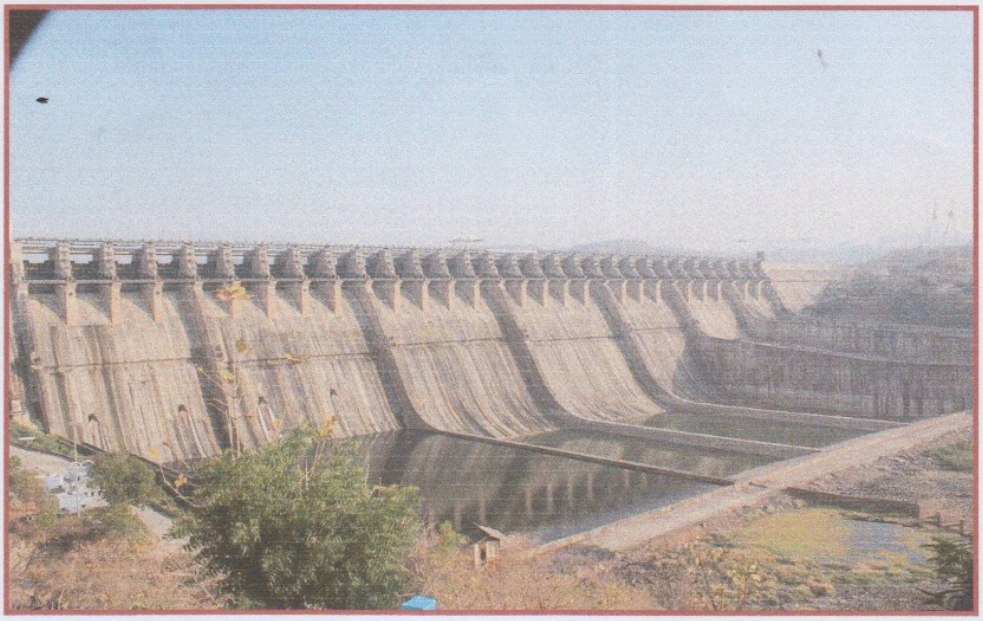
8	**Conclusions and Recommendations**	The fieldwork enabled the students to understand the topography of the geographical area in conjunction with the population dynamics. It gave a firsthand experience to young geographers in handling and extrapolating geographical data with local realities. It improves 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.

Photograph of the activity / programme:



Name &Sign of organizing Teacher

Head Department of geography

Principal G.T.Patil College,Nandurbar

Department of Geography
N.T.V.S's
G.T.P.College,Nandurbar

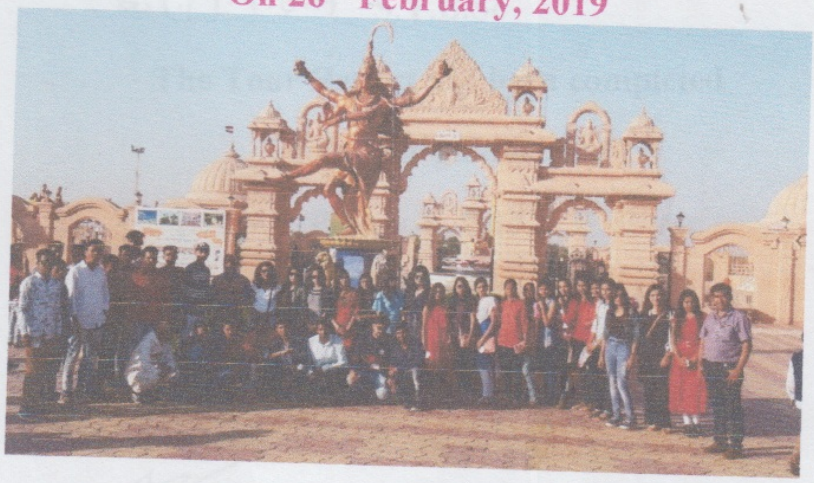
KAVAYITRI BAHINABAI CHAUDHRI NORTH MAHARASHTRA UNIVERSITY, JALGOAN

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 26th February, 2019



Name of Student:-.....
Class:-.....
Exam, Seat No:-.....
Under the Guidance: 1.Prof. S.D.Borse
2.Prof.R.R.Deore

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 relathion 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

INTRODUCTION

Geography is fundamental to the study fo tourism, beause tourism is geographical in nature. Tourism occurs in place, it involves moment and activities between places and it is an activity in which both place cjaracteristics and personal self-identities are formed, through the relationships that are created among places, landscaps and people. Physical geography provides the essential background, against which tourism places are created and environment impacts and concers are major issues that must be considerd 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 divest. It has also and example of secularism. Men and Women of many religious, 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 Dediyapada Taluka towards west , Akkalkuwa Taluka towards East , Umarpada Taluka towards west , Nandod Taluka towards North .Rajpipla , Songadh , Nandurbar , Vyara are the near by 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 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 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, Maharastra 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 km2 (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 km2 (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 km2 (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.

Saurastra Narmada Avataran 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		DATEOF 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	
T.Y.B.A				
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
S.Y.B.Sc				
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	

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

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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 musieum. 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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Photograph of the activity / programme:

Dr. R. P. 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

Department of Geography N.T.V.S's G.T.P College, Nandurbar

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 कमांक ———————— याने/हिने कवयित्री बहिणाबाई चौधरी उत्तर महाराष्ट् विद्यापीठाने ठरवून दिल्याप्रमाणे भौगोलिक सहलीत भाग घेवून ''सहल वृत्तांत'' सन २०१९ – २०२० मध्ये पूर्ण केला आहे.

डॉ. एन.एस.पवार

विभाग प्रमुख

Department of Geography N.T.V.S's G.T.P.College,Nandurbar

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 दिवसेदिवस वाढत चाललेली झरनशाखा 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.अलीकडील काळात पर्यटन या शब्दाला बरेच महत्व प्राप्त झाले आहे. काही विषय मानवाला कलाटणी देउन 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 डोळयाने 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 मानवनिमि।त किंवा जलाशय, निसर्गनिर्मित स्थळांची निवड करतात.

सहलीचा मुख्य उद्देश म्हणजे एखद्या आध्यामिक, ऐतिहासिक व नैसर्गिक ठिकाणी जाणे. सहलीमूळे बरेच वेगळे अनुभव येतात. सहलीमध्ये रोजच्या जीवनापेक्षा वेगळाच आनेद 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 इतिहासांतील 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. भौगोलिकृष्टयाही 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 मराठयांच्या हालचालींचं सेनापतीपद हे अधिकार क्रमाक्रमाने मिळवलं. त्याच्या हयातीतच त्याचा मुलगा खंडेराव मृत्यू पावल्याने खंडेरावाचा मुलगा मालेराव यास गादीवर बसवण्यात आलं. तथापि मालेरावाच्या अकाली निधनामुळे खंडेराव यांच्या पत्नी अहिल्याबाई यांनी १७५४ ते१७९५ 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 नाष्टा म्हणजे पोहे, हे इथं समीकरण आहे. एवढया 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 .त्यांनतर 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 ज्योतिर्लिंगापैकी 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 रुपी भगवान शंकरांची पूजा केली जाते. अशी मान्यता आहे कि येथे पूजा केल्यास आपले स्वप्न पूर्ण होते. हे एक सदाशिव मंदिर आहे. येथे भक्त

मोठ्या 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 विष्णूचि 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 पलीकडचे 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 हत्तीच्या 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 अभिनित 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 म्हणुन 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.

मांडु 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 करुन 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 बौध्दिक ज्ञानात नवीन माहितीची भर पडत असते.

त्याचप्रमाणे या सहलीतून सर्वच मित्रांचा सहवास आम्हाला लाभला. तसेच काही मित्रास असलेले सुप्त गुणांची माहीती 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.NO	NAME	CLASS		DATEOF 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.YB.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 Sunil	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.		

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G.T.PATIL ARTS, COMMERCE AND SCIENCE COLLEGE,
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DST FIST Identified College, ISO 9001:2008 Certified
Awarded "Excellent College, 2014" By North Maharashtra University, Jalgaon

Prof. Dr. V. S. Shrivastava
Principal

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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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8	**Conclusions and Recommendations**	The fieldwork enabled the students to understand thegeographical, 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

Photograph of the activity / programme:

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Photograph of the activity / programme:

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. व्ही. 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.

Dr. R. R. Deore
Name & Sign of
organizing Teacher

Head
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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 06th 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

Department of Geography N.T.V.S's G T P College,Nandurbar

HEAD
Department of Geography & Research Center
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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

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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

INDEX

INTRODUCTION

Geography is fundamental to the study of tourism, because tourism is geographical in nature. Tourism occurs in place, it involves moment 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, landscaps and people. Physical geography provides the essential background, against which tourism places are created and environment impacts and cancers 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 divest. It has also and example of secularism. Men and Women of many religious, 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 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 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 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 core (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, Maharastra 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 km2 (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 km2 (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 km2 (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.

Saurastra Narmada Avataran 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 Tedya	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

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 विदयमाने 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 विदयमाने **"जिल्ह्यातील भूजल स्थिती आणि भूजल पुर्नभरण"** या विषयावर वेबिनार च्या माध्यमातून भूगोल विषयाच्या विद्यार्थ्या**साठी** मार्गदर्शन व प्रशिक्षण आयोजित केले असून आपल्या उपस्थितीसाठी / सहभागी होणेसाठी खालील (लिंक)दुवा चा उपयोग करु 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

पार्श्वभुमी : भूजल सर्वेक्षण आणि विकास यंत्रणेच्या (GSDA) स्थापनेला ५० वर्षे पुर्ण 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 विदयमाने** मार्फत **"जिल्ह्यातील भूजल स्थिती आणि भूजल पुर्नभरण"** या विषयावर **वेबिनार** व्दारे तांत्रिक माहीती व प्रत्यक्ष उपाययोजना करण्यासाठी मार्गदर्शन **करणे** असा कार्यक्रम आयोजित करण्यात आला आहे.

जिल्ह्यात शेती, पिण्याचे पाणी व लहान मोठे व्यवसाय मुख्यत्वे भूजलावर अवलंबुन आहेत. जिल्ह्यातील **काही** भाग हा पहाडी क्षेत्राने व्यापलेला असल्याने या भागामध्ये भूजलाची उपलब्धता मुबलक प्रमाणात नसल्यामुळे पाण्याची टंचाइ सतत असते. ह्यावर उपाय म्हणुन जिल्ह्यातील भूशास्त्र समजुन घेणे व भूजलाचा उपसा नियंत्रित करण्यासोबतच भूजलाचे योग्य ठिकाणी पुर्नभरण झाल्यास सततच्या पाणी टंचाईचे निवारण करणे सोपे होइल.

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.
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१२.०० - १२.३०	**भूजल पुर्नभरण-छतावरिल पाउस पाणी संकलन**	**डॉ. सुजित सुरेश शिंपी,** सहाय्यक भूवैज्ञानिक, नंदुरबार
१२.१५-	**प्रश्नोत्तरे, चर्चा व समारोप**	-

सावित्रीबाई फुले पुणे विद्यापीठ
(पूर्वीचे पुणे विद्यापीठ)
भौतिकशास्त्र विभाग
गणेशखिंड पुणे-४११००७
दूरध्वनी क्र.(०२०) २५६९२६७८, २५६९१००२, २५६९१००९
विस्तारीत क्र. २०२/२०६/२२२
फॅक्स (०२०) २५६९१६८४

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To,
Dr. Anil N. Kulkarni
Assistant Professor,
Department of Physics,
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Nandurbar- 425412.

Date: 10/[illegible]/2019

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

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Chemical Solution Deposition of Sb_2Se_3 Films to Study their Structural, Morphological and Optical Properties

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Abstract

At room temperature chemical solution deposition technique has been employed for the deposition of Sb_2Se_3 thin films. Solution based deposition of Sb_2Se_3 crystals with variation in reaction time was found to be playing a significant role in controlling the reaction rate during the deposition of Sb_2Se_3 films. Temporal evolution of structural, morphological and optical properties of deposited Sb_2Se_3 films was investigated using X-ray diffraction (XRD), scanning electron microscopy and UV-visible spectroscopy, respectively. Solution deposition of Sb_2Se_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 Sb_2Se_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 Sb_2Se_3 crystals in the visible region. This is also evident from the photoluminescence studies, which reveal the luminescence intensity variation with crystal size of Sb_2Se_3 as a function of deposition time. Optical and morphological response of Sb_2Se_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: Sb_2Se_3; Chemical solution deposition; XRD; Strain broadening; Photoluminescence.
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Article type: Research article.

1. Introduction

Recently, metal chalcogenides like CdS, PbS, PbSe, HgS, In_2S_3, In_2Se_3, Bi_2S_3, Bi_2Se_3, Bi_2Te_3, Sb_2S_3 and Sb_2Se_3, have attracted considerable attraction of researchers as promising materials in thermoelectric cooling and optical devices.[1-4] Among these materials, in recent time stibnite family members viz., Bi_2Se_3, Bi_2Te_3, Sb_2S_3 and Sb_2Se_3 have been immerged out as promising candidates.[5,6] This is possibly due to their alluring optical and electrical properties in the nano regime. However, in the case of stibnite family based chalcogenides, Sb_2Se_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.[7-12]

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.[13-16]

Therefore, to explore complete optical properties of Sb_2Se_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 Sb_2Se_3.[17-20]

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However, countable communications deal with the chemical solution deposition of Sb2se3 followed by the studies on the optical properties including PL.[21,22]

Thus, in this work, Sb_2Se_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 $SbCl_3$ (0.01 M) and Na_2SeO_3 (0.01 M) were prepared in acetone and double distilled water, respectively in two different beakers, wherein $SbCl_3$ acts as a precursor of Sb^{3+} and Na_2SeO_3 that of Se^{2-}. The deposition process is discussed in the following steps. First, the bath for Sb^{3+} was prepared by adding 1 gm of $SbCl_3$ 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 Sb^{3+}-TEA complex. In the next event, a 2M Se^{2-} precursor solution was prepared in double distilled water under constant stirring of 10 minutes and slowly introduced into the Sb^{3+}-TEA complex precursor solution under constant stirring. TEA, a complexing agent helps for obtaining soluble species of 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 Sb_2Se_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 Sb_2Se_3 films were carried out using X-ray Diffractometry (XRD) (model: XRD, Rigaku "D/B max -2400", Cu K_α = 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 Sb_2Se_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 Sb_2Se_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 50.90º, indexed to (220), (101), (021), (221), (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 Sb_2Se_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.[23-24]

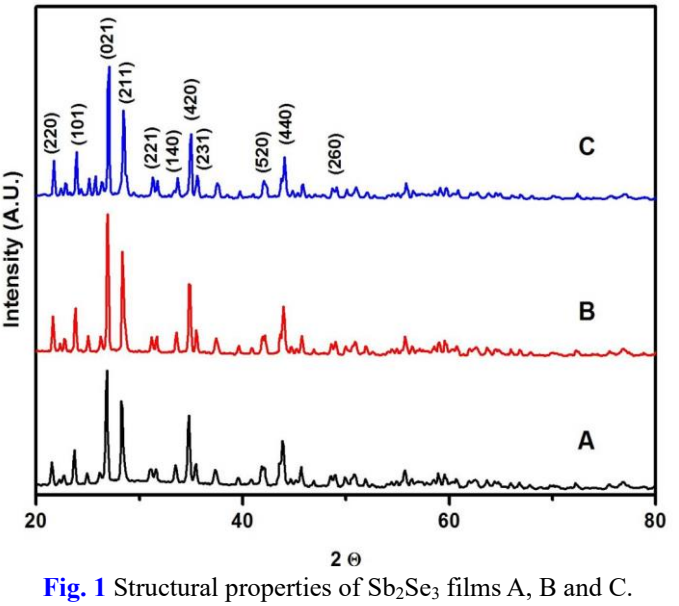

Fig. 1 Structural properties of Sb_2Se_3 films A, B and C.

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,[16]

$$\beta \, Cos\theta = \frac{K\lambda}{D} + n \, Sin\theta \qquad (1)$$

where β is the full width at half maximum in radians of the diffraction peak under consideration after instrumental broadening correction, θ is the angle of diffraction, D is the size of the crystallite, ηis the strain in the material), and the plot about β Cosθ Vs η Sinθ 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 Table1.

In addition, to further prove the deposition of Sb_2Se_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 Sb_2Se_3 films reveals the presence of Sb and Se in ~ 2:3 ratio, confirms the formation of Sb_2Se_3.

Table 1. Physical Parameters of all prepared samples.

Sample	2θ°	Sinθ	β_r(rad) × 10^{-3}	β_r COSθ × 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	

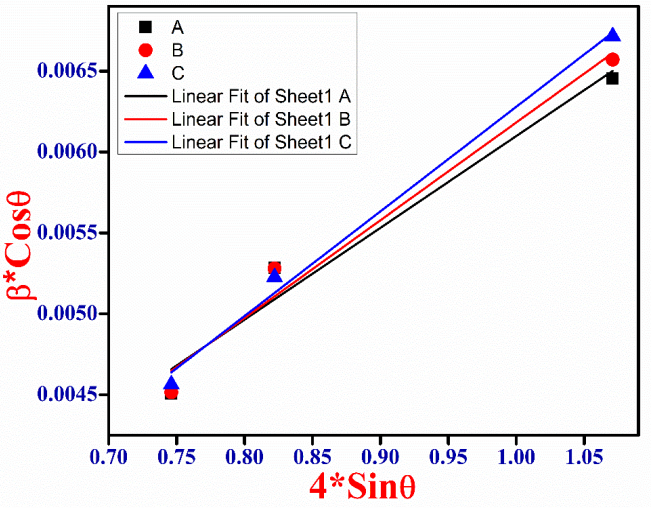

Fig. 2 Williamson-Hall plot for the estimation of crystallite size.

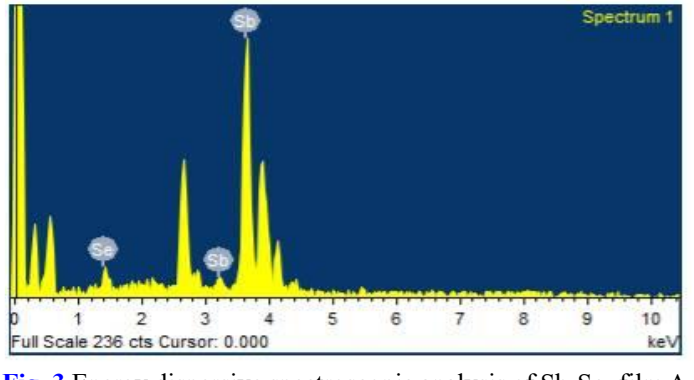

Fig. 3 Energy dispersive spectroscopic analysis of Sb_2Se_3 film A.

3.2 Morphological analysis of Sb_2Se_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. $4A_1$) 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. $4A_2$). This may be due to the controlled nucleation of the Sb_2Se_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. $4B_1$). However, it is clearly seen from the higher magnification image (Fig. $4B_2$) 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. $4C_1$ and C_2).

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 Sb_2Se_3 nanocrystals. During the initial deposition, reaction rate may have been driven by the Sb-TEA complex, which leads to control the release of 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 nano-spheres and solid nanospheres of Sb_2Se_3 reported in literature.[25-27]

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

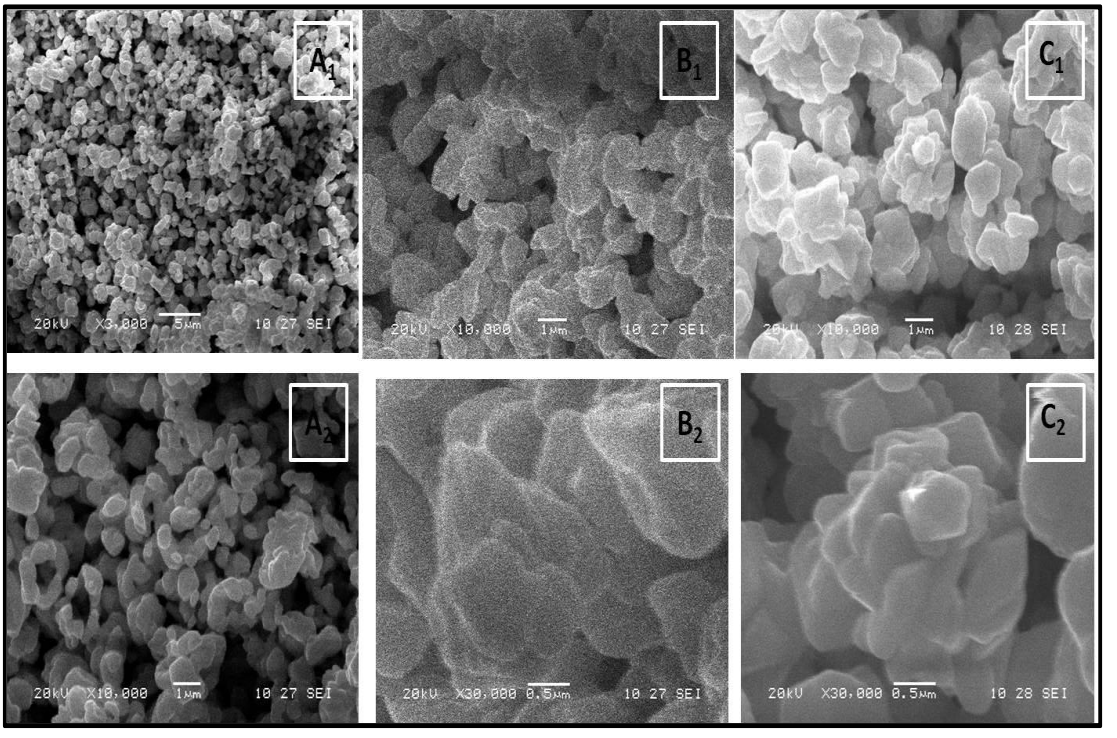

Fig. 4 Morphological analysis of films A, B and C.

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.[19] Band gap plots depict the optical energy band gap (Eg) values in the range of 1.60 to 1.63 eV, respectively.[28] These values of Eg 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.[29-31]

$$\alpha h\upsilon = \beta (h\upsilon - E_g)^n \quad (2)$$

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.[1] 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.[32,33] 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.[33]

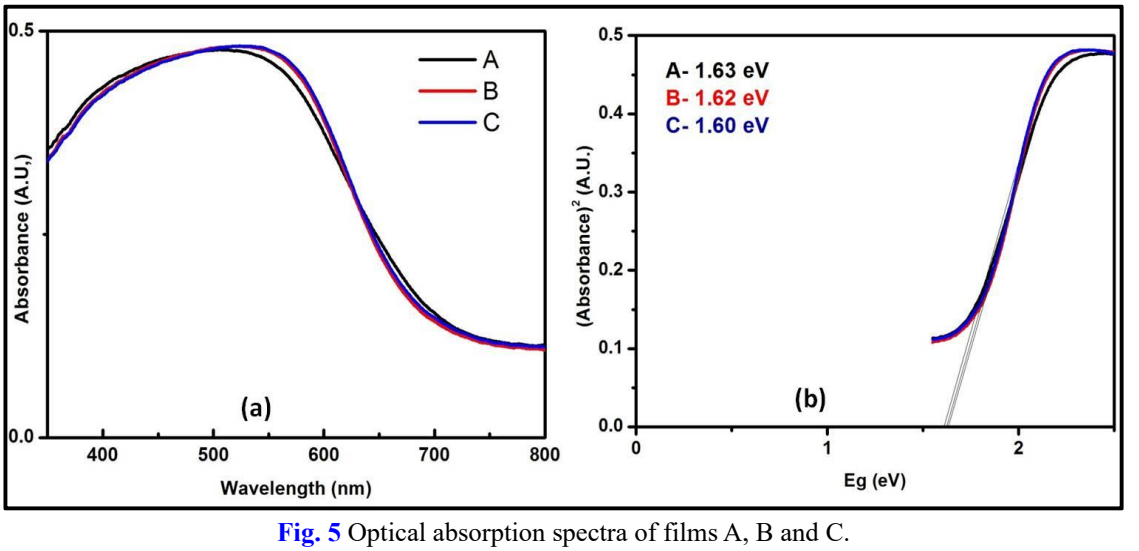

Fig. 5 Optical absorption spectra of films A, B and C.

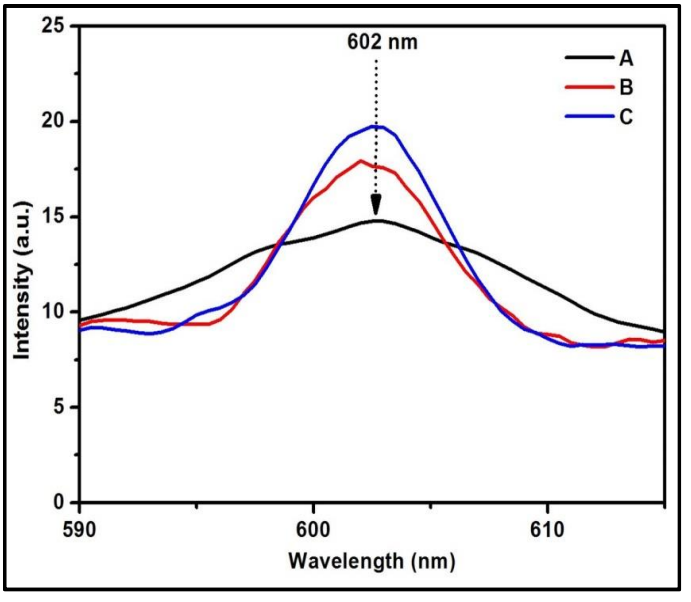

Fig. 6 Spectroscopy of films A, B and C.

3.6 Contact angle measurement

Measuring contact angles is a simple means to analyze wettability of thin film surfaces.[34] 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 Sb_2Se_3 films with a contact angle of about 60˚ 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.[12] Such a hydrophilic nature of deposited Sb_2Se_3 finding applications in heterojunction based optical devices.

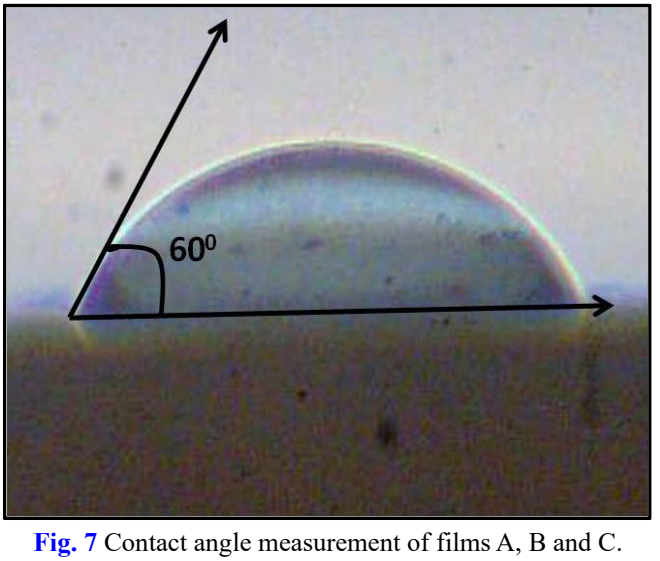

Fig. 7 Contact angle measurement of films A, B and C.

4. Conclusions

Role of the deposition time during the solution deposition of Sb_2Se_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 Sb_2Se_3 nanocrystals. The temporal growth of Sb_2Se_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 Sb_2Se_3 crystals. Observed morphological and optical properties reveal Sb_2Se_3 a promising absorber material in opto-electronic applications including photovoltaic devices.

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Conflict of Interest

There is no conflict of interest.

Supporting Information

Not applicable.

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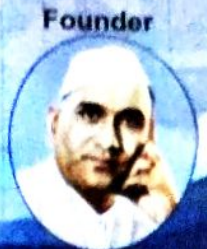

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Solvent-free grindstone synthesis of four new (*E*)-7-(arylidene)-indanones and their structural, spectroscopic and quantum chemical study: a comprehensive theoretical and experimental exploration

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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.

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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 antimalarial 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

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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

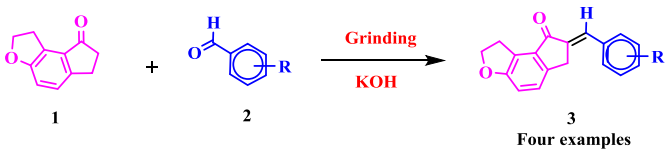
1,2,6,7-tetrahydro-8*H*-indeno[5,4-*b*]furan-8-one was purchased from Henan Tianfu Chemical Co., Ltd., Zhengzhou, China, and other chemicals (Make: Merck, Sigma Aldrich, and Avra synthesis) with high purity were purchased from sigma laboratory, Nashik. The chemicals were used as received without any further purification. Melting points were determined in open capillary and uncorrected. ^{1}H NMR and ^{13}C NMR spectra were recorded with a Bruker using $CDCl_3$ 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-8H-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 (λ 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 ^{1}H NMR and ^{13}C NMR spectroscopic methods.

3.2. Physical and spectral data

(E)-7-(4-methylbenzylidene)-1,2,6,7-tetrahydro-8H-indeno[5,4-b]furan-8-one (3a): Yield: 95%; yellow solid; m.p. 108 °C;^{1}H NMR (500 MHz, $CDCl_3$) δ (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);^{13}C NMR (126 MHz, $CDCl_3$) δ (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-8H-indeno [5,4-b]furan-8-one (3b): Yield: 93%; yellow solid; m.p. 140°C;^{1}H NMR (500 MHz, $CDCl_3$) δ (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);^{13}C NMR (126 MHz, $CDCl_3$) δ (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-7H-indeno[5,4-b]furan-7-ylidene)methyl)benzonitrile (3c): Yield: 84%; yellow solid; m.p. 179 °C;^{1}H NMR (500 MHz, $CDCl_3$) δ (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); ^{13}C NMR (126 MHz, $CDCl_3$) δ (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.

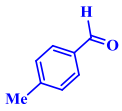
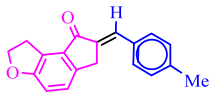
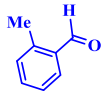
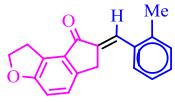
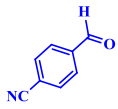
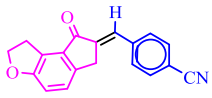
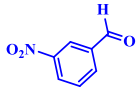
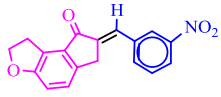
(E)-7-(3-nitrolbenzylidene)-1,2,6,7-tetrahydro-8H-indeno [5,4-b]furan-8-one(3d):

Yield: 90%; yellow solid; m.p. 146 °C;^{1}H NMR (500 MHz, $CDCl_3$) δ (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); ^{13}C NMR (126 MHz, $CDCl_3$) δ (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

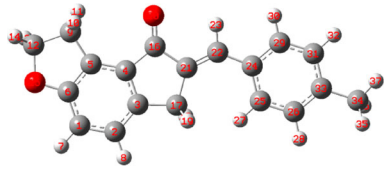
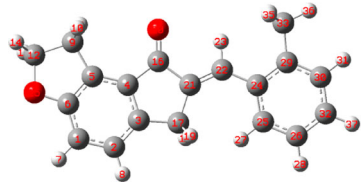
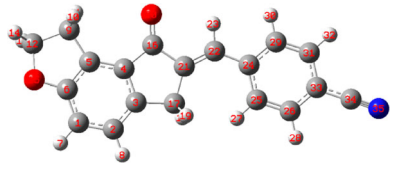
The structures of the four new 7-arylidene indanones (**3a**–**3d**) are presented in Table 2. The optimised molecular structures obtained by using the density functional theory method with

Table 1. Physicochemical data of (*E*)-7-arylidene-1,2,6,7-tetrahydro-8*H*-indeno[5,4-*b*]furan-8-one derivatives[a].

Entry	Aromatic aldehyde	Product	Time (min)	Yield[b] (%)	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	(*E*)-7-(4-methylbenzylidene)-1,2,6,7-tetrahydro-8*H*-indeno[5,4-*b*]furan-8-one	**MBIF-1**	
3b	(*E*)-7-(2-methylbenzylidene)-1,2,6,7-tetrahydro-8*H*-indeno[5,4-*b*]furan-8-one	**MBIF-2**	
3c	(*E*)-4-((8-oxo-1,2,6,8-tetrahydro-7*H*-indeno[5,4-*b*]furan-7-ylidene)methyl)benzonitrile	**OIFB**	
3d	(*E*)-7-(3-nitrolbenzylidene)-1,2,6,7-tetrahydro-8*H*-indeno[5,4-*b*]furan-8-one	**NBIF**	

a basis set 6-311G (d,p). The point group symmetry for all four molecules is C1. The molecule **NBIF** has the highest polarity (μ = 5.7058 Debye) whereas the molecule **MBIF-2** has the lowest polarity (μ = 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.

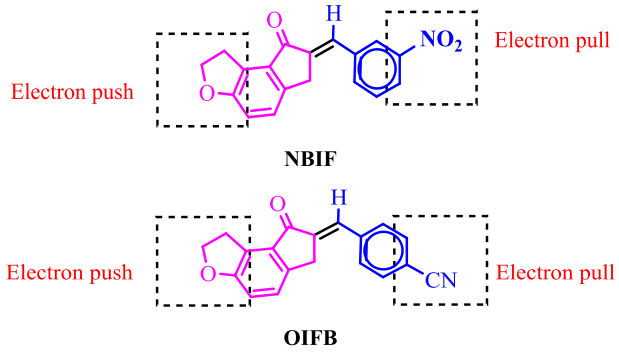


Figure 1. (Colour online) Captodative type phenomenon in NBIF and OIFB.

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 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 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

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_{HOMO} = −5.988) is the highest in the **MBIF-1** molecule while the LUMO reactivity (E_{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.

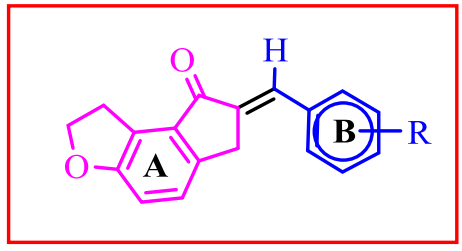


Figure 2. (Colour online) General structure with ring labelling.

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 (χ), absolute hardness (η), global softness (σ), global electrophilicity index (ω), chemical potential (Pi) maximum number of electron transferred (ΔNmax) have been established. All these parameters provide valuable insights into the chemical reactivity of molecules. The highest value of the electronegativity (χ = 4.557 **eV**) in the molecule **OIFB** suggests that it has the most powerful electron attracting property. The data of absolute

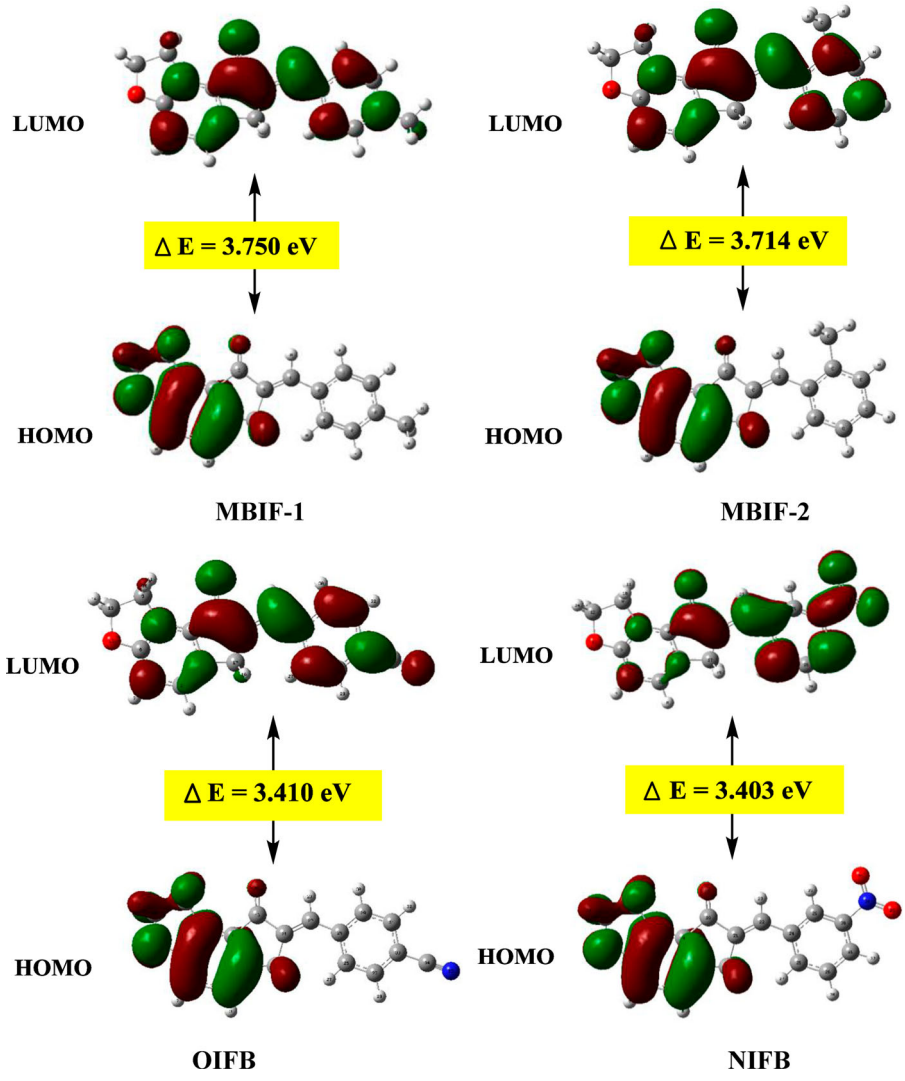


Figure 3. (Colour online) HOMO–LUMO pictures.

Table 7. Electronic parameters.

Name	E (a.u.)	E_{HOMO} (eV)	E_{LUMO} (eV)	I (eV)	A (eV)	Eg (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: $I = -E_{HOMO}$ & $A = -E_{LUMO}$.

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 ($\Delta Nmax = 2.6727$ eV). By employing TD-B3LYP/6-311G (d,p) level of theory for B3LYP/6-311G (d,p) optimised geometries, absorption energies (λ 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	χ (eV)	η (eV)	σ (eV^{-1})	ω (eV)	Pi (eV)	ΔNmax (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: $\chi = (I + A)/2$; $\eta = (I - A)/2$; $\sigma = 1/\eta$; $\omega = Pi^2/2\eta$; $Pi = -\chi$; $\Delta Nmax = -Pi/\eta$. Abbreviations: χ, electronegativity; η, absolute hardness; σ, global softness; ω, global electrophilicity; Pi, chemical potential; ΔNmax, maximum no. of electron transferred.

Table 9. Absorption energies (λ 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	λ^{abs}	*f*	Configuration	Transition
MBIF-1	S_0–>S_1	386.52	0.0116	73–>74	H–>L
MBIF-2	S_0–>S_1	390.94	0.0170	73–>74	H–>L
OIFB	S_0–>S_1	428.04	0.0120	75–>76	H–>L
NBIF	S_0–>S_1	420.47	0.0103	80–>81	H–>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

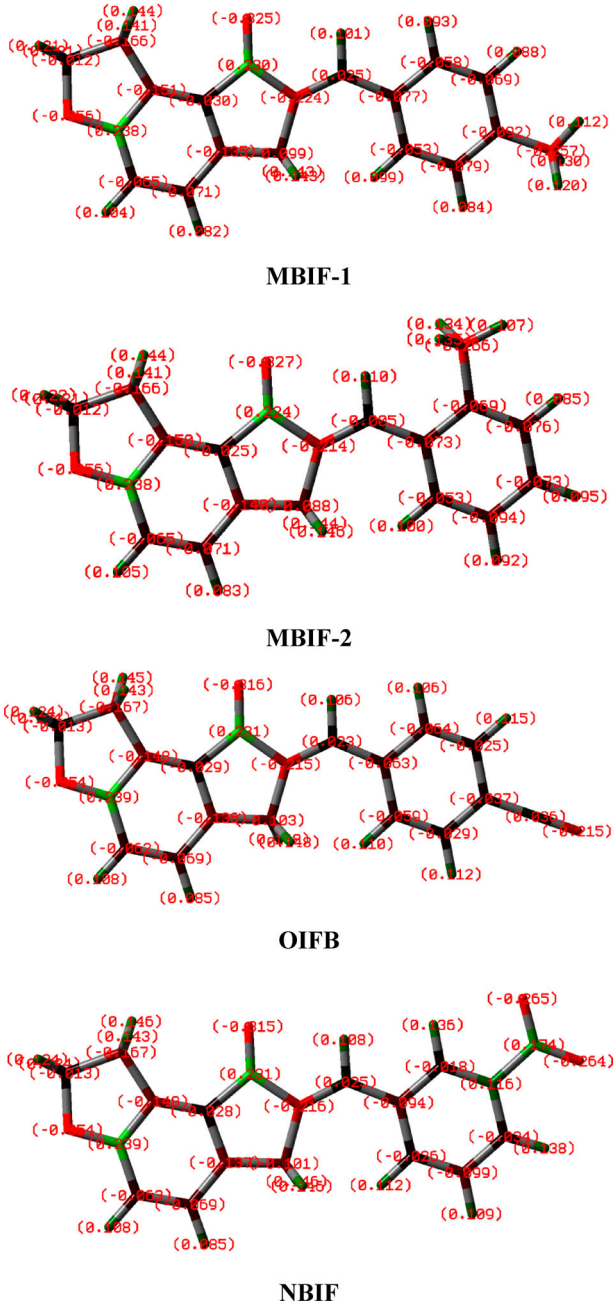


Figure 4. (Colour online) Mulliken atomic charge distribution.

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_{total}), heat capacity at constant volume (Cv), total entropy (S), zero-point vibrational energy (Ev_0), rotational constants were computed. These are given in Table 12. It is evident from the data of E/B3LYP and E_{total} that the presence of electron releasing and electron attracting groups together augments the stability of the molecules. The **OBIF** 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^{-1})	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, Cv (cal $mol^{-1}K^{-1}$)	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 $mol^{-1}K^{-1}$)	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 Ev_0 (kcal mol^{-1})	186.926	187.295	169.078	171.378
Rotational constants (GHZ)	1.097 0.120 0.109	0.910 0.138 0.120	1.079 0.103 0.094	0.879 0.093 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

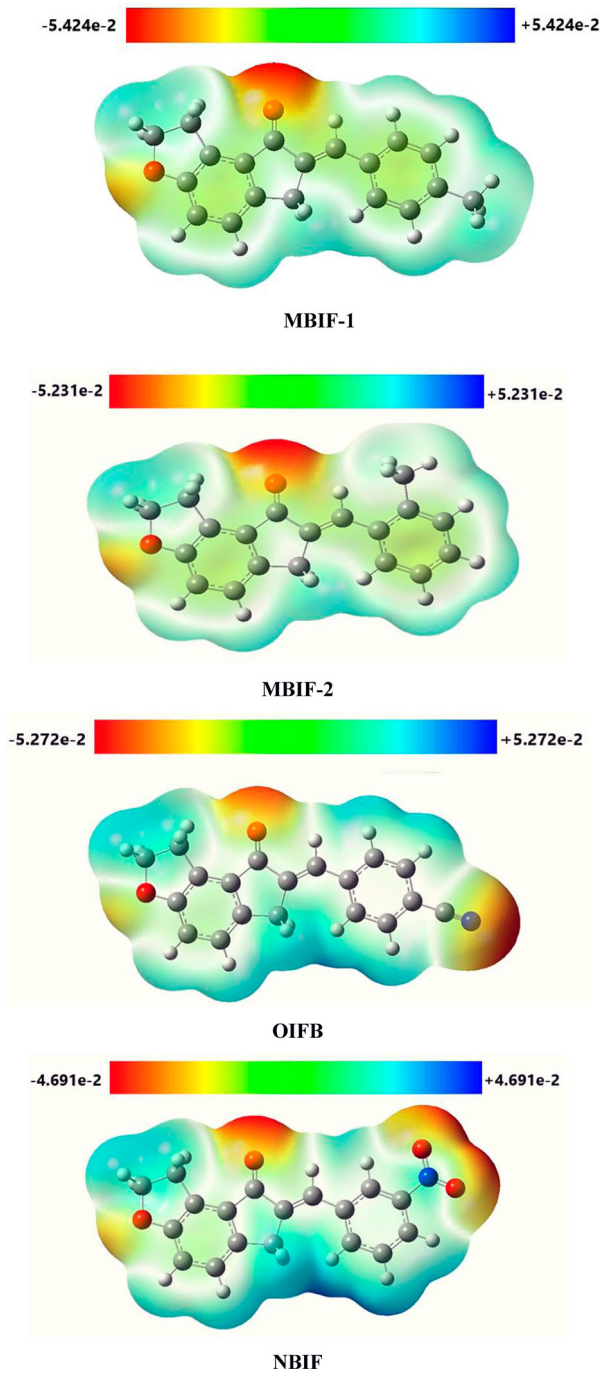


Figure 5. (Colour online) Molecular electrostatic potential surfaces.

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}H NMR and ^{13}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 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.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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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

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Enhance catalytic performance of lipase immobilized on Polyaniline (PANI)–Fe3O4 magnetic nanocomposite and its application in biodiesel synthesis from waste cooking oil

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Abstract:	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)–Fe3O4 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 0C 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)–Fe3O4 magnetic nanocomposite improved its stability towards denaturation by heat and pH. Moreover it has quite efficiently catalyses the biodiesel synthesis with good operational stability.
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Question	**Response**

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_3O_4 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

Enhance catalytic performance of lipase immobilized on Polyaniline (PANI)–Fe_3O_4 magnetic nanocomposite and its application in biodiesel synthesis from waste cooking oil

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Abstract

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_3O_4 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 ^{0}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_3O_4 magnetic nanocomposite improved its stability towards denaturation by heat and pH. Moreover it has quite efficiently catalyses the biodiesel synthesis with good operational stability.

Keywords: PANI–Fe3O4 magnetic nanocomposites, Lipase, Immobilization, Thermostability, Biodiesel

1.Introduction:

Biodiesel syntheses from vegetable oils have immense potential as a renewable source of energy. A number of processes have been developed for biodiesel production involving chemical or enzyme catalysis or supercritical CO_2 medium [1][2][3]. Enzymatic transesterification of triglycerides is a good alternative to chemical process as it is a green approach of producing renewable fuel. Enzyme catalysis has shown high purity of products due to its ecofrienldly, selective nature and low temperature requirement [2].

In many countries biodiesel synthesized using edible and non-edible oil; however because of the high cost of the vegetable oils biodiesel cost 1.5 times higher than fossil diesel and it limited its wide application[3]. Therefore in the present study, waste oils chosen as the raw materials for biodiesel synthesis.

There are many reports on biodiesel production using enzyme catalysis by free or immobilized lipase. Immobilized lipase in particular is suitable for continuous biodiesel production because of its ease of recovery from the reaction mixture. A great variety of lipase immobilisation methods such as adsorption, covalent immobilization, entrapment and whole-cell biocatalyst have been reported [4][5]. Among the various immobilization methods adsorption and covalent immobilization methods are the most cost effective and efficient means of immobilization. Adsorption is one of the easiest methods but the bonding of the enzyme to the matrix is often weak and such biocatalysts generally lack the degree of stabilization achieved by covalent attachment. Covalent immobilization methods have the strongest enzyme-support bonding compared with other methods. The lipase needs both firmness and flexibility, as the flexible active center enhances its endurance towards distortions without losing activity. But strong multipoint covalent bonding will lead to the irreversible distortion of active center and the risk of losing function. So in the present investigation an intermediate process between adsorption and covalent attachment has been utilized for immobilization of *Aspergillus niger* (RM1265) lipase to enhance the immobilization efficiency and stability of enzyme.

Lipases immobilized on nanoparticles are an excellent catalyst for biodiesel synthesis [6]. The magnetic nanocomposite has been utilized for immobilization as the smaller size particles will increase the total acting surface of reacting particles in reaction mixture, moreover magnetic

isolation of lipase make the processes is advantageous from an economic point of view. In the present investigation, *Aspergillus niger* (RM1265) lipase was first immobilized on activated nanocomposite then it was utilized for methanolysis of waste oil.

2. Experimental:

2.1. Chemicals

Lipase from *Aspergillus niger* (RM1265) was purchased from HiMedia and *p*-nitrophenol palmitate was purchased from Sigma aldrich. Waste cooking oil was collected from local restaurants. All other solvents and reagents were AR grade.

2.2. Modification of nanocomposite

Polyaniline (PANI)–Fe_3O_4 magnetic nanocomposite has been utilized for immobilization of lipase which was synthesized in situ through self-polymerization of monomer aniline [7]. 5g magnetic nanocomposites were modified by refluxing it in 25 ml ethanolamine. After 3 h of reflux nanocomposite were washed thrice with 60 ml acetone and air dried. Magnetic nanocomposites were then activated using 25 ml 4% (w/v) glutaraldehyde in 50 mM phosphate buffer (pH 8.0) with gentle agitation at 4 ^{0}C for 2 h. The activated magnetic nanocomposites were washed with phosphate buffer to make it glutaraldehyde free.

2.3. Immobilization of lipase

About 25 ml lipases in 50 mM phosphate buffer (pH 8.0) was mixed with 0.1 ml of Tween 80 and stirred for 5 min followed by the addition of 5 g of magnetic nanocomposite. Hundred milliliter of chilled acetone was added and the mixture was stirred for 30 min at 4 ^{0}C. Magnetic nanocomposite immobilized lipase was filtered, washed with 25 ml of chilled acetone and lyophilized.

2.4. Lipase assay

Lipase assay was done spectrophotometrically using *p*-nitro phenyl palmitate as the substrate[8]. One unit (U) of lipase was defined as the amount of enzyme that liberates 1 µmol of p-nitro phenol per min under the assay conditions.

2.5. *Characterizations of immobilized lipase*

2.5.1. *SEM analysis*

SEM analysis of modified nanocomposite and lipase immobilized modified nanocomposite were carried out on using HITACHI-S- 4800(type II) instrument, Japan.

2.5.2. ***Thermo Gravimetric Analysis:*** TGA of modified nanocomposite and lipase immobilized modified nanocomposite were carried out using Thermal analyser -Perkin Elmer Pyris -1 TGA.

2.5.3. ***FTIR Analysis:*** FTIR analysis of modified nanocomposite and lipase immobilized modified nanocomposite were carried out on FT-IR Spectrometer Perkin Elmer Spectrum GX 10,000 cm^{-1} to 370 cm^{-1}.

2.5.4. ***Effect of temperature and Thermostability***

The effect of temperature on the free and immobilized lipase activity was determined for *p*-NPP hydrolysis. The hydrolysis of *p*-NPP was observed at various temperatures (20–70^0C), where the *p*-NPP solution was preincubated to reach the desired temperature before the addition of lipase.

2.5.5. ***pH stability and Thermostability***

The effect of pH on the free or immobilized enzymes was examined after pre-incubating the enzyme samples at 30^0C for 60 min at pH 4–11 [50 mM sodium acetate buffer (pH 4, 5), 50 mM potassium phosphate buffer (pH 6,7), 50 mM Tris–HCl buffer (pH 8, 9), and 50 mM glycine–NaOH buffer (pH 10, 11)]. Then the residual activity was assayed under the standard conditions. Thermostsbility of the free and immobilized lipase activity was observed by incubating in phosphate buffer (50 mM, pH 7.0) at temperatures ranging from 30°C to 90°C for 60 min, followed by measurement of the residual enzyme activity at 37°C. The enzyme activity of the not incubated lipase was taken as 100%.

2.6. Biodiesel synthesis

2.6.1. Reaction setup for transesterification reaction

Transesterification reaction for biodiesel synthesis was carried out at 30°C in screw-capped vials placed inside a reciprocal shaker. The initial reaction mixture consisted of oil: methanol molar ratio of 1:2, *t*- butanol:oil volume ratio of 0.2, immobilized lipase 50 U and 200 rpm along with the respective controls (samples without enzyme).

2.6.2. Sampling and Analysis

Synthesis of fatty acid methyl ester was analyzed by method was modified based on hydroxamic acid test [9].

2.7. *Operational stability of nanocomposite bound lipase*

Operational stability of immobilized lipases was also observed for biodiesel synthesis. After the completion of reaction, the immobilized lipases were collected by centrifugation at 5,000 rpm for 10 min and washed with hexane in order to remove the reactants adsorbed on matrix. Then the immobilized lipases were resuspended in the same composition of freshly prepared reaction mixture to start a new run and the supernatant was assayed for biodiesel synthesis.

3. Result and discussion:

3.1. Immobilization of enzyme

Immobilization of lipase was carried out on modified crosslinked nanocomposite, where the immobilization yield of lipase on was estimated by calculating the specific activity of respective lipases before and after binding to nanocomposite. Lipase showed 85% immobilization on modified cross linked aminated nanocomposite. The present result of immobilization yield is higher than those earlier reports [10][11]. Covalent attachment is the most efficient method of enzyme immobilization, but because of strong multi-interactions between the enzyme and support, sometimes distortions of enzymes occur that lead to denaturation and loss of enzyme activity. In the present immobilization process first ethanolamine was adsorbed on nanocomposite and then it was treated with glutaraldehyde followed by enzyme immobilization. So this process is not completely covalent attachment therefore lipase is efficiently immobilized on activated nanocomposite without losing its enzyme activity. It was observed that the activated nanocomposite enhances the immobilization yield and thermostability of lipase.

3.2. SEM analysis of modified nanocomposite and lipase immobilized on modified nanocomposite

Scanning electron microscopy is widely used to study the morphological features and surface characteristics of catalyst surface. The magnetic nanocomposite of Polyaniline/Fe_3O_4 are analyzed by SEM after activation with ethanolamine and glutaraldehyde as shown in Figure(1a**)**. In Figure(1a**)** polyaniline–Fe_3O_4 has heterogeneous surface, there is whitish cluster of Fe_3O_4 nanoparticles on the dark greyish surface of polyaniline that we have used earlier for degradation of dyes[7]. The SEM micrographs of magnetic nanocomposite of polyaniline/Fe_3O_4 also showed surface texture and porosity in figure 1(a).The magnetic nanocomposite of polyaniline/Fe_3O_4 are

analyzed by SEM after the enzyme immoblisation as shown in Figure 1b. The figure 1(b) shows increased in surface texture and porosity, that's mainly due to successfully binding of the enzyme substrate with the surface. So, we easily distinguished figure 1(a) and 1(b) from their porosity and concluded successful enzyme immobilisation on modified polyaniline/ Fe_3O_4 catalyst nanocomposite.

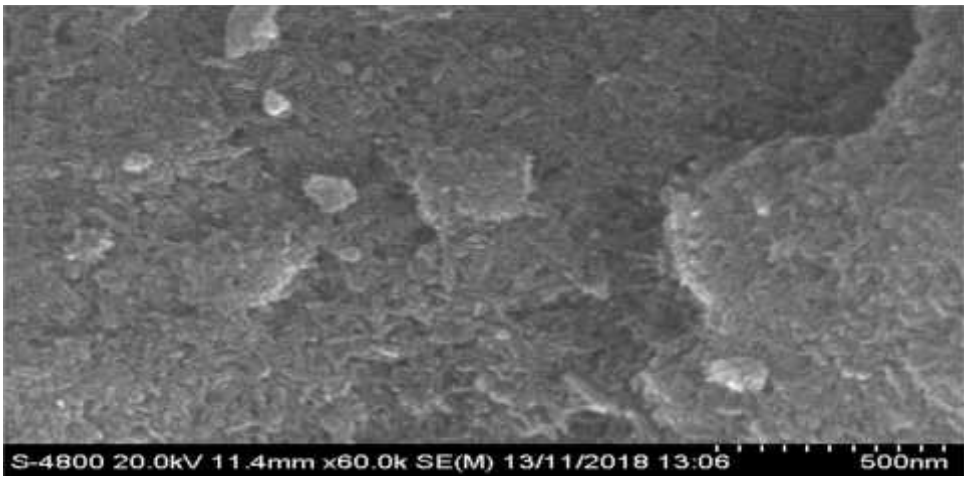

Figure 1a: SEM of magnetic nanocomposite of polyaniline/Fe_3O_4 modified after treatment with ethanolamine and glutaraldehyde

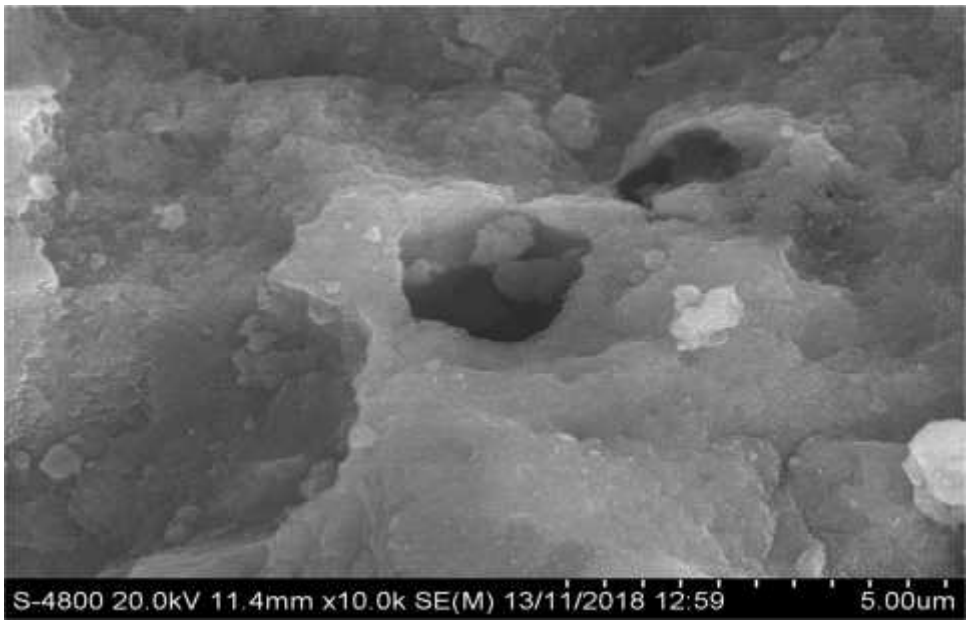

Figure 1b: SEM of lipase immobilized modified magnetic nanocomposite of polyaniline/Fe_3O_4.

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 ^{0}C was mainly due to evaporation of water and low molecular weight species. The second weight loss 220 to 300 ^{0}C was associated with the doping agent degradation. The weight loss around 400 to 500 ^{0}C was associated with degradation of polyaniline. Beyond 500 ^{0}C Fe_3O_4 was decomposed from covalently bonded Polyaniline. This trend was observed in both the Figure 2a (Polyaniline- Fe_3O_4) and Figure 2b (Polyaniline- Fe_3O_4 enzyme nanocomposite). But weight loss is slightly more in Figure 2b that is due to use of enzyme in a reaction.

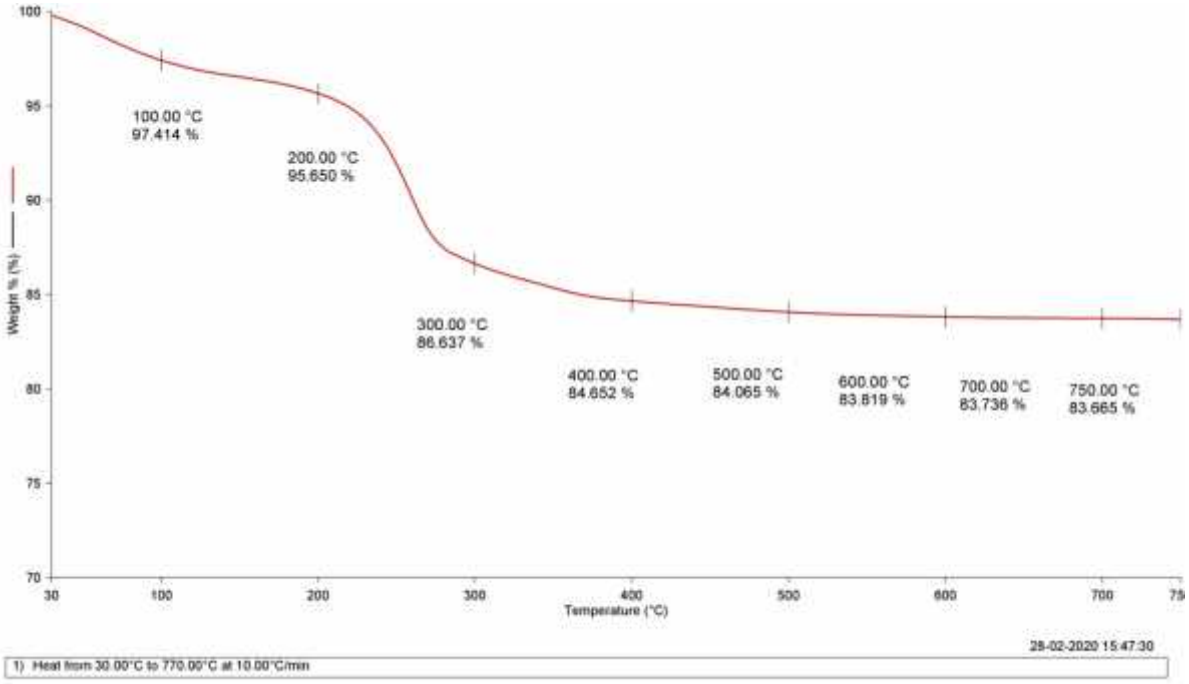

Figure 2a: TGA curve of magnetic nanocomposite of polyaniline/Fe_3O_4 modified after treatment with ethanolamine and glutaraldehyde

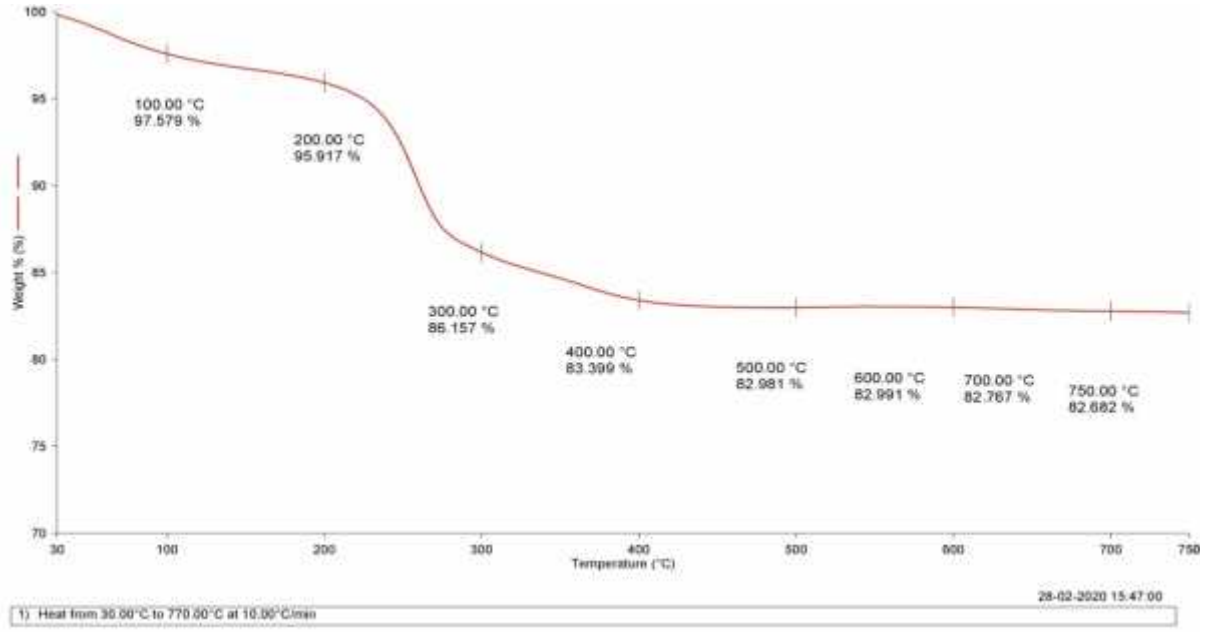

Figure 2b: TGA curve of lipase immobilized modified magnetic nanocomposite of polyaniline/Fe_3O_4.

3.4. FT-IR analysis of activated nanocomposite and lipase immobilized on activated nanocomposite

The FT-IR spectra of activated PANI–Fe_3O_4 nanocomposite and enzyme immobilized PANI–Fe_3O_4 nanocomposite are shown in figure 3a and 3b respectively. It shows absorption band at 468 cm^{-1}, 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^{-1} 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^{-1} which may assigned to C-H stretching vibration of aldehyde group. This is because activated PANI–Fe_3O_4 nanocomposite has free aldehyde group which is utilized for lipase immobilization in enzyme immobilized PANI–Fe_3O_4 nanocomposite. So FTIR analysis showed the efficient enzyme immobilization on PANI–Fe_3O_4 nanocomposite.

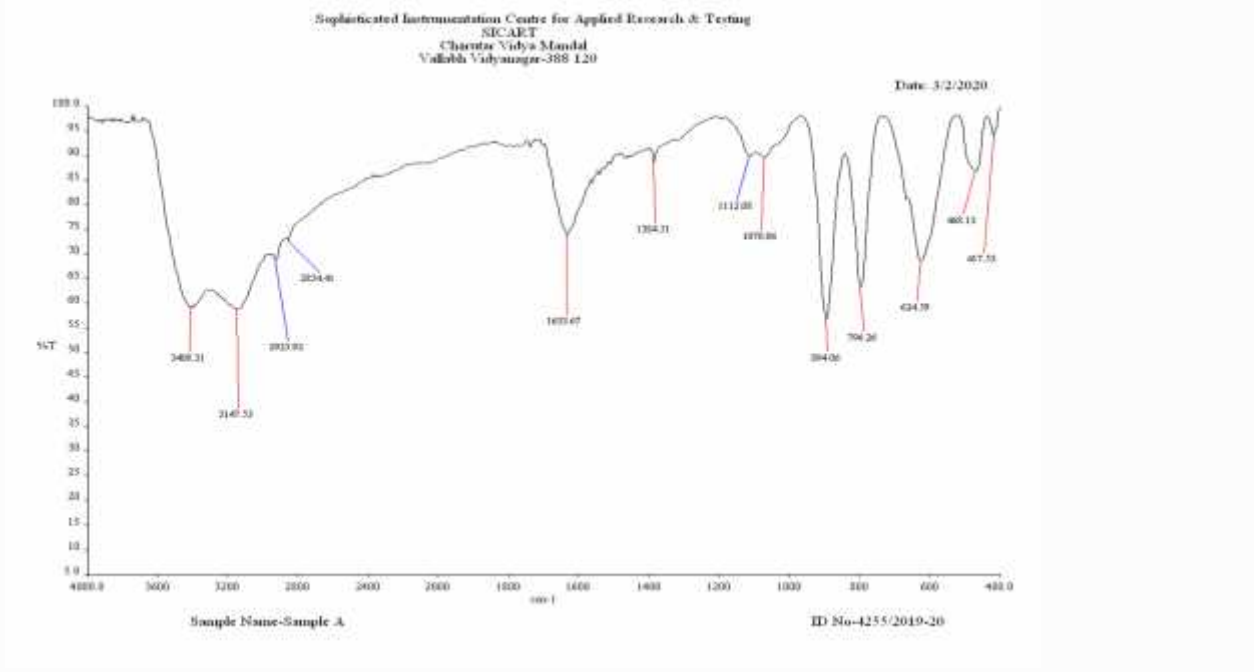

Figure 3a: FTIR spectrum of magnetic nanocomposite of polyaniline/Fe_3O_4 modified after treatment with ethanolamine and glutaraldehyde.

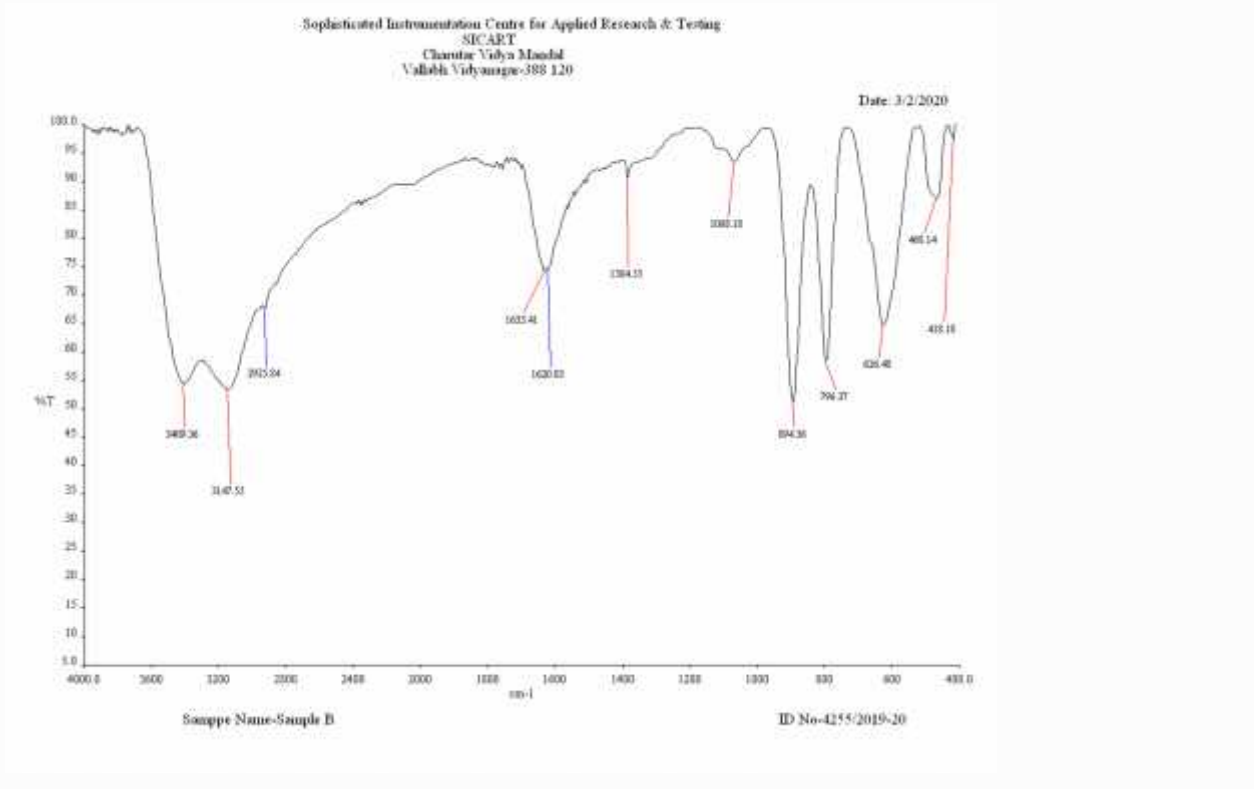

Figure 3b: FTIR spectrum of lipase immobilized modified magnetic nanocomposite of polyaniline/Fe_3O_4.

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 ^{0}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].

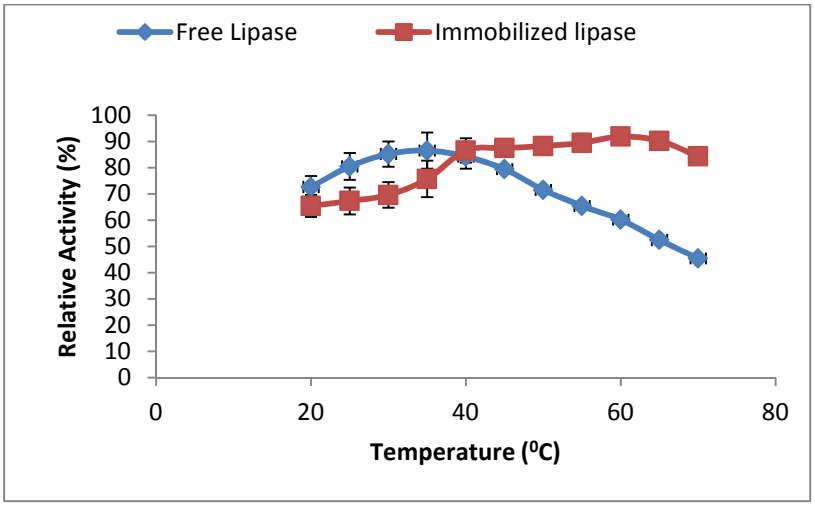

Figure 4: Effect of temperature on free and immobilized lipase. Data are represented as the mean ± standard deviation of three replications.

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^{0}C to 90^{0}C (Figure 5). It was observed that free lipase activity decreased after 40^{0}C and became inactive beyond 60^{0}C while the immobilized lipase was completely retained its activity. It has been observed that even at 90^{0}C, after one hour of incubation, the immobilized lipase retained 84% of its initial activity, whereas the free lipase

became inactive far before this temperature. Although there are several previous reports where immobilized lipase was stable in comparison to its free form but the thermal stability observed in the present study was found to be very much improved than the earlier reports [12] [13].

Thermal stability depends on the strength of bonds formed between the enzyme and the support which prevent its unfolding at higher temperature. The thermal stability of immobilized enzymes might be drastically increased due to its strong attachment to activated magnetic nanocomposite.

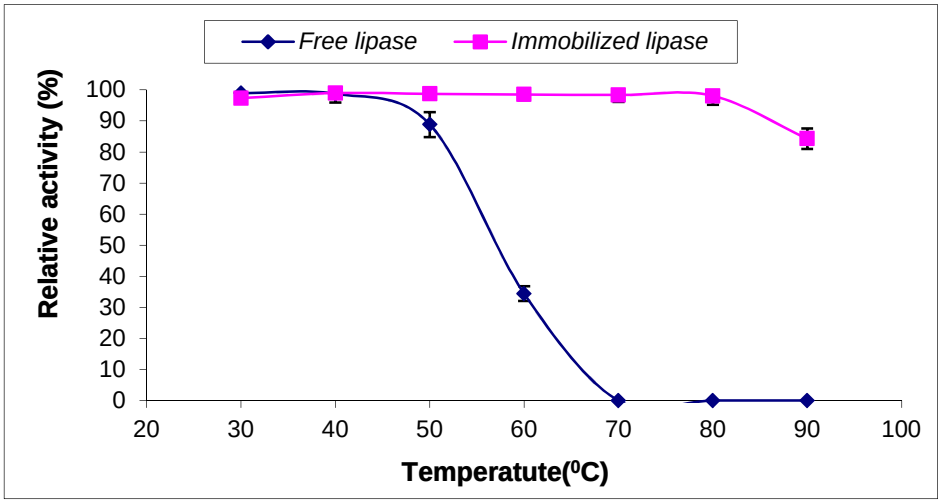

Figure 5: Thermostability of free and immobilized lipase. Data are represented as the mean ± standard deviation of three replications.

3.7. Effect of pH on lipase activity

Immobilization of enzyme may attribute to the conformational changes of enzyme resulting in a variation of optimum pH. According to the present observation free as well as immobilized lipases remained stable in the pH range from 4 to 7. pH 8 onwards immobilized lipase retained activity, while free lipase started deactivating (Figure 6). This higher stability of immobilized lipase may be due to the bonding between enzyme and activated magnetic nanocomposite, which prevent the denaturation of enzyme at basic pH [14].

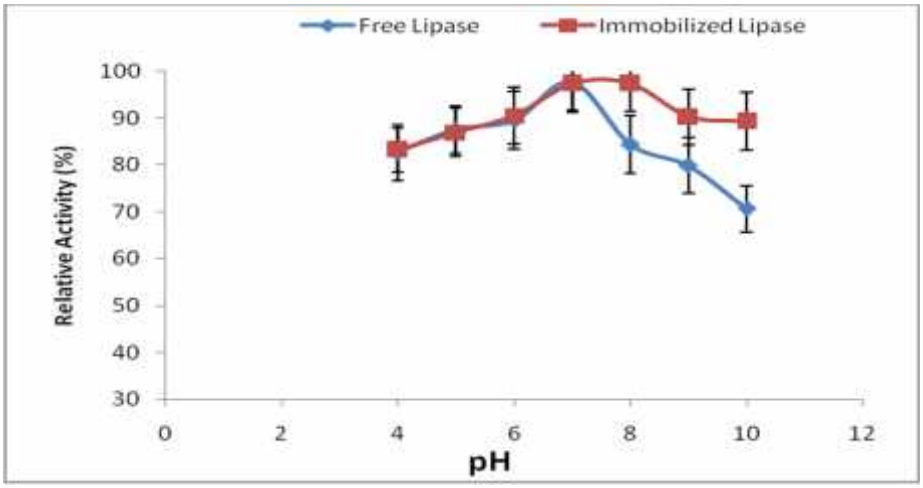

Figure 6: Effect of pH on free and immobilized lipase. Data are represented as the mean ± standard deviation of three replications.

3.8. Kinetic parameters of free and immobilized lipases

The kinetic constants Vmax and Km were calculated from the double reciprocal plots shown in Figure 7. Free lipase showed Km values of 0.4mM and Vmax 1.5 U/mg, while immobilized lipase had Km value of 0.27 mM and Vmax 1.4 U/mg. The decrease in km 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, Vmax values of enzymes exhibit a decrease on immobilization; which is in accordance with the other similar results [15].

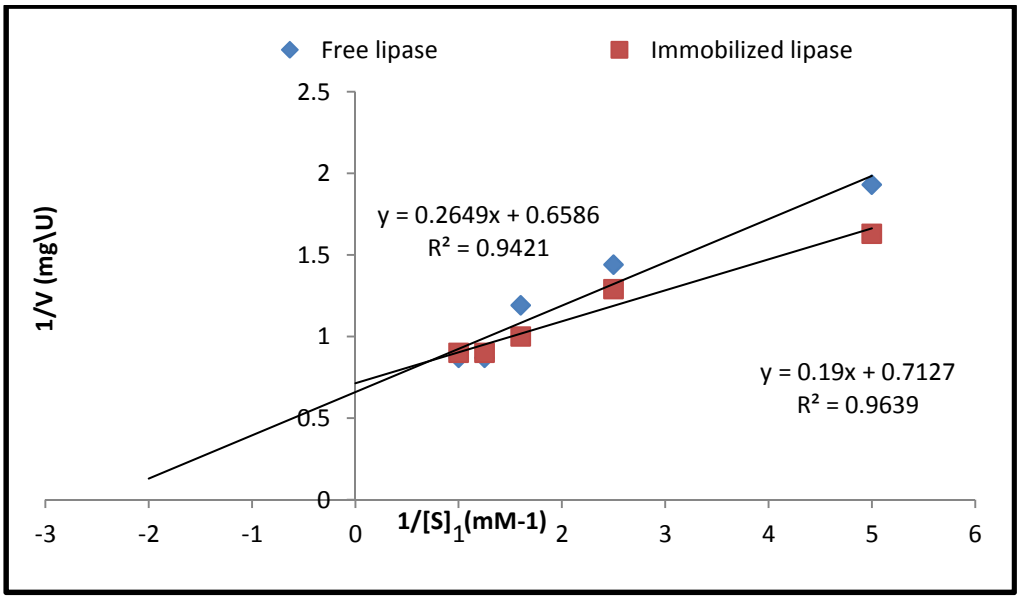

Figure 7: Lineweaver–Burk plots for free and immobilized lipase

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.

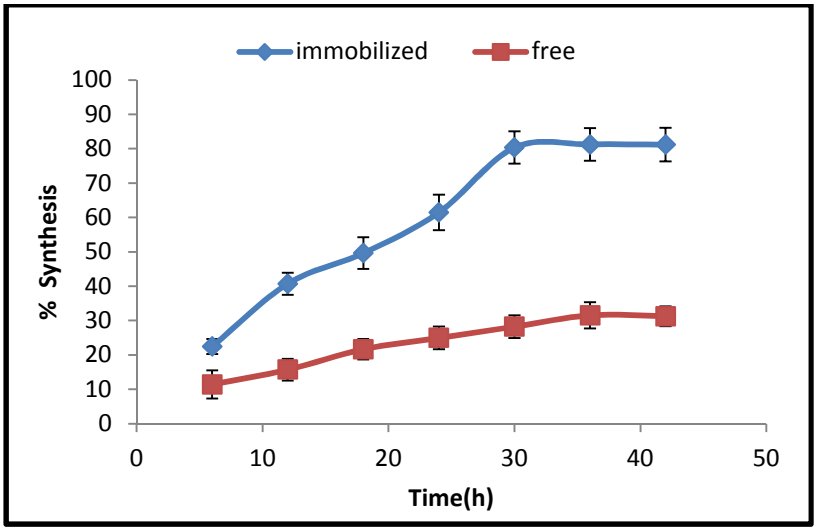

Figure 8: Biodiesel synthesis with free and immobilized lipase. Data are represented as the mean ± standard deviation of three replications.

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.

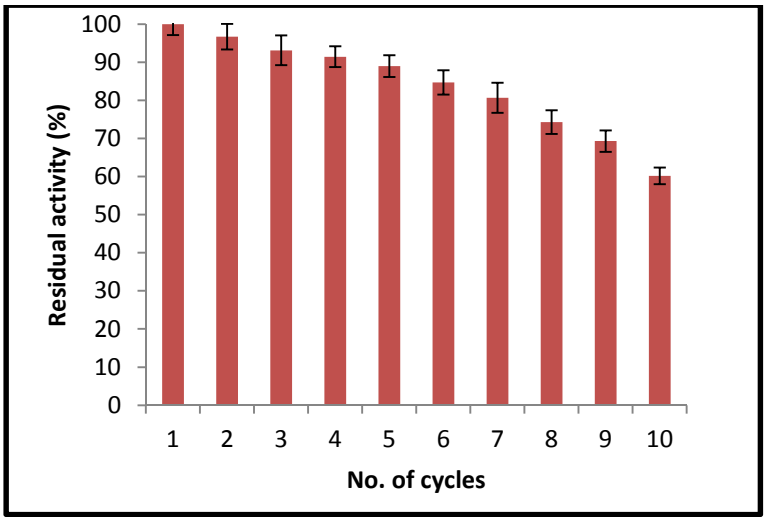

Figure 9: Operational stability of immobilized lipases for biodiesel synthesis. Data are represented as the mean ± standard deviation of three replications.

Conclusion:

Immobilization of lipase has been attempted successfully on polyaniline (PANI)–Fe_3O_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)–Fe_3O_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

The author declares that there is no conflict of interest, financial or otherwise.

Acknowledgements

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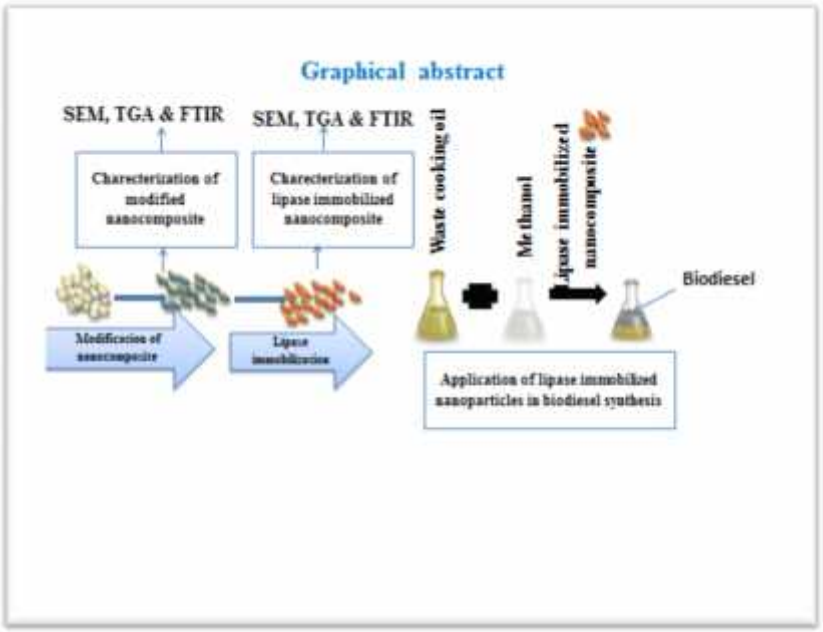

Declaration of Interest

Research Highlights

- Lipase has been immobilized on magnetic nanocomposite (modified polyaniline (PANI)–Fe_3O_4 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_3O_4 magnetic nanocomposite were also studied.
- The conversion yield of biodiesel was found to be 80% with the lipase immobilized on modified polyaniline (PANI)–Fe_3O_4 magnetic nanocomposite while it was only 28% with free lipase.

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Synthesis of Magnetic Nano Sized Cobalt Ferrite Thin Film by Chemical Bath Deposition Method and their Photocatalytic Application for Removal of Congo red Dye

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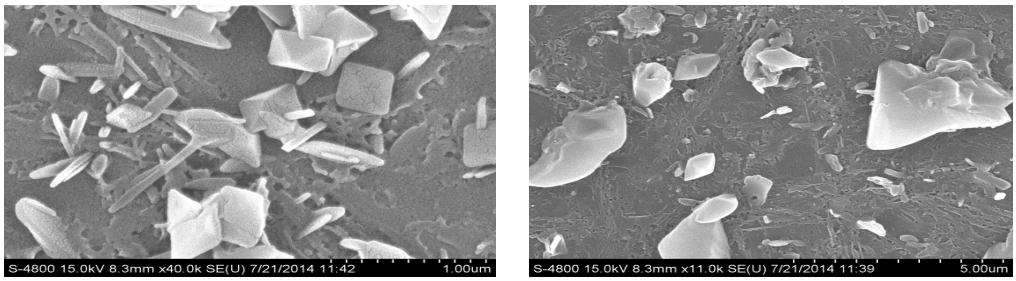
ABSTRACT

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 ($CoFe_2O_4$) 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 mg L^{-1}, contact time 120 min and pH 7.

Graphical Abstract



SEM micrograph of prepared $CoFe_2O_4$ 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^{-1} 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 $CoFe_2O_4$ 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 $CoCl_2$ $6H_2O$ and 0.2 M solution of $FeCl_3$ $6H_2O$. These salts were used as source of Co^{+2} and Fe^{+3}ions by adding NH_4OH 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.

$$CoCl_2 + 2FeCl_3 + 8\ NH_4OH \rightarrow CoFe_2O_4 + 8\ NH_4Cl + 4H_2O$$

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 $CoFe_2O_4$ is as shown in fig-1.It shows main peak at 35.58^0 and subsidiary peak at 43.73^0, 64.45^0. It shows match scan with **JCPDS card NO-221086** at radiation of 1.54 A^0.The intensity of peaks indicates the crystallinity of $CoFe_2O_4$.The average particle size of $CoFe_2O_4$ is estimated by Scherer formula is 28 nm.

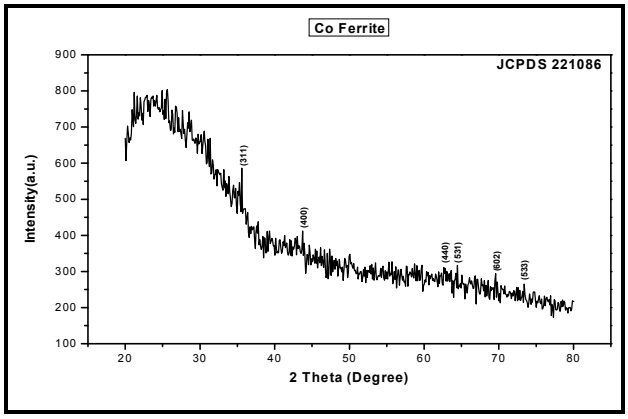


Figure 1. XRD analysis of prepared $CoFe_2O_4$ thin film.

Scanning electron microscopy (SEM): The $CoFe_2O_4$ 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 $CoFe_2O_4$. Fig-2(a) shows surface texture and whitish cluster on $CoFe_2O_4$ 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 $CoFe_2O_4$ surface. The thin film surface is similar to before photocatalytic degradation.

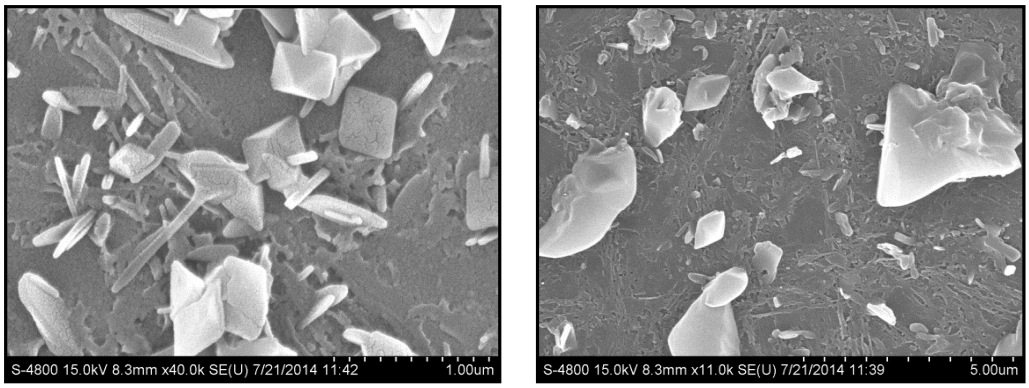


Figure 2. (a) and (b) SEM micrograph of prepared $CoFe_2O_4$ thin film

Vibrating sample magnetometer (VSM) Analysis: The magnetic property of $CoFe_2O_4$ 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 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 λ max 510 nm. The utmost condition for removal of dyes is 30 mg L^{-1}, pH 7 and prepared $CoFe_2O_4$ thin film. The results obtained during this study are represented in (Fig 4-6).

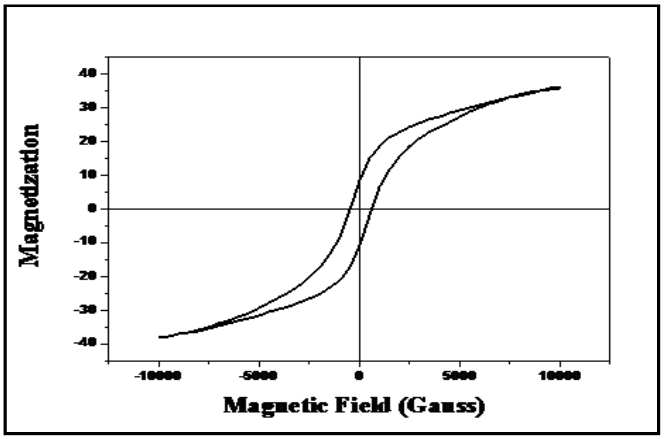


Figure 3. VSM analysis of $CoFe_2O_4$ Nano thin films (Hysteresis loop).

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 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 $CoFe_2O_4$ thin film. When the pH increases onwards 7 the repulsion of the dye molecules by $CoFe_2O_4$ surface would result in reduction in efficiency of degradation of CR.

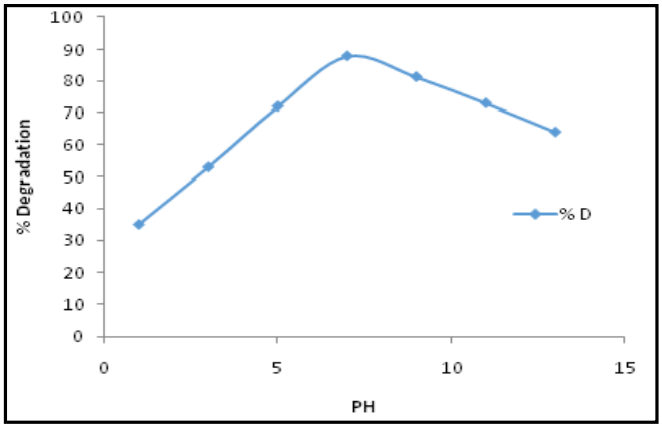


Figure 4. Effect of pH on removal of Congo red dye by $CoFe_2O_4$ thin film.

Effect of initial dye concentration: The rate of degradation of Congo red dye was studied by varying the dye concentration from 10 to 100 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 $CoFe_2O_4$ 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).

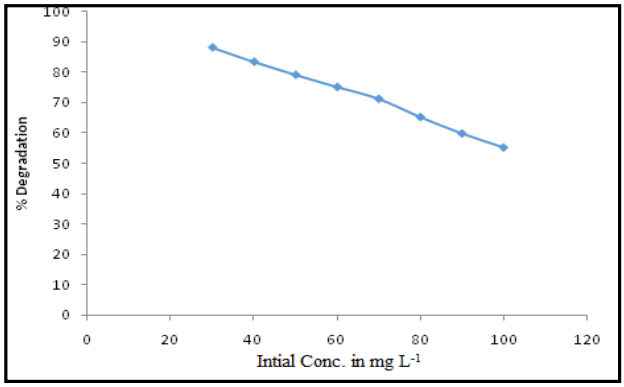


Figure 5. Effect of initial concentration of Congo red dye on % degradation at pH 7.

Effect of contact time: The effect of contact time for the photocatalytic degradation of CR dye by $CoFe_2O_4$ 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 $CoFe_2O_4$ thin film is not efficiently activated, as the thin film surface get activated rate of degradation of dye increases rapidly.

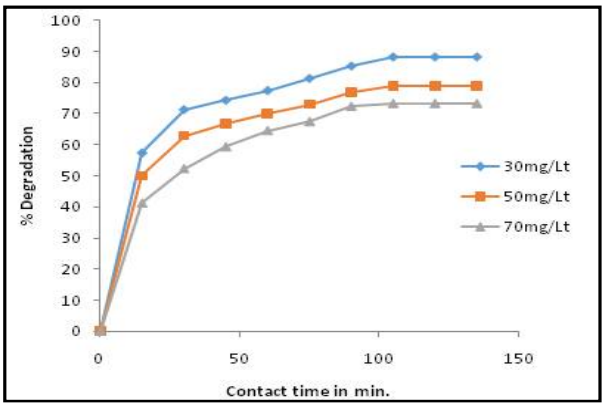


Figure 6. Effect of contact time on % degradation of Congo red at pH 7.

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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Collaboration/Linkage Certificate

To whomsoever it may be concern

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

MASCOT ORGANIC RANALA Tal.Dist.Nandurbar

Yours Sincerely

Date:21/03/2021

Mascot Organic
At Post Ranala, Sr.No.462 & 464, Plot No : 85, Tal. & Dist. Nandurbar 425412
mascotorganic@gmail.com, info@mascotorganic.com

Memorandum of Understanding for Academic Cooperation

between

METs Institute of Engineering, Bhujbal knowledge city, Nasik

and

NTVS's G. T. Patil Arts Commerce and Science College, Nandurbar

In accordance with a desire to take the guidance of experts, the **METs Institute of Engineering, Bhujbal knowledge city,** Nasik, has entered into this formal statement of collaboration in the form of Linkage with **NTVS's G. T. Patil Arts Commerce and Science College, Nandurbar** for encouraging students in getting a varied training through programs to be suggested by both the above collaborators.

The institution has agreed to explore and utilize the guidance and cooperation of **METs Institute of Engineering, Bhujbal knowledge city,** Nasik, and **NTVS's G. T. Patil Arts Commerce and Science College, Nandurbar:**

1. To enhance employability skills through Curriculum and Teaching Practices and discuss ways in which courses could promote scientific and technical knowledge among our students.
2. Collaborating with **METs Institute of Engineering, Bhujbal knowledge city,** Nasik, and **NTVS's G. T. Patil Arts Commerce and Science College, Nandurbar** to engage in an online exchange of ideas and pedagogic materials, be the basis for professional development activities such as Seminars, Workshops and Resource persons for our faculty.
3. Jointly propose and engage in research or training programs sponsored by funding agencies, and invite each other's faculty to participate therein.

It is understood that the details of joint activities/conditions for utilization of results achieved, arrangements for specific visits, exchange, and all other forms of cooperation will be handled on mutually agreeable terms for each specific case.

This MoU will take effect from the date it is signed by representatives of the two institutions. It will remain valid for five years and may be continued thereafter after suitable review and agreement.

Place:

Date: December, 2020

Principal
METs Institute of Engineering,
Bhujbal knowledge city, Nasik

Principal
MET's Institute of Engineering,
Bhujbal Knowledge City
At. Adgaon, Tal.& Dist : Nashik-3

MET's Institute of Engineering ★ Bhujbal Knowledge City ★ ADGAON NASIK-3

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Electrodeposition of Bi_2Te_3 thin films for thermoelectric applications: effect of electrolyte pH

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ABSTRACT

Modern materials like Bi_2Te_3 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_2Te_3 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_2Te_3 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^{IV} compounds [6, 7], Homologous oxides [8, 9], Half-Heusler alloys [10, 11] etc.

Among these materials, in the current thread of research, Bi_2Te_3 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_2Te_3 nanowire arrays (12–33 μV/K), pulse electrodeposited Bi_2Te_3 thin films (− 65 μV/K), and *n*-type Bi_2Te_3 films (− 51.6 μV/K) had shown Seebeck coefficient ranging from 12 to 65 μV/K [12–14].

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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 carries 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 Bi_2Te_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 Bi^{3+} and 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 Bi_2Te_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]

$$TeO_2 + H^+ \rightarrow HTeO_2^+; (0.37 < pH < 0.07) \quad (1)$$

$$HTeO_2^+ + H^+ \rightarrow Te^{+4} + H_2O \quad (2)$$

$$Bi_2O_3 + 4H^+ \rightarrow 2BiOH^{+2} + H_2O; atpH < 0.047 \quad (3)$$

$$BiOH^{+2} + H^+ \rightarrow Bi^{+3} + H_2O \quad (4)$$

$$3Te^{+4} + 2Bi^{+3} \rightarrow Bi_2Te_3 + 18e^- \quad (5)$$

For Eqs. 1–4, the rate of the reaction will be decided by the 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 Bi_2Te_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 ($Bi_2(NO_3)_3.5H_2O$) and tellurium dioxide (TeO_2) were prepared in nitric acid (HNO_3), respectively, in two different beakers, wherein $Bi_2(NO_3)_3.5H_2O$ acts as a precursor of Bi^{3+} and TeO_2, that of Te^{2-} explained in the following steps as shown in Fig. 1 [15, 18, 20].

First, the bath of 7.5 mM 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 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 Te^{2-} precursor solution was slowly introduced into the 16.5 ml that of 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 Bi^{3+} and Te^{2+} ions in the presence of EDTA, which helps for obtaining the soluble species of the 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 Bi^{3+} and 10 mM 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 Bi_2Te_3 thin films as function of pH [15, 18, 20].

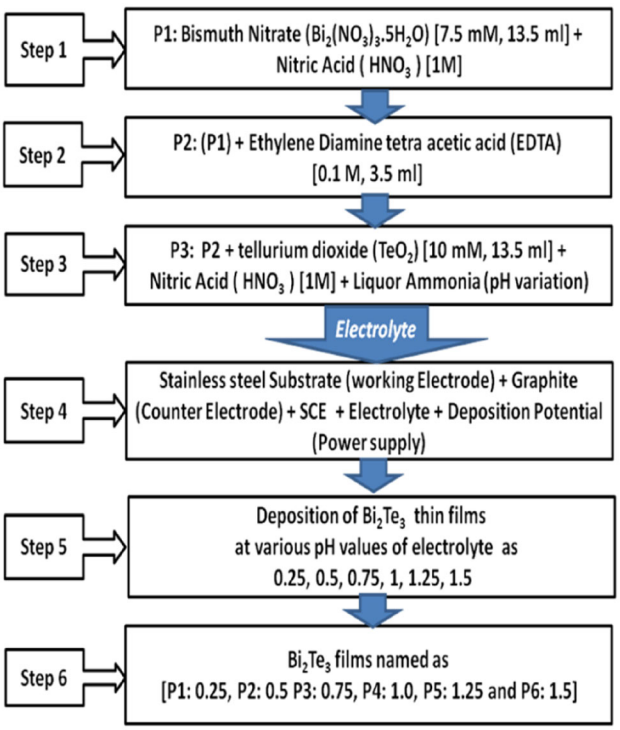

Fig. 1 Stepwise process involved in the electrodeposition of Bi_2Te_3 thin film of samples (P1–P6)

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 Bi_2Te_3 crystals in the electrodeposited films were carried out with the help of Panalytical Xpert PRO X-ray diffractometer (XRD) with Cu Kα radiation (λ = 1.5405 A°). 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 Nanoflash (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 Bi^{3+}, 10 mM TeO^{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 Bi_2Te_3. However, in case of P1 and P2, the presence of Nucleation loop indicates irreversible Te–

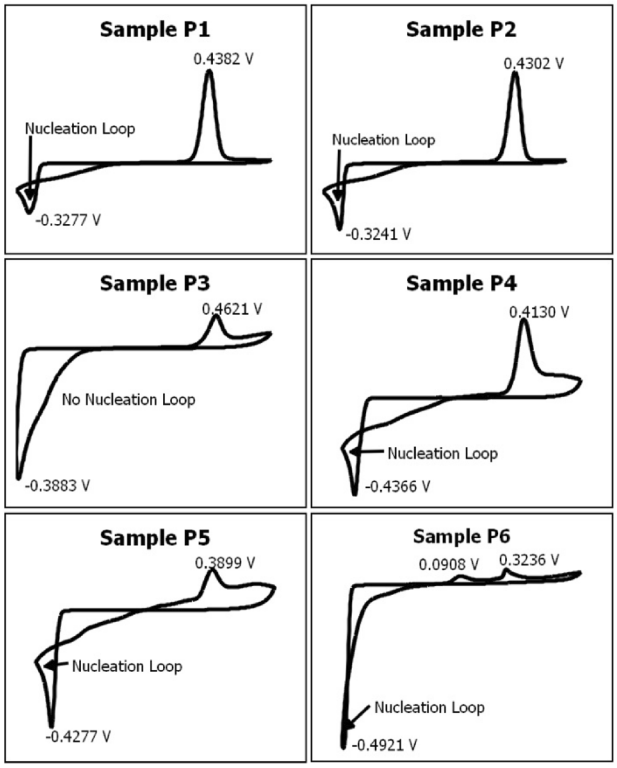

Fig. 2 Cyclic voltammograms Bi_2Te_3 with different pH values from (P1–P6)

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 Bi_2Te_3 around $2\theta \sim 27.74°$, 41.02°, 44.32°, and 50.44° 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.

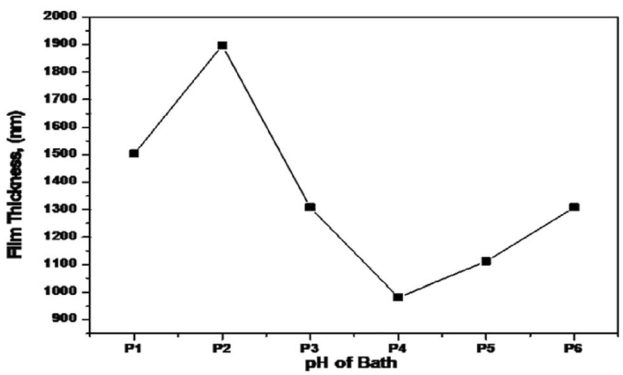

Fig. 3 Thickness variation of the samples (P1–P6) for deposition time of 40 min

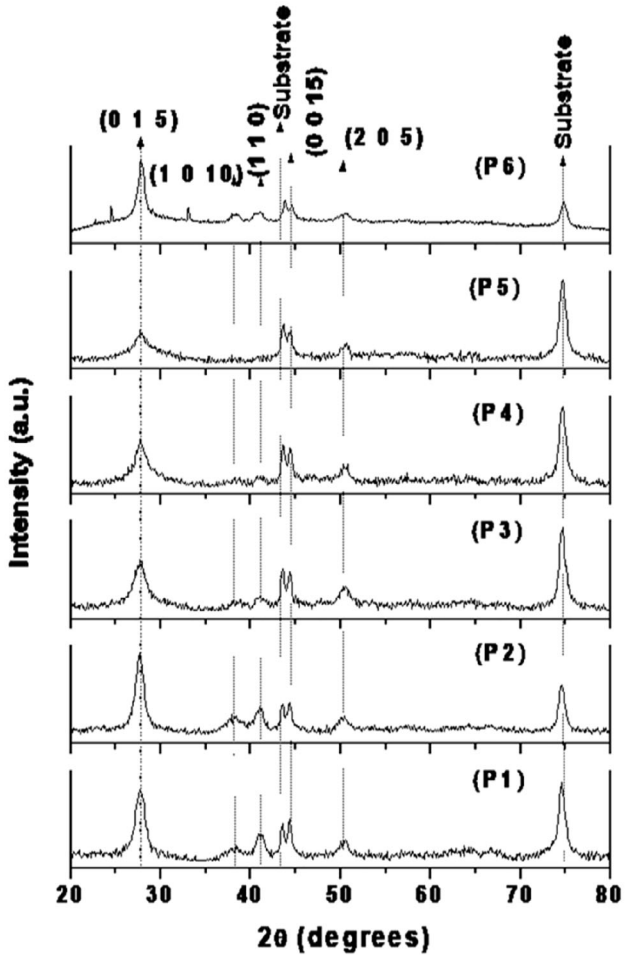

Fig. 4 X-ray diffraction patterns of samples (P1–P6)

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^{16} linesm^{-2} and δ dislocation density in 10^{-4}line^{-2} m^{-4}

For the analysis, Scherer's equation and standard JCPDS card No: 15-0863 [24] for Bi_2Te_3 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_2Te_3 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

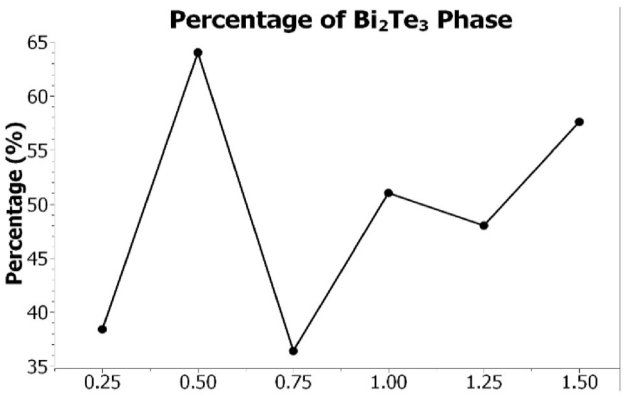

Fig. 5 Bi_2Te_3 Phase amount for the samples (P1–P6) using XRD data

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 Be-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

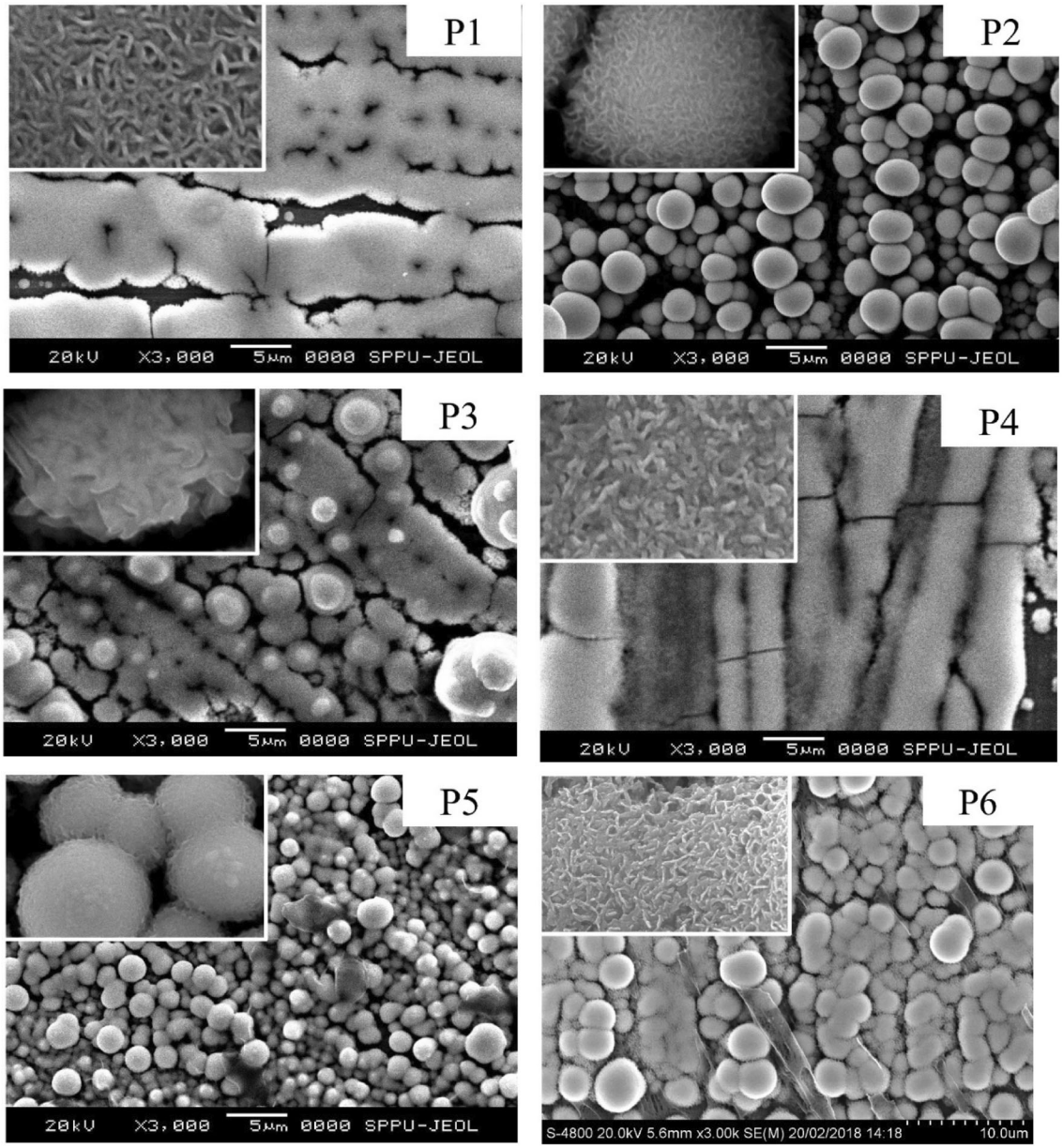

Fig. 6 Scanning Electron Images of samples (P1–P6): 3000 × main images and 6000 × (higher resolution) images in inset

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 σ is electrical conductivity, S is Seebeck coefficient, κ 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).

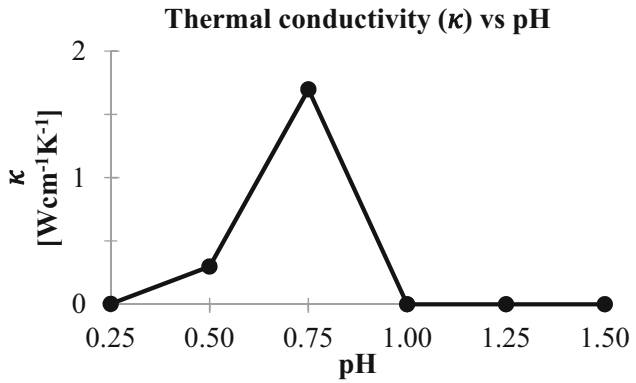

Fig. 7 Variation of thermal conductivity with pH for samples (P1–P6)

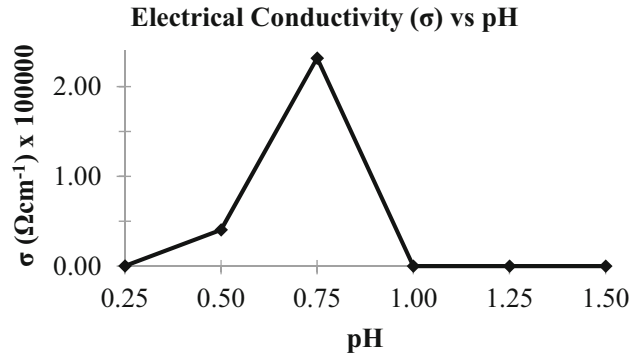

Fig. 8 Variation of electrical conductivity with pH for samples (P1–P6)

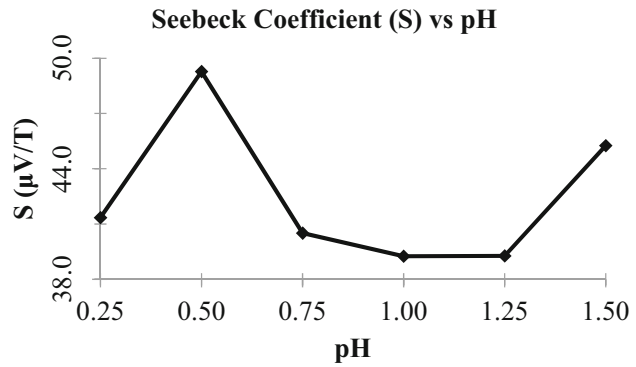

Fig. 9 Variation of Seebeck coefficient with pH for samples (P1–P6)

4 Conclusion

The paper reports successful electrodeposition of Bi_2Te_3 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.

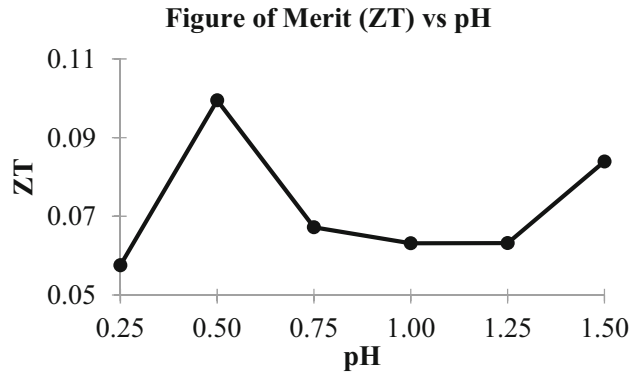

Fig. 10 Variation of figure of merit with pH for samples (P1–P6)

Sample P2 found to yield better Bi_2Te_3 as a thermoelectric material (S = 49.28 μV/T, ZT = 0.099) than the Si (∼ 42 μV/T) and Ge (∼ 47 μV/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.

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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[5]. 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.

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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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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.

GTP COLLEGE NANDURBAR PIN-425412

1

- **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

Signature:

PRINCIPAL
Bhusawal Arts,Science and P.O.Nahata
Commerce College, Bhusawal

Name: Prof. Minakshi V. Waykole

Designation: Principal

Date:30/09/2019

Seal:

BHUSAWAL

For

NTVS's G. T. Patil Arts, Commerce and Science College, Nandurbar-425412

(Prof. Dr. V. S. Shrivastava)
Principal
PRINCIPAL
G.T.Patil Arts,Commerce &
Science College
NANDURBAR - 425 412 (M.S.)

Name: Prof. V. S. Shrivastava

Designation: Principal

Date:30/09/2019

Seal:

GTP COLLEGE,NANDURBAR
PIN-425412

2

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

K.A.A.N.M.Sonawane Arts,Comm.& Sci. College SATANA 423301 NASHIK

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"

15th & 16th 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 / Chaires 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 15th & 16th February, 2023.

Dr. Rajendra D. Vasait
Co-ordinator

Prin. Dr. Vijay J. Medhane
Convener

|| SHRI ||
NANDURBAR TALUKA VIDHAYAK SAMITI's
G. T. PATIL ARTS, COMMERCE AND SCIENCE COLLEGE,
NANDURBAR, DIST- NANDURBAR-425412 (M.S.)
NAAC Re-Accredited A
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.ntvsgtpcollege.org

G.T.P.C. A/NO./1977/

Date: 25/03/2022

Received
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 UNDERSTADING

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:

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- **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:

BAMBHORI JALGAON

For

NTVS's G. T. Patil Arts, Commerce and Science College, Nandurbar-425412

Signature:

PRINCIPAL
Gajmal Tulshiram Patil College, Nandurbar

Name: Prof. V. [illegible]

Designation: Principal

Date: 30/4/2022

Seal:

Gajmal Tulshiram Patil College
Nandurbar
Dist.
Nandurbar

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 ~~19~~ 15/05/2022. kindly allowed them to stay at hostel on non-payment basis.

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.
2/5/2022

1000/-

SSBTs COLLEGE OF ENGINEERING AND TECHNOLOGY HOSTEL

Receipt Voucher

Name. : G.T.Patil College Nandurbar

ID. : 28666

Dated : 02/05/2022

Particualrs	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 21st 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 2nd 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)
Mr. Rajan R. Shivsal-)
In the presence of:)
1 Shiv Kumar Sharma

Signed and delivered by the)
Within named 'Employee')
Namely Pravin N. More)
In the presence of:)
1 Uttam Katulkar

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*

NOTARY
M. P. PATEL
SARANGPUR
DIST. BHARUCH
Reg. No.
GOVT. OF GUJARAT

SIGNED BEFORE ME
M. P. PATEL
B.Com., LL.B.
ADVOCATE & NOTARY
(Govt. of Guj.)

Reg. No. 6932/22
Date 3 OCT 2022

INDIA NON JUDICIAL

Government of Gujarat

सत्यमेव जयते

Certificate of Stamp Duty

Rs. 100

Certificate No.	:	**IN-GJ315401029176 95U**
Certificate Issued Date	:	21-Sep-2022 12:21 PM
Account Reference	:	IMPACC (AC)/ gj13380611/ ANKLESHWAR1/ GJ-BH
Unique Doc. Reference	:	SUBIN-GJGJ13380611925906861659 42U
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-GJ315401029176 95U

JD 0010831626

Statutory Alert:

1. The authenticity of this Stamp certificate should be verified at 'www.shcilestamp.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

Certificate of Registration

This is to Certify that
Quality Management System of

NANDURBAR TALUKA VIDHAYAK SAMITI'S
G.T. PATIL ARTS, COMMERCE & SCIENCE COLLEGE

NANDURBAR- 425412 MAHARASHTRA, INDIA

has been assessed and found to conform to the requirements of

ISO 9001:2015

for the following scope :

PROVIDING THE EDUCATIONAL SERVICES FOR THE STUDENTS OF ARTS, COMMERCE & SCIENCE IN GRADUATION, POST-GRADUATION & RESEARCH LEVEL

Certificate No	: **20EQCA08**		
Initial Registration Date	: 28/09/2020	Issuance Date	: 28/09/2020
Date of Expiry	: 27/09/2023		
1st Surve. Due	: 28/08/2021	2nd Surve. Due	: 28/08/2022

EGAC Accredited QMS Certification CAB # 118005

IAF MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT

Director

Magnitude Management Services Pvt. Ltd
403, Madhubhan Building, 56, Nehru Place, New Delhi-110019, India
e-mail: info@mmscertification.com, website: www.mmscertification.com

* *Subject to Successful Surveillance Audit n case surveillance audit is not allowed to be conducted, this certificate shall be suspended(withdrawal).*

Certificate Verification: Please Re-check the validity of certificate at http://www.mmscertificatio... ...ntents.aspx or www.mmscertification.com at Active Clients.

Government of India

Ministry of Human Resource Development

Department of Higher Education

Statistics Division

New Delhi

Certificate

Reference No. C-8847-2017

This is to certify that Mahendra Jaypalsingh Raghuvanshi of 220053-NTVS'S G.T.PATIL ARTS,SCIENCE & COMMERCE COLLEGE, NANDURBAR. has successfully uploaded the data of All India Survey on Higher Education(AISHE) 2017-2018.

(Madan Mohan)
Deputy Director General

Dated: 31/01/2019

Name of the signatory

Government of India

Ministry of Human Resource Development

Department of Higher Education

Statistics Division

New Delhi

Certificate

Reference No. C-8847-2017

This is to certify that Mahendra Jaypalsingh Raghuvanshi of 220053-NTVS'S G.T.PATIL ARTS,SCIENCE & COMMERCE COLLEGE, NANDURBAR. has successfully uploaded the data of All India Survey on Higher Education(AISHE) 2017-2018.

(Madan Mohan)
Deputy Director General

Dated: 31/01/2019

Name of the signatory

Government of India

Ministry of Human Resource Development

Department of Higher Education

Statistics Division

New Delhi

Certificate

Reference No. C-8847-2018

This is to certify that Mahendra Jaypalsingh Raghuvanshi of 220053-NTVS'S G.T.PATIL ARTS,SCIENCE & COMMERCE COLLEGE, NANDURBAR. has successfully uploaded the data of All India Survey on Higher Education(AISHE) 2018-2019.

(Madan Mohan)
Deputy Director General

Dated: 31/01/2019

Name of the signatory

Government of India
Ministry of Human Resource Development
Department of Higher Education
Statistics Division
New Delhi

Certificate

Reference No. C-8847-2019

This is to certify that Vinod Shankar Shrivastava of 220053-NTVS'S G.T.PATIL ARTS,SCIENCE & COMMERCE COLLEGE, NANDURBAR. has successfully uploaded the data of All India Survey on Higher Education(AISHE) 2019-2020.

(Madan Mohan)
Additional Director General

Dated: 29/12/2020

Name of the signatory

Data Capture Format - College

Aishe Code: C-8847	Survey Year: 2020

Name Of the Institution	220053-NTVS'S G.T.PATIL ARTS,SCIENCE & COMMERCE COLLEGE, NANDURBAR.
Aishe Code	C-8847
Year of Establishment	1964
Status Prior to Establishment, if	Any Other

Address

Location Of The Institution	Rural
Address Line1	Shani Mandir Road,
Address Line2	Nandurbar
City	Nandurbar
Country	INDIA
State	Maharashtra
District	Nandurbar
Block	Nandurbar
Pin Code	425412
Longitude(in degree)	74.14222
Latitude(in degree)	21.22801
Total Area (in acre)	29.94
Total Constructed Area (in sq.m)	31590.0
Website	www.ntvsgtpcollege.org

Institute Head Details

Name	Dr.Vindo Shankar Shrivastava
Designation	Principal
Email	drvinod_shrivastava@yahoo.com
Mobile	9423905823
Telephone No (with std code)	09423905823

Nodal Officer Details

Name	Dr.Vinod Shankar Shrivastava
Designation	Principal
Email	gtpcollege@rediffmail.com
Mobile	09423905823
Telephone No (with std code)	02564222293

Affiliation Details

Name Of University To Which	Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon
Year of Affiliation with University	1964
Name Of The Other University To	0320
Name Of the statutory Body through	University Grants Commission

Institute Details

Type of Institution	Affiliated College
Ownership Status of Institution	Private Aided
Management of Institution	Society
Is It evening college	No
Whether the Institution is exclusively meant for students from one gender:	No
Autonomous Institute	No
Whether Institute adopted any village under Unnat Bharat Scheme?	Yes
Is This a Minority Managed Institution	Yes
Minority Community Type	Others
Whether The Institution Has The National Cadet Corps(NCC)	Yes

Number Of Students Enrolled In NCC	
Female	Total
54	54

Whether The Institution Has The National Social Service(NSS)	Yes

Number Of Students Enrolled In NSS	
Female	Total
250	250

Is it a Specialized University:	No
Specialised University	No
Other Specialised University	
Whether The College Is Running Only Diploma Level Course	No
Diploma Level Course	
Other Diploma Course	
Whether Awards Degree through Any University:	
If Yes, then University Name	

Residential Facility

Is Staff Quarter Available	No
Teaching Staff	0
Non Teaching Staff	0

Aishe Code: C-8847	Survey Year: 2020
Total Staff Quarter	0
Is Students Hostel Available	Yes
No Of Hostels	2

S.No	Name	Type	Capacity	Students Residing
1	GTP College	Boys Hostel	75	0
2	GTP College	Girls Hostel	75	0

List Of Departments:

S.No	Name OF Department / Centers
1	PG Arts
2	Commerce
3	Science
4	PG Commerce
5	PG Sacience
6	Arts

Regular Programme Details

Regular Programmes offered by Institution

S.No	Level	Name Of The Programme	Dsicipline/ Subject	Broad Discipline Group Category	Broad Discipline Group Name	Whether Vocational Course	Year of Start	Approved Intake	Admission Criterion	Course Duratio		Type	Examination System	Statuatory Body Through Which Approved	University Through Which Approved	Accreditation Status
										Y	M					
1	Under Graduate	B.A.-Bachelor of	Arts	Arts	Arts	No	1964	2060	University level	3	0	Both	Semester	University Grants	Kavayitri Bahinabai	Yes
2	Under Graduate	B.Com.-Bachelor of	comeerce	Commerce	Commerce	No	1969	1560	University level	3	0	Both	Semester	University Grants	Kavayitri Bahinabai	Yes
3	Under Graduate	B.Sc.-Bachelor of	Science	Science	Science	No	1969	860	University level	3	0	Both	Semester	University Grants	Kavayitri Bahinabai	Yes
4	Post Graduate	M.A.-Master of Arts	English	Indian Language	Other Indian	No	1972	120	University level	2	0	General	Semester	University Grants	Kavayitri Bahinabai	Yes
5	Post Graduate	M.A.-Master of Arts	History	Indian Language	Other Indian	No	1972	120	University level	2	0	Both	Semester	University Grants	Kavayitri Bahinabai	Yes
6	Post Graduate	M.A.-Master of Arts	Marathi	Indian Language	Other Indian	No	1972	120	University level	2	0	Both	Semester	University Grants	Kavayitri Bahinabai	Yes
7	Post Graduate	M.A.-Master of Arts	Hindi	Indian Language	Other Indian	No	1972	120	University level	2	0	Both	Semester	University Grants	Kavayitri Bahinabai	Yes
8	Post Graduate	M.A.-Master of Arts	Economic	Indian Language	Other Indian	No	1972	120	University level	2	0	General	Semester	University Grants	Kavayitri Bahinabai	Yes
9	Post Graduate	M.Com.-Master of	Commerce	Commerce	Commerce	No	1969	240	University level	2	0	Both	Semester	University Grants	Kavayitri Bahinabai	Yes
10	Post Graduate	M.Sc.-Master of	Botany	Science	Botany	No	1968	100	University level	2	0	General	Semester	University Grants	Kavayitri Bahinabai	Yes
11	Post Graduate	M.Sc.-Master of	Computer Science	Science	Other Science	No	2001	100	University level	2	0	General	Semester	University Grants	Kavayitri Bahinabai	Yes
12	Post Graduate	M.Sc.-Master of	Geography	Science	Other Science	No	1964	100	University level	2	0	General	Semester	University Grants	Kavayitri Bahinabai	Yes
13	Post Graduate	M.Sc.-Master of	Mathematics	Science	Mathematics	No	1970	40	University level	2	0	General	Semester	University Grants	Kavayitri Bahinabai	Yes
14	Post Graduate	M.Sc.-Master of	Organic Chemistr	Science	Chemistry	No	1969	60	University level	2	0	General	Semester	University Grants	Kavayitri Bahinabai	Yes
15	Post Graduate	M.Sc.-Master of	Physics	Science	Physics	No	1969	60	University level	2	0	General	Semester	University Grants	Kavayitri Bahinabai	Yes
16	Post Graduate	M.A.-Master of Arts	Psychology	Indian Language	Other Indian	No	1966	60	University level	2	0	General	Semester	University Grants	Kavayitri Bahinabai	Yes
17	Post Graduate	M.Sc.-Master of	Zoology	Science	Zoology	No	1969	60	University level	2	0	General	Semester	University Grants	Kavayitri Bahinabai	Yes

Student Enrollment Regular Course

Programmes offered by Institution:

Note-
D- Department
L- Level
P- Programme
D/S- Discipline/Subject
WVC- Whether Vocational Course
C-Category
OM- Other Minority
MM- Muslim Minority
SE-SG - Seats earmarked as per GOI/State Govt.
T- Total
F- Female
TG- Transgender

S.No	L	P	Broad Discipline Group Category	Broad Discipline Group	D/S	Whether Vocational Course	Type	Year	Category	Number Of Students Enrolled																				REMARKS
										General				EWS				SC				ST				OBC				TOTAL				
										SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	
1	Under Graduate	Arts	Arts	Arts(Under Graduate)	B.A.-Bachelor of Arts	No	Both	1	T	720	43	15	0	0	0	0	0	0	42	18	0	0	371	117	0	0	58	28	0	720	514	178	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		10	2	0		0	0	0		18	6	0		35	17	0		0	0	0		63	25	0	NA
2	Under Graduate	Arts	Arts	Arts(Under Graduate)	B.A.-Bachelor of Arts	No	Both	2	T	720	26	7	0	0	0	0	0	0	29	11	0	0	273	96	0	0	67	23	0	720	395	137	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained

S.No	L	P	Broad Discipline Group Category	Broad Discipline Group	D/S	Whether Vocational Course	Type	Year	Category	Number Of Students Enrolled																				REMARKS
										General				EWS				SC				ST				OBC				TOTAL				
										SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	
3	Under Graduate	Arts	Arts	Arts(Under Graduate)	B.A.-Bachelor of Arts	No	Both	3	T	620	15	8	0	0	0	0	0	0	28	10	0	0	169	43	0	0	47	22	0	620	259	83	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
4	Under Graduate	Commerce	Commerce	comeerce (Under Graduate)	B.Com.-Bachelor of Commerce	No	Both	1	T	520	79	32	0	0	0	0	0	0	6	3	0	0	47	12	0	0	67	27	0	520	199	74	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
5	Under Graduate	Commerce	Commerce	comeerce (Under Graduate)	B.Com.-Bachelor of Commerce	No	Both	2	T	520	71	35	0	0	0	0	0	0	17	9	0	0	42	14	0	0	103	59	0	520	233	117	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
6	Under Graduate	Commerce	Commerce	comeerce (Under Graduate)	B.Com.-Bachelor of Commerce	No	Both	3	T	520	85	34	0	0	0	0	0	0	8	2	0	0	34	16	0	0	63	18	0	520	190	70	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
7	Under Graduate	Science	Science	Science(Under Graduate)	B.Sc.-Bachelor of Science	No	Both	1	T	320	48	23	0	0	0	0	0	0	22	11	0	0	57	18	0	0	139	64	0	320	266	116	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
8	Under Graduate	Science	Science	Science(Under Graduate)	B.Sc.-Bachelor of Science	No	Both	2	T	320	69	29	0	0	0	0	0	0	23	12	0	0	57	36	0	0	176	90	0	320	325	167	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
9	Under Graduate	Science	Science	Science(Under Graduate)	B.Sc.-Bachelor of Science	No	Both	3	T	220	72	37	0	0	0	0	0	0	24	15	0	0	45	24	0	0	142	83	0	220	283	159	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
10	Post Graduate	Other Indian Languages	Indian Language	Economic (Post Graduate)	M.A.-Master of Arts	No	General	1	T	120	4	0	0	0	0	0	0	0	4	3	0	0	72	23	0	0	11	6	0	120	91	32	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
11	Post Graduate	Other Indian Languages	Indian Language	Economic (Post Graduate)	M.A.-Master of Arts	No	General	2	T	120	2	2	0	0	0	0	0	0	1	1	0	0	55	16	0	0	4	2	0	120	62	21	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained

S.No	L	P	Broad Discipline Group Category	Broad Discipline Group	D/S	Whether Vocational Course	Type	Year	Category	Number Of Students Enrolled																				REMARKS
										General				EWS				SC				ST				OBC				TOTAL				
										SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	
12	Post Graduate	Other Indian Languages	Indian Language	English(Post Graduate)	M.A.-Master of Arts	No	General	1	T	90	3	2	0	0	0	0	0	0	1	1	0	0	19	5	0	0	3	2	0	90	26	10	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
13	Post Graduate	Other Indian Languages	Indian Language	English(Post Graduate)	M.A.-Master of Arts	No	General	2	T	90	6	5	0	0	0	0	0	0	5	3	0	0	33	10	0	0	10	4	0	90	54	22	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
14	Post Graduate	Other Indian Languages	Indian Language	Hindi(Post Graduate)	M.A.-Master of Arts	No	Both	1	T	90	2	2	0	0	0	0	0	0	3	2	0	0	25	10	0	0	3	3	0	90	33	17	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
15	Post Graduate	Other Indian Languages	Indian Language	Hindi(Post Graduate)	M.A.-Master of Arts	No	Both	2	T	90	2	2	0	0	0	0	0	0	0	0	0	0	19	8	0	0	4	3	0	90	25	13	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
16	Post Graduate	Other Indian Languages	Indian Language	History(Post Graduate)	M.A.-Master of Arts	No	Both	1	T	90	2	0	0	0	0	0	0	0	4	2	0	0	76	27	0	0	7	2	0	90	89	31	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
17	Post Graduate	Other Indian Languages	Indian Language	History(Post Graduate)	M.A.-Master of Arts	No	Both	2	T	90	1	0	0	0	0	0	0	0	2	1	0	0	52	15	0	0	9	4	0	90	64	20	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
18	Post Graduate	Other Indian Languages	Indian Language	Marathi(Post Graduate)	M.A.-Master of Arts	No	Both	1	T	120	0	0	0	0	0	0	0	0	2	1	0	0	88	27	0	0	12	5	0	120	102	33	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
19	Post Graduate	Other Indian Languages	Indian Language	Marathi(Post Graduate)	M.A.-Master of Arts	No	Both	2	T	120	2	1	0	0	0	0	0	0	0	0	0	0	65	21	0	0	13	9	0	120	80	31	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
20	Post Graduate	Other Indian Languages	Indian Language	Psychology(Post Graduate)	M.A.-Master of Arts	No	General	1	T	60	0	0	0	0	0	0	0	0	2	2	0	0	7	4	0	0	1	1	0	60	10	7	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained

S.No	L	P	Broad Discipline Group Category	Broad Discipline Group	D/S	Whether Vocational Course	Type	Year	Category	Number Of Students Enrolled																				REMARKS
										General				EWS				SC				ST				OBC				TOTAL				
										SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	
21	Post Graduate	Other Indian Languages	Indian Language	Psychology(Post Graduate)	M.A.-Master of Arts	No	General	2	T	60	0	0	0	0	0	0	0	0	2	1	0	0	7	4	0	0	3	1	0	60	12	6	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
22	Post Graduate	Commerce	Commerce	Commerce(Post Graduate)	M.Com.-Master of Commerce	No	Both	1	T	240	69	31	0	0	0	0	0	0	13	8	0	0	57	22	0	0	63	41	0	240	202	102	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
23	Post Graduate	Commerce	Commerce	Commerce(Post Graduate)	M.Com.-Master of Commerce	No	Both	2	T	240	44	27	0	0	0	0	0	0	11	7	0	0	31	7	0	0	57	24	0	240	143	65	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
24	Post Graduate	Botany	Science	Botany(Post Graduate)	M.Sc.-Master of Science	No	General	1	T	20	1	1	0	0	0	0	0	0	0	0	0	0	2	2	0	0	9	8	0	20	12	11	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
25	Post Graduate	Botany	Science	Botany(Post Graduate)	M.Sc.-Master of Science	No	General	2	T	20	5	4	0	0	0	0	0	0	0	0	0	0	1	1	0	0	12	12	0	20	18	17	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
26	Post Graduate	Chemistry	Science	Organic Chemistry (Post Graduate)	M.Sc.-Master of Science	No	General	1	T	60	8	4	0	0	0	0	0	0	2	0	0	0	5	2	0	0	27	7	0	60	42	13	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
27	Post Graduate	Chemistry	Science	Organic Chemistry (Post Graduate)	M.Sc.-Master of Science	No	General	2	T	60	5	5	0	0	0	0	0	0	0	0	0	0	5	3	0	0	22	12	0	60	32	20	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
28	Post Graduate	Mathematics	Science	Mathematics(Post Graduate)	M.Sc.-Master of Science	No	General	1	T	40	13	12	0	0	0	0	0	0	1	1	0	0	4	2	0	0	14	13	0	40	32	28	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
29	Post Graduate	Mathematics	Science	Mathematics(Post Graduate)	M.Sc.-Master of Science	No	General	2	T	40	5	4	0	0	0	0	0	0	0	0	0	0	3	3	0	0	9	9	0	40	17	16	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained

S.No	L	P	Broad Discipline Group Category	Broad Discipline Group	D/S	Whether Vocational Course	Type	Year	Category	Number Of Students Enrolled																				REMARKS
										General				EWS				SC				ST				OBC				TOTAL				
										SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	SEAP GOI / State Govt.	T	F	TG	
30	Post Graduate	Other Science	Science	Computer Science(Post Graduate)	M.Sc.-Master of Science	No	General	1	T	20	8	7	0	0	0	0	0	0	1	1	0	0	0	0	0	0	8	7	0	20	17	15	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
31	Post Graduate	Other Science	Science	Computer Science(Post Graduate)	M.Sc.-Master of Science	No	General	2	T	20	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7	0	20	8	8	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
32	Post Graduate	Other Science	Science	Geography(Post Graduate)	M.Sc.-Master of Science	No	General	1	T	20	0	0	0	0	0	0	0	0	0	0	0	0	13	7	0	0	3	3	0	20	16	10	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
33	Post Graduate	Other Science	Science	Geography(Post Graduate)	M.Sc.-Master of Science	No	General	2	T	20	1	1	0	0	0	0	0	0	0	0	0	0	3	1	0	0	12	4	0	20	16	6	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
34	Post Graduate	Physics	Science	Physics(Post Graduate)	M.Sc.-Master of Science	No	General	1	T	40	12	7	0	0	0	0	0	0	0	0	0	0	3	1	0	0	12	8	0	40	27	16	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
35	Post Graduate	Physics	Science	Physics(Post Graduate)	M.Sc.-Master of Science	No	General	2	T	40	4	3	0	0	0	0	0	0	1	1	0	0	0	0	0	0	8	6	0	40	13	10	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
36	Post Graduate	Zoology	Science	Zoology(Post Graduate)	M.Sc.-Master of Science	No	General	1	T	20	3	1	0	0	0	0	0	0	3	2	0	0	4	3	0	0	10	8	0	20	20	14	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
37	Post Graduate	Zoology	Science	Zoology(Post Graduate)	M.Sc.-Master of Science	No	General	2	T	20	2	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	9	5	0	20	12	6	0	NA
									PWD		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									MM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained
									OM		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	Category-wise data not maintained

Foreign Students Enrollment:	
Whether Foreign Students Enrolled Int The Institution	No
Approved Intake Capacity of International Students along with NRI	

Regular Examination Results

Programmes offered by Institution (Total Number of Students Appeard in Final Year)

Note-
L- Level
D/S- Discipline/Subject
BDGC- Broad Discipline Group Category
BDGN- Broad Discipline Group Name
OM- Other Minority
MM- Muslim Minority
T- Total
F- Female
TG- Transgender

S NO	L	P	D/S	BDGC	BDGN	Whether Vocational Course	Type	Total Number of Students Appeard in Final Year																			REMARKS
								Category	General			EWS			SC			ST			OBC			TOTAL			
									Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	
1	Post Graduate	M.A.-Master of Arts	Economic(Post Graduate)	Indian Language	Other Indian Languages	No	General	T	2	2	0	0	0	0	1	1	0	55	16	0	4	2	0	62	21	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
2	Post Graduate	M.A.-Master of Arts	English(Post Graduate)	Indian Language	Other Indian Languages	No	General	T	6	5	0	0	0	0	5	3	0	33	10	0	10	4	0	54	22	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
3	Post Graduate	M.A.-Master of Arts	Hindi(Post Graduate)	Indian Language	Other Indian Languages	No	Both	T	2	2	0	0	0	0	0	0	0	19	8	0	4	3	0	25	13	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
4	Post Graduate	M.A.-Master of Arts	History(Post Graduate)	Indian Language	Other Indian Languages	No	Both	T	1	0	0	0	0	0	2	1	0	52	15	0	9	4	0	64	20	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
5	Post Graduate	M.A.-Master of Arts	Marathi(Post Graduate)	Indian Language	Other Indian Languages	No	Both	T	2	1	0	0	0	0	0	0	0	65	21	0	13	9	0	80	31	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
6	Post Graduate	M.A.-Master of Arts	Psychology(Post Graduate)	Indian Language	Other Indian Languages	No	General	T	0	0	0	0	0	0	2	1	0	7	4	0	3	1	0	12	6	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
7	Post Graduate	M.Com.-Master of Commerce	Commerce(Post Graduate)	Commerce	Commerce	No	Both	T	44	27	0	0	0	0	11	7	0	31	7	0	57	24	0	143	65	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
8	Post Graduate	M.Sc.-Master of Science	Botany(Post Graduate)	Science	Botany	No	General	T	5	4	0	0	0	0	0	0	0	1	1	0	12	12	0	18	17	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
9	Under Graduate	B.A.-Bachelor of Arts	Arts(Under Graduate)	Arts	Arts	No	Both	T	15	8	0	0	0	0	28	10	0	169	43	0	47	22	0	259	83	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained

S NO	L	P	D/S	BDGC	BDGN	Whether Vocational Course	Type	Total Number of Students Appeard in Final Year																	REMARKS
								Category	General			EWS			SC			ST			OBC			TOTAL			
									Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	
10	Under Graduate	B.Com.-Bachelor of Commerce	comeerce(Under Graduate)	Commerce	Commerce	No	Both	T	85	34	0	0	0	0	8	2	0	34	16	0	63	18	0	190	70	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
11	Under Graduate	B.Sc.-Bachelor of Science	Science(Under Graduate)	Science	Science	No	Both	T	72	37	0	0	0	0	24	15	0	45	24	0	142	83	0	283	159	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained

Programmes offered by Institution (Total Number of Students Passed/Awarded Degree)

S NO	L	P	D/S	BDGC	BDGN	Whether Vocational Course	Type	Total Number of Students Passed/Awarded Degree																	REMARKS
								Category	General			EWS			SC			ST			OBC			TOTAL			
									Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	
1	Post Graduate	M.A.-Master of Arts	Economic(Post Graduate)	Indian Language	Other Indian Languages	No	General	T	2	2	0	0	0	0	1	1	0	53	16	0	4	2	0	60	21	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
2	Post Graduate	M.A.-Master of Arts	English(Post Graduate)	Indian Language	Other Indian Languages	No	General	T	6	5	0	0	0	0	5	3	0	32	10	0	10	4	0	53	22	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
3	Post Graduate	M.A.-Master of Arts	Hindi(Post Graduate)	Indian Language	Other Indian Languages	No	Both	T	2	2	0	0	0	0	0	0	0	19	8	0	4	3	0	25	13	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
4	Post Graduate	M.A.-Master of Arts	History(Post Graduate)	Indian Language	Other Indian Languages	No	Both	T	1	0	0	0	0	0	2	1	0	50	15	0	9	4	0	62	20	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
5	Post Graduate	M.A.-Master of Arts	Marathi(Post Graduate)	Indian Language	Other Indian Languages	No	Both	T	2	1	0	0	0	0	0	0	0	63	20	0	13	9	0	78	30	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
6	Post Graduate	M.A.-Master of Arts	Psychology (Post Graduate)	Indian Language	Other Indian Languages	No	General	T	0	0	0	0	0	0	2	1	0	7	4	0	3	1	0	12	6	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
7	Post Graduate	M.Com.-Master of Commerce	Commerce(Post Graduate)	Commerce	Commerce	No	Both	T	44	27	0	0	0	0	10	7	0	29	7	0	56	24	0	139	65	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained

S NO	L	P	D/S	BDGC	BDGN	Whether Vocational Course	Type	Total Number of Students Passed/Awarded Degree																	REMARKS
								Category	General			EWS			SC			ST			OBC			TOTAL			
									Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	
8	Post Graduate	M.Sc.-Master of Science	Botany(Post Graduate)	Science	Botany	No	General	T	4	4	0	0	0	0	0	0	0	1	1	0	11	11	0	16	16	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
9	Under Graduate	B.A.-Bachelor of Arts	Arts(Under Graduate)	Arts	Arts	No	Both	T	14	8	0	0	0	0	27	10	0	158	40	0	46	22	0	245	80	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
10	Under Graduate	B.Com.-Bachelor of Commerce	comeerce(Under Graduate)	Commerce	Commerce	No	Both	T	84	34	0	0	0	0	8	2	0	33	16	0	62	18	0	187	70	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
11	Under Graduate	B.Sc.-Bachelor of Science	Science(Under Graduate)	Science	Science	No	Both	T	71	37	0	0	0	0	23	15	0	44	23	0	142	83	0	280	158	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained

Programmes offered by Institution (Out of Total, Number of Students Passed with 60% or above)

S NO	L	P	D/S	BDGC	BDGN	Whether Vocational Course	Type	Out of Total, Number of Students Passed with 60% or above																	REMARKS
								Category	General			EWS			SC			ST			OBC			TOTAL			
									Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	
1	Post Graduate	M.A.-Master of Arts	Economic (Post Graduate)	Indian Language	Other Indian Languages	No	General	T	2	2	0	0	0	0	1	1	0	53	16	0	4	2	0	60	21	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
2	Post Graduate	M.A.-Master of Arts	English(Post Graduate)	Indian Language	Other Indian Languages	No	General	T	6	5	0	0	0	0	5	3	0	32	10	0	10	4	0	53	22	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
3	Post Graduate	M.A.-Master of Arts	Hindi(Post Graduate)	Indian Language	Other Indian Languages	No	Both	T	2	2	0	0	0	0	0	0	0	19	8	0	4	3	0	25	13	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
4	Post Graduate	M.A.-Master of Arts	History(Post Graduate)	Indian Language	Other Indian Languages	No	Both	T	1	0	0	0	0	0	2	1	0	50	15	0	9	4	0	62	20	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
5	Post Graduate	M.A.-Master of Arts	Marathi(Post Graduate)	Indian Language	Other Indian Languages	No	Both	T	2	1	0	0	0	0	0	0	0	63	20	0	13	9	0	78	30	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained

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S NO	L	P	D/S	BDGC	BDGN	Whether Vocational Course	Type	Category	Out of Total, Number of Students Passed with 60% or above																	REMARKS
									General			EWS			SC			ST			OBC			TOTAL			
									Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	
6	Post Graduate	M.A.-Master of Arts	Psychology(Post Graduate)	Indian Language	Other Indian Languages	No	General	T	0	0	0	0	0	0	2	1	0	7	4	0	3	1	0	12	6	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
7	Post Graduate	M.Com.-Master of Commerce	Commerce(Post Graduate)	Commerce	Commerce	No	Both	T	44	27	0	0	0	0	10	7	0	29	7	0	56	24	0	139	65	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
8	Post Graduate	M.Sc.-Master of Science	Botany(Post Graduate)	Science	Botany	No	General	T	4	4	0	0	0	0	0	0	0	1	1	0	11	11	0	16	16	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
9	Under Graduate	B.A.-Bachelor of Arts	Arts(Under Graduate)	Arts	Arts	No	Both	T	14	8	0	0	0	0	27	10	0	158	40	0	46	22	0	245	80	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
10	Under Graduate	B.Com.-Bachelor of Commerce	comeerce (Under Graduate)	Commerce	Commerce	No	Both	T	84	34	0	0	0	0	8	2	0	33	16	0	62	18	0	187	70	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
11	Under Graduate	B.Sc.-Bachelor of Science	Science(Under Graduate)	Science	Science	No	Both	T	71	37	0	0	0	0	23	15	0	44	23	0	142	83	0	280	158	0	NA
								PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
								OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained

Whether They Have Placement Cell:

No Of Students Placed	Median Salary Of Placed	No Of Students Selected For Higher Studies
2	15000	1

Teaching Staff:

S.No	Country Name	Passport Number	Department Name	Name Of The Employee	Designation	Gender	DOB	Social Category	Religious Community	PWD	Nature Of Appointment	Selection Mode	DOJ	Date of Joining Teaching Profession	Highest Qualification	Additional/Eligibility Qualification	Broad Discipline Group Category	Broad Discipline Group Name	Whether Vocational Course	Year Spent Eclusively In Other Than	Job Status	Date Of Change In Status	Mobile No	Email
1	INDIA	NA	Science	Manohar Rajendra Patil	Assistant Professor	Male	1985-10-17	OBC	Hindu	No	Regular	Direct	2011-07-06	2011-07-06	Ph.D.	NET	Science	Science	No	6	Continue		9579296645	profmanoharpatil@gmail.
2	INDIA	NA	Science	Prafulla Subhash Patil	Assistant Professor	Male	1977-08-07	OBC	Hindu	No	Regular	Direct	2009-09-06	2009-09-06	Ph.D.	NET	Science	Science	No	8	Continue		9404185472	prafulpatil78@gmail.com
3	INDIA	NA	Arts	Manohar Bansilal patil	Assistant Professor	Male	1976-08-04	OBC	Hindu	No	Regular	Direct	2015-02-02	2015-02-02	Post Graduate	NET	Arts	Arts	No	3	Continue		9420139284	mbpatil04@gmail.com
4	INDIA	NA	Arts	Fula Rangrao Khandekar	Assistant Professor	Male	1975-07-01	SC	Hindu	No	Regular	Direct	2011-07-07	2011-07-07	Post Graduate	NET	Arts	Arts	No	7	Continue		9765391910	fulakhanekar@gmail.
5	INDIA	NA	Arts	Nishant Bhimraoji Shende	Assistant Professor	Male	1981-12-01	SC	Hindu	No	Regular	Direct	2011-07-06	2011-07-06	Post Graduate	SLET	Arts	Arts	No	7	Continue		9096898976	shendenishant81@gmail.
6	INDIA	NA	Science	nanasaheb Pandharinath	Assistant Professor	Male	1989-10-26	General	Hindu	No	Regular	Direct	2017-08-10	2017-08-10	Ph.D.	NET	Science	Science	No	1	Continue		9011947785	nphuse@yahoo.in
7	INDIA	NA	Arts	Gokuldas Sonu Thakare	Assistant Professor	Male	1972-06-15	ST	Hindu	No	Regular	Direct	1996-09-02	1996-09-02	Ph.D.		Arts	Arts	No	21	Continue		9420852620	gokuldasthakare@gmail.
8	INDIA	NA	Commerce	Narendra Babugir Gosavi	Associate Professor	Male	1962-06-01	OBC	Hindu	No	Regular	Direct	1989-08-09	1989-08-09	Ph.D.		Commerce	Commerce	No	28	Continue		9860780898	drnbgosavi@gmail.com
9	INDIA	NA	Science	Govind Hanmantrao Balde	Assistant Professor	Male	1984-07-01	General	Hindu	No	Regular	Direct	2011-07-08	2011-07-08	Ph.D.		Science	Science	No	6	Continue		9860828285	govindbalde@gmail.com
10	INDIA	NA	Arts	Madhav Kautik Kadam	Assistant Professor	Male	1968-06-01	General	Hindu	Yes	Regular	Direct	2011-07-08	2011-07-08	Ph.D.		Arts	Arts	No	7	Continue		7588318759	madhavkadam69@gmail.
11	INDIA	NA	Arts	Mahendra Jaypasing	Associate Professor	Male	1967-11-14	General	Hindu	No	Regular	Direct	1999-07-12	1999-07-12	Ph.D.		Arts	Arts	No	20	Continue		9423942750	dr.mjraghuwanshi@gm

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S.No	Country Name	Passport Number	Department Name	Name Of The Employee	Designation	Gender	DOB	Social Category	Religious Community	PWD	Nature Of Appointment	Selection Mode	DOJ	Date of Joining Teaching Profession	Highest Qualification	Additional/Eligibility Qualification	Broad Discipline Group Category	Broad Discipline Group Name	Whether Vocational Course	Year Spent Eclusively In Other Than	Job Status	Date Of Change In Status	Mobile No	Email
12	INDIA	NA	Arts	Vijaya Sukadev Patil	Associate Professor	Female	1965-06-01	OBC	Hindu	No	Regular	Direct	1988-06-20	1988-06-20	Ph.D.		Arts	Arts	No	28	Continue		9421534665	vijayapatil165@gmail.com
13	INDIA	NA	Commerce	Vijaysing Indrasing Girase	Associate Professor	Male	1962-01-20	General	Hindu	No	Regular	Direct	1986-08-01	1986-08-01	Post Graduate		Commerce	Commerce	No	31	Continue		9422263023	vijaygirase1962@gmail.
14	INDIA	NA	Arts	Vijay Zipa Chaudhari	Assistant Professor	Male	1981-07-25	OBC	Hindu	No	Regular	Direct	2015-02-04	2015-02-04	Ph.D.	NET	Arts	Arts	No	2	Continue		9823667735	vijay.chdhri@rediffmail.
15	INDIA	NA	Commerce	Vilas Murlidhar Ahirrao	Associate Professor	Male	1961-05-01	OBC	Hindu	No	Regular	Direct	1986-07-14	1986-07-14	M.Phil		Commerce	Commerce	No	30	Continue		9421569993	vilas.ahirrao@gmail.com
16	INDIA	NA	Arts	Vinod Gautam Somkuwar	Assistant Professor	Male	1982-10-01	SC	Hindu	No	Regular	Direct	2009-07-28	2009-07-28	Post Graduate	NET	Arts	Arts	No	9	Continue		9766889370	vinodsomkuwar156@gm
17	INDIA	NA	No Department	Vinod Shankar Shrivastava	Principal	Male	1962-06-14	General	Hindu	No	Regular	Direct	1989-09-01	1989-09-01	Post Doctorate		Science	Chemistry	No	30	Continue		9423905823	drvinod_shrivastava@yaho
18	INDIA	NA	Arts	Amol Rameshrao Bhuyar	Assistant Professor	Male	1983-01-13	OBC	Hindu	No	Regular	Direct	2011-07-08	2011-07-08	M.Phil	NET	Arts	Arts	No	7	Continue		9028297473	bhuyaramol1@gmail.com
19	INDIA	NA	Arts	Arun Daga Akhade	Assistant Professor	Male	1982-08-15	SC	Hindu	No	Regular	Direct	2010-09-13	2010-09-13	Post Graduate	NET	Arts	Arts	No	8	Continue		7798566378	arunda1982@gmail.com
20	INDIA	NA	Commerce	Ashokkumar Shantilal Khivsara	Associate Professor	Male	1961-02-14	General	Hindu	No	Regular	Direct	1987-07-01	1987-07-01	M.Phil		Commerce	Commerce	No	29	Continue		9421569987	ca_ks.sharma@yahoo.
21	INDIA	NA	Arts	Ashok Mhanku Pawar	Assistant Professor	Male	1963-06-01	SC	Hindu	No	Regular	Direct	1993-08-14	1993-08-14	Ph.D.		Arts	Arts	No	24	Continue		9403950564	dr.inka@rediffmail.
22	INDIA	NA	Science	Bapu Baburao Mangale	Associate Professor	Male	1962-06-06	SC	Hindu	No	Regular	Direct	1986-07-14	1986-07-14	Ph.D.		Science	Science	No	30	Continue		9689170742	bapumangle@gmail.com
23	INDIA	NA	Arts	Bapu Hilal Samudre	Assistant Professor	Male	1968-03-11	SC	Hindu	No	Regular	Direct	1993-08-01	1993-08-01	Post Graduate		Arts	Arts	No	24	Continue		9422374746	bapusamudre32@gmail.
24	INDIA	NA	Arts	Bhanudas Kashiram	Associate Professor	Male	1963-03-12	General	Hindu	No	Regular	Direct	1986-09-04	1986-09-04	M.Phil		Arts	Arts	No	27	Continue		9881441116	mr.bhanudasmahale@
25	INDIA	NA	Science	Chatur Pundlik Sawant	Associate Professor	Male	1962-05-26	OBC	Hindu	No	Regular	Direct	1986-10-01	1986-10-01	Ph.D.		Science	Science	No	30	Continue		9420533719	drcpsawant@gmail.ocm
26	INDIA	NA	Arts	Darbarsing Dhansing Girase	Associate Professor	Male	1970-10-10	General	Hindu	Yes	Regular	Direct	1994-09-07	1994-09-07	Post Graduate		Arts	Arts	No	23	Continue		9420851356	darbarg@gmail.com
27	INDIA	NA	Commerce	Dilip Rambhau Jagtap	Assistant Professor	Male	1964-03-23	General	Hindu	No	Regular	Direct	2000-09-18	2000-09-18	Ph.D.		Commerce	Commerce	No	18	Continue		9823692360	dilip.jagtap60@gmail.
28	INDIA	NA	Arts	Dinesh Barku Deore	Assistant Professor	Male	1984-10-18	OBC	Hindu	No	Regular	Direct	2011-07-11	2011-07-11	Post Graduate	NET	Arts	Arts	No	8	Continue		9403588795	deoredinesh@gmail.com
29	INDIA	NA	PG Sacience	Dr.Anil Natthu Kulkarni	Assistant Professor	Male	1984-05-29	General	Hindu	No	Regular	Direct	2019-08-08	2019-08-08	Ph.D.	PG Diploma	Science	Physics	No	1	Continue		8623096268	kulkarni.may29@gmai
30	INDIA	NA	PG Arts	Dr.Vasaim Firoz Makrani	Assistant Professor	Male	1979-11-11	General	Muslim	No	Regular	Direct	2019-08-08	2019-08-08	Ph.D.	SLET	Arts	Arts	No	1	Continue		9423940606	vasimfmakrani786@gmai
31	INDIA	NA	Arts	Dyaneshwar Madhavrao	Assistant Professor	Male	1971-10-03	OBC	Hindu	No	Regular	Direct	1996-09-02	1996-09-02	M.Phil		Arts	Arts	No	21	Continue		9890915215	dmsupalekar2011@gmail.
32	INDIA	NA	Commerce	Komalsing Bhura Girase	Associate Professor	Male	1961-01-01	OBC	Hindu	No	Regular	Direct	1987-07-06	1987-07-06	Post Graduate		Commerce	Commerce	No	29	Continue		8485854646	kb.girase1161@gmail.
33	INDIA	NA	Arts	Narendra Supadusing	Associate Professor	Male	1961-08-24	General	Hindu	No	Regular	Direct	1986-08-28	1986-08-28	M.Phil		Arts	Arts	No	27	Continue		9423193724	naren.pawar@yahoo.in
34	INDIA	NA	Arts	Madhav Shankar Waghmare	Assistant Professor	Male	1981-06-10	SC	Hindu	No	Regular	Direct	2015-02-02	2015-02-02	Post Graduate	NET	Arts	Arts	No	3	Continue		9823487834	madhavdongoankar10@g
35	INDIA	NA	Commerce	Kacharula l Satyanarayan	Assistant Professor	Male	1961-11-05	General	Hindu	No	Part-Time	Direct	1987-07-01	1987-07-01	Post Graduate		Commerce	Commerce	No	30	Continue		9422787701	ca_ks.sharma@yahoo.
36	INDIA	NA	Science	keshavsing Lakhansing	Assistant Professor	Male	1991-08-06	General	Hindu	No	Regular	Direct	2017-08-10	2017-08-10	Post Graduate	NET	Science	Science	No	1	Continue		9158072400	profklpardeshi@gmail.com
37	INDIA	NA	Arts	Narendra Narayan Marathe	Associate Professor	Male	1963-06-01	General	Hindu	No	Regular	Direct	1989-08-01	1989-08-01	Post Graduate		Arts	Arts	No	26	Continue		9420533743	nnmarathe89@gmail.com
38	INDIA	NA	Arts	Prakash Arjun Bhamare	Associate Professor	Male	1963-06-01	SC	Hindu	No	Regular	Direct	1987-08-01	1987-08-01	Ph.D.		Arts	Arts	No	30	Continue		9822294255	bhamaregtp@rediffmail.
39	INDIA	NA	Science	Prem Kumar Gautam	Assistant Professor	Male	1978-05-29	General	Hindu	No	Regular	Direct	2011-07-06	2011-07-06	Ph.D.	NET	Science	Science	No	6	Continue		9764704372	premunat@gmail.com
40	INDIA	NA	Arts	Rahul Purushottam Meghe	Associate Professor	Male	1963-06-01	SC	Hindu	No	Regular	Direct	2001-09-17	2001-09-17	Post Graduate		Arts	Arts	No	19	Continue		9423940674	rahulmeghe01@gmail.
41	INDIA	NA	Science	Rajendra Raghunath Kasar	Associate Professor	Male	1961-06-01	OBC	Hindu	No	Regular	Direct	1987-11-23	1987-11-23	Ph.D.		Science	Science	No	30	Continue		9823258205	rrkasargtpndb@rediffmail.
42	INDIA	NA	Arts	Sahebrao Uttam Ahire	Assistant Professor	Male	1973-06-02	General	Hindu	No	Regular	Direct	2017-08-10	2017-08-10	Post Graduate	SLET	Arts	Arts	No	1	Continue		9823119255	asaheb rao@yahoo.in
43	INDIA	NA	Science	Sameera Ahrar Ahmad	Assistant Professor	Female	1976-01-01	General	Muslim	No	Regular	Direct	2011-07-07	2011-07-07	Ph.D.		Science	Science	No	6	Continue		9422856835	ahmadsameera.2011@
44	INDIA	NA	Science	Sandip Panduran g Patil	Assistant Professor	Male	1987-06-18	OBC	Hindu	No	Regular	Direct	2011-07-06	2011-07-06	Ph.D.	NET	Science	Science	No	7	Continue		9960194619	sandip.patil@gmail.
45	INDIA	NA	Science	Sangita Baburao Pimpare	Assistant Professor	Female	1982-05-20	OBC	Hindu	No	Regular	Direct	2010-09-13	2010-09-13	M.Phil	SLET	Science	Science	No	8	Continue		9405373904	sangitamhjn@gmail.com
46	INDIA	NA	Arts	Sateesh Ramkisan rao Surye	Assistant Professor	Male	1983-07-25	General	Hindu	No	Regular	Direct	2009-08-07	2009-08-07	Post Graduate	SLET	Arts	Arts	No	9	Continue		8983345757	satishsurye@gmail.com
47	INDIA	NA	Arts	Shamrao Bhagawan Wayase	Assistant Professor	Male	1971-06-01	OBC	Hindu	No	Regular	Direct	1995-08-01	1995-08-01	Ph.D.		Arts	Arts	No	23	Continue		9420852614	wayaseshamrav@rediffm

S.No	Country Name	Passport Number	Department Name	Name Of The Employee	Designation	Gender	DOB	Social Category	Religious Community	PWD	Nature Of Appointment	Selection Mode	DOJ	Date of Joining Teaching Profession	Highest Qualification	Additional/Eligibility Qualification	Broad Discipline Group Category	Broad Discipline Group Name	Whether Vocational Course	Year Spent Eclusively In Other Than	Job Status	Date Of Change In Status	Mobile No	Email
48	INDIA	NA	Arts	Subhash Kumar Thakare	Assistant Professor	Male	1967-04-08	ST	Hindu	No	Regular	Direct	1994-08-12	1994-08-12	Ph.D.		Arts	Arts	No	23	Continue		9923535234	subhasthakare5@gmail.
49	INDIA	NA	Arts	Suchita Vinayakrao Gosavi	Associate Professor	Female	1958-11-19	OBC	Hindu	No	Regular	Direct	1990-09-01	1990-09-01	Post Graduate	NET	Arts	Arts	No	25	Retired		9405207740	gosavigtp@nmu.in
50	INDIA	NA	Arts	Sultan Piru Pawar	Assistant Professor	Male	1979-04-07	ST	Hindu	No	Regular	Direct	2006-07-19	2006-06-19	Ph.D.		Arts	Arts	No	14	Continue		9403086020	sultanpawar7@gmail.
51	INDIA	NA	Science	Sunil Kaduba Chaudhari	Associate Professor	Male	1962-03-31	OBC	Hindu	No	Regular	Direct	1985-09-17	1985-09-17	Post Graduate		Science	Science	No	31	Continue		9637435014	sunilchaudhari208@gmail.
52	INDIA	NA	Arts	Suresh Uttam Patil	Associate Professor	Male	1965-06-01	General	Hindu	No	Regular	Direct	1987-08-17	1987-08-17	Post Graduate		Arts	Arts	No	28	Continue		9822821845	sureshpatil@gmail.com
53	INDIA	NA	PG Commerce	Swapnil Vithalprasad Mishra	Assistant Professor	Male	1979-02-27	General	Hindu	No	Regular	Direct	2019-08-08	2019-08-08	Ph.D.	SLET	Commerce	Commerce	No	1	Continue		9422288120	swapnilmishra@gmail.
54	INDIA	NA	Arts	Tarak Lakhanchandra Das	Assistant Professor	Male	1984-05-29	General	Hindu	No	Regular	Direct	2015-02-02	2015-02-02	Post Graduate	NET	Arts	Arts	No	3	Continue		9730008720	tarak1930.das@gmail.
55	INDIA	NA	Arts	Upendra Jaivantrao Dhagdha	Assistant Professor	Male	1986-10-21	General	Hindu	No	Regular	Direct	2017-08-08	2017-08-08	Post Graduate	NET	Arts	Arts	No	1	Continue		9404970832	upendra.dhagdhage@

Designation-Wise Sanctioned Strength:

S.No	Designation	Sanctioned Strength	In Position	In Vocational Courses
1	Assistant Professor	0	35	0
2	Associate Professor	0	18	0
3	Principal	0	1	0

Non Teaching Staff:

S.No	Staff Type	Group	Sanctioned Strength	Category	Number Of Position																		REMARKS
					General			EWS			SC			ST			OBC			TOTAL			
					Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	
1	Library Staff	Group D	15	Total	10	0	0	0	0	0	0	0	0	3	0	0	0	0	0	15	0	0	NA
				PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
				Muslim Minority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
				Other Minority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
2	Library Staff	Group C	3	Total	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	NA
				PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
				Muslim Minority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
				Other Minority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
3	Non Teaching Staff Excluding Lib & Phy Education	Group D	28	Total	9	0	0	0	0	0	7	0	0	3	0	0	0	0	0	28	0	0	NA
				PWD	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	3	0	0	NA
				Muslim Minority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
				Other Minority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
4	Non Teaching Staff Excluding Lib & Phy Education	Group C	20	Total	11	0	0	0	0	0	0	0	0	1	0	0	0	1	0	19	1	0	NA
				PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
				Muslim Minority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
				Other Minority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
5	Non Teaching Staff Excluding Lib & Phy Education	Group B	3	Total	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	NA
				PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
				Muslim Minority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
				Other Minority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained

Non Teaching Staff Count:

Total Number of non Teaching Staff	67
Total Number of Males in non Teaching Staff	66
Total Number of Females In non Teaching Staff	1
Total Number of Transgender in non Teaching Staff	0

Financial income:

Aishe Code: C-8847	Survey Year: 2020

S.No	Items	Amount In Thousands
1	Grants Recieved From	
(i)	University Grants Commission	0.0
(ii)	Distance education Council	0.0
(iii)	Other Central Government Departmnts	0.0
2	Grants recieved From State government	120336.239
3	Grants Recieved From University	0.0
4	Grants Recieved From Local Bodies	0.0
5	Donations	0.0
6	Tuition Fee	2208.065
(i)	Indian students in regular education mode	0.0
(ii)	Foreign students in regular education	
(iii)	Indian students in distance education	0.0
(iv)	Foreign students in distance education	
7	Other Fees	50.425
8	Interests	495.333
9	Sale Of Application Form	383.78
10	Other Income	0.0
(i)	Payment on lodging and boarding from Indian students	0.0
(ii)	Payment on lodging and boarding from foreign students	
(iii)	Income from faculties visiting abroad	0.0
(iv)	Other sources	0.0
11	Total	123473.842

Financial Expenditure:

S.No	Items	Amount In Thousands
1	Salary,Allowances & Retirement Benefits	120305.8
2	Buldings (Construction And Maintainence)	168.425
3	Library And Laboratory	898.882
4	Research Activities	148.132
5	Scholarships	7716.899
6	Other Expenses	4238.69
7	Total	133476.828

Infrastructure:

Aishe Code: C-8847	Survey Year: 2020

(A) Note:

NKN = National knowlege Network

NMEICT = National Mission On Education Through Information & Communication technology

1	Play Ground	Yes	1	18	Solar Power Generation	Yes	
2	Auditorium	Yes	1	19	Connectivity NKN	Yes	
3	Theatre	No	0	20	Connectivity NMEICT	Yes	
4	Library	Yes	1	21	Campus Is Differently Abled	Yes	
(a)	Number Of Books		99200	(i)	Hand Rails	No	
(b)	Number of Journals (Peer		255	(ii)	Ramp attached to classroom	Yes	
5	Laboratory	Yes	1	22	Grievance Redressal Mechanism	Yes	
6	Conference Hall	Yes	1	23	Vigilance Cell	yes	
7	Health center	Yes	1	24	Equal Opportunity Cell	yes	
8	Gymnausim/Fitness Center	Yes	1	25	Sexual Harassment Cell	Yes	
9	Indoor Stadium	No	0	26	Counselors For Students	Yes	
10	Common Room	Yes	1	27	Clinic / First Aid Room	Yes	
11	Computer center	Yes	1	28	Separate Toilet For Girls	Yes	
12	Cafeteria	Yes	1	29	Skill Development Center	Yes	
13	Guest House	Yes	1	30	Self-Defense Class For Females	No	
14	Separate Common Room	Yes	1	31	Anti-Ragging Cell	Yes	
15	Total Number of Classrooms and Seminar Halls		24	32	Number Of Toilets		
16	Total Number of Computers in the Campus for Academic Work*		62	(i)	Total	4	
				(ii)	Girls	2	
17	Incubation Centres/Start-up Units		0	(iii)	Toilet for disabled Males	0	
(B)				(iv)	Toilet for disabled Females	0	

(i)	Whether the University / Institution have Disaster Management facilities.	Yes
(ii)	Whether capacity Building and Training/awareness programmes	Yes
(iii)	Whether vulnerability assessment checks were made during the year.	Yes
(C)	Is any mock drill or rehearsal programme conducted.	Yes
(i)	Whether Institution has Internal Quality Assurance Cell (IQAC)	Yes
(ii)	Date of Establishment of IQAC	6/1/00 12:00 AM
	Contact Details of IQAC	2564222293

Whether College/ Institution maintain Scholarships	Yes

Category	Number of Students Receiving Government Scholarships																		Remarks
	General			EWS			SC			ST			OBC			TOTAL			
	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	Total	Female	Trans Gender	
Total	621	278	0	86	43	0	99	53	0	1129	362	0	602	329	0	2451	1022	0	NA
PWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
Muslim Minority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained
Other Minority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Category-wise data not maintained

Whether College/Institution maintain Fellowships	No
Whether College/ Institution maintain Loans Data:	No
Whether Institution Accredited:	Yes

S No	Name	Accreditation Body	Is Score Provided	Max Score	Score	Cycle of Accreditation	Status of Accreditation	Date if Accreditation Validity	Grade
1	NAAC	NAAC	Yes	4	3.1	Cycle 2	Yes	3/2/20 12:00 AM	A

Government of India
Ministry of Education
Department of Higher Education
Statistics Division
New Delhi

Certificate

Reference No. C-8847-2021

This is to certify that Dr.Mahendra Jaypalsingh Raghuwanshi of 220053-NTVS'S G.T.PATIL ARTS,SCIENCE & COMMERCE COLLEGE, NANDURBAR. has successfully uploaded the data of All India Survey on Higher Education(AISHE) 2021-2022.

RRajesh

(Shri R. Rajesh)
Deputy Director General

Dated: 13/01/2023

Nandurbar Taluka Vidhayak Samiti's
G. T. PATIL ARTS COMMERCE AND SCIENCE COLLEGE,
NANDURBAR – 425412
NAAC ACCREDITED 'A' GRADE

Department of English

Prof. V.S. Shrivastava
Principal

1. **Title of Event**: Competitive Skills & Public Speaking **Date**: 24/09/2017

2. **Introduction of the event**: NTVS's G.T.Patil college's Department of English organised a One day workshop On Competitive Skills & Public Speaking under 'DRUSHTI 2017'. It was hosted by Department of English. The workshop was inaugurated by HON. Superintendent of Police Sanjay Patil ,HON. Chandrakant Raghuwanshi ,Dr.A.P.Khairnar , Principal Dr. V.S.Shrivstava and Dr.M.J.Raghuwanshi, Preeti Malviya and Prof. Tejas Beldar DrV.Z.Chaudhari and Prof .Dinesh Deore. Superintendent of Police expressed the opinion that youth should focus on the books .

3. **Duration:** OneDay.

4. **Place:** Library G.T.Patil college, Nandurbar .

5. **Inaugurator/Chief guest :** HON. Chandrakant Raghuweanshi and S.P. Sanjay Patil

6. **Attendees**: 200 students .

7. **Particular activity:** Competitive Skills & Public Speaking

8. **Social inclusion/alliance:** The host Department of English G.T.Patil college Nndurbar .

9. **Message to society:** Importance of Competitive Skills & Public Speaking

10. **Concluding Remarks:** Success comes from consistent efforts done in the right way. Everyone has some skill, it needs to developed.

Nandurbar Taluka Vidhayak Samiti's

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

NAAC Re-Accredited 'A' Grade (CGPA- 3.10)

DRUSHTI 2017

One Day University Level Workshop on

Competitive Skills & Public Speaking

Organized by Department of English &
Sponsored by BCUD, North Maharashtra University, Jalgaon

Certificate

This is to certify that _____

of _____ has actively participated in One Day University Level Workshop on **Competitive Skills & Public Speaking** organized by the Department of English, G.T. Patil College, Nandurbar & Sponsored by BCUD, NMU, Jalgaon on 22nd September 2017. His / Her participation in the workshop is appreciated.

Prof. D.B. Deore
Co-ordinator

Prof. N.N. Marathe
Head, Dept. of English

Dr. M.J. Raghuwanshi
Vice-Principal

Prof.Dr. V.S. Shrivastava
Principal

NANDURBAR TALUKA VIDHNANDURBAR 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

Dr. V S Shrivastava
Principal

Office: (02564) 222293, 226534
E-Mail: gtpcollege@rediffmail.com
Web: www.ntvsgtpcollege.org

Date: 26 / 03 / 2018

Report

- Introduction of the event:- F.Y.B.Sc. Geography Syllabus Restructuring Workshop
- Duration : - One day
- Place: - G T Patil Arts, Commerce and Science College, Nandurbar
- Inaugurator: - Hon. Manojbhaiyya Raghuvanshi
- Chief guest: - Dr. V. J. Patil (Chairman BOS KBCNMU)

Guests of honor: - Dr. V.S. Shrivastava and Dr. M. J. Raghuvanshi

F.Y.B.Sc Geography Syllabus Restructuring Workshop was held in association with KBCNMU Jalgaon and GT Patil Arts Commerce and Science College, Nandurbar, in the said workshop, the syllabus of 06 papers were taught in both semesters of F.Y.B.Sc. The syllabus of Geography was discussed and a new syllabus was designed. The workshop was attended by professors from various colleges in the university area.

Sessions: - Three

Valedictory: - Dr. R.R. Kasar

Name and Signature of Coordinator

Name and signature of Principal with stamp

PRINCIPAL
GT Patil College,
Nandurbar-425412

North Maharashtra University, Jalgaon
&
N.T.V.S's G.T. Patil Arts Commerce & Science college, Nandurbar.

Orgnize
One Day Workshop on

F.y. B.Sc Geography Syllabus Restruching

Date 26th March 2018.

Registration No.	Name of faculty	Name of College	E-mail I D	Mob. No	Signature.
GEO-10	DR. SANDANSHIV LALIT PRATAP	SVS's Dadasaheb Rawal, college, Dondaicha Dist Dhule.	lalitsandanshiv@gmail.com	9422790814	[signature]
GEO-11	Dr. Shivaji Bansilal Patil	Late Annasaheb R.D. Deore Arts & Sci. College Mhasadi Tal. Sakri	drshivajipatil@gmail.com	9421619135	[signature]
GEO-12	Prof. Pamesh Chudaman Ahire	—	rcahire@rediffmail.com	9763079991	[signature]
GEO-13	Dr Vijay ~~Prahlad~~ Pralhad Chaudhari	—	vijaychaudhari1973@gmail.com	9421611774	[signature]
GEO-14	Prof. Siddharth Bhaskar Sonawane	Smt. N.N.C. Arts Comm. & Sci College Kusumba Dhule	Siddharth.Sonawane@gmail.com	9960055517	[signature]
GEO-15	Dr. V.G. Gonekar	MJP Valvi ASC College Dhadgaon Dist. Nandurbar	-	8275312334	[signature]
GEO-16	Prof. Fattesing Makhram Rathod	ASC College Songir Songir Dist Dhule	[illegible]	9890910443	[signature]
GEO-17	Dr. Ahire Suresh R.	Uttamrao Patil College Dahivel Tal Sakri	ahiresuresh@gmail	9423916322	[signature]
GEO-18	Prof. Nandre A. P.	Smt. Vimalbai Uttamrao Patil College Sakri			[signature]

F.Y B.Sc. Geography Syllabus Restructuring Workshop - 2018. Participants Registration List. (2)

Dt. 24th March 2018

Registration No.	Name of Faculty	Name of College	E-mail ID	Mob. No.	Signature
GEO-01	Mr. Vijay Ramchandra Bariskar Assis. professor.	B.P. Arts, S.I.A. Comm. College Pisl-Jalgaon	vbariskar15@gmail.com	9766772850	V.R.Bariskar 28/3/18.
GEO-02	Prof Ganpat Manaji Patil	JES's College Nandurbar	ganpatpatil.gis@gmail.com	9823051320	
GEO-3	Mrs Sandhya D. Patil	—11—		9222446648	
GEO-4	Mr Manoj D. Mudholkar	Rural foundation Nandurbar Sanchalit Senior science college Akkalkuva	manojmudholkar2015@gmail.com	8149878175	26/3/18
GEO-5	Prof. Dattatraya Y. Patil	V.N. college Shahada. Dist. Nandurbar	dattady@gmail.com	9421888205	
GEO-6	Dr. Sandip B. Garud	Arts, com. & sci college, Taloda	Sandipgarud171@gmail.com	9423457259	
GEO-7	Mr. Mohan. A. Vasave	Arts, comm. & Science college Taloda	mohanvasavegeo@gmail.com	8390978088	
GEO-8	Mr. Raju. Z. Yashod	Arts, comm. & Science college Taloda	Mr.Raju@gmail.com	8999515799	
GEO-9	Dr. Parag Vishnupant Tatte	Arts, comm and science college Taloda.	Parag.tatte225@gmail.com	8275395270	

Reg No	Name of faculty	Name ...	College	E-mail I D	Mob. No.	Sign.
GEO-28	Dr. Uttam V. Nile	B.S.G.	Shahada	[illegible]@gmail.com	9420[illegible]	[illegible]
GEO-29	Prof. Rahul V. Patil	P.S.G.	Shahada		7720023491	
GEO-30	Prof. Sachin P. Bhosarkar Sachin Pundlik Bhasarkar	Jijamata college Nandurbar		sachinbhasarkar5[illegible]@gmail.com	[illegible]	[illegible]
GEO-31	Prof. Sandip S. Bhavsar	Vasant[illegible] college [illegible]	NMK Shahada	sandipbh[illegible]@gmail.com	95[illegible]	[illegible]
GEO-32	Prof. Sunil Motilal Pant	R. [illegible] College Par[illegible]		sunilm[illegible]@rediffmail.com	94220[illegible]	[illegible]
GEO-33	Mahale Anil Suresh	R. [illegible] College Par[illegible]		mahale[illegible]@rediffmail.com	94216[illegible]	[illegible]
GEO-34	Prof. Manda Abesing Gavit	A. [illegible] College [illegible]bar		[illegible]@gmail.com	94233[illegible]	[illegible]
GEO-35	Dr. Shrikant Bhagwan Mahajan			profsbmahajan@gmail.com	9423592608	[illegible]
GEO-36	Prof. Smt. Chhaya Suresh Gavit			—	9421998[illegible]	[illegible]

Reg. No	Name of faculty	Name of College	E-mail. I.D	Mob. No.	Sign.
GEO-37	Dr. Namdev Narsingrao Gajre	Arts, Comm. & Science College, Narapur	dnngajre@gmail.com	9422306997	[signature]
GEO-38	Prof. V. J. Patil	Dr. A. G. D. Bendale Mahila Mahavidyalaya Jalgaon	vjp80@gmail.com	9421689013	[signature]
GEO-39	Prof. Ramesh pandu More	Dr. A G D Bendale Mahila Mahavidyalaya, Jalgaon	rpmore70@gmail.com	9822503473	[signature]
GEO-40	Dr. Shaikh Irfan Bashir	Iqra's H. J. Thim college, Mehrun, Jalgaon	irfanshaikh7313@gmail.com	7276742171	[signature]
GEO-41	Mr. Ankush Chintaman Khobragade	RFNS Senior Science College Akkalkuwa, Nandurbar	ankush.pck369@gmail.com	9665202415	[signature]
GEO-42	Mr. Hemantkumar Ratnakar Ratnaparkhi	JES's Arts Science & Comm. college Nandurbar	sadubhosarkar.sb@gmail.com	7709666593	[signature]
GEO-43	Dr. N. S. Pawar	G.T.P. College Nandurbar			
GEO-44	Prof S. D. Borse	G.T.P College Nandurbar	borseshaligram@rediffmail.com	9623514705	[signature]
GEO-45	Prof. F. R. Khandekar	G.T.P. College Nandurbar			[signature]

Registration No	Name of faculty	Name of College	E-mail. ID	Mob. No.	Sign.
GEO-19	Dr. Sunil Chunilal Gaane	S.P.D.M. College, Shirpur	malharsunil127@gmail.com	9801911o5	[signature]
GEO-20	Dr. Bhagwan Nimba Girase	G.V.S. Arts College Bamkheda	giruebhagwan@gmail.com	9604077915	[signature]
GEO-21	Prin. Dr. A.T. Patil	Sarvajanik Kalen mahavidyalay Visarwadi Tal Navapur	atpkho.patil@gmail.com	7350020036	[signature]
GEO-22	prof. Vivekanand Dattu patil	A&C college Songir Tal dist Dhule.	prof.vdpatil@gmail.com	9421568788	[signature]
GEO-23	Dr. R. J. Borse	S.S.V.P.Sanstha's L.K.Dr.P.R. Ghogrey Sci. College Dhule.	rjborse@rediffmail.com	9420441162	[signature]
GEO-24	Prof. Salunke Nitinkumar. M.	Vasantrao Naik, Arts, Com & Sci college Shahada, Dist NDB.	nSalunke5@gmail.com	9422791602	[signature]
GEO-25	Prof. Patil Rajendra Kashinath	Vasantrao Naik Arts, Com & Science college, Shahada dist. NDB		9403259259	[signature]
GEO-26	DR KUWAR SUNIL VIKRAM	T.E.S's Modern College Nandurbar	Sunil.Kuwarndb@rediffmail.com	9422789227	[signature]
GEO-27	prof Chavan B.F.	—11—	bfchavan@gmail.com	9850236645	[signature]

Reg. No	Name of faculty	Name of college	E-mail-ID	Mob.No.	Sign.
GEO-46	Prof. A.R. Bhuyar.	G.T.P. College, Nandurbar.	bhuyaramol1@gmail.com	9028271479	
GEO-47	Prof. M.B. Patil.	G.T.P. College	Nandurbar	mbpatil104@gmail.com	7744011246	
GEO-48	Prof. R.R. Deore	G.T.P. College	Nandurbar.	rrdeore1603@gmail.com	9404571571	
GEO-49					
GEO-50					
GEO 51					
GEO-52					
GEO-53					
GEO-54					

HEAD
Department of Geography & Research Center
Gajmal Tulshiram Patil College
Nandurbar-425412.

Nandurbar Taluka Vidhayak Samiti's
G. T. PATIL ARTS COMMERCE AND SCIENCE COLLEGE,
NANDURBAR – 425412
NAAC ACCREDITED 'A' GRADE

Prof. Dr V S Shrivastava
Principal

Date: 21/01/2019

1.Title of Event: University Level Workshop on Global skills

2. Introduction of the event: NTVS's G.T.Patil college, Nandurbar organised the University Level Workshop on Global Skills under the event **'DRUSHTI'** hosted by Department of English from 21st to 23rd January 2019. Under this workshop the students learned more about global skills such as Communication and Collaboration ,Creativity and Critical Thinking ,Intercultural Competence and Citizenship ,Emotional Self-regulation and Wellbeing, Digital Literacies etc. Prof. Tejas Beldar and Dr.V Z Chaudhari delivered a talk on Global skills . Prof. Dinesh Deore host the workshop.

3. Duration: Three Days .

4. Place: Language Laboratory G. T. Patil College Nandurbar

5. Inaugurator/Chief Guest: Hon. Shri. Manojbhaiyya Raghuwanshi and Dr. V S Shrivastava

6. Attendees: 240.

7. Particular activity: Workshop on Global Skills

8. Social inclusion/alliance: Department of English G.T.Patil College ,Nandurbar

9. Message to society: Importance of 'Global Skills' in the growth of Nation

10. Concluding Remarks: The administrator praised the efforts of organizers and the initiative of the Department of English.

Nandurbar Taluka Vidhayak Samiti's

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

NAAC Re-Accredited 'A' Grade (CGPA- 3.10)

DRUSHTI

In Memory of Late Dadasaheb Batesingh Raghuwanshi

Department of English Organized

Workshop on

GLOBAL SKILLS

21 - 23 January 2019

Certificate

This is to certify that _____

of _____ class has actively participated in the Three Day Workshop on **Global Skills** organized by the Department of English, G.T. Patil College, Nandurbar Under the event **DRUSHTI** during 21-23 January, 2019 held at Language Laboratory. His / Her participation in the workshop is appreciated.

Dr. V.Z. Chaudhari	Prof. D.B. Deore	Prof. N.N. Marathe	Dr. M.J. Raghuwanshi	Prof.Dr. V.S. Shrivastava
Convener	Organizing Secretary	Head, Dept. of English	Vice-Principal	Principal

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. V. S. Shrivastava
Principal

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

Report **Date:13/02/2019**

Title of Conference : **"Green synthesis of nanomaterials and their application ".**

Introduction of the event: (Brief Note including..): National conference on" Green synthesis of nanomaterials and their applications" had provided a common platform for exchange of views, ideas, research and suggestions for developing strategies for various fields of chemical science.

Duration: 12 February 2019

Place: Nandurbar

Inaugurator: Hon. Shri Yashwant D. Patil (Secretary NTVS Nandurbar)

Chief Guest: Prof. (Dr.) Ashok Sharma (Registrar University Indore. M.P.)

Guest of Honor: Prof.K.R.Desai (Director, Uka Tarsodia University Bardoli)

Attendees with sheet of attendance at least (100): Attached

1. Keynote: It was given by Prof.K.R.Desai (Director, Uka Tarsodia University Bardoli).

2. Sessions: It was conducted in four sessions.

3. Presentations: There are 20 participants have done presentation.

4. Valedictory: The chief guest of valedictory function was Prof.B.V.Pawar (Director BCUD NMU Jalgaon).

5. Concluding Remarks: The idea regarding **"green synthesis of nanomaterials and their applications"** was circulated over the all over India. More than 100 participants were benefited by this programme.

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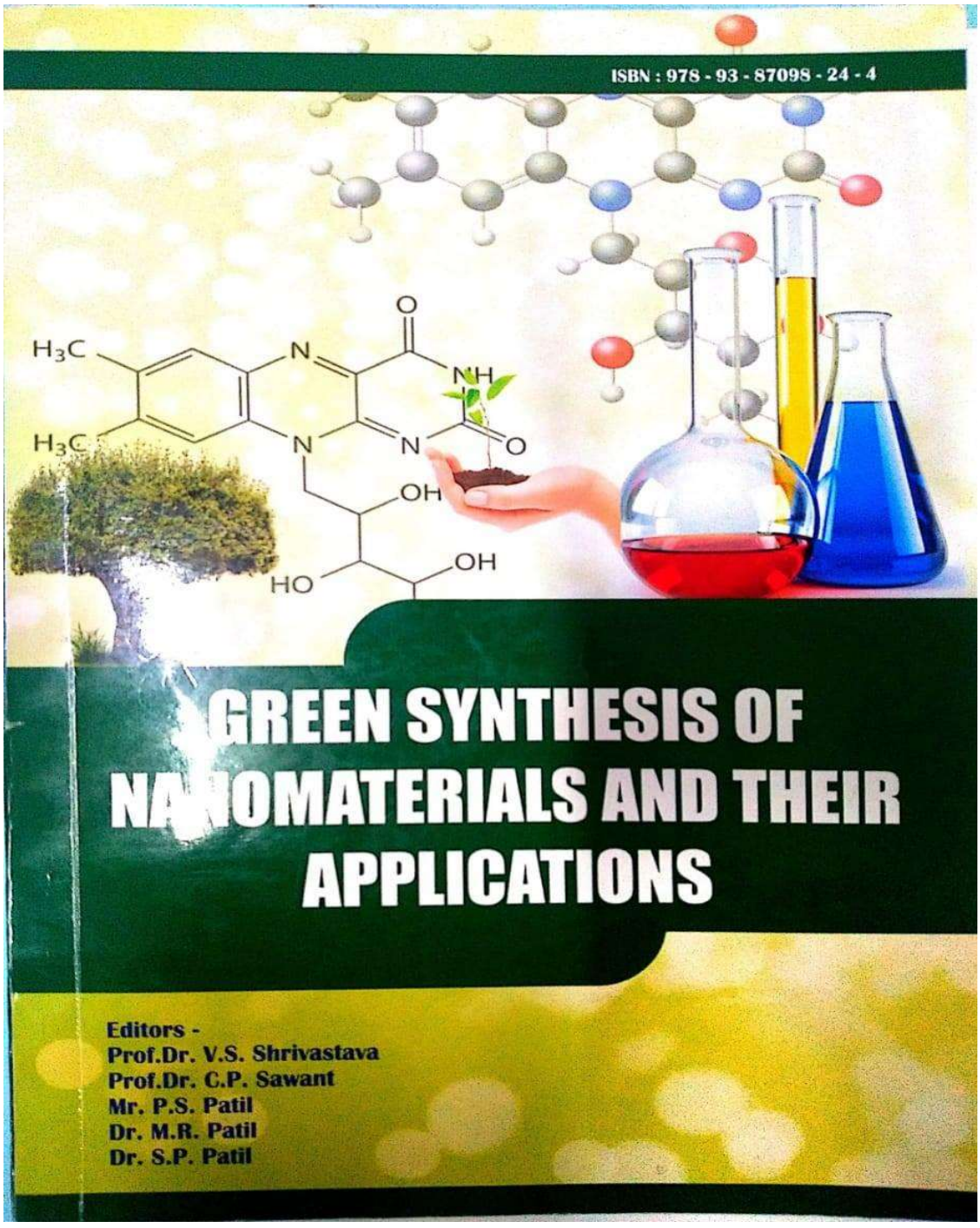

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रसायनशास्त्र विभागाच्या एकदिवसीय कार्यशाळेच्या उद्घाटन प्रसंगी डॉ. अशोक शर्मा (अधिष्ठाता इंदौर विश्वविद्यालय), प्रोफे. के.आर. देसाई (बारडोली), प्राचार्य, उपप्राचार्य व इतर मान्यवर.

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 ISBN : 978 - 93 - 87098 - 24 - 4

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Abstracts of Keynote Address and Invited Talks

Full Length Papers

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Abstracts

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Website: ntvsgtpcollege.org

Programme/Event : One day National conference 5/12/02/2019 on "Green Synthesis of Nanomaterials & their application"

Attendance

Sr. No.	Name of the participant	Name of College	Designation	Sign
1.	Dr. M. R. Patil	G.T. Patil college	Asst Prof	
2	Adhare Sachin A.	G.T. Patil College	CHB	
3	Manoj Ratan sable	Aadarsh College	CHB	
4	Dhanashri A. Sonar	G.T.P college	Student	
5	Dr. F. R. Khandekar	G.T.P. college	Asst. Prof	
6	Dr. A. R. Bhuyar	G.T.P. college	Asst. Prof	
7	M. B. Khairnar	G.T.P college	Student	
8	Dr. Sanjay Kaple	G.T. Patil college	Asst. Prof	
9	Nagh Aashish H.	Pune University	Student	
10	Mr. M. B. Patil	G.T. Patil college	Asst. Prof.	
11	Dr. Y. V. Marathe	G.T.P. College	"	
12	Dr. G.B. Gupta	G.T.P. College	" (CHB)	
13	Dr. G.R. Chaudhari	A.S. Bhusaval	Asst. prof	
14	Mr. C.H. Sarode	P.O. Nahata	" (CHB)	
15	Mr. N.S. Joshi	ASC, Bodwad	Asst Prof	
16	Dr. V.A Adole	Surgana college	Asst Prof	
17	Dr. P.K. Koli	Nandgaon college	Asst Prof	
18	Mr. D.B. Deore	G.T.P. college	Assist. prof	
19	Prof. U.J. Dhegadhage	"	Assist Prof	
20	Dr. Gaurav Gupta	J.C.T. Mumbai	Post-DOC	
21	Dr. R.P. meshe	G.T. Patil college	Assist Prof	
22	Prof. S.U. Patil	"	Assis Prof	
23	Mr. T.G. Raysing	N.M.U. Jalgaon	"	

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Website: ntvsgtpcollege.org

Programme/Event : "One day National conference" Date : 12/02/2019

Attendance

Sr. No.	Name of the participant	Name of College	Designation	Sign
24	Dr. N. P. Hiwe	G.T.P.C.N.dlb.	Asst. Prof.	
25	Y.S.Sonar	GTP Ndb	C.H.B	
26	B. B. Chaudhari	G.T.P.N.D.B	CHB	
27	Patil Varsha V.	GTP College	CHB	
28	Pimpare S.B.	GTP College	Assi.Prof	
29	Mr. R.L.Parradeshi	GTP college.	Asst Prof	
30	Dr. V.P. Chaudhari	GTP College	Asst prof.	
31	Dr. G.P. Waghulde	Bhalod college	Asso.prof	
32	Dr. G.H. Sonawane	Kisan College	Asso. Prof	
33	Mr. Vinish Chandran	R.F.N.S. College.	Director of Physical Education	
34	Dr. Y.V. Marathe	G.T.P. College	RHB	
35	Ganesh N. Bagul	G.T. Patil college	student	
36	Shubham H. Desale	G.T.P. college Ndb	Student	
37	Kunal S. Mali	G.T.P.College Ndb	Student	
38	Mr. R.V. Patil	P.S.G.V.P college	Asst.Prof	
39	Pimpale Rushikesh Bhavrao	G.T. Patil college	Student	
40	Mali Vidya Devaji	G.T. patil college	Student	
41	Patil Kavita shantilal	G.T. Patil college	Student	
42	Dr. Annapurna Jha	Jamshedpur	Asst Prof	
43	Dr. Swapnil Wani	ASC College Talda	Asst. Prof	
44	Dr. S. P. Patil	G.T. Patil college	Asst Prof	
45	Padvi Jyoti Satyawan	KBC NMU Jalgaon	student	
46	Dr. D. S. Shirsath	SNDT Mahila college Dondaicha	CHB	

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Website: ntvsgtpcollege.org

Programme/Event : One day National conference Date : 12/02/2019
on "Green Synthesis of Nanomaterials & their applications"

Attendance

Sr. No.	Name of the participant	Name of College	Designation	Sign
47	Jitendra C. Patil	G.T.P, NDB	CHB	
48	Dr. Anjali Bisnoi	Ankaleshwar (Guj)	Asso Prof	
49	Prof. K.R. Desai	Bardoli Surat (Guj)	Director	
50	Harshal P. Borse	G.T. Patil College NDB	Student	
51	Rohit M. Patil	G.T. Patil College NDB	Student	
52	Aghale Jayesh B.	Aurangabad.	Asst. Prof	
53	Dr. T.L Das	G.T. Pcollege NDB	Dir. of Phy. Edu	
54	Dr. G.E. Balde	—"—	Assist. Prof	
55	S. R. Badgujar	—"—	Re. Student	
56	R.S. Lohar	G.T.P. NDB	CHB	
57	Vijay N. Khandare	Jijamata	Asst. Prof	
58	Dr. Rohit Gadekar	Aurangabad.	CHB	
59	Neha P. Chaware	V.V. [illegible]	CHB	
60	Bhatu R. Rajput	GTP	CHB	
61	P. S. Patil	G.T.P. College	Assistant Prof.	
62	Dr. Abhijeet Deshmukh	Aurangabad.	CHB	
63	Dr. Rahul Thakur	Visar Wadi	Dir. of Physical Edu	
64	Sagar B. Patel	PSGVP's	Professor	
65	Mr. Ganesh N. Bagul.	G.T. patil college Ndb	student	
66	Shubhangi H. Dasale	G.T. Patil college NDB	student	
67	Kalpesh B. patil	G.T. patil. college ND	student	
68	Kunal S. Mali	G.T. Patil. college	student	
69	Akshay R. Rajput	G.T.P. college	student	

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Programme/Event : One day National conference Date: 12/01/2019

Attendance

Sr. No.	Name of the participant	Name of College	Designation	Sign
70	Prof. (Dr.) Ashok Kumar	Indore	Registrar	
71	Dr. Vikas V. Gite	KBCNMU Jalgaon	Professor	
72	Dr. N. D. Chaudhari	Nandurbar	Principal	
73	Mo. S. A. Bhilare	ICT. Mumbai	R. A	
74	Dr. A. G. Beldar	P.S.G.V.P Shahada	Asst. Prof.	
75	Dr. Dinesh Kanade	P. G. College Sendhwa	Asst. Prof	
76	Dr. B. B. Patil	Kisan college Parola	Asst. Prof	
77	Mr. Narendra M. Patil	G.T.P. College.	Research student	
78	Dr. R.B. Ahirao	Arts & Sci. College, Dahiwel	Asst. Prof	
79	Prof. Mahesh Baviskar	P.G. College Sendhwa	Asst. Prof	
80	Dr. Bharat N. Patil	science college.	Asst. Prof	
81	Mr. R.S. Padvi	science college Akkalkuwa	Asst. Prof	
82	Mrs. Surekha Mundke	Asc College Navapur	Asst. Prof	
83	Dr. J. U. Patil	Arts. Sci. College Dahiwel	Asst. Prof.	
84	Dr. Sudhirkumar Shrivastava	Acs College Taloda	Asso. Prof	
85	Miss. Pratiksha A. Shirole	R.N. College Parola	Research scholar	
86	Dr. P.M. Yeole	R.L. College Patola	Asst. Prof	
87	Dr. M.K. Patel	P.S.G.V.P Shahada	Asso. Prof	
88	Mr. G.M. Shende	science college Akkalkuwa	Asst. Prof.	
89	Mr. K. B. patil	G.T. patil college nab	student	
90	Dr. S.R. Surye	G.T. Patil College	Asst. Prof	
91	Mr. T. R. Girase	ICT. Mumbai	R. A	
92	Mr. Vijay Gavhane	-11-	R.A	

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Programme/Event : One day National conference 12/02/2019

Attendance

Sr. No.	Name of the participant	Name of College	Designation	Sign
93	Mr. H. R. Valvi	G.T. Patil colleg	student	H.R.V.
94	Mr. S.D. Khairnar	G.T.P college	Student	
95	Mr. A.B. Valvi	—"—	Student	ABvalvi
96	Mr. K.D. Patil	—"—	Student	K Patil
97	Mr. N.D. Jadhav	G.T.P. College, NDB	Research Student	
98	Mr. Ajay Ardhapure	ZET, Mumbai	R.A	
99	Mr. Aniket Gholap	—"—	R.A.	
100	Ganesh Nagorao Bagul	G.T.P. College, NDB	Student	
101	Shubham. H. Desale	G.T.P. NDB	student	SHDesale
102	Kalpesh. B. Patil	G.T. Publ. Lib	Student	
103	Akshay J. Rajput	G.T. Patil colle	Student	
104	Shubham V. Patil	G.T.P. Coll. NDB	student	
105	Shivraj J. Grase	G.T.P college	Student	
106	Kunal. S. Mali	G.T.P college	Student	
107	Vidnere Rahul B	G.T.P college	Student	

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(Prof. Dr. V. S. Shrivastava)
Principal
PRINCIPAL
G.T.Patil Arts,Commerce & Science College
NANDURBAR - 425 412 (M.S.)

Nandurbar Taluka Vidhayak Samiti's

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

Department of English, Skill Development and Placement Cell
in Collaboration with

College of Law, Nandurbar

Organized University Level Workshop on

Employability and Digital Skills

Under the event

DRUSHTI 2020

In memory of Late Dadasaheb Batesing Raghuwanshi

Certificate

This is to certify that _____

of _____ has actively participated in Workshop on **Employability and Digital Skills** organized by G.T. Patil College in collaboration with College of Law, Nandurbar from 3-5 February 2020. His / Her participation in the workshop is appreciated.

Dr. V.Z. Chaudhari	Prof. N.N. Marathe	Dr. M.J. Raghuwanshi	Dr. N.D. Chaudhari	Prof.Dr. V.S. Shrivastava
Co-ordinator	Head, Dept. of English	Vice-Principal, G.T.P. College	Principal, College of Law	Principal, G.T.P. College

Nandurbar Taluka Vidhayak Samiti's
G. T. PATIL ARTS COMMERCE AND SCIENCE COLLEGE,
NANDURBAR – 425412
NAAC ACCREDITED 'A' GRADE

Department of English

Prof. V.S. Shrivastava
Principal

Date: 03/02/2020

1.Title of Event: Workshop on Employability skills

2. Introduction of the event: NTVS's G.T.Patil college, Nandurbar organised the University Level Workshop ON Employability and Digital Skills under the event 'DRUSHTI' hosted by Department of English from 3rd to 5th February 2020.Under this workshop the students learned about various sectors of employment and job opportunities in digital marketing .

3. Duration: Three Days .

4. Place: G. T. Patil Arts, Commerce and Science College Nandurbar

5. Inaugurator/Chief Guest: Hon. Shri. Manojbhaiyya Raghuwanshi and College Administrator

6. Attendees: 250.

7. Particular activity: Workshop on Employability skills

8. Social inclusion/alliance: The host college, Department of English

9. Message to society: Importance of Digitalisation

10. Concluding Remarks: The administrator praised the efforts of winners and participants and the initiative of the Department OF English.

दिव्य मराठी विशेष • हेल्थ ॲण्ड हायजिन, एटिकेट्स ॲण्ड मॅनर्स, टिमवर्क, सायबर सेक्युरिटीवर मार्गदर्शन

दृष्टी उपक्रमांतर्गत कौशल्य विकासावर कार्यशाळा

प्रतिनिधी | नंदुरबार

येथील जी.टी. पाटील महाविद्यालयात इंग्रजी विभागातर्फे जागतिक कौशल्य या विषयावर तीन दिवसीय कार्यशाळा घेण्यात आली. 'दृष्टी' उपक्रमांतर्गत ही कार्यशाळा घेण्यात आली.

दृष्टी हा उपक्रम नंदुरबार तालुका विधायक समितीचे माजी अध्यक्ष बटेसिंगभैया रघुवंशी यांच्या स्मृतीनिमित्त तीन वर्षांपासून राबवण्यात येत आहे. या उपक्रमांतर्गत स्थानिक ते विद्यापीठस्तरावर कौशल्य विकास कार्यशाळा होते. त्यानुसार स्पोकन इंग्लिश, पब्लिक स्पिकिंग, कॉन्फिडन्स बिल्डिंग, कॉम्पिटिटिव्ह स्किल्स, रोजगार कौशल्य, मुलाखत कौशल्य, सादरीकरण कौशल्य, नेतृत्व कौशल्य आदी कौशल्यावर मार्गदर्शन करण्यात येते. कार्यशाळेचे उद्घाटन प्राचार्य डॉ.व्ही. एस. श्रीवास्तव, उपप्राचार्य डॉ. महेंद्र रघुवंशी, विभाग प्रमुख प्रा.नरेंद्र मराठे, प्रा.बी.के. महाले, डॉ.डी.डी. गिरासे, प्रा.अरुण आखाडे, सहसमन्वयक प्रा.दिनेश देवरे व समन्वयक डॉ.विजय चौधरी यांच्या उपस्थितीत झाले. विधी महाविद्यालयाचे प्राचार्य डॉ.एन.डी. चौधरी यांनी मार्गदर्शन केले. या वेळी निबंध स्पर्धेतील विजेत्यांना बक्षिसे देण्यात आली. स्पर्धेत साधना मालचेने प्रथम, रोहिणी कोकणीने द्वितीय क्रमांक मिळवला. कार्यशाळेत जागतिक, स्पर्धात्मक, प्रशासकीय कौशल्य, मार्केटिंग कौशल्य, हेल्थ ॲण्ड हायजिन, एटिकेट्स ॲण्ड मॅनर्स, टिमवर्क, सायबर सेक्युरिटी आदी विषयावर इंग्रजी विभागाचे लेफ्ट डॉ. विजय चौधरी व प्रा.दिनेश देवरे यांनी मार्गदर्शन केले. या कार्यशाळेत ४२ विद्यार्थ्यांनी सहभाग नोंदवला. सहभागी विद्यार्थ्यांची ४ संघात विभागणी करण्यात आली होती. सामान्यज्ञान स्पर्धा, ॲडव्हर्टाइझमेंट सादर करणे, बैठक घेणे, व्हीजन तयार करणे आदी विविध स्पर्धा घेण्यात आल्या. वाणिज्य विभागाचे प्रमुख प्रा.व्ही.एम.अहिरराव, प्रा. व्ही.आय.गिरासे, मराठी विभागाचे डॉ.माधव कदम, संरक्षण विभागचे प्रा.उपेंद्र धगधगे उपस्थित होते.

नंदुरबार येथे झालेल्या कौशल्य विकास कार्यशाळेत सहभागी विद्यार्थी.

छायाचित्र व्हायरल करण्याची धमकी दिल्याने एकावर गुन्हा दाखल

नंदुरबार | तालुक्यातील भांगाडा येथे एका युवतीचे छायाचित्र काढून ते सोशल मीडियावर व्हायरल करण्याची धमकी देण्यात आली. त्यानंतर संबंधित युवतीने आत्महत्येचा प्रयत्न केला. याप्रकरणी एकाच्या विरोधात गुन्हा दाखल करण्यात आला.

या घटनेत २२ वर्षीय युवतीचे छायाचित्र काढून तिला धमकावण्याचा प्रयत्न झाला. अश्लील छायाचित्र सोशल मीडियावर व्हायरल करण्याची धमकी देण्यात आली. त्यामुळे संबंधित युवतीने कपाशीवर फवारणीचे औषध प्राशन करून आत्महत्येचा प्रयत्न केला. या प्रकरणी पीडित युवतीने नंदुरबार उपनगर पोलिसात फिर्याद दिली.

NTVS's

G.T.Patil College, Nandurbar

Six Day Workshop on "Computing skills" 2019-20

Attendance

Sr. No.	Name	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1	Shri Rajendra Bhagwanrao Patil	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	Mukesh Vijaysing Pardeshi	[illegible]	[illegible]	[illegible]	[illegible]		
3	Ravindra J. Raghuvanshi	R.J.Ra	[illegible]	[illegible]	[illegible]	R.J.Ra	R.J.Ra
4	Thorat T. J.	[illegible]	[illegible]	[illegible]			
5	Thakare A.P.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	श्री. मल्हारराव जी. पवार	Pawar	Pawar	Pawar	Pawar	Pawar	Pawar
7	[illegible]	[illegible]	[illegible]	AB	AB	[illegible]	[illegible]
8	[illegible] S.B.	[illegible]	[illegible]	[illegible]	[illegible]		
9	Mr Ravindra T. Badgujar	Badgujar	Badgujar	Badgujar	Badgujar	Badgujar	Badgujar
10	Shri Chetan S. Pardeshi	[illegible]	AB	AB	AB		
11	Mr. Mukesh K. Patil	[illegible]	AB	AB	AB		
12	Mr. B. J. Badgujar	Badg	Badg	Badg	Badg		
13	Mr R.M Patil (Rambhau)	AB	RPatil	RPatil	RPatil	RPatil	RPatil
14	~~Mr. R.P. Badgujar~~ R H Patil	AB	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15	Mr S.R. Masodhe	SRudhe	SRudhe	SRudhe	SRudhe	SRudhe	SRudhe
16	~~Mr R. J. Rajput~~ D.S Chhikara	AB	[illegible]	AB	AB		

NTVS's

G.T.Patil College, Nandurbar

Six Day Workshop on "Computing Skills"

Attendance

Sr.No.	Name	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1)	Patil Harish Lalsing	AB					
2)	Parmar Jitendra Madhavrao	AB		AB	AB		
3)	Hemade Jitendra Bharat						
4)	~~Rajendra S. Raghuvanshi~~						
5)	Patil Ramesh M.	AB			AB		
6)	~~Patil R.H.~~						
7)	A. K. Tamboli	AB					
8)	K. J. Patel	AB	AB				
9)	R. V. Suryawanshi	AB	AB				
10)	S. T. Patil	AB					

नंदुरबार तालुका विधायक समिती संचलित

गजमल तुळशीराम पाटील महाविद्यालय

शिक्षकेतर कर्मचारी संगणक प्रशिक्षण कार्यशाळा वर्ष २०१९-२०

नोंदणी अर्ज

१. कर्मचाऱ्याचे पूर्ण नाव : रघुवंशी रविंद्र जयपालसिंग

२. हुद्दा : 1/5/2015 वरिष्ठ लिपीक

३. कार्यरत असलेल्या शाळेचे/महाविद्यालयाचे नाव : ग. तु. पाटील, महाविद्यालय, नंदुरबार

४. सेवा कालावधी : 1/8/1995 परिचर 25 वर्षे

५. शैक्षणिक पात्रता : 12 वी पास 2018

६. मोबाइल नंबर : 7020244758

७. संगणक कोर्स झालेला असल्यास कोर्स चे नाव : MS-CIT July-2013

८. टायपींग येत असल्यास (✓) ही खूण करा : ☐ मराठी ☑ इंग्रजी

संस्थेद्वारे घेण्यात येणाऱ्या संगणक प्रशिक्षण कार्यशाळेत उपस्थित राहून प्रशिक्षण पूर्ण करण्यासाठी माझी संमती आहे.

रघुवंशी रविंद्र जयपालसिंग

(R. J. Raghuvanshi)

कर्मचाऱ्याचे नाव व सही

Sr. No. : 13- 0487509

Maharashtra State Board of Technical Education, Mumbai

Maharashtra Knowledge Corporation Limited

|| Creating a Knowledge Lit World ||

This is to certify that

RAGHUWANSHI RAVINDRA JAYPALSINGH

R. S. Raghuwanshi

The withinsigned having successfully completed the prescribed course of studies and having passed the examination with 74 percent marks has been awarded the

Maharashtra State Certificate in Information Technology (MS-CIT)

On behalf of the Government of Maharashtra in the month of *July - 2013* in testimony whereof are set the seals and signatures of the Director, Maharashtra State Board of Technical Education, Mumbai and the Managing Director, Maharashtra Knowledge Corporation Limited.

Section Number	Section Name	Marks Obtained	Maximum Marks
I	Learning Process*	43	50
II	Final Examination	31	50
	TOTAL MARKS	**74**	**100**

Following is the criteria for passing the MS-CIT Examination successfully:
Aggregate score of 40 Marks (in Sections I & II) out of 100 with:

- Minimum 20 Marks out of 50 are required for passing in Learning Process (Section I) &
- Minimum 20 Marks out of 50 are required for passing in Final MS-CIT Examination (Section II) with at least 6 marks in the Objective and 14 marks in the Practical.

Director
MSBTE

Managing Director & CEO
MKCL

नंदुरबार तालुका विधायक समिती संचलित

गजमल तुळशीराम पाटील महाविद्यालय

शिक्षकेतर कर्मचारी संगणक प्रशिक्षण कार्यशाळा वर्ष २०१९-२०

नोंदणी अर्ज

१. कर्मचाऱ्याचे पूर्ण नाव : पाटील हरेश जालसिंग

२. हुद्दा : प्रयोगशाळा सहाय्यक

३. कार्यरत असलेल्या शाळेचे/महाविद्यालयाचे नाव : ग. तु. पाटील महाविद्यालय नंदुरबार

४. सेवा कालावधी : २ वर्षे

५. शैक्षणिक पात्रता : बी. ए.

६. मोबाइल नंबर : 8275590434

७. संगणक कोर्स झालेला असल्यास कोर्स चे नाव : एम. एस. सी. आय. टी.

८. टायपींग येत असल्यास (✓) ही खूण करा : ☐ मराठी ☐ इंग्रजी

संस्थेद्वारे घेण्यात येणाऱ्या संगणक प्रशिक्षण कार्यशाळेत उपस्थित राहून प्रशिक्षण पूर्ण करण्यासाठी माझी संमती आहे.

हरेश जालसिंग पाटील

[HJPatil.]

कर्मचाऱ्याचे नाव व सही

नंदुरबार तालुका विधायक समिती संचलित

गजमल तुळशीराम पाटील महाविद्यालय

शिक्षकेतर कर्मचारी संगणक प्रशिक्षण कार्यशाळा वर्ष २०१९-२०

नोंदणी अर्ज

१. कर्मचाऱ्याचे पूर्ण नाव : जितेंद्र भारत हेमाडे

२. हुद्दा : प्रयोगशाळा सहाय्यक

३. कार्यरत असलेल्या शाळेचे/महाविद्यालयाचे नाव : ग.तु. पाटील महाविद्यालय नंदुरबार

४. सेवा कालावधी : दोन वर्ष

५. शैक्षणिक पात्रता : B.A.

६. मोबाइल नंबर : 9890703131

७. संगणक कोर्स झालेला असल्यास कोर्स चे नाव : M.S.CIT

८. टायपींग येत असल्यास (✓) ही खूण करा : ☐ मराठी ☑ ~~इंग्रजी~~

संस्थेद्वारे घेण्यात येणाऱ्या संगणक प्रशिक्षण कार्यशाळेत उपस्थित राहून प्रशिक्षण पूर्ण करण्यासाठी माझी संमती आहे.

जे.बी.हेमाडे

कर्मचाऱ्याचे नाव व सही

नंदुरबार तालुका विधायक समिती संचलित

गजमल तुळशीराम पाटील महाविद्यालय

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नोंदणी अर्ज

१. कर्मचाऱ्याचे पूर्ण नाव : श्री. महेश विद्याधरसिंग परदेशी

२. हुद्दा : ग्रंथालय सहायक

३. कार्यरत असलेल्या ~~शाळेचे~~/महाविद्यालयाचे नाव : जी-टी. पाटील महाविद्यालय

४. सेवा कालावधी : 27 वर्षे

५. शैक्षणिक पात्रता : M. Lib ; M-A.

६. मोबाइल नंबर : 9422736429

७. संगणक कोर्स झालेला असल्यास कोर्स चे नाव : MS-CIT

८. टायपींग येत असल्यास (✓) ही खूण करा : ☐ मराठी ☐ इंग्रजी

संस्थेद्वारे घेण्यात येणाऱ्या संगणक प्रशिक्षण कार्यशाळेत उपस्थित राहून प्रशिक्षण पूर्ण करण्यासाठी माझी संमती आहे.

(श्री. एम-टी. परदेशी)

[ ]

कर्मचाऱ्याचे नाव व सही

नंदुरबार तालुका विधायक समिती संचलित

गजमल तुळशीराम पाटील महाविद्यालय

शिक्षकेतर कर्मचारी संगणक प्रशिक्षण कार्यशाळा वर्ष २०१९-२०

नोंदणी अर्ज

१. कर्मचाऱ्याचे पूर्ण नाव : पवार मन्साराम जानु

२. हुद्दा : कनिष्ठ लिपीक

३. कार्यरत असलेल्या शाळेचे/महाविद्यालयाचे नाव : नॉन्टी.पी.महा.नंदुरबार

४. सेवा कालावधी : 25 वर्षे

५. शैक्षणिक पात्रता : बी.ए.

६. मोबाइल नंबर : ७८७५७९८६०८

७. संगणक कोर्स झालेला असल्यास कोर्स चे नाव : MHCET

८. टायपींग येत असल्यास (✓) ही खूण करा : ☐ मराठी ☐ इंग्रजी

संस्थेद्वारे घेण्यात येणाऱ्या संगणक प्रशिक्षण कार्यशाळेत उपस्थित राहून प्रशिक्षण पूर्ण करण्यासाठी माझी संमती आहे.

[श्री.एम.जे. पवार]

कर्मचाऱ्याचे नाव व सही

नंदुरबार तालुका विधायक समिती संचलित

गजमल तुळशीराम पाटील महाविद्यालय

शिक्षकेतर कर्मचारी संगणक प्रशिक्षण कार्यशाळा वर्ष २०१९-२०

नोंदणी अर्ज

१. कर्मचाऱ्याचे पूर्ण नाव : पाटील सुनिल तोंगल

२. हुद्दा : कनि७८ - लिपीक

३. कार्यरत असलेल्या शाळेचे/महाविद्यालयाचे नाव : विधी महाविद्यालय नंदुरबार

४. सेवा कालावधी : 3 वर्ष

५. शैक्षणिक पात्रता : B.A.

६. मोबाइल नंबर : 9657549424

७. संगणक कोर्स झालेला असल्यास कोर्स चे नाव :

८. टायपींग येत असल्यास (✓) ही खूण करा : ☐ मराठी ☑ इंग्रजी

संस्थेदवारे घेण्यात येणाऱ्या संगणक प्रशिक्षण कार्यशाळेत उपस्थित राहून प्रशिक्षण पूर्ण करण्यासाठी माझी संमती आहे.

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कर्मचाऱ्याचे नाव व सही

नंदुरबार तालुका विधायक समिती संचलित

गजमल तुळशीराम पाटील महाविद्यालय

शिक्षकेतर कर्मचारी संगणक प्रशिक्षण कार्यशाळा वर्ष २०१९-२०

नोंदणी अर्ज

१. कर्मचाऱ्याचे पूर्ण नाव : श्री० राजेंद्र भाऊराव पाटील

२. हुद्दा : मुख्य लिपीक

३. कार्यरत असलेल्या शाळेचे/महाविद्यालयाचे नाव : ग.तु.पाटील महाविद्यालय, नंदुरबार

४. सेवा कालावधी : २६ वर्षे

५. शैक्षणिक पात्रता : एम.कॉम II

६. मोबाइल नंबर : ९५०८९८११०८

७. संगणक कोर्स झालेला असल्यास कोर्स चे नाव : नाही

८. टायपींग येत असल्यास (✓) ही खूण करा : ☐ मराठी ☐ इंग्रजी

संस्थेद्वारे घेण्यात येणाऱ्या संगणक प्रशिक्षण कार्यशाळेत उपस्थित राहून प्रशिक्षण पूर्ण करण्यासाठी माझी संमती आहे.

श्री० राजेंद्र पाटील

कर्मचाऱ्याचे नाव व सही

नंदुरबार तालुका विधायक समिती संचलित

गजमल तुळशीराम पाटील महाविद्यालय

शिक्षकेतर कर्मचारी संगणक प्रशिक्षण कार्यशाळा वर्ष २०१९-२०

नोंदणी अर्ज

१. कर्मचाऱ्याचे पूर्ण नाव : श्रीमती ढाकणे एस. बी.

२. हुद्दा : ज्यु. क्लर्क

३. कार्यरत असलेल्या शाळेचे/महाविद्यालयाचे नाव : ग. तु. पाटील महाविद्यालय

४. सेवा कालावधी : २८ वर्ष

५. शैक्षणिक पात्रता : B.A.

६. मोबाइल नंबर : 9552718919

७. संगणक कोर्स झालेला असल्यास कोर्स चे नाव :

८. टायपींग येत असल्यास (✓) ही खूण करा : ☐ मराठी ☐ इंग्रजी

संस्थेद्वारे घेण्यात येणाऱ्या संगणक प्रशिक्षण कार्यशाळेत उपस्थित राहून प्रशिक्षण पूर्ण करण्यासाठी माझी संमती आहे.

[ढाकणे एस. बी.]

कर्मचाऱ्याचे नाव व सही

नंदुरबार तालुका विधायक समिती संचलित

गजमल तुळशीराम पाटील महाविद्यालय

शिक्षकेतर कर्मचारी संगणक प्रशिक्षण कार्यशाळा वर्ष २०१९-२०

नोंदणी अर्ज

१. कर्मचाऱ्याचे पूर्ण नाव : श्री राजु हिरामण पाटील

२. हुद्दा : प्रयोगशाळा - सहाय्यक

३. कार्यरत असलेल्या शाळेचे/महाविद्यालयाचे नाव : ग. तु. पाटील महाविद्यालय, नंदुरबार

४. सेवा कालावधी : २६ वर्ष.

५. शैक्षणिक पात्रता : एम. कॉम

६. मोबाइल नंबर : 9579031258

७. संगणक कोर्स झालेला असल्यास कोर्स चे नाव : _____

८. टायपींग येत असल्यास (✓) ही खूण करा : ☐ मराठी ☐ इंग्रजी

संस्थेद्वारे घेण्यात येणाऱ्या संगणक प्रशिक्षण कार्यशाळेत उपस्थित राहून प्रशिक्षण पूर्ण करण्यासाठी माझी संमती आहे.

[ ]

कर्मचाऱ्याचे नाव व सही

श्री. राजु हिरामण पाटील

नंदुरबार तालुका विधायक समिती संचलित

गजमल तुळशीराम पाटील महाविद्यालय

शिक्षकेतर कर्मचारी संगणक प्रशिक्षण कार्यशाळा वर्ष २०१९-२०

नोंदणी अर्ज

१. कर्मचाऱ्याचे पूर्ण नाव : रविंद्र तुकाराम वसुजर

२. हुद्दा : कनिष्ठ लिपीक

३. कार्यरत असलेल्या शाळेचे/महाविद्यालयाचे नाव : जी. टी. पाटील महाविद्यालय, नंदुरबार

४. सेवा कालावधी : 09/03/१९९३ पासून २७ वर्षे

५. शैक्षणिक पात्रता : M. Com., LL.M., steno, MSCIT, I.T.I

६. मोबाइल नंबर : 7875198275

७. संगणक कोर्स झालेला असल्यास कोर्स चे नाव : M.S.C.I.T.

८. टायपींग येत असल्यास (✓) ही खूण करा : ☑ मराठी ☑ इंग्रजी

संस्थेत्वारे घेण्यात येणाऱ्या संगणक प्रशिक्षण कार्यशाळेत उपस्थित राहून प्रशिक्षण पूर्ण करण्यासाठी माझी संमती आहे.

I रविंद्र तुकाराम वसुजर

कर्मचाऱ्याचे नाव व सही

Nandurbar Taluka Vidhayak Samiti's
G. T. PATIL ARTS COMMERCE AND SCIENCE COLLEGE,
NANDURBAR – 425412
NAAC ACCREDITED 'A' GRADE

Department of English

Prof. Dr V S Shrivastava
Principal

Date: 21/01/2019

1.Title of Event: University Level Workshop on Global skills

2. Introduction of the event: NTVS's G.T.Patil college, Nandurbar organised the University Level Workshop on Global Skills under the event 'DRUSHTI' hosted by Department of English from 21st to 23rd January 2019.Under this workshop the students learned more about global skills such as Communication and Collaboration ,Creativity and Critical Thinking ,Intercultural Competence and Citizenship ,Emotional Self-regulation and Wellbeing, Digital Literacies etc. Prof. Tejas Beldar and Dr.V Z Chaudhari delivered a talk on Global skills . Prof. Dinesh Deore host the workshop.

3. Duration: Three Days .

4. Place: Language Laboratory G. T. Patil College Nandurbar

5. Inaugurator/Chief Guest: Hon. Shri. Manojbhaiyya Raghuwanshi and dr. V S Shrivastava

6. Attendees: 240.

7. Particular activity: Workshop on Global Skills

8. Social inclusion/alliance: Department of English G.T.Patil College ,Nandurbar

9. Message to society: Importance of Digitalisation

10. Concluding Remarks: Taking into consideration the efforts of the department

NANDURBAR TALUKA VIDHNANDURBAR 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

Dr. V S Shrivastava
Principal

Office: (02564) 222293, 226534
E-Mail: gtpcollege@rediffmail.com
Web: www.ntvsgtpcollege.org

Date: 11 / 05 / 2021

Report

-Introduction of the event: On Line Workshop of MA/Msc Geography Syllabus Restructuring

- Duration: - One day
- Place: - G T Patil Arts, Commerce and Science College, Nandurbar
- Inaugurator: Hon. Manojbhaiyya Raghuvanshi
- Chief guest: - - Dr. V. J. Patil (Chairman BOS KBCNMU)

Guest of honors: - Dr. V.S. Shrivastava and Dr. M. J. Raghuvanshi

MA/MSc Geography Syllabus Restructuring Workshop was held in association with KBCNMU Jalgaon and GT Patil Arts Commerce and Science College, Nandurbar, in the said workshop, the syllabus of 12 papers were taught in both semesters of MA/MSc. The syllabus of Geography was discussed and a new syllabus was designed. The workshop was attended by professors from various colleges in the university area.

Sessions: - Three

Valedictory: - Dr. Sanjay Bhaise

Name and Signature of Coordinator

Name and signature of Principal with stamp

PRINCIPAL
GT Patil College,
Nandurbar-425412

Nandurbar Taluka Vidhayak Samiti's
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Prof. V. S. Shrivastava
Principal

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

Report

An online National Level Workshop on

"Entrepreneurship as a career choice"

Nandurbar Taluka Vidhayak Samiti's
G. T. PATIL ARTS COMMERCE AND SCIENCE COLLEGE, NANDURBAR – 425412
NAAC ACCREDITED 'A' GRADE
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Principal

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Website: ntvsgtpcollege.org

• About College -

Nandurbar Taluka Vidhayak Samiti Started first senior college in the town with faculties of Arts & Commerce in the year 1964. In the same college science faculty was opened in 1969. The College is recently developed under the able guidance of Late Hon.Dadasaheb Shri.Bhatesing K. Raghuwanshi, Ex-MLC and Chairman, N.T.V.S. Nandurbar.

The college is located in tribal district and the campus area is 29.49 acres. The college is recognized by the UGC 2(f) and 12(B) in April 1978.

During the year 2011-2012 the institution has celebrated Golden Jubilee of institution by organizing various programmes and it was inaugurated by the auspicious hands of Her Excellency Smt. Pratibha Devising Patil, President of India on 26th Feb, 2012, in the presence of Hon.Shri. K.Shankarnarayan, Governor of Maharashtra and Hon.Shri. Pruthviraj Chavan, Chief Minister, Maharashtra.

In the academic year 2013-14 college has got recognition as DST-FIST from Department of Science and Technology, New Delhi and sanctioned Rs.80 lakhs. The college is re-accredited with "A" grade in the year 2015 by the NAAC. Also the College has received excellent college award by North Maharashtra University, Jalgaon, in the year 2014-15. Recently our college has certified by ISO 9001:2008 (QMS). The college imparts degree education along with 11 post graduate programmes & 09 Ph.D. Programmes. The College is having academic facilities such as well equipped laboratories, rich library, botanical garden, gymnasium & play grounds. College is compatible to meet the local needs and the challenges for student that they have face to future.

• About KCIIL -

KBC-NMU centre for innovation, incubation and linkages (KCIIL) is established at Kavayitri Bahinabai Chaudhari North Maharashtra University (KBCNMU) Campus to promote innovation and create vibrant entrepreneurial ecosystem in the University. KCIIL aims to provide handholding support to students and start-ups to build and develop innovative solutions to address the socio-economic problems.

• KCIIL Offerings -

- Incubation infra support,
- Specialised facilities,
- Industry and investor connect,
- Grant Management,
- Patent and IP support, and
- Technical and business mentoring support.

Through this cell following activities will take place from time to time:

- Sessions by successful entrepreneurs/start-up founders,
- Session on various aspects of entrepreneurship,
- Information on activities related to entrepreneurship ecosystem will be shared periodically, and
- Virtual internship opportunities at KCIIL will be intimatedfrom time to time.

• Objectives of the Webinar -

- To create a vibrant local innovation ecosystem,
- To provide start-p/entrepreneurship supporting mechanism in college/institute,
- To prepare college/institute for competing on various platforms and achieve desirable outcomes of mutual growth,
- To develop better cognitive ability amongst arising innovators,
- To explore entrepreneurship opportunities through KCIIL,
- Entrepreneurship promotion through self-employment and talent utilization, wherein innovators would be supported and mentored to become successful entrepreneurs, and
- To spread awareness about innovation, incubation, linkages, business service providers, economic development entities, and the business community.

• Targeted Audience -

- Students
- Teachers
- Businessman
- Incubators
- House-makers
- Marketing persons

• Link to Join -

(E-Certificate will be issued for participants within 7 days)

• Our Inspiration •

Late Hon. Dadasaheb B.K. Raghuwanshi
(Ex-MLC & Former Chairman N.T.V.S., Nandurbar)

• Patrons •

Hon.Shri. Chandrakant B. Raghuwanshi
(Ex-MLC & Chairman N.T.V.S. Nandurbar)
Hon.Shri. Manoj B. Raghuwanshi
(Vice-Chairman N.T.V.S., Nandurbar)
Hon.Adv. Rajendra B. Raghuwanshi
(Former Additional Solicitor General of India
Director N.T.V.S., Nandurbar)
Hon.Shri. Yashwant D. Patil
(Secretary, N.T.V.S., Nandurbar)
Hon.Dr. Mahendra S. Raghuwanshi
(Co-ordinator, N.T.V.S., Nandurbar)

• President of the Webinar •

Prof.Dr. Vinod S. Shrivastava
(Principal, N.T.V.S.'s G.T. Patil College, Nandurbar)
Dr. Mahendra J. Raghuwanshi
(Vice-Principal, N.T.V.S.'s G.T. Patil College, Nandurbar)

• Convenor of the Webinar •

Dr. Manohar R. Patil
(Co-ordinator, KIEDC and Assistant Professor,
Dept. of Chemistry, G.T. Patil College, Nandurbar)
Mo. 8788762562

• Organising Secretories •

Dr. Gaurav R. Gupta
(Assistant Professor, Dept. of Chemistry,
G.T. Patil College, Nandurbar)
Mo. 9960227828
Dr. Anil N. Kulkarni
(Assistant Professor, Dept. of Physics,
G.T. Patil College, Nandurbar)
Mo. 9561564226
Dr. S.V. Mishra
(Assistant Professor, Dept. of Commerce,
G.T. Patil College, Nandurbar)
Mo. 9422288120

Nandurbar Taluka Vidhayak Samiti's
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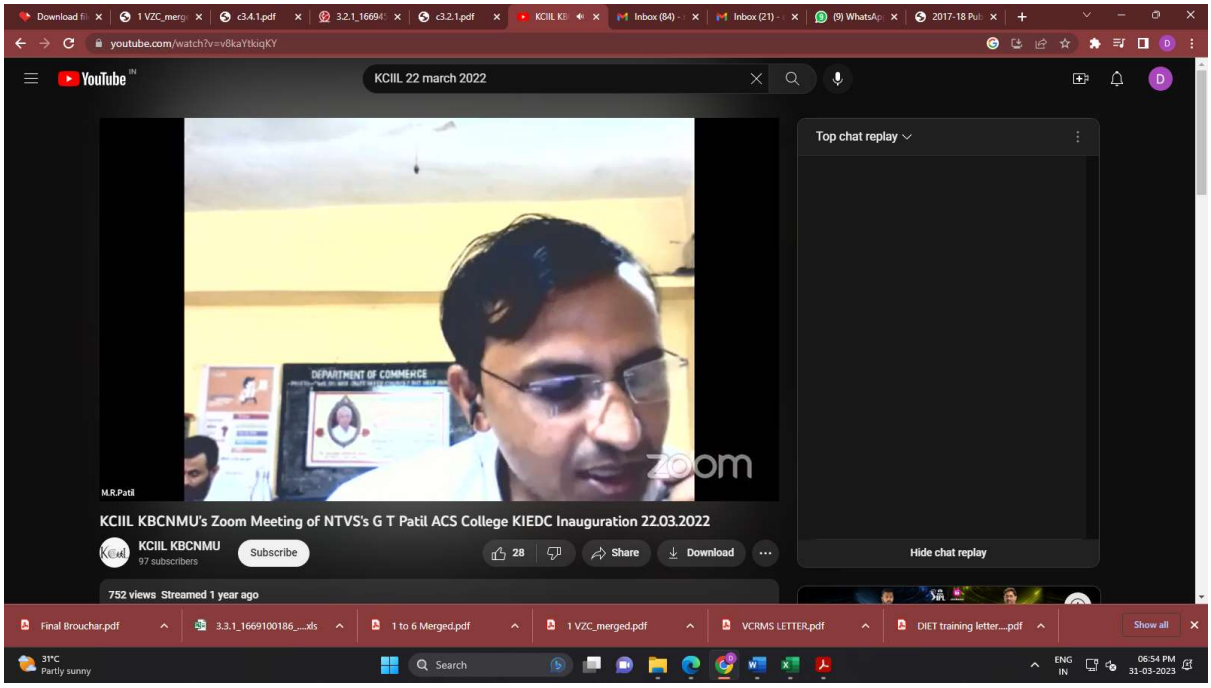
Website: ntvsgtpcollege.org
Prof. V. S. Shrivastava
Principal



Youtube Link: https://www.youtube.com/watch?v=v8kaYtkiqKY

(Prof. Dr. V. S. Shrivastava)
Principal
PRINCIPAL
G.T.Patil Arts,Commerce &
Science College
NANDURBAR - 425 412 (M.S.)

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Report

An online National Level Workshop on

"INTELLECTUAL PROPERTY RIGHTS AND PATENT FILLING"

Introduction of the event:

The workshop on Intellectual Property Rights and Patent Filling generally covers the following topics:

Introduction to Intellectual Property Rights (IPRs): The workshop starts with an introduction to the concept of IPRs, their significance, and how they protect the creative works of individuals and organizations.

Types of IPRs: The workshop then moves on to the different types of IPRs, such as patents, copyrights, trademarks, and trade secrets.

Patenting Process: The workshop provides a detailed understanding of the patenting process, including the steps involved in filling and prosecuting a patent application.

Patentability Criteria: The workshop also covers the various criteria that a patent application must meet to be granted a patent, including novelty, non-obviousness, and industrial applicability.

Patent Search: The workshop also provides an overview of the patent search process, which is critical for identifying existing patents and preventing infringement.

Patent Filling: The workshop then delves into the specifics of filling a patent application, including drafting the patent specification and claims.

1. **Date : 3RD August 2021**
- **Place : NTVS's G. T. Patil Arts Commerce and Science College, Nandurbar**
- **Inaugurator: Mr.Y.D.Patil (Secretary NTVS Nandurbar)**
- **Chief guest and Resource persons: 1) Prof. S.H. Sonawane, Professor, NIT, Warangal**
- **2) Prof. A. S. Deokate, Professor, J.M. Patel Arts, Commerce and**
- **Science College, Bhandara**
- **Guest of honour: Dr. M. G. Raghuwanshi, Co-Ordinator NTVS's**
- **Attendees with sheet of attendance at least: 111**

2. **Keynote: Dr. V. S. Shrivastava, Principal G.T.P. College Nandurbar**

3. **Sessions**: Two Sessions 1) 10:30 AM to 12:00 PM

4. **Organizer**: Internal Quality Assurance Cell (IQAC), Gajmal Tulshiram Patil Arts, Commerce and Science College , Nandurbar-425412

2) 12:00 : 1:30 PM

5. Presentations: Workshop was conducted in two sessions. The presentation was conducted through zoom plateform.

6. Valedictory: **Dr. M.J.Raghuwanshi (Vice principal) , Dr.M.R.Patil, Dr.G. R. Gupta**

7. **Concluding Remarks:** A workshop on Intellectual Property Rights and Patent Filling is an excellent opportunity for individuals and organizations to learn about the different types of IPRs, the patenting process, and how to develop an effective patent strategy to protect their innovations and creative works.

News and Photographs of the IPR Workshop:

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पाटील महाविद्यालयात ऑनलाईन कार्यशाळा

नंदुरबार (प्रतिनिधी)- येथील ग.तु.पाटील महाविद्यालयात इन्टेलेच्युअल प्रॉपर्टी राईटस् पेटंट फाईलिंग याविषयावर ऑनलाईन कार्यशाळा घेण्यात आली. यावेळी कॉपीराईड कायदा याविषयी चर्चासत्रातुन मार्गदर्शन करण्यात आले.

कार्यशाळेचे उद्घाटन नंताविसचे समन्वयक डॉ.एम.एस.रघुवंशी यांच्या हस्ते करण्यात आले. कार्यशाळेसाठी वक्ता म्हणुन भंडारा महाविद्यालयाचे प्रा.ए.एस.देवकाते, वरणगाल एनआयटीआयचे प्रा.एच.एस.सोनवणे उपस्थित होते. यावेळी प्रा.देवकाते यांनी कॉपीराईट कायदा तर प्रा.सोनवणे यांनी पेटंट फाईलिंग विषयी माहिती दिली. प्रास्ताविक प्राचार्य डॉ.व्ही.एस.श्रीवास्तव यांनी केले. कार्यशाळेचे समन्वयक म्हणुन उपप्राचार्य एम.जे.रघुवंशी यांनी काम पाहिले. सूत्रसंचलन प्रा.डॉ.एम.आर. पाटील यांनी केले. यशस्वीतेसाठी डॉ.एस.व्ही.मिश्रा, डॉ.व्ही.झेड. चौधरी, डॉ.योगेश मराठे, डॉ.जी.आर.गुप्ता, डॉ.पी.एस.पाटील आदींनी परिश्रम घेतले.

(Prof. Dr. V. S. Shrivastava)
Principal
PRINCIPAL
G.T.Patil Arts,Commerce &
Science College
NANDURBAR - 425 412 (M.S.)

Name and signature of Coordinator
Principal with stamp

ग.तु.पाटील महाविद्यालयात रोल ऑफ स्पोर्ट्स अण्ड आर्म फोर्सेस इन नॅशनल इंटिग्रेशन या विषयावर राष्ट्रीय बेविनार

नंदुरबार (प्रतिनिधी)- येथील ग.तु. पाटील महाविद्यालय क्रीडा विभाग व राष्ट्रीय छात्र सेना विभागा तर्फे रोल ऑफ स्पोर्ट्स अंड आर्म फोर्सेस इन नॅशनल इंटिग्रेशन या विषयावर राष्ट्रीय वेबीनारचे आयोजन करण्यात आले होते.

सदर वेबीनार साठी मार्गदर्शक म्हणून विजय निकेतन महाविद्यालय आंध्र प्रदेश येथील प्रा.जोगी प्रसाद तर इंडियन नेव्हीचे रिटायर कमांडर व श्रीधर विद्यापीठाचे कुलगुरू कमांडर डॉ.भूषण दिवाण यांनी मार्गदर्शन केले. वेबिनारचे उद्घाटन एम.एस.एम.महाविद्यालय औरंगाबाद येथील प्रा.डॉ.मकरंद जोशी यांनी केले व त्यांनी मनोगतात खेळ हे राष्ट्रीय एकात्मता दर्शवण्यासाठी उत्तम व्यासपीठ आहे तसेच खेळ व्यक्तीमध्ये संघटनाची भावना निर्माण करतो, असे प्रतिपादन केले. महाविद्यालयाचे प्राचार्य डॉ.व्ही.एस.श्रीवास्तव अध्यक्षस्थानी होते. उपप्राचार्य डॉ.महेंद्र रघुवंशी यांनी मनोगतात खेळ व सशस्त्र सेना यांची राष्ट्रीय एकात्मतासाठी असलेले योगदान सखोल व ज्वलंत

अशी उदाहरणे देऊन उपस्थितांना मार्गदर्शन केले. क्रीडा संचालक डॉ.तारक दास यांनी प्रस्तावना व वेबिनार घेण्याचे उद्दिष्टे मांडली. तांत्रिक सत्रात प्रा.जोगी प्रसाद यांनी रोल ऑफ स्पोर्ट्स इन नॅशनल इंटिग्रेशन विषयावर मार्गदर्शन करीत खेळ भावना खेळाडूंना व व्यक्तींना बांधून ठेवण्याचे काम करते, असे प्रतिपादित करत मार्गदर्शन केले. अध्यक्षस्थानी प्राचार्य भरत चालसे होते. त्यांनी सांगितले की ओलंपिक व पंडेमिक हे दोघेही गोष्टी राष्ट्रीय एकात्मतेसाठी पूरक कशात ठरल्या यावर मंथन केले व उत्तम सादरीकरणासाठी वक्त्यांचे कौतुकही केले. दुसऱ्या तांत्रिक सत्रात कमांडर भूषण दिवाण यांनी राष्ट्रीय एकात्मता व मिल्ट्री फॉर्सेस यांचे धडे १९७१ चे युद्ध व इतर युद्ध ज्यात सर्जिकल स्ट्राइक, गलवान अशा विविध गोष्टींचे अनुभव सांगितले व राष्ट्रीय एकात्मता देशाची महानता टिकवण्यासाठी गरजेची आहे, असे प्रतिपादन केले. अध्यक्षस्थानी विधी महाविद्यालयाचे प्राचार्य डॉ.एन.डी.चौधरी यांनी राष्ट्रीय एकात्मता क्रीडाक्षेत्र व सशस्त्र सेना यांचा पाया आहे, ज्यातून सर्वसामान्यांना प्रेरणा मिळत असते, असे आपल्या मनोगतात व्यक्त केले. सदर वेबिनारास जवळजवळ १० राज्यातून तीनशे जणांनी सहभाग नोंदविला. कार्यक्रमाचे समन्वयक म्हणून डॉ.तारक दास तर सहाय्यक समन्वयक म्हणून एनसीसीचे प्रमुख लेफ्ट.डॉ.विजय चौधरी यांनी परिश्रम घेतले. तसेच तांत्रिक सहकार्य डॉ.स्वप्निल मिश्रा, संगणक विभागाचे प्रा.निलेश चव्हाण यांनी केले. कार्यक्रमाच्या यशस्वीतेसाठी डॉ.दिनेश देवरे व डॉ.धगधगे, डॉ.माधव कदम, डॉ.अमोल भूयार यांनी परिश्रम घेतले.

अभिषेक सूर्यवंशी उच्च शिक्षणासाठी अमेरिकेला रवाना

तळोदा (प्रतिनिधी)- येथील सुपुत्र अशोक राजकपुर सूर्यवंशी हे उच्च शिक्षणासाठी अमेरिकेला रवाना झाले आहेत.

अमेरिकेतील उच्च शिक्षणासाठी अभिषेक राजकपुर सूर्यवंशी यांची निवड झाली. कोलोरॅडो बोल्डर विद्यापीठात हजारो भारतीय विद्यार्थ्यांपैकी अभिषेक सूर्यवंशींची निवड निवड झाली आहे. त्यांनी यापूर्वी मुंबई येथील व्हीजेटीआय विद्यापीठातुन बीटेक इलेक्ट्रॉनिकची पदवी घेतली आहे. या उच्च अभ्यासक्रमासाठी रिलायन्स जिओमध्ये टेलीकम्युनिकेशन ऑफीसर म्हणुन निवड झाली आहे. अभिषेक सूर्यवंशी हे सेवानिवृत्त मुख्याध्यापक राजकपुर महाजन यांचे चिरंजीव आहेत.

DISTRICT LEGAL SERVICES AUTHORITY, NANDURBAR

(DISTRICT COURT, TOKAR-TALAV ROAD, NANDURBAR)
Ph. No- 02564/210710, E-mail - dlsa.nandurbar@rediffmail.com

Date : 11/10/2021

To,

Dr. Amol Bhuyar

NSS Program officers

G.T.Patil College Nandurbar.

This is to certify that, on 09/10/2021 the NSS department of G.T.Patil Art, Commerce and Science College organised webinar on POCSO Act, 2012 in collaboration with District Legal Services Authourity, Nandurbar. This program helped to create awareness about the provisions of protection of children form sexual offences (POCSO) Act, 2012.

Yours faithfully,

11.10.21

(D.V.Harne)
Secretary,DLSA,
Nandurbar.