University of Mumbai

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विद्याविषयक प्राधिकरणे
सभा आणि सेवा विभाग(ए.ए.एम.एस)
रूम नं. १२८ एम.जी.रोड, फोर्ट,
मुंबई – ४०० ०३२
टेलिफोन नं - ०२२ - ६८३२००३३

(नॅक पुनर्मूल्यांकनाद्वारे ३.६५ (सी.जी.पी.ए.) सह अ++ श्रेणी
विद्यापीठ अनुदान आयोगाद्वारे श्रेणी १ विद्यापीठ वर्जा)

क.वि.प्रा.स.से./आयसीडी/२०२५-२६/३७ दिनांक : २७ मे, २०२५

परिपत्रक:-

सर्व प्राचार्य/संचालक, संलग्नित महाविद्यालये/संस्था, विद्यापीठ शैक्षणिक विभागांचे संचालक/ विभाग प्रमुख यांना कळविण्यात येते की, राष्ट्रीय शैक्षणिक धोरण २०२० च्या अमंलबजावणीच्या अनुषंगाने **शैक्षणिक वर्ष २०२५-२६** पासून **पदवी व पदव्युत्तर अभ्यासक्रम** विद्यापरिषदेच्या दिनांक २८ मार्च २०२५ व २० मे, २०२५ च्या बैठकीमध्ये मंजूर झालेले सर्व अभ्यासक्रम मुंबई विद्यापीठाच्या www.mu.ac.in या संकेत स्थळावर NEP २०२० या टॅब वर उपलब्ध करण्यात आलेले आहेत.

(डॉ. प्रसाद कारंडे)
कुलसचिव

मुंबई – ४०० ०३२
२७ मे, २०२५

AC – 20/05/2025
Item No. – 6.17 (N)

As Per NEP 2020

University of Mumbai

Syllabus for Major Vertical – 1 & 4 (Scheme – III)		
Name of the Programme – B.Sc. (Chemistry)		
Faculty of Science		
Board of Studies in Chemistry		
U.G. Second Year Programme	**Exit Degree**	**U.G. Diploma in Chemistry**
Semester		**III & IV**
From the Academic Year		**2025-26**

University of Mumbai

(As per NEP 2020)

Sr. No.	Heading	Particulars
1	**Title of program** **O:_____**	**B.Sc. (Chemistry)**
2	**Exit Degree**	**U.G. Diploma in Chemistry**
3	**Scheme of Examination** **R: _____**	NEP 40% Internal 60% External, Semester End Examination Individual Passing in Internal and External Examination
4	**Standards of Passing** **R: _____**	**40%**
5	**Credit Structure** **R: SU - 525 C (III)** **R: SU - 525 D (III)**	**Attached herewith**
6	**Semesters**	**Sem. III & IV**
7	**Program Academic Level**	**5.00**
8	**Pattern**	**Semester**
9	**Status**	**New**
10	**To be implemented from Academic Year**	**2025-26**

Sd/-	**Sd/-**	**Sd/-**
Sign of **Dr. Sunil Patil** **Coordinator,** **Board of Studies in Chemistry**	**Sign of** **Prin. (Dr.) Madhav Rajwade** **Offg. Associate Dean,** **Faculty of Science and Technology**	**Sign of** **Prof. (Dr.) Shivram Garje** **Offg. Dean,** **Faculty of Science and Technology**

Under Graduate Diploma in Chemistry

Credit Structure (Sem. III & IV)

	R:_____C								
Level	**Semester**	**Major**		**Minor**	**OE**	**VSC, SEC (VSEC)**	**AEC, VEC, IKS**	**OJT, FP, CEP, CC,RP**	**Cum. Cr. / Sem.**	**Degree/ Cum. Cr.**
		Mandatory	**Electives**							
5.0	III	6 **Paper I: S3MJ3**: Progressive Physical and Analytical Chemistry I **Paper II:** Theory **S3MJ4**: Progressive Inorganic and Organic Chemistry I **Practical I: S3MJCHP3**: Chemistry Practical 3		4	4	SEC: 2, Skills in Chemistry Synthesis of Nanoparticles	AEC:2	CC: 2 CEP/ FP: 2	22	**UG Diploma 88**
	R:_____D									
	IV	**Paper I: S3MJ5**: Progressive Physical and Analytical Chemistry II **Paper II:** Theory **S3MJ6**: Progressive Inorganic and Organic Chemistry II **Practical I: S3MJCHP4**: Chemistry Practical 4		4	4	VSC:2 Water and Soil Analysis	VEC: 2	CC: 2 CEP/ FP: 2	22	
	Cum Cr.	12		08	08	06	04	04	44	
Exit option; Award of UG Diploma in Major and Minor with 80-88 credits and an additional 4 credits core NSQF course/ Internship OR Continuewith Major and Minor										

[Abbreviation - OE – Open Electives, VSC – Vocation Skill Course, SEC – Skill Enhancement Course, (VSEC), AEC – Ability Enhancement Course, VEC – Value Education Course, IKS – Indian Knowledge System, OJT – on Job Training, FP – Field Project, CEP – Community Engagement Project, CC – Co-Curricular, RP – Research Project]

Sem. - III

Vertical - 4

SEC

Syllabus
B.Sc. (Chemistry)
(Sem.- III)

Title of Paper Skills in Chemistry (S3SECCH31)

Sr. No.	Heading	Particulars
1	**Description the course :**	To equip chemistry students with the practical knowledge for the preparation of personal hygiene and cosmetic products. The course is useful for the students to learn laboratory skills for the preparation of the products, survey and general analysis of such products.
2	**Vertical :**	Skill Enhancement Course (SEC)
3	**Type :**	Practical
4	**Credit**:	2 credits (1 credit = 15 Hours for Theory or 30 Hours of Practical work in a semester)
5	**Hours Allotted :**	60 Hours
6	**Marks Allotted**:	50 Marks
7	**Course Objectives**:	

1.	To introduce students to the fundamental techniques of formulating everyday cosmetic and personal care products.
2.	To develop hands-on laboratory skills in the preparation of various cosmetic formulations.
3.	To impart knowledge on quality assessment techniques such as solubility testing, moisture analysis, viscosity, pH measurement, and foaming ability.
4.	To enable learners to analyze the physicochemical properties of cosmetic products using instrumental and classical methods.
5.	To provide experience in interpreting cosmetic product labels, ingredient functionalities, and regulatory compliance.
6.	To foster comparative and critical thinking skills by analyzing and benchmarking various commercial cosmetic brands.

8 **Course Outcomes**:

CO 1.	Formulate various cosmetic products using standard laboratory protocols.
CO 2.	Perform chemical and physical analyses of cosmetic products.
CO 3.	Compare foaming abilities of shampoo brands using experimental methods.
CO 4.	Determine active ingredient concentrations and interpret efficacy.
CO 5.	Conduct surveys on product labels and ingredient lists.
CO 6.	Evaluate and compare product performance across brands.

9 Modules:

Semester	Module	Description	Hours	Credits
IV	**Unit I**	Preparation	6 (Sessions) * 4 (hours) = 24	**02**
	Unit II	Analysis	6 (Sessions) * 4 (hours) = 24	
	Unit III	Surveys	3 (Sessions) * 4 (hours) = 12	
			Total = 60 Hours	

Unit	Description	Hours
I	Preparations (Any 6) 1.1. To prepare the Talcum Powder. 1.2. To prepare the Bath Soap. 1.3. To prepare the Shampoo. 1.4. To prepare the Nail Polish. 1.5. To prepare the Nail Polish Remover. 1.6. To prepare Hand Wash. 1.7. To prepare Hand Sanitizer. 1.8. To prepare Hand Cream. 1.9. To prepare Body Lotion 1.10. To prepare after Shave Lotion.	4Hours each practical 6 * 4 = 24
II	Analysis 2.1. To determine the amount of matter insoluble in boiling water of the given material. 2.2. To determine the moisture, volatility and to test the solubility of the color in the given material. 2.3. To study the comparative foaming ability of the various Shampoo brands using Cylinder Shake Method. 2.4. To measure the pH of the sample of a cosmetic products using pH meter. 2.5. To determine the relative viscosity of a given liquid product using Ostwald Viscometer. 2.6. To determine the concentration of Thioglycolic acid in a given Depilatories.	4 Hours each practical 6 * 4 = 24
III	Surveys 3.1. To carry out the survey of given cosmetic product's label. 3.2. To carry out the study of ingredients in given cosmetic products. 3.3. To determine and compare the melting points of the Lipstick of various brands using slip melting point method.	4 Hours each practical 3 * 4 = 12

10 Reference Books:

1) Barel, A. O.; Paye, M.; Maibach, H. I. (2014), Handbook of Cosmetic Science and Techology, CRC Press.

2) Garud, A.; Sharma, P. K.; Garud, N. (2012), Text Book of Cosmetics, Pragati Prakashan.

3) Gupta, P. K.; Gupta, S. K. (2011), Pharmaceutics and Cosmetics, Pragati Prakashan

4) Butler, H. (2000), Poucher's Perfumes, Cosmetics and Soap, Springer

	5) Kumari, R. (2018), Chemistry of Cosmetics, Prestige Publisher. **6)** Formulation Guide for cosmetics; The Nisshin Oillio Group, Ltd. **7)** US Patent, 4,735,798 Apr. 5, 1988.	
12	**Internal Continuous Assessment: 40%**	**External, Semester End Examination 60% Individual Passing in Internal and External Examination**
13	**Continuous Evaluation through:** Quizzes, Class Tests, presentation, project, role play, creative writing, assignment etc.(at least 3)	

Syllabus
B.Sc. (Chemistry)
(Sem.- III)

Title of Paper: Synthesis of Nanoparticles (S3SECCH32)

Sr No	Heading	Particulars
1	**Description of the Course**	This course aims to provide chemistry students with practical knowledge and laboratory skills in the preparation and analysis of nanoparticles (NPs). This course provides hands-on experience in the preparation, analysis, and application of nanoparticles (NPs) for various practical purposes. The course also covers the survey and general analysis of such products, equipping students with the essential techniques for understanding and creating innovative products in the industry.
2	**Vertical**	Skill Enhancement Course
3	**Type**	Practical based
4	**Credits**	2 Credits
5	**Hours Allotted**	60 Hours (15 Practical of 4 Hours duration)
6	**Marks Allotted**	50 Marks
7	**Course Objectives**	
	1.	Introduce students to the basic concepts of nanoscience, including nanoscale materials, properties, and applications.
	2.	Explore chemical, physical, and biological methods for nanoparticle synthesis.
	3.	Highlight eco-friendly and sustainable methods for synthesizing nanoparticles using plant extracts, microorganisms, and biomaterials.
	4.	Introduce students to techniques such as UV-Vis spectroscopy, Dynamic Light Scattering (DLS), X-ray Diffraction (XRD), and Scanning Electron Microscopy (SEM) for analyzing nanoparticles.
	5.	Discuss real-world applications such as water purification and catalysis.
	6.	Encourage students to develop laboratory skills for synthesizing and characterizing nanoparticles.
	7.	Discuss emerging trends and future scope in nanotechnology.
8	**Course Outcomes (CO):**	
	CO 1.	Explain the fundamental principles of nanoscience, the nanoscale effect, and the importance of nanoparticles in various domains.
	CO 2.	Explain the fundamental principles of nanoscience, the nanoscale effect, and the importance of nanoparticles in various domains.
	CO 3.	Utilize characterization tools such as UV-Vis spectroscopy, Dynamic Light Scattering (DLS), X-ray Diffraction (XRD), and Scanning Electron Microscopy (SEM) to analyze the properties of synthesized nanoparticles.
	CO 4.	Follow laboratory safety protocols for nanoparticle synthesis and handling.
	CO 5.	Conduct hands-on experiments to synthesize and characterize nanoparticles, enhancing laboratory and analytical skills.
	CO 6.	Integrate knowledge from chemistry, physics, and biology to explore emerging trends in nanotechnology.

9 9. Modules

Semester	Module	Description	Hours	Credits
IV	**Unit I**	Preparation	6 (Sessions) * 4 (hours) = 24	**02**
	Unit II	Analysis	6 (Sessions) * 4 (hours) = 24	
	Unit III	Surveys	3 (Sessions) * 4 (hours) = 12	
			Total = 60 Hours	

Unit	Description	Hours
I	Preparations (Any 6) 1.1. To prepare ZnO nanoparticles using sol gel method. 1.2. To remove methylene blue dye using ZnO nanoparticles. 1.3. To study the effect of particle size on optical properties of ZnO NPs. 1.4. To study the photocatalytic degradation of methylene blue dye using TiO_2 nanoparticles under UV light. 1.5. To encapsulate TiO_2 nanoparticles within a chitosan biopolymer matrix and study their stability.	4 Hours each practical 6 * 4 = 24
II	Analysis 2.1. To analyze the weight loss of ZnO nanoparticles as a function of temperature and determine their thermal stability using TGA data. 2.2. To determine the size of ZnO NPs using Debye-Scherrer formula using XRD data. 2.3. To identify the ZnO crystal structures of materials using X-ray diffraction (XRD) spectra. 1.4. To compare the UV absorption of regular sunscreen and nano-based sunscreen using a UV lamp.	4 Hours each practical 6 * 4 = 24
III	Surveys 3.1. To study different synthesis methods for nanoparticles and compare their efficiency and applications. 3.2. To find the toxicity, environmental impact, and safe handling practices for ZnO and TiO_2 nanoparticles. 3.3. To explore the use of nanoparticles in drug delivery and evaluate their advantages in medicine. 3.4. To investigate how nanoparticles are used in improving the efficiency of solar cells. 3.5. To explore the role of ZnO & TiO_2 nanoparticles in cosmetics and personal care products.	4 Hours each practical 3 * 4 = 12

10 References:

1) Gleiter, H. (2007). *Nanomaterials: An Introduction to Synthesis, Properties, and Applications*. Wiley-VCH.
2) *Pundlik Ware, Mujahid Khan, Navinchandra Shimpi,* Synthesis of ZnO nanoparticles using peels of *Passiflora foetida* and study of its activity as an efficient catalyst for the degradation of hazardous organic dye, SN Applied Sciences, 2021.
3) Xu, J., Zhang, W., & Li, X. (2018). *Synthesis of ZnO nanoparticles by sol-gel method and*

their photocatalytic properties. Journal of Nanomaterials, 2018, 2837264.

4) Zhang, X., Yang, C., & Ma, X. (2013). *Efficient removal of methylene blue from aqueous solutions using ZnO nanoparticles as photocatalysts*. Journal of Hazardous Materials, 260, 134-141.

5) Zhao, J., & Huo, Z. (2011). *Size-dependent optical properties of ZnO nanoparticles and their applications in photocatalysis.* Journal of Nanomaterials, 2011, 853727.

6) Karthik, R., & Gopal, K. (2014). *Photocatalytic degradation of methylene blue using TiO_2 nanoparticles under UV light.* Environmental Progress & Sustainable Energy, 33(3), 687-694.

7) Venkatesan, J., & Manivasagan, P. (2015). *Fabrication and characterization of TiO_2 nanoparticle-loaded chitosan-based nanocomposites for biomedical applications.* Marine Drugs, 13(3), 1136-1154.

8) Zhang, H., & Lee, S. (2016). *Encapsulation of TiO_2 nanoparticles within biopolymers: Stability and applications in biomedical and environmental fields.* Journal of Applied Polymer Science, 133(33), 43947.

9) M.A. Green, & M. J. Keevers. (2005). *Nanostructured Materials for Solar Energy Applications*. Elsevier.

10) **Bohm, A.**, & **Smith, D.** (2014). *Thermogravimetric Analysis of Nanoparticles and Composite Materials*. Elsevier.

11) **M. J. Seitz, & M. S. Shoham**. (2011). *Characterization of Nanomaterials Using X-ray Diffraction Techniques*. Elsevier.

12) R. V. Patel, & K. N. Patel. (2016). *Determination of Particle Size of ZnO Nanoparticles Using X-ray Diffraction (XRD) and Debye-Scherrer Formula*. Journal of Nanomaterials, 2016, 8236984.

13) **Stokes, A.R.**, & **Wilson, A.J.C.** (2018). *X-ray Diffraction and the Analysis of Materials*. Springer.

14) M. D. Mahajan, & P. R. Joshi. (2014). *XRD Analysis of ZnO Nanoparticles: Crystal Structure and Size Determination*. Journal of Nanomaterials, 2014, 519045.

15) **K. R. P. Sundararajan**, & **V. S. Kumar**. (2019). *Nanotechnology in Cosmetics and Sunscreens: Materials and Applications*. Wiley.

16) J. M. Gonzalez, & P. R. Mercado. (2017). *Comparing UV Absorption in Regular vs. Nano-based Sunscreens under UV Light*. Journal of Photochemistry and Photobiology, 187(3), 467-474.

17) Gleiter, H. (2007). Nanomaterials: An Introduction to Synthesis, Properties, and Applications. Wiley-VCH.

18) Zhang, L., & Wang, M. (2016). A Survey on Different Methods of Nanoparticle Synthesis and Their Applications. Journal of Nanoscience and Nanotechnology, 16(4), 429-437.

19) Colvin, V.L., & Schmid, K. (2012). *Environmental and Health Impacts of Nanomaterials*. Wiley-VCH.

20) Zhang, Q., & Liu, Q. (2018). Toxicological Effects of ZnO and TiO_2 Nanoparticles: Mechanisms, Applications, and Environmental Impacts. Nanotoxicology, 12(3), 147-157.

21) G. A. Patil, & D. Patil. (2015). Nanoparticle-Based Drug Delivery Systems for Cancer Treatment. Drug Delivery, 22(2), 105-117.

22) Mukherjee, P., & L. Mohan (2015). *Nanotechnology in Cosmetics: Applications and Innovations*. Wiley-VCH.

23) A. R. Kummari, & G. D. Patel. (2016). Nanoparticles in Cosmetics: Role of TiO_2 and

	ZnO in Skin Protection. Cosmetics and Toiletries, 31(7), 12-19.

12	**Internal Continuous Assessment: 40%**	**External, Semester End Examination 60% Individual Passing in Internal and External Examination**
13	**Continuous Evaluation through:** Quizzes, Class Tests, presentation, project, role play, creative writing, assignment etc.(at least 3)	

Vertical - 4
VSC

Syllabus
B.Sc. (Chemistry)
(Sem.- IV)

Title of Paper: Soil and Water Analysis (S3VSCCH41)

Sr No	Heading	Particulars
1	**Description of the Course**	This vocational skill course provides practical, hands-on training in the chemical and physical analysis of soil and water—two essential natural resources that are vital for agriculture, environmental management, and sustainable development. The course equips students with the knowledge and skills necessary to evaluate soil fertility, water quality, and environmental health utilizing classical titrimetric methods, gravimetric analysis, and modern instrumental techniques such as conductometry, spectrophotometry, and pH measurement. Students will acquire the ability to conduct key laboratory tests, interpret analytical data, and prepare comprehensive practical reports, which include the preparation of soil health cards and the utilization of soil and water analysis kits.
2	**Vertical**	Vocational Skill Course (VSC)
3	**Type**	Practical
4	**Credits**	02
5	**Hours Allotted**	60 Hours
6	**Marks Allotted**	50 Marks
7	**Course Objective:** 1.To develop a basic understanding of soil qualities 2. To develop the ability to use principles of soil chemistry for soil treatment 3. To understand soil quality control in the natural systems 4. To develop a basic understanding of water quality. 5. To develop ability to use principles of water chemistry for water treatment and water quality control in the natural systems.	
8	**Course Outcomes (CO):-** **After completing the course, students will able to-** 1. Identify the quality of soil of the surroundings. 2. Develop the environmental control plan for environment pollution problem. 3. Classify the various samples of soil according to their purity. 4. Discover the various components of soil. 5. Analyse the different type of pollutants present in the water samples. 6. Bring the awareness among the people. 7. Provide suggestions to the concern authorities.	

9	**Module** **Perform the following practical's (Any Ten)** 1 To measure organic matter and moisture content of soil using redox titration. 2. To find Alkalinity of different types of soil sample by acid-base titration. 3. Estimation of water holding capacity of soil by gravimetry 4. Measurement of electrical conductivity of the soil sample by using Electrical conductivity meter. 5. To estimate bulk density and particle density of the soil sample using specific gravity bottle. 6. Preparation of the soil health card and demonstration of soil Analysis Kit. 7. Determination of pH of Water using pH meter (electrometrically) 8. To Measure the conductivity of water sample using Conductometer. 9. Estimation of the acidity of water sample titrimetrically. 10. Analysis of carbonate and bicarbonate of water sample by titration with HCl. 11. Estimation of chloride present in water sample by Argentometry 12. Evaluate of sulphate present in given water sample by turbidimetry. 13. Determination of nitrate present in given water sample by spectrophotometry. 14. To measure dissolved oxygen (DO) in water sample using Winkler's (azide modification) method
10	**Reference Books:-** 1. Soil and air analysis by S.K. Maiti. 2. A comprehensive laboratory manual for Environmental Sciences and Engineering By P.R. Sreemahadevan Pillai. New Age International Publishers. 3. Maiti, S.K. (2002): Chemical analysis of soil. In Handbook of methods in Environmental studies A.B.D. Publishers 4. Introduction to soil laboratory manual-J.J. Harset stipes. 5. Introduction to soil science laboratory manual, Palmer and troch-Lowa state. 6. Sarkar, D.; Haldar, A. Physical and Chemical Methods in Soil Analysis, 2nd Ed., New Age International (2010). 7. Saha, A. K. Methods of Physical and Chemical Analysis of Soil, Kalyani Publishers (2008). 8. APHA, Standard Methods for the Examination of Water, Sewage and Industrial Wastes. 20th Ed., American Public Health Association: Washington, USA (1995). 9. Water in water, a book about a water cycle By Miranda Paul, 2015. 10. Liptak, B.G. Environmental Engineers Handbook, Vol. II, Water Pollution, Chilton Book Company, U.S.A. 11. Mason, F.C. Biological Effects of Water Pollution. 12. De, A. K, (1998); Environmental Chemistry (3rd edn.), Wiley Eastern India Ltd. 13. Bureau of Indian Standards (BIS) 10500-91: Specification for drinking water, Indian Standard Institution (Bureau of Indian Standard), New Delhi: 14. APHA, AWWA (1998): Standard methods for the examination of water and waste water (20th edn.). American Public Health Association, Washington D. C. 15. Goel, P.K. (1997): Water Pollution Causes, Effects and Control, New Age International (P) Ltd., Pub. New Delhi. 16. Indian Standard Institution (ISI) (1983): ISI specification of drinking water, IS-10500. 17. Kudesia V.P. and R. Kudesia (1998): Water pollution Pragati Prakashan,

	18. NEERI (1981): A course manual of water and wastewater analysis. National Environmental Engineering and Research Institute, Nagpur. 19. WHO (2006): Guidelines for Drinking water Quality, World Health Organization, Incorporating First Addendum to Third Edition-Volume 1 20. Trivedy, R.K. and P.K. Goel (1986): Chemical and biological methods for water pollution studies, Environ. Publ., Karad, India.	
12	**Internal Continuous Assessment: 40%**	**External, Semester End Examination 60% Individual Passing in Internal and External Examination**
13	**Continuous Evaluation through:** Quizzes, Class Tests, presentation, project, role play, creative writing, assignment etc.(at least 3)	

Examination Pattern for Vocational Skill Courses (VSC) and Skill Enhancement Courses (SEC)

Practical	Credit	No. of Hours	Marks
	02	60	50

Internal Continuous Assessment: 40% (20 Marks)	Practical Examination: 60% (30 Marks)
Continuous Evaluation through: Presentation, project, creative writing, Industrial Visit report submission (at least 1) (10 Marks) and Survey Reports (any two) (10 Marks)	**Practical Journal: 05 Marks** **Practical on Unit I or Unit II: 25 Marks**
Individual Passing in Internal and External Examination	

Letter Grades and Grade Points:

Semester GPA/ Programme CGPA Semester/ Programme	% of Marks	Alpha-Sign/ Letter Grade Result	Grading Point
9.00 - 10.00	90.0 - 100	O (Outstanding)	10
8.00 - < 9.00	80.0 - < 90.0	A+ (Excellent)	9
7.00 - < 8.00	70.0 - < 80.0	A (Very Good)	8
6.00 - < 7.00	60.0 - < 70.0	B+ (Good)	7
5.50 - < 6.00	55.0 - < 60.0	B (Above Average)	6
5.00 - < 5.50	50.0 - < 55.0	C (Average)	5
4.00 - < 5.00	40.0 - < 50.0	P (Pass)	4
Below 4.00	Below 40.0	F (Fail)	0
Ab (Absent)	-	Ab (Absent)	0

Sd/-
Sign of
Dr. Sunil Patil
Coordinator,
Board of Studies in Chemistry

Sd/-
Sign of
Prin. (Dr.) Madhav Rajwade
Offg. Associate Dean,
Faculty of Science and Technology

Sd/-
Sign of
Prof. (Dr.) Shivram Garje
Offg. Dean,
Faculty of Science and Technology