



॥ सा विद्या या विमुक्तये ॥

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

'ज्ञानतीर्थ', विष्णुपुरी, नांदेड - ४३१ ६०६ (महाराष्ट्र राज्य) भारत

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

'Dnyanteerth', Vishnupuri, Nanded - 431 606 (Maharashtra State) INDIA

Established on 17th September, 1994, Recognized By the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'B++' grade

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विज्ञान व तंत्रज्ञान विद्याशाखे अंतर्गत
राष्ट्रीय शैक्षणिक धोरण-२०२० नुसार
पदवी तृतीय वर्षाचे अभ्यासक्रम
(Syllabus) शैक्षणिक वर्ष २०२६-२७
पासून लागू करण्याबाबत.

परिपत्रक

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, दिनांक २२ एप्रिल २०२६ रोजी संपन्न झालेल्या मा.विद्यापरिषद बैठकीतील विषय क्र.०८/६४-२०२६ च्या ठरावानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील राष्ट्रीय शैक्षणिक धोरण-२०२० नुसार पदवी तृतीय वर्षाचे अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२६-२७ पासून लागू करण्यास मा.विद्यापरिषदेने मान्यता प्रदान केली आहे. त्यानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील बी.एस्सी. तृतीय वर्षाचे खालील विषयाचे अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२६-२७ पासून लागू करण्यात येत आहे.

01	B.Sc. III Year Physics
02	B.Sc. III Year Geography
03	B.Sc. III Year Fishery Science
04	B.Sc. III Year Dyes & Drugs

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या www.srtmun.ac.in या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी, ही विनंती.

'ज्ञानतीर्थ' परिसर,

विष्णुपुरी, नांदेड - ४३१ ६०६.

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दिनांक : १४.०७.२०२६

उपकुलसचिव
शैक्षणिक (१-अभ्यासमंडळे) विभाग

प्रत माहिती व पुढील कार्यवाहीस्तव :-

- १) मा. कुलगुरू महोदयांचे कार्यालय, प्रस्तुत विद्यापीठ.
- २) मा. प्र.कुलगुरू महोदयांचे कार्यालय, प्रस्तुत विद्यापीठ
- ३) मा. अधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
- ४) मा. संचालक, परिक्षा व मुल्यमापन मंडळ, प्रस्तुत विद्यापीठ.
- ५) मा. प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
- ६) सिस्टीम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ. यांना देवून कळविण्यात येते की, परिपत्रक अभ्यासक्रम संकेतस्थळावर प्रसिध्द करण्यात यावेत.



SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY

NANDED – 431 606 (MS)

UNDER GRADUATE PROGRAMME OF SCIENCE & TECHNOLOGY

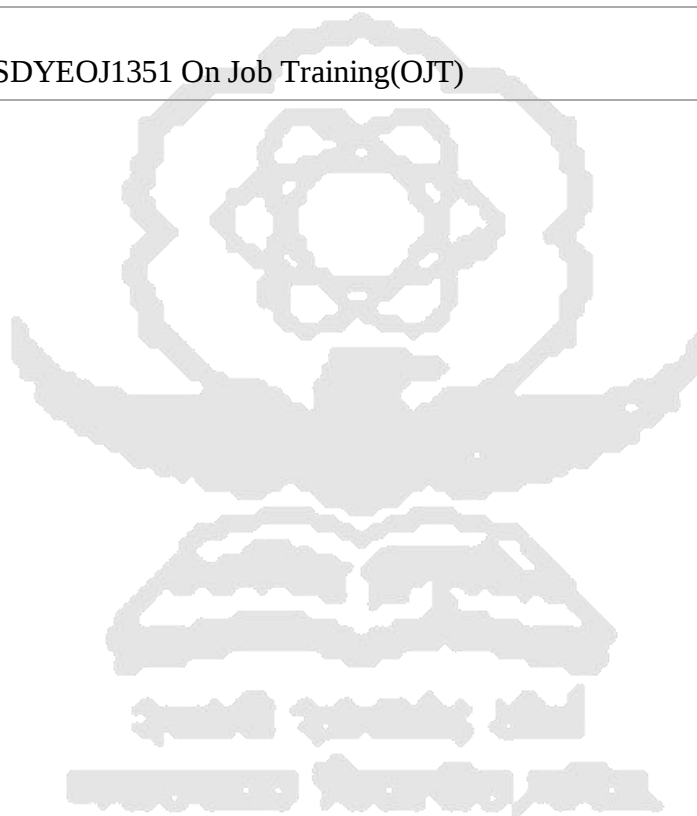
B.Sc. THIRD YEAR
SUBJECT — DYES AND DRUGS

With Effect from the Academic Year 2026–2027
(As per NEP-2020)

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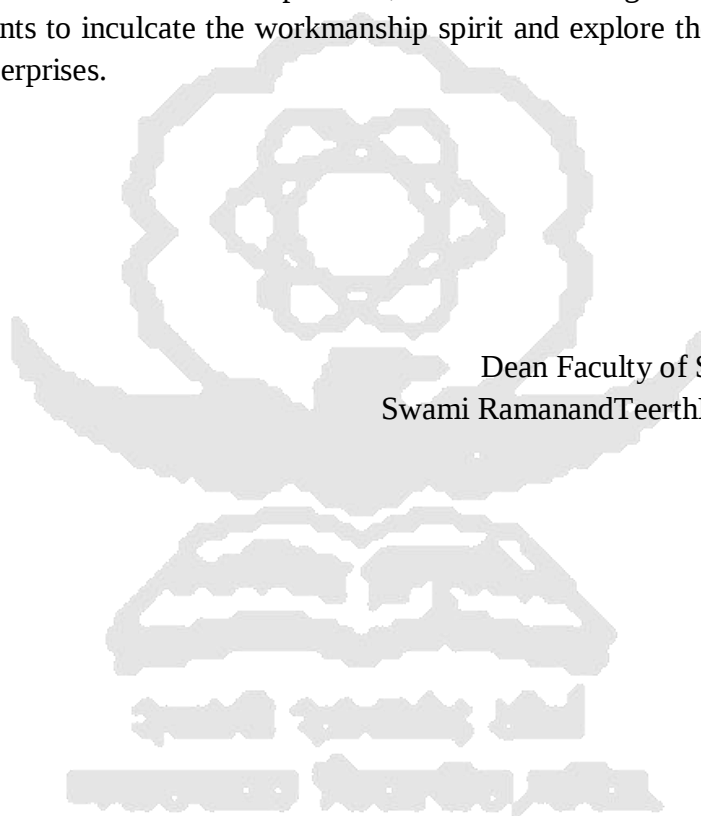
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Swami RamanandTeerthMarathwada University, Nanded, enduring to its vision statement “Enlightened Student: A Source of Immense Power”, is trying hard consistently to enrich the quality of science education in its jurisdiction by implementing several quality initiatives. Revision and updating curriculum to meet the standard of the courses at national and international level, implementing innovative methods of teaching-learning, improvisation in the examination and evaluation processes are some of the important measures that enabled the University to achieve the 3Es, the equity, the efficiency and the excellence in higher education of this region. To overcome the difficulty of comparing the performances of the graduating students and also to provide mobility to them to join other institutions the University has adopted the cumulative grade point average (CGPA) system in the year 2014-2015. Further, following the suggestions by the UGC and looking at the better employability, entrepreneurship possibilities and to enhance the latent skills of the stakeholders the University has adopted the Choice Based Credit System (CBCS) in the year 2018-2019 at graduate and post-graduate level. This provided flexibility to the students to choose courses of their own interests. To encourage the students to opt the world-class courses offered on the online platforms like, NPTEL, SWAYM, and other MOOCS platforms the University has implemented the credit transfer policy approved by its Academic Council and also has made a provision of reimbursing registration fees of the successful students completing such courses. SRTM University has been producing a good number of high calibre graduates; however, it is necessary to ensure that our aspiring students are able to pursue the right education. Like the engineering students, the youngsters pursuing science education need to be equipped and trained as per the requirements of the R&D institutes and industries. This would become possible only when the students undergo studies with an updated and evolving curriculum to match global scenario. Higher education is a dynamic process and in the present era the stakeholders need to be educated and trained in view of the self-employment and self-sustaining skills like startups. Revision of the curriculum alone is not the measure for bringing reforms in the higher education, but invite several other initiatives. Establishing industry-institute linkages and initiating internship, on job training for the graduates in reputed industries are some of the important steps that the University would like to take in the coming time. As a result, revision of the curriculum was the need of the hour and such an opportunity was provided by the New Education Policy 2020. National Education Policy 2020 (NEP 2020) aims at equipping students with knowledge, skills, values, leadership qualities and initiates them for lifelong learning. As a result the students will acquire expertise in specialized areas of interest, kindle their intellectual curiosity and scientific temper, and create imaginative individuals. The curriculum given in this document has been developed following the guidelines of NEP-2020 and is crucial as well as challenging due to the reason that it is a transition from general science based to the discipline-specific-based curriculum. All the recommendations of the SukanuSamiti given in the NEP Curriculum Framework-2023 have been followed, keeping the disciplinary approach with rigor and depth, appropriate to the comprehension level of learners. All the Board of Studies (BoS) under the Faculty of Science and Technology of this university have put in their tremendous efforts in making this curriculum of international standard. They have taken care of maintaining logical sequencing of the subject matter with

proper placement of concepts with their linkages for better understanding of the students. We take this opportunity to congratulate the Chairman(s) and all the members of various Boards of Studies for their immense contributions in preparing the revised curriculum for the benefits of the stakeholders in line with the guidelines of the Government of Maharashtra regarding NEP-2020. We also acknowledge the suggestions and contributions of the academic and industry experts of various disciplines. We are sure that the adoption of the revised curriculum will be advantageous for the students to enhance their skills and employability. Introduction of the mandatory On Job Training, Internship program for science background students is praise worthy and certainly help the students to imbibe firsthand work experience, team work management. These initiatives will also help the students to inculcate the workmanship spirit and explore the possibilities of setting up of their own enterprises.



Dr. M. K. Patil
Dean Faculty of Science and Technology
Swami RamanandTeerthMarathwada University,
Nanded

From the Desk of Chairman

Board of Studies in Chemistry

It gives me great pleasure to present the revised syllabus for **B.Sc. Third Year (Semester V & VI) – Chemistry**, prepared in accordance with the guidelines of the **National Education Policy (NEP) 2020** and the academic framework of **Swami RamanandTeerthMarathwada University, Nanded**.

The present curriculum has been carefully designed to ensure a balanced integration of **fundamental concepts, practical skills, and emerging trends in chemistry**. Emphasis has been placed on **application-oriented learning, interdisciplinary approach, skill development, and employability enhancement**, which are essential in the contemporary scientific and industrial landscape.

Special features of this syllabus include the introduction of courses such as **Applications of Software in Chemistry, Green Chemistry, Industrial Chemistry components, and Field Project/On-Job Training**, which aim to bridge the gap between theoretical knowledge and real-world applications. The inclusion of **Indian Knowledge System (IKS)** further enriches the curriculum by connecting traditional scientific wisdom with modern chemistry.

The syllabus also incorporates **modern pedagogical approaches, outcome-based education (OBE), and continuous assessment methods**, ensuring that students develop critical thinking, analytical ability, and research aptitude.

I sincerely appreciate the valuable contributions of all **Board of Studies members, subject experts, and faculty colleagues** who have actively participated in designing and refining this curriculum.

I am confident that this revised syllabus will significantly contribute to the **holistic academic and professional development of students**, preparing them to meet the challenges of higher education, research, and industry.

Dr. D. R. Munde

Chairman

Board of Studies in Chemistry

Swami RamanandTeerthMarathwada University, Nanded

Details of the Board of Studies Members in the subject Chemistry under the faculty of Science & Technology of S.R.T.M. University, Nanded

Sr. No.	Name	Address	Designation
1.	Dr. D. R. Munde	Science College, Nanded	Chairman
2.	Dr. Sangeeta S. Makone	School of Chemical Sciences, SRTMU, Nanded	Member
3.	Dr. Suresh D. Dhage	ACS College, Gangakhed	Member
4.	Dr. Krishna Chaitanya	School of Chemical Sciences, SRTMU, Nanded	Member
5.	Dr. Shivraj B. Sirsat	YeshwantMahavidyalaya, Nanded	Member
6.	Dr. JamanAngulwar	Dayanand Science College, Latur	Member
7.	Dr. Nitish Kumar S. Kaminwar	LalBahadurShastri College, Dharmabad	Member
8.	Dr. A. S. Bondge	ShivneriMahavidyalaya, Shirur (Anantpal)	Member
9.	Dr. Anil B. Chitrawar	Degloor College, Degloor	Member
10.	Dr. Yogesh S. Nalwar	Toshniwal ACS College, Sengaon	Member
11.	Dr. S. P. Hungirgekar	Shivaji University, Kolhapur	Member
12.	Dr. Siddhnath V. Bhosale	Principal Scientist, CSIR–IICT, Hyderabad	Expert Member
13.	Dr. P. Bhaskar Reddy	Associate Vice President, R&D Biophore Pharmaceuticals Pvt. Ltd., Hyderabad	Industry Expert
14.	Dr. Ratnashil T. Sonkamble	Maharashtra Mahavidyalaya, Nilanga	Member

ABBREVIATIONS USED

Abbreviation	Full Form
POs	Program Outcomes
PS	Program Structure
PSOs	Program Specific Outcomes
COs	Course Outcomes
TLP	Teaching-Learning Process
AM	Assessment Method
DSC	Discipline Specific Core
DSE	Discipline Specific Elective
GE	Generic Elective
OE	Open Elective
VSC	Vocational Skill Course
SEC	Skill Enhancement Course
IKS	Indian Knowledge System
AEC	Ability Enhancement Course
VEC	Value Education Course
OJT	On Job Training (Internship)
FP	Field Project
CEP	Community Engagement Project
CC	Co-curricular Courses
RM	Research Methodology
RP	Research Project
MJ	Major Course
MN	Minor Course

INTRODUCTION TO UNDERGRADUATE DEGREE IN DYES AND DRUGS

As per the guidelines of the **University Grants Commission (UGC)** and the framework adopted by **Swami RamanandTeerthMarathwada University, Nanded**, the **Undergraduate (UG) Programme in Dyes and Drugs** is structured under the **National Education Policy (NEP)** with a flexible **Four-Year (Eight Semesters)** framework, with an option to exit after **Three Years (Six Semesters)**.

The **Teaching–Learning Process (TLP)** is designed to be **student-centric, outcome-based, and skill-oriented**, integrating theory, practical, vocational, and experiential learning components. The curriculum ensures a **strong foundation in core Dyes and Drugs subjects** along with opportunities for advanced learning and interdisciplinary exposure.

The programme includes a combination of the following course types:

- **Major (DSC/MJ – Discipline Specific Core / Major Courses)**
- **Minor (MN/DSE – Discipline Specific Electives)**
- **Vocational Skill Courses (VSC)**
- **Skill Enhancement Courses (SEC)**
- **Indian Knowledge System (IKS)**
- **Open/Generic Electives (OE/GE)**
- **Ability and Value Enhancement Courses (AEC/VEC)**
- **Field Projects, Internships (OJT), and Community Engagement Projects (CEP)**

This structure promotes a multidisciplinary and interdisciplinary approach, allowing students to explore diverse academic areas alongside their core discipline. The programme offers flexibility in course selection, credit accumulation, and academic progression, enabling students to design their learning pathway based on their interests, aptitude, and career aspirations.

Furthermore, the provision of multiple entry and exit options ensures that students can obtain Certificate, Diploma, Degree, or Honours Degree at different stages, thereby enhancing employability and supporting higher education opportunities.

Overall, the UG Programme in Dyes and Drugs under SRTMU aims to develop scientific knowledge, practical skills, critical thinking, research aptitude, and professional competence, preparing students for higher studies, research, and diverse career opportunities in industry, academia, and allied fields.

PROGRAM DURATION AND EXIT OPTIONS

The duration of the **Undergraduate (UG) Programme in Dyes and Drugs** at **Swami RamanandTeerthMarathwada University, Nanded** shall be **four years (Eight Semesters)** under the NEP framework. Students shall have **multiple entry and exit options** as per NEP guidelines:

- Students completing only three years (Six Semesters) will be awarded a Bachelor of Science (B.Sc.) Degree in Dyes and Drugs.
- Students exiting after the first year (Two Semesters) will be awarded an Undergraduate Certificate in Dyes and Drugs, provided they have earned the prescribed credits.
- Students exiting after the second year (Four Semesters) will be awarded an Undergraduate Diploma in Dyes and Drugs, subject to fulfilment of required credits.
- Students completing the four-year programme (Eight Semesters) will be awarded a Bachelor of Science in Dyes and Drugs (Honours / Honours with Research) as per university regulations.

Students who exit the programme at any stage (Certificate/Diploma) shall be eligible for re-entry within a maximum period of three years, subject to university rules and availability of seats.

The credit framework is designed to ensure flexibility in academic progression:

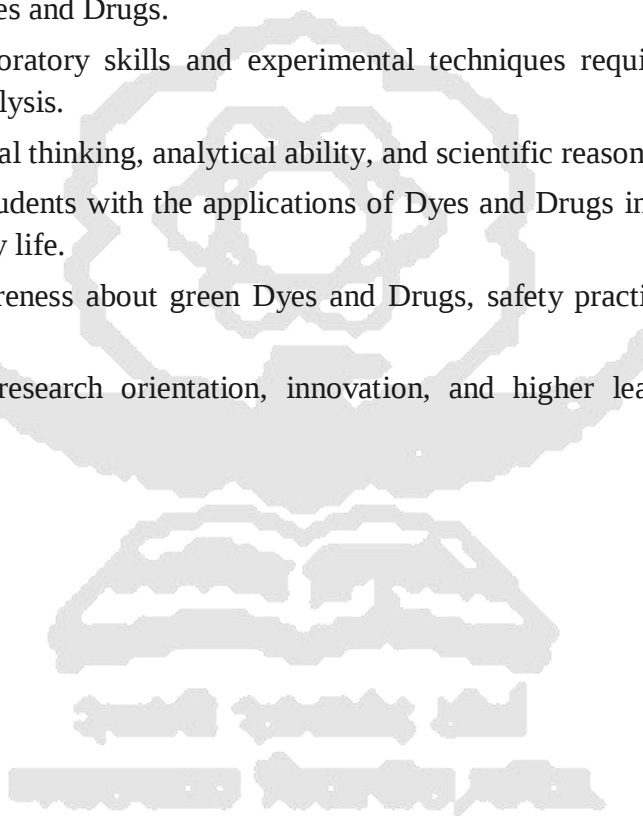
- Minimum credits per semester: 18
- Maximum credits per semester: 26
- Recommended credits per semester: 22

Table 1: Awards and Required Credits

Sr. No.	NCrF / NHEQF Level	Type of Award	Stage of Exit/ Programme Duration	Credits Required
1	Level 4.5	Undergraduate Certificate in Dyes and Drugs	After successful completion of First Year (Semester I & II)	44
2	Level 5.0	Undergraduate Diploma in Dyes and Drugs	After successful completion of Second Year (Semester III & IV)	88
3	Level 5.5	Bachelor of Science (B.Sc.) in Dyes and Drugs	After successful completion of Third Year (Semester V & VI)	132
4	Level 6.0	Bachelor of Science in Dyes and Drugs (Honours / Honours with Research)	After successful completion of Fourth Year (Semester VII & VIII)	176

OBJECTIVES OF THE PROGRAM

- To strengthen students' understanding of fundamental and advanced concepts in Physical, Organic, and Inorganic Dyes and Drugs.
- To develop the ability to apply chemical principles to solve theoretical and practical problems in Dyes and Drugs.
- To enhance laboratory skills and experimental techniques required for qualitative and quantitative analysis.
- To promote critical thinking, analytical ability, and scientific reasoning among students.
- To familiarize students with the applications of Dyes and Drugs in industry, environment, health, and daily life.
- To develop awareness about green Dyes and Drugs, safety practices, and environmental sustainability.
- To encourage research orientation, innovation, and higher learning in the chemical sciences.



PROGRAM OUTCOMES

After successful completion of the B.Sc. Dyes and Drugs programme, students will be able to:

PO1: Disciplinary Knowledge

Demonstrate comprehensive knowledge of fundamental and advanced concepts in **Physical, Organic, and Inorganic Dyes and Drugs**, including theoretical and practical aspects.

PO2: Problem Analysis

Apply chemical principles, mathematical tools, and scientific reasoning to identify, formulate, and solve complex theoretical and experimental problems.

PO3: Critical Thinking

Develop critical thinking and analytical skills to evaluate scientific data, interpret results, and draw logical conclusions.

PO4: Experimental Skills & Laboratory Competence

Perform qualitative and quantitative chemical analysis using standard laboratory techniques, instruments, and modern tools with accuracy and precision.

PO5: Modern Tool Usage

Utilize contemporary chemical software, instrumentation, and ICT tools for data analysis, simulation, and research applications.

PO6: Environment and Sustainability

Understand the role of Dyes and Drugs in environmental protection and sustainable development, including principles of **green Dyes and Drugs** and pollution control.

PO7: Ethics and Safety

Follow ethical practices, laboratory safety protocols, and professional responsibilities in academic and industrial settings.

PO8: Communication Skills

Communicate scientific information effectively through oral presentations, laboratory reports, and technical writing.

PO9: Lifelong Learning

Recognize the need for continuous learning and professional development in the field of chemical sciences and related disciplines.

PO10: Research and Innovation

Develop research aptitude, creativity, and innovation skills for pursuing higher studies, research, and entrepreneurship.

PO11: Teamwork and Leadership

Work effectively as an individual and as a member or leader in multidisciplinary teams.

PO12: Application in Society and Industry

Apply chemical knowledge in solving real-life problems related to **industry, health, agriculture, and environment**.

PROGRAM SPECIFIC OUTCOMES

After completion of the programme, students will be able to:

PSO1: Core Dyes and Drugs Competence

Acquire in-depth knowledge of core areas such as:

- Thermodynamics, kinetics, and quantum Dyes and Drugs
- Organic reaction mechanisms and synthesis
- Coordination Dyes and Drugs, spectroscopy, and materials Dyes and Drugs

PSO2: Laboratory Proficiency

Develop hands-on skills in:

- Volumetric, gravimetric, and instrumental analysis
- Organic synthesis and purification techniques
- Handling modern instruments like pH meter, conductometer, spectrophotometer, etc.

PSO3: Application of Chemical Knowledge

Apply chemical concepts in:

- Industrial processes (fertilizers, polymers, pharmaceuticals)
- Environmental monitoring and pollution control
- Health, food Dyes and Drugs, and daily life applications

PSO4: Green Dyes and Drugs and Sustainability

Implement principles of green Dyes and Drugs, waste minimization, and eco-friendly practices in laboratory and industrial contexts.

PSO5: Research Orientation

Design and conduct basic research experiments, analyze data, and present findings scientifically.

PSO6: Interdisciplinary Understanding

Integrate Dyes and Drugs with related fields such as **biology, physics, environmental science, and material science**.

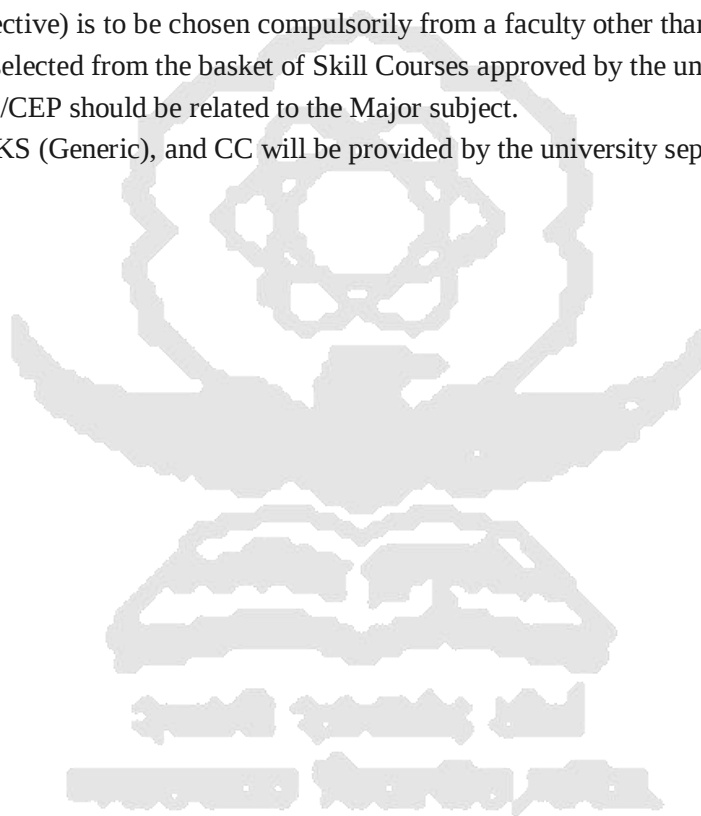
PSO7: Employability and Skill Development

Develop skills relevant to:

- Chemical industries
 - Quality control laboratories
 - Teaching and academic research
 - Competitive examinations and higher education
-

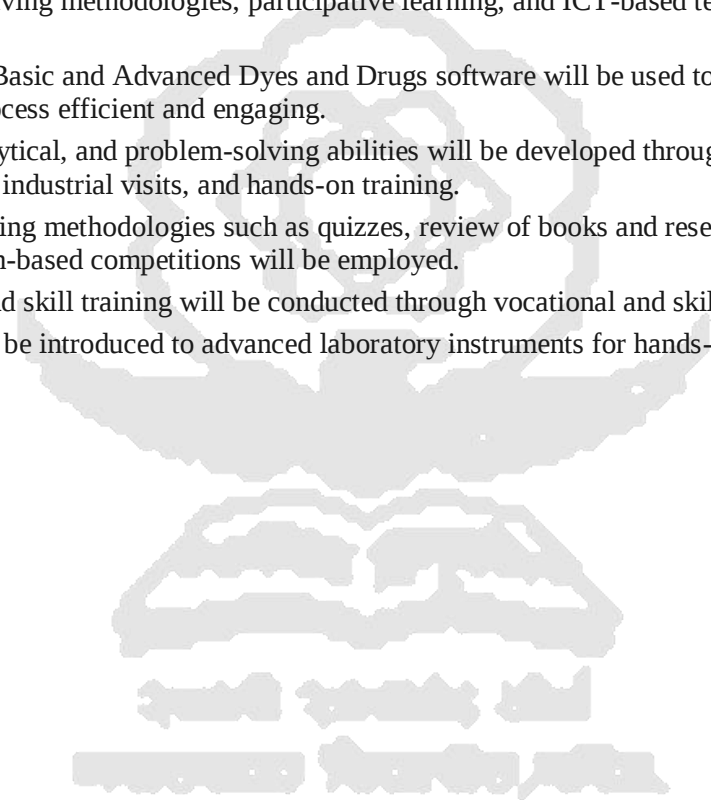
GENERAL GUIDELINES FOR THE SELECTION OF SUBJECTS

1. A student has to choose three subjects from the same faculty in the first year. At the start of the second year, he/she has to opt for one subject as the Major subject and one (from the remaining two subjects) as the Minor subject; the last one will be dropped by the student.
2. A student cannot select a subject as Major or Minor other than the subjects taken in the first year.
3. OE (Open Elective) is to be chosen compulsorily from a faculty other than that of the Major.
4. SEC is to be selected from the basket of Skill Courses approved by the university.
5. VSC, FP/OJT/CEP should be related to the Major subject.
6. AEC, VEC, IKS (Generic), and CC will be provided by the university separately.



TEACHING-LEARNING PROCESS

- a.** Courses will be taught through the traditional chalk-and-talk method, laboratory work, ICT-enabled teaching–learning tools, project work, seminars, case studies, field work, internships, hands-on training, etc.
- b.** Students will be engaged in various student-centric activities including experiential learning, problem-solving methodologies, participative learning, and ICT-based teaching–learning processes.
- c.** ICT tools in Basic and Advanced Dyes and Drugs software will be used to make the teaching–learning process efficient and engaging.
- d.** Critical, analytical, and problem-solving abilities will be developed through project-based learning, internships, industrial visits, and hands-on training.
- e.** Problem-solving methodologies such as quizzes, review of books and research papers, workshops, and research-based competitions will be employed.
- f.** Vocational and skill training will be conducted through vocational and skill-based courses.
- g.** Students will be introduced to advanced laboratory instruments for hands-on training.



METHODS OF ASSESSMENT

The primary objective of assessment is to evaluate the attainment of learning outcomes of the course in alignment with the broader goals of strengthening core theoretical knowledge, developing practical laboratory skills, and promoting research aptitude among students.

The assessment system shall be based on **Continuous Internal Evaluation (CIE)** and **End Semester University Examination (ESE)** as per the norms of **Swami RamanandTeerthMarathwada University, Nanded**.

Continuous Internal Evaluation (CIE)

During the semester, students' performance and mastery of the prescribed learning outcomes will be evaluated through various academic activities such as:

- Short answer tests
- Class tests
- Seminars and presentations
- Group discussions
- Quizzes and MCQs
- Assignments and tutorials
- Project work

Each theory and practical course shall carry **10 marks for internal assessment (for each-credit course)**. The internal assessment will be conducted by the respective colleges as per university guidelines.

End Semester Examination (ESE)

The End Semester Examination will be conducted by **Swami RamanandTeerthMarathwada University, Nanded** for both theory and practical courses. Each credit course shall carry **15 marks for the End Semester Examination (ESE)**.

Scheme of Examination

- Total marks for 2-credit course: 50 (20 Internal + 30 ESE)
- Total marks for 4-credit course: 100 (40 Internal + 60 ESE)
- Internal examinations will be conducted by the respective colleges.
- External examinations will be conducted by SRTMU, Nanded at the end of each semester.

Marks distribution under CA (40%)

Sr. No.	Continuous Assessment Modes	For 4 Credit (Marks)	For 2 Credit (Marks)	For 3 Credit (Marks)
1	Class Test	20	10	15
2	Assignment, Presentation, Viva, Quiz, Open Book, etc.	12	06	09
3	Attendance	08	04	06
	Total	40	20	30

STRUCTURE OF T.Y. B.SC.DYES AND DRUGS (Major)



Swami Ramanand Teerth Marathwada University, Nanded

Faculty of Science and Technology

Credit Framework for B.Sc. III Year

Multidisciplinary Degree Program with Multiple Entry and Exit

Year &Level	Semester	Major (From the same Faculty)		Minor 1 (From the same Faculty)	Minor2 (From the same Faculty)	Generic Elective (GE) (select from Basket 3 of Faculties other than Science and Technology)	Vocational &Skill Enhancement Course	Ability Enhancement Course (AEC) (Basket 4) Value Education Courses (VEC) / Indian Knowledge System(IKS) (Basket 5)	Field Project/Case Study/ OJT/	Credits	Total Credits
1	2	3		4	5	6	7	8	9	10	11
3 (5.5)	V	SDYECT1301(3cr) SDYECT1302(3cr) SDYEIKS1303(2cr) SDYEC1301(2cr) SDYEC1302(2cr) 12 Credits	Major Elective SDYEET1301(2cr) SDYECP1301(2cr) 04 Credits	--	--	--	SDYEC1301 02Credits	--	FP/CS SDYEF1301 Or SDYEC1301 04 Credits	22	132
	VI	SDYECT1351(3cr) SDYECT1352(3cr) SDYECT1353(2cr) SDYEC1351(2cr) SDYEC1352(2cr) 12 Credits	Major Elective SDYEET1351(2cr) SDYECP1351(2cr) 04 Credits	--	--	--	SDYEC1351 02Credits	--	SDYEOJT1351 04 Credits	22	
	Cum. Cr.	56		12	08	08	6+8=14	22	4+8=12		
Exit option: B.Sc. with Major in <u>DYES AND DRUGS</u> and Minor <u>DSM</u>											



B.Sc. Third Year Semester V (Level 5.5)

Teaching Scheme

	CourseCode	CourseName	CreditsAssigned			TeachingScheme (Hrs./week)	
			Theor y	Practical	Total	Theory	Practical
Major	SDYE CT1301	Chemistry of Synthetic Dyes- I	03	--	12	03	--
	SDYE CT1302	Chemistry of Synthetic Drugs- I	03	--		03	--
	SDYE IKS1303	Subject related IKS	02	--		02	--
	SDYE CP1301	Practical's on SDYECT 1301	-	02		--	04
	SDYE CP1302	Practical's on SDYECT 1302		02		--	04
Elective	SDYE ET1301 OR SDYE ET1302	Natural Dyes For Industrial Applications Or Applications of Chromatographic techniques in Dyes and drugs Dyes and Drugs	02	--	04	02	--
	SDYE EP1301 OR SDYE ET1302	Practical Based on SDYE ET1301 OR SDYE ET1302	-	02		--	04
Vocational Course	SDYE VC1301	Techniques for Characterization of Dyes.	--	02	02	--	04
Field Project/ Case Study/OJT	SDYE FP1301 or SDYE CP1301	Field Project/Case Study	--	04	04	--	08
Total Credits=22			10	12	22	10	24



B.Sc. Third Year Semester V (Level 5.5)

Examination Scheme

[40% Continuous Assessment (CA) and 60% End Semester Assessment (ESA)]

Subject (1)	CourseCode (2)	CourseName (3)	Theory				Practical		Total Col(6+7)/ Col (8+9) (10)
			Continuous Assessment(CA)			ESA			
			Test I (4)	Test II (5)	Average of T1&T2 (6)	Total (7)	CA (8)	ESA (9)	
Major	SDYE CT1301	Chemistry of Synthetic Dyes- I	15	15	30	45	--	--	75
	SDYE CT1302	Chemistry of Synthetic Drugs- I	15	15	30	45	--	--	75
	SDYE IKS1303	Subject related IKS	10	10	20	30	--	--	50
	SDYE CP1301	Practical's on SDYECT 1301	--	--	--	--	20	30	50
	SDYE CP1302	practical's on SDYECT 1302	--	--	--	--	20	30	50
Elective	SDYE ET1301	Natural Dyes For Industrial Applications Or Applications of Chromatographic techniques in Dyes and drugs Dyes and Drugs	15	15	30	45	--	--	75
	SDYE EP1301	Practical Base don SDYE ET1301	--	--	--	--	10	15	25
Vocational Course	SDYE VC1301	Techniques for Characterization of Dyes.	--	--	--	--	20	30	50
Field Project/ Case Study/OJT	SDYE FP1301 or SDYE CP1301	Field Project/Case Study	--	--	--	--	40	60	100



B.Sc. Third Year Semester VI (Level 5.5)

Teaching Scheme

	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hrs/week)	
			Theory	Practical	Total	Theory	Practical
Major	SDYE CT1351	Chemistry of Synthetic Dyes-II	03	--	12	03	--
	SDYE CT1352	Unit operation and Pharmaceutical dosage forms	03	--		03	--
	SDYE CT1353	Environmental aspects of drug Dyes and Drugs	02	--		02	--
	SDYE CP1351	practical's on SDYE CT 1351	-	02		--	04
	SDYE CP1352	Practical Based on SDYE CT1352		02		--	04
Elective	SDYE ET1351	Principles of Drug Design OR Dyes and Drugs of Natural Drugs	02	--	04	03	--
	SDYE EP1351	Practical Based on SDYE ET1351	-	02		--	02
Vocational Course	SDYE VC1351	Study Expectorants and Antitussives.	--	02	02	--	04
Field Project/ Case Study/OJT	SDYE OJ1351	On Job Training(OJT)	--	04	04	--	08
Total Credits=22			11	11	22	11	22



B.Sc. Third Year Semester VI (Level 5.5)

Examination Scheme

[40% Continuous Assessment (CA) and 60% End Semester Assessment (ESA)]

Subject (1)	Course Code (2)	Course Name (3)	Theory				Practical		Total Col(6+7)/ Col (8+9) (10)
			Continuous Assessment (CA)			ESA			
			Test I (4)	Test II (5)	Average of T1 & T2 (6)	Total (7)	CA (8)	ESA (9)	
Major	SDYECT1351	Chemistry of Synthetic Dyes-II	15	15	30	45	--	--	75
	SDYECT1352	Unit operation and Pharmaceutical dosage forms	15	15	30	45	--	--	75
	SDYECT1353	Environmental aspects of drug Dyes and Drugs	10	10	20	30	--	--	50
	SDYEC1351	practical's on SDYECT 1351	--	--	--	--	20	30	50
	SDYEC1352	Practical Based on SDYECT1352	--	--	--	--	20	30	50
Elective	SDYEET1351	Principles of Drug Design OR Dyes and Drugs of Natural Drugs	15	15	30	45	--	--	75
	SDYEET1351	Practical Based on SDYEET1351	--	--	--	--	10	15	25
Vocational Course	SDYEC1351	Study Expectorants and Antitussives.	--	--	--	--	20	30	50
Field Project/ Case Study/OJT	SDYEOJ1351	On Job Training (OJT)	--	--	--	--	40	60	100

Swami RamanandTeerthMarathwada University, Nanded

Faculty of Science & Technology

B.Sc. Third Year - Dyes and Drugs

Chemistry of Synthetic Dyes - I

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYECT1301
Year of Implementation	Academic Year 2026-2027
Semester	V
Paper Type	Core Major
Credits	3
Total Hours	45 Hours
Formative Assessment Marks	30
Summative Assessment Marks	45
Total Marks	75

Course Objectives:

- To understand the effect of light on dyes and dyed fibres.
- To learn the concept and applications of fluorescent brighteners.
- To study the Dyes and Drugs and dyeing process of disperse dyes.
- To understand the Dyes and Drugs and applications of reactive dyes.
- To learn about mordant dyes and their methods of application.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Explain the effect of light on dyes and dyed fibres, including the factors affecting light fastness.	Understand	PO1, PO3
CO2	Describe fluorescence, phototropy, and the mechanism of fading in dyed materials.	Understand / Analyze	PO1, PO3
CO3	Explain the structure, dyeing process, and applications of disperse dyes.	Understand / Apply	PO1, PO12
CO4	Discuss the constitution, properties, and applications of reactive dyes.	Understand / Analyze	PO1, PO2
CO5	Explain the types, properties, and methods of application of mordant dyes.	Understand / Apply	PO1, PO12

Detailed Syllabus:

Unit No.	Unit Title	Topics	Hours
I	Action of Light on Dyes and Dyed Fibres	Factors affecting fastness of dyed fibres; general considerations; fluorescence; phototropy; mechanism of fading; constitution of dyes and light fastness with respect to nitro, azo, basic, sulphur, indigo, and anthraquinone dyes; light fastness of pigments.	12
II	Disperse Dyes	Introduction; ionamines; disperse acetate dyes and solacet dyes; chemical structure of disperse dyes; dispersion process; function of dispersing agents; disperse dyeing process; fibre swelling in dyeing; use of carriers; use of heat energy in dyeing.	13
III	Reactive Dyes	Introduction; constitutional aspects of reactive dyes; flexibility through chromogen and reactive group; vinyl sulfone dyes; sulphatoethylsulfone dyes; acrylamide dyes; reactive mordants;	10

		crosslinking agents; dyer's requirements.	
IV	Mordant Dyes	Introduction; natural mordant dyes; synthetic mordant dyes; methods of application - chrome mordant process, after chrome process, and meta chrome process.	10

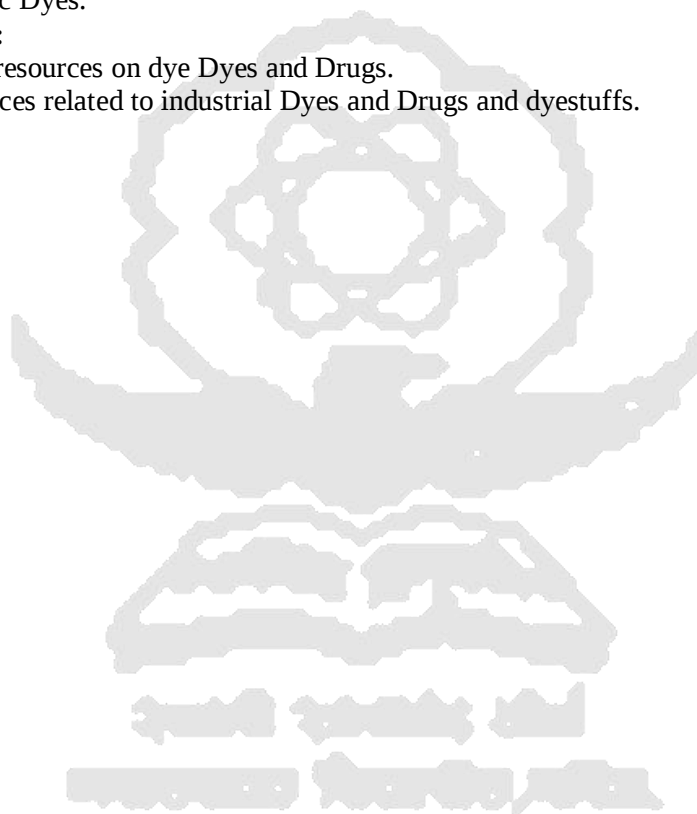
Total Hours: 45 Hours

Recommended Textbooks:

1. K. Venkataraman, The Dyes and Drugs of Synthetic Dyes, Vol. I & II.
2. Rajbir Singh, Synthetic Dyes.
3. Gurdeep R. Chatwal, Synthetic Dyes.
4. M. S. Yadav, Synthetic Dyes.

E-Resources / MOOCs:

1. SWAYAM / NPTEL resources on dye Dyes and Drugs.
2. e-PG Pathshala resources related to industrial Dyes and Drugs and dyestuffs.



Swami RamanandTeerthMarathwada University, Nanded

Faculty of Science & Technology

B.Sc. Third Year - Dyes and Drugs

Chemistry of Synthetic Drugs - I

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYECT1302
Year of Implementation	Academic Year 2026-2027
Semester	V
Paper Type	Core Major
Credits	3
Total Hours	45 Hours
Formative Assessment Marks	30
Summative Assessment Marks	45
Total Marks	75

Course Objectives:

- To learn the classification and mechanism of action of cardiovascular drugs.
- To understand causes, prevention, and treatment of cancer.
- To study the Dyes and Drugs of autonomic drugs.
- To gain knowledge of diuretics and their pharmaceutical applications.
- To understand tuberculosis and antitubercular drugs.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Classify cardiovascular drugs and explain their mechanism of action.	Understand	PO1, PO12
CO2	Describe antineoplastic drugs, cancer risk factors, and chemotherapy.	Understand / Analyze	PO1, PO3
CO3	Explain the classification, synthesis, and therapeutic uses of autonomic drugs.	Understand / Apply	PO1, PO12
CO4	Discuss the classification, synthesis, and applications of diuretics.	Understand / Apply	PO1, PO12
CO5	Explain the synthesis and therapeutic uses of antitubercular drugs.	Understand	PO1, PO12

Detailed Syllabus:

Unit No.	Unit Title	Topics	Hours
I	Cardiovascular Drugs	Introduction and classification; cardiac glycosides - digoxin and digitoxin, mechanism of action; antihypertensive and hypotensive drugs - hydralazine, minoxidil, lidocaine, methyldopa, diazoxide; antiarrhythmic agents - dexpropranolol, procainamide, disopyramide, propranolol; vasopressor drugs - isoxsuprine and prenylamine.	12
II	Antineoplastic Drugs	Introduction; cancer-causing agents; environmental and hereditary risk factors; cancer chemotherapy - cytotoxic agents, antimetabolites, hormones, antibiotics, alkaloids, and miscellaneous drugs.	8
III	Autonomic Drugs and Diuretics	Introduction and classification of autonomic drugs; sympathomimetic, antiadrenergic, cholinomimetic, antimuscarinic, ganglionic blocking, and adrenergic neurone blocking agents; synthesis and uses of ephedrine, epinephrine, salbutamol, propranolol, acetylcholine, atropine, mecamylamine, and bethanidine; diuretics - introduction, classification,	18

		synthesis, and applications of chlormerodrin, meralluride, chlorothiazide, benzthiazide, acetazolamide, quinethazone, chlortalidone, and furosemide.	
IV	Antitubercular Drugs	Introduction; characteristics of antitubercular drugs; synthesis and applications of p-aminosalicylic acid, isoniazid, ethambutol, and pyrazinamide.	7

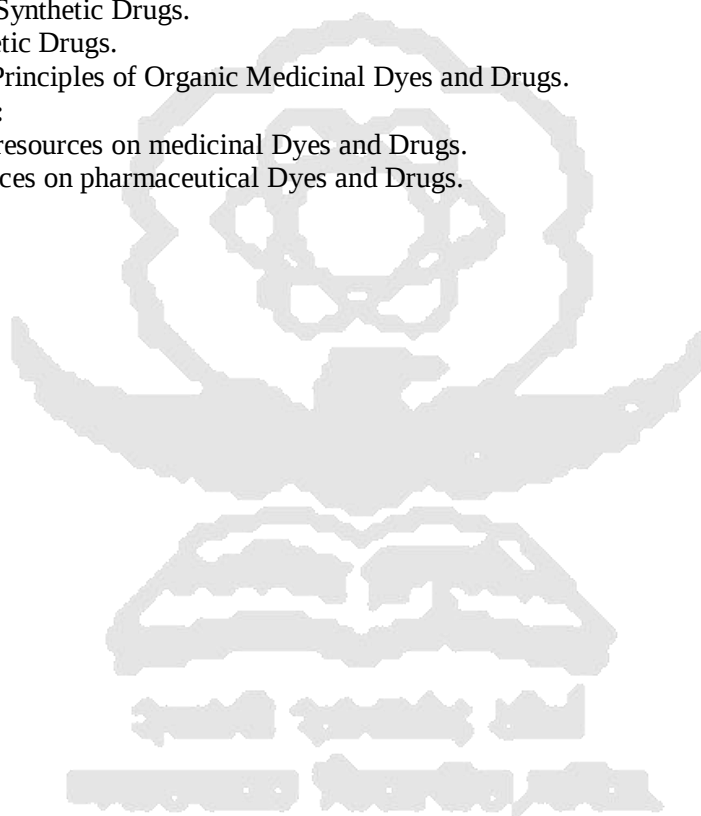
Total Hours: 45 Hours

Recommended Textbooks:

1. Rajbir Singh, Synthetic Drugs.
2. Gurdeep R. Chatwal, Synthetic Drugs.
3. S. K. Agarwal, Synthetic Drugs.
4. Rama RaoNadendla, Principles of Organic Medicinal Dyes and Drugs.

E-Resources / MOOCs:

1. SWAYAM / NPTEL resources on medicinal Dyes and Drugs.
2. e-PG Pathshala resources on pharmaceutical Dyes and Drugs.



Swami RamanandTeerthMarathwada University, Nanded

Faculty of Science & Technology

Programme Details

Indian Knowledge System in Chemistry

Name of the Programme	B.Sc. Third Year (Dyes and Drugs)
Title of the Course	Indian Knowledge System in Chemistry(SDYEIKS1303)
Year of Implementation	Academic Year 2026–27
Semester	V
Paper Type	IKS (Indian Knowledge System)
Credits	(Theory: 2)
Total Hours	30 Hours (Theory)
Formative Assessment	20 Marks (Internal Assessment)
Summative Assessment	30 Marks (Semester End Examination)
Total Marks	50 Marks

Course Objectives (CO)

1. To introduce students to the rich chemical heritage of India from prehistoric to ancient periods.
2. To develop an understanding of Indian philosophical concepts of matter and atomic theories.
3. To explore the applications of Chemistry in ancient Indian medicine, textiles, metallurgy, and daily life.
4. To examine traditional chemical techniques such as distillation, calcination, and fermentation from a modern scientific perspective.

Course Outcomes (COs)

CO No.	Course Outcome Statement	Bloom's Level	PO Mapping
CO1	Explain early chemical traditions and material advancements from prehistoric to Harappan India.	Understand	PO1, PO3, PO9
CO2	Analyze Vedic and philosophical concepts of matter, including Vaisheshika and Jain atomic theories.	Analyze	PO2, PO3, PO10
CO3	Evaluate applications of chemical knowledge in ancient Indian medicine, textiles, and household materials.	Evaluate	PO6, PO8, PO12
CO4	Apply knowledge of ancient chemical techniques such as metallurgy, distillation, sublimation, and fermentation.	Apply	PO4, PO5, PO7, PO11

Detailed Syllabus (Four Modules – 30 Hours)

Module No.	Unit Title	Topics	Hours
I	Early Chemical Traditions – Prehistoric to Harappan India	• Pre-Harappan developments: early settlements, pottery techniques, coloured ceramics, copper extraction and fabrication. • Harappan advancements: ceramic technology, faience, pigments (ferric oxide, manganese oxide), glazed pottery, construction materials (gypsum, lime, sand). • Metals and minerals: copper, bronze alloys, gold, silver, semi-precious stones, galena, natural dyes	07

		(madder). • Post-Harappan phase: cultural transition and spread of metallurgical practices.	
II	Vedic Knowledge and Philosophical Concepts of Matter	• Chemical knowledge in Vedic texts: metals, alloys, fermentation (soma, sura), natural dyes, medicinal plant use. • Atomic theories: Vaisheshika (Kanada) – paramanu, atomic combinations, molecular structures; Jain theory – atomic forces and chemical affinity. • Samkhya and Nyaya perspectives: evolution of matter, tanmatras, sensory properties, concept of akasha.	07
III	Applications of Dyes and Drugs in Ancient India	• Medicine (Ayurveda): Rasashastra, herbal and mineral-based preparations. • Textiles: natural dyes (indigo, madder, turmeric), mordants, dyeing techniques. • Tools and weapons: metal crafting and hardening techniques. • Ceramics and household materials: glazed pottery, terracotta, soaps, oils, and cosmetics. • Construction materials: gypsum, lime, and sand-based binders and plasters.	08
IV	Ancient Chemical Techniques and Processes	• Metallurgy (□□□□□□□□): extraction, purification, and alloy formation (brass, bronze, wootz steel). • Distillation (□□□□□□□□□□): preparation of perfumes, essential oils, and medicines. • Other techniques: sublimation (□□□□□□□□□□), calcination, and fermentation processes in beverages and medicinal formulations.	08

Total: 30 Hours

Recommended Textbooks

1. Pakrashi, B. C., & Ghosh, S. (Eds.). *History of Science in India, Vol. III: Chemical Sciences*. The National Academy of Sciences, India (NASI) & Ramakrishna Mission Institute of Culture, Kolkata.
2. S. Mahdihassan, *Indian Alchemy: Its Origin and Ramifications*, Motilal Banarsidass, 1991.
3. B. V. Subbarayappa, *Dyes and Drugs in Ancient and Medieval India*, INSA, 1999.
4. P. C. Ray, *History of Dyes and Drugs in Ancient and Medieval India*, Indian Chemical Society, 1956.
5. O. P. Jaggi, *History of Science and Technology in India (Vol. 1–12)*, Atma Ram & Sons, 1970.
6. Debiprasad Chattopadhyaya, *History of Science and Technology in Ancient India*, Firma KLM, 1986.

E-Resources / MOOCs

1. NPTEL: Indian Knowledge System – IIT Kharagpur (<https://nptel.ac.in>)
2. SWAYAM: History of Science and Technology in India – UGC
3. INSA Digital Repository (<https://insa.nic.in>) – Resources on Indian Dyes and Drugs

Faculty of Science & Technology
B.Sc. Third Year - Dyes and Drugs
Practicals on SDYECP1301

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYECP1301
Year of Implementation	Academic Year 2026-2027
Semester	V
Paper Type	Core Major Practical
Credits	2
Total Hours	30 Hours
Formative Assessment Marks	20
Summative Assessment Marks	30
Total Marks	50

Course Objectives:

- To prepare representative pharmaceutical formulations.
- To learn the preparation of oral solutions, suspensions, emulsions, lotions, and ointments.
- To prepare ear drops and elixirs.
- To prepare granules of powder drugs.
- To become familiar with ChemDraw software.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Prepare pharmaceutical formulations such as syrups, solutions, emulsions, lotions, and ointments.	Apply	PO4, PO12
CO2	Prepare elixirs, ear drops, and granules of powder drugs using standard procedures.	Apply	PO4, PO12
CO3	Demonstrate practical formulation skills relevant to pharmaceutical Dyes and Drugs.	Apply / Analyze	PO4, PO7
CO4	Draw chemical structures and reactions using ChemDraw software.	Apply	PO5, PO8

List of Experiments / Practicals:

Sr. No.	Title of Experiment / Practical	Hours
1	Preparation of glycerines: borax glycerine and phenol glycerine	3
2	Preparation of syrups: simple syrup and lemon syrup	3
3	Preparation of oral solutions: sodium citrate and citric acid solution, KI oral solution, and strong iodine solution	3
4	Preparation of emulsions: cod liver oil, turpentine, castor oil, and acacia emulsions	3
5	Preparation of lotions: calamine lotion and zinc sulphate lotion	3
6	Preparation of ointments: simple ointment and sulphur ointment	3
7	Preparation of elixirs	3
8	Preparation of ear drops: hydrogen peroxide and sodium bicarbonate ear drops	3
9	Preparation of granules of powder drugs	3
10	Drawing structures and reactions using ChemDraw software	3

Total Hours: 30 Hours

Faculty of Science & Technology
B.Sc. Third Year - Dyes and Drugs
Practicals on SDYECP1302

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYECP1302
Year of Implementation	Academic Year 2026-2027
Semester	V
Paper Type	Core Major Practical
Credits	2
Total Hours	30 Hours
Formative Assessment Marks	20
Summative Assessment Marks	30
Total Marks	50

Course Objectives:

- To understand assay techniques for different drug samples.
- To determine percentage purity of a given sample.
- To determine refractive index of different samples.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Perform assay of selected drug samples by standard laboratory methods.	Apply	PO4, PO7
CO2	Determine the percentage purity of a given drug sample.	Apply / Analyze	PO4, PO3
CO3	Measure the refractive index of drug samples using a refractometer.	Apply	PO4, PO5

List of Experiments / Practicals:

Sr. No.	Title of Experiment / Practical	Hours
1	Determination of percentage purity of calcium gluconate by complexometric titration	3
2	Assay of ascorbic acid	3
3	Assay of isoniazid	3
4	Assay of chloroquine	3
5	Assay of riboflavin	3
6	Assay of benzyl penicillin	3
7	Assay of dapsone	3
8	Assay of chloroquine phosphate	3
9	Determination of refractive index of methyl salicylate	3
10	Determination of refractive index of eugenol / cinnamon oil	3

Total Hours: 30 Hours

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Faculty of Science & Technology

B.Sc. Third Year - Dyes and Drugs

Natural Dyes for Industrial Applications

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYEET1301
Year of Implementation	Academic Year 2026-2027
Semester	V
Paper Type	Elective Core
Credits	2
Total Hours	30 Hours
Formative Assessment Marks	20
Summative Assessment Marks	30
Total Marks	50

Course Objectives:

- To understand the history, promotion, and sources of natural dyes.
- To study the properties, classification, advantages, and limitations of natural dyes.
- To learn the dyeing technology of natural colorants used in textiles.
- To appreciate the industrial relevance of natural dyes.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Explain the history, promotion, and sources of natural dyes.	Understand	PO1, PO9
CO2	Describe the properties, classification, advantages, and limitations of natural dyes.	Understand / Analyze	PO1, PO3
CO3	Discuss natural colorants and dyeing technology used in textile dyeing.	Understand / Apply	PO1, PO12
CO4	Evaluate the industrial relevance of natural dyes.	Analyze / Evaluate	PO6, PO12

Detailed Syllabus:

Unit No.	Unit Title	Topics	Hours
I	History and Basics of Natural Dyes	Promotion of natural dyes; sources of natural dyes; constitutional aspects; requisites of a true dye; types of dyes; chemical entities responsible for colour.	6
II	Natural Dyes: Properties and Classification	Properties; characteristics; classification based on chemical nature and colour; advantages and disadvantages; availability of natural dyes.	8
III	Natural Colorants in Textile Dyeing	Introduction; reasons for natural coloration; dyeing technology; mordanting; standardization of coloration process; mixtures of	8

		plant material.	
IV	Natural Dyes on an Industrial Scale	1.Hank Dyeing of Woolen Yarn and Production of Woolen Caps 2.Dyeingof Cones in a Yarn Dyeing Machine 3 Dyeingof Cotton Fabric Dyeing Machine. 4.Dyeingof Cotton FabriconaJigDyeing Machine.	8

Total Hours: 30 Hours

Recommended Textbooks:

1. Padma S. Vankar, Handbook on Natural Dyes for Industrial Applications.
2. Thomas Bechtold and Rita Mussak, Handbook of Natural Colorants.
3. Charles E. Pellow, Dyes and Dyeing.

E-Resources / MOOCs:

1. SWAYAM / NPTEL modules related to natural dyes and textile Dyes and Drugs.
2. Relevant e-PG Pathshala resources on dyestuffs and colourDyes and Drugs.

Swami RamanandTeerthMarathwada University, Nanded

Faculty of Science & Technology

B.Sc. Third Year - Dyes and Drugs

Applications of Chromatographic Techniques in Dyes and Drugs.

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYEET1302
Year of Implementation	Academic Year 2026-2027
Semester	V
Paper Type	Elective Core (Alternative Option)
Credits	2
Total Hours	30 Hours
Formative Assessment Marks	20
Summative Assessment Marks	30
Total Marks	50

Course Objectives:

- To explain the concept, history, and principles of chromatography.
- To classify important chromatographic techniques.
- To apply TLC and paper chromatography for separation and identification.
- To understand applications of chromatography in dyes and drug industries.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Explain the concept, history, and principles of chromatography.	Understand	PO1, PO9
CO2	Classify different chromatographic techniques and explain their principles.	Understand / Analyze	PO1, PO3
CO3	Apply TLC and paper chromatography for separation and identification.	Apply	PO4, PO5
CO4	Discuss applications of chromatography in dyes and drug industries.	Analyze / Apply	PO5, PO12

Detailed Syllabus:

Unit No.	Unit Title	Topics	Hours
I	Introduction and History of Chromatography	Introduction, concept, definition, stationary phase, mobile phase, and history of chromatography.	4
II	Types of Chromatography	Paper chromatography, TLC, ion-exchange chromatography, gel permeation chromatography, affinity chromatography, gas chromatography, and HPLC.	6
III	Chromatographic Techniques	TLC - theory, principles, method, spot shape, adsorbents, plate preparation, sample application, and development; paper chromatography - technique, paper types, solvents, equilibrium, development, detection, and identification.	10
IV	Applications in Dyes and Drugs	Applications of chromatographic techniques in dye industry and drug industry.	10

Total Hours: 30 Hours

Recommended Textbooks:

1. A. H. Beckett and J. B. Stenlake, Practical Pharmaceutical Dyes and Drugs.

2. Vogel, Textbook of Practical Organic Dyes and Drugs.
3. Relevant standard texts on chromatography and analytical Dyes and Drugs.

E-Resources / MOOCs:

1. SWAYAM / NPTEL resources on analytical Dyes and Drugs and chromatography.
2. e-PG Pathshala resources on chromatographic techniques.



Swami RamanandTeerthMarathwada University, Nanded

Faculty of Science & Technology

B.Sc. Third Year - Dyes and Drugs

Practical Based on SDYEET1301

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYEET1301
Year of Implementation	Academic Year 2026-2027
Semester	V
Paper Type	Elective Core Practical
Credits	2
Total Hours	30 Hours
Formative Assessment Marks	20
Summative Assessment Marks	30
Total Marks	50

Course Objectives:

- To synthesize compounds of medicinal importance.
- To learn the basic technique of TLC.
- To identify prepared compounds using TLC.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Synthesize selected compounds of medicinal importance.	Apply	PO4, PO10
CO2	Perform TLC for identification and separation.	Apply / Analyze	PO4, PO5
CO3	Identify synthesized compounds using chromatographic methods.	Analyze	PO4, PO5

List of Experiments / Practicals:

Sr. No.	Title of Experiment / Practical	Hours
1	Preparation of benzimidazole from o-phenylenediamine and formic acid	3
2	Preparation of benzotriazole from o-phenylenediamine and nitrous acid	3
3	Preparation of 2,3-diphenylquinoxaline from benzil and o-phenylenediamine	3
4	Preparation of phenytoin from benzoin and urea	3
5	Preparation of benzocaine from p-aminobenzoic acid and ethanol	3
6	Preparation of phenothiazine from diphenylamine and sulphur powder	3
7	Preparation of 4-benzylidene-2-phenyl oxazole-5-one from benzoyl glycine and benzaldehyde	3
8	Identification of the prepared compounds with the help of TLC (any four)	9

Total Hours: 30 Hours

Swami RamanandTeerthMarathwada University, Nanded

Faculty of Science & Technology

B.Sc. Third Year - Dyes and Drugs

Practical Based on SDYEET1301

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYEET1301
Year of Implementation	Academic Year 2026-2027
Semester	V
Paper Type	Elective Core Practical
Credits	2
Total Hours	30 Hours
Formative Assessment Marks	20
Summative Assessment Marks	30
Total Marks	50

Course Objectives:

- To Know the basics of Biostatistics
- To learn the graphical representation of data.
- To perform activity regarding sampling techniques..

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Apply biostatistical parameters to given data	Apply	PO4, PO10
CO2	Perform graphical representation of data.	Apply / Analyze	PO4, PO5
CO3	Apply sampling techniques to given data.	Analyze	PO4, PO5

List of Experiments / Practicals:

Sr. No.	Title of Experiment / Practical	Hours
1	1. Basic Statistical Calculations Calculation of mean, median, mode ,Calculation of range, variance, and standard deviation ,Coefficient of variation (CV)	10
2	2. Graphical Representation of Data Bar diagram ,Histogram,,Piechart ,Frequency polygon and curve, Ogive (cumulative frequency curve)	10
3	Random sampling Stratified sampling Systematic sampling.	10

Total Hours: 30 Hours

Swami RamanandTeerthMarathwada University, Nanded

Faculty of Science & Technology

B.Sc. Third Year - Dyes and Drugs

Techniques for Characterisation of Dyes

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYEVC1301
Year of Implementation	Academic Year 2026-2027
Semester	V
Paper Type	VEC / Core Theory
Credits	2
Total Hours	30 Hours
Formative Assessment Marks	20
Summative Assessment Marks	30
Total Marks	50

Course Objectives:

- To introduce important techniques used for characterisation of dyes.
- To study spectroscopic and chromatographic methods relevant to dyes.
- To understand mordants and dyeing techniques.
- To examine dyeing mechanism and fastness properties.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Explain the principles of chromatographic and spectroscopic methods used in dye characterisation.	Understand	PO1, PO5
CO2	Discuss the role of mordants and mordanting techniques in dyeing.	Understand / Analyze	PO1, PO12
CO3	Describe the mechanism of dyeing and fastness properties of dyed materials.	Understand / Analyze	PO1, PO3
CO4	Interpret the relevance of modern analytical techniques in quality evaluation of dyes.	Analyze	PO5, PO10

Detailed Syllabus:

Unit No.	Unit Title	Topics	Hours
I	Chromatographic Studies	Thin layer chromatographic studies; column chromatographic studies; applications in analysis of dyes.(Activities to perform)	8
II	Spectroscopic Studies	Ultra-violet visible spectrophotometric studies; Fourier transform infrared studies; mass spectrometric studies..(Activities to perform)	8
III	Advanced Analytical Techniques	High performance liquid chromatographic studies; gas chromatographic studies; significance of analytical instrumentation in dye characterisation..(Activities to perform)	7
IV	Mordants, Dyeing and Fastness	Mordants used in dyeing; mordant tannins and tannic acid; metallic mordants; mordanting techniques; mechanism of dyeing; fastness properties of dyed materials..(Activities to perform)	7

Total Hours: 30 Hours

Recommended Textbooks:

1. K. Venkataraman, TheDyes and Drugs of Synthetic Dyes, Vol. I & II.

2. Chatwal, Dyes and their Intermediates.
3. V. A. Shenai, Introduction to the Dyes and Drugs of Dyestuffs.

E-Resources / MOOCs:

1. SWAYAM / NPTEL resources on spectroscopy and chromatography.
2. Relevant e-PG Pathshala resources on dye Dyes and Drugs and analytical methods.



Swami RamanandTeerthMarathwada University, Nanded

Faculty of Science & Technology B.Sc. Third Year - Dyes and Drugs Field Project / Industrial Visit

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYEF1301
Year of Implementation	Academic Year 2026-2027
Semester	V
Paper Type	Core Major / Field Component
Credits	4
Total Hours	120 Hours
Formative Assessment Marks	40
Summative Assessment Marks	60
Total Marks	100

Course Objectives:

- To bridge classroom theory with industrial practice.
- To develop interest in practical applications of the subject.
- To foster observation and reporting skills.
- To provide hands-on field exposure.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Relate theoretical concepts with industrial practices in dyes and drugs Dyes and Drugs.	Apply	PO2, PO12
CO2	Demonstrate observation and reporting skills through field study.	Apply / Analyze	PO8, PO11
CO3	Prepare a field trip report and deliver a presentation based on the visit.	Apply / Create	PO8, PO11
CO4	Develop practical awareness of dyes and drugs industries.	Analyze	PO9, PO12

Detailed Syllabus:

Unit No.	Unit Title	Topics	Hours
A	Industrial / Field Exposure	Arrange a field trip to a textile industry, cosmetic industry, tanning industry, silk farming unit, or pharmaceutical plant.	20
B	Observation and Data Collection	Study industrial processes, equipment, raw materials, product handling, quality control, and safety practices during the visit.	20
C	Report and Presentation	Preparation of trip report and PowerPoint presentation based on field observations and learning outcomes.	20

Total Hours: 120 Hours

Recommended Textbooks:

1. The Dyes and Drugs of Synthetic Dyes, Vol. I & II by K. Venkataraman.
2. Synthetic Dyes by Rajbir Singh.
3. Handbook on Natural Dyes for Industrial Applications by Padma S. Vankar.
4. Relevant industry manuals and institutional guidelines.

E-Resources / MOOCs:

1. Institutional ICT resources for report preparation and presentation.

Swami RamanandTeerthMarathwada University, Nanded

Faculty of Science & Technology

B.Sc. Third Year - Dyes and Drugs

Chemistry of Synthetic Dyes - II

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYECT1351
Year of Implementation	Academic Year 2026-2027
Semester	VI
Paper Type	Core Major
Credits	3
Total Hours	45 Hours
Formative Assessment Marks	30
Summative Assessment Marks	45
Total Marks	75

Course Objectives:

- To learn the properties and uses of sulphur dyes.
- To understand the concept of fluorescent brighteners.
- To study identification and evaluation of dyes.
- To discuss chromatographic methods used in dye analysis.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Explain the classification, properties, fastness, and applications of sulphur dyes.	Understand	PO1, PO12
CO2	Describe the concept, mechanism, and applications of fluorescent brightening agents.	Understand / Analyze	PO1, PO3
CO3	Discuss the identification, purification, and evaluation of commercial dyes.	Analyze	PO3, PO5
CO4	Explain the concept and applications of chromatography in the analysis of dyes.	Understand / Apply	PO4, PO5

Detailed Syllabus:

Unit No.	Unit Title	Topics	Hours
I	Sulphur Dyes	Classification, thionation conditions, properties, applications, fastness, sulphur side chain, and carbon-carbon linkage.	13
II	Fluorescent Brightening Agents	Fluorescence, mechanism, characteristic properties, brighteners for cellulosic and acrylic fibres, and toxicity.	10
III	Identification and Evaluation of Dyes	Identification and purification of commercial dyes; separation of azo, basic, and vat dyes; evaluation by chemical analysis, colorimetry, and experimental dyeing.	12
IV	Chromatography in Analysis of Dyes	Concept, types of chromatography, adsorption and partition chromatography, paper chromatography, TLC, and chromatography of dyes.	10

Total Hours: 45 Hours

Recommended Textbooks:

1. K. Venkataraman, The Dyes and Drugs of Synthetic Dyes, Vol. I & II.
2. Rajbir Singh, Synthetic Dyes.

3. Gurdeep R. Chatwal, Synthetic Dyes.

E-Resources / MOOCs:

1. SWAYAM / NPTEL resources on dye Dyes and Drugs and analytical methods.
2. e-PG Pathshala resources on dyestuffs and colourDyes and Drugs.



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Faculty of Science & Technology

B.Sc. Third Year - Dyes and Drugs

Unit Operation and Pharmaceutical Dosage Forms

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYECT1352
Year of Implementation	Academic Year 2026-2027
Semester	VI
Paper Type	Core Major
Credits	3
Total Hours	45 Hours
Formative Assessment Marks	30
Summative Assessment Marks	45
Total Marks	75

Course Objectives:

- To learn the requirements for pharmaceutical plant construction.
- To understand the principles of unit operations.
- To study different modes of unit operations.
- To gain knowledge of pharmaceutical dosage forms and their preparation.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Describe materials used for pharmaceutical plant construction.	Understand	PO1, PO12
CO2	Explain the principles of important unit operations in pharmaceutical processes.	Understand / Analyze	PO1, PO2
CO3	Discuss modes of unit operation such as distillation, crystallisation, mixing, and drying.	Understand / Apply	PO1, PO12
CO4	Explain principles of drug formulation and preparation of common dosage forms.	Understand / Apply	PO4, PO12

Detailed Syllabus:

Unit No.	Unit Title	Topics	Hours
I	Materials for Pharmaceutical Plant Construction	Metallic and non-metallic materials used in pharmaceutical plant construction.	8
II	Principles of Unit Operation	Introduction; unit operation; fluid flow; Reynolds experiment; heat transfer; steam as heating medium.	10
III	Modes of Unit Operation	Distillation, size reduction, crystallisation, mixing, and drying.	12
IV	Pharmaceutical Dosage Forms	Principles of drug formulation; principal pharmaceutical ingredients; general considerations in drug product formulation; preparation of oral solutions, syrups, elixirs, suspensions, emulsions, and tablets.	15

Total Hours: 45 Hours

Recommended Textbooks:

1. Rama RaoNadendla, Principles of Organic Medicinal Dyes and Drugs.
2. British Pharmacopoeia.
3. Indian Pharmacopoeia.

4. A. H. Beckett and J. B. Stenlake, Practical Pharmaceutical Dyes and Drugs.

E-Resources / MOOCs:

1. SWAYAM / NPTEL resources on pharmaceutical Dyes and Drugs and unit operations.
2. Relevant e-PG Pathshala resources on dosage forms and pharmaceutical technology.



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Faculty of Science & Technology

B.Sc. Third Year - Dyes and Drugs

Environmental Aspects of Dyes and Drugs chemistry.

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYECT1353
Year of Implementation	Academic Year 2026-2027
Semester	VI
Paper Type	Core Major
Credits	2
Total Hours	45 Hours
Formative Assessment Marks	20
Summative Assessment Marks	30
Total Marks	50

Course Objectives:

- To learn about pollutants from the drug industry.
- To study pharmaceutical contaminants in the environment.
- To understand the concept of green Dyes and Drugs.
- To develop awareness of policy and public issues related to drug pollution.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Explain sources and types of pharmaceutical pollutants in the environment.	Understand	PO1, PO6
CO2	Discuss the ecological impact of pharmaceutical contaminants and methods of risk assessment.	Understand / Analyze	PO3, PO6
CO3	Explain green Dyes and Drugs principles in drug design and sustainable drug development.	Understand / Apply	PO6, PO10
CO4	Discuss public awareness, pollution control, and policy measures related to environmental drug Dyes and Drugs.	Analyze	PO6, PO12

Detailed Syllabus:

Unit No.	Unit Title	Topics	Hours
I	Introduction to EnvironmentalAspect Dyes and Drugs	Definition and scope; sources of pharmaceutical pollutants; types of drugs found in the environment; pathways of drug entry into the environment; classification of pharmaceutical contaminants; examples such as antibiotics, NSAIDs, and antidepressants.	8
II	Impact on Ecosystem	Effects on aquatic organisms; endocrine disruption; development of antibiotic resistance; toxicity studies and risk assessment.	7
III	Green Dyes and Drugs in Drug Design and Future Prospects	Principles of green Dyes and Drugs; eco-friendly drug synthesis; design of biodegradable drugs; reduction of environmental toxicity; sustainable drug development.	8
IV	Wastewater Treatment nd Drug	Conventional treatment methods	7

	emoval	Advanced treatment techniques	
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Total Hours: 45 Hours

Recommended Textbooks:

1. Relevant texts on environmental Dyes and Drugs and pharmaceutical pollution.
2. Rama RaoNadendla, Principles of Organic Medicinal Dyes and Drugs.
3. Current resources on green Dyes and Drugs and environmental toxicology.

E-Resources / MOOCs:

1. SWAYAM / NPTEL resources on green Dyes and Drugs and environmental Dyes and Drugs.
2. Relevant MOOCs on sustainability and pharmaceutical pollution.



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Faculty of Science & Technology B.Sc. Third Year - Dyes and Drugs Practicals on SDYECP1351

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYECP1351
Year of Implementation	Academic Year 2026-2027
Semester	VI
Paper Type	Core Major Practical
Credits	2
Total Hours	60 Hours
Formative Assessment Marks	20
Summative Assessment Marks	30
Total Marks	50

Course Objectives:

- To prepare various dyes in the laboratory.
- To learn the estimation of dyes by reduction method.
- To study separation by column chromatography.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Prepare representative dyes in the laboratory.	Apply	PO4, PO10
CO2	Estimate dyes by reduction method using titanium chloride.	Apply	PO4, PO5
CO3	Separate mixtures using column chromatography.	Apply / Analyze	PO4, PO5

List of Experiments / Practicals:

Sr. No.	Title of Experiment / Practical	Hours
1	Preparation of dyes (any five): Phenylazo-beta-naphthol, Mageson II, Chrysoidine, Mordant Yellow, Fast Red B, Orange I	20
2	Estimation of dyes by reduction method using titanium chloride (any five): indigo carmine, crystal violet, eosin, methylene blue, malachite green	20
3	Separation of given mixtures by column chromatography (two mixtures)	20

Total Hours: 60 Hours

Swami RamanandTeerthMarathwada University, Nanded

Faculty of Science & Technology B.Sc. Third Year - Dyes and Drugs Practicals on SDYECP1352

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYECP1352
Year of Implementation	Academic Year 2026-2027
Semester	VI
Paper Type	Core Major Practical
Credits	2
Total Hours	30 Hours
Formative Assessment Marks	20
Summative Assessment Marks	30
Total Marks	50

Course Objectives:

- To understand assay estimation of dyes by diazotization.
- To learn chromatographic separation techniques.
- To perform preliminary and qualitative analysis of organic compounds.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Estimate coupling components by diazonium salt solution.	Apply	PO4, PO5
CO2	Separate mixtures by TLC and paper chromatography.	Apply / Analyze	PO4, PO5
CO3	Perform preliminary and qualitative tests for selected organic compounds.	Apply / Analyze	PO4, PO3

List of Experiments / Practicals:

Sr. No.	Title of Experiment / Practical	Hours
1	Estimation of coupling components by diazonium salt solution (any four): R-acid, beta-naphthol, resorcinol, J-acid	10
2	Chromatography: separation of given mixtures by TLC (two mixtures) and paper chromatography (two mixtures)	10
3	Preliminary and qualitative tests for phenol, carbohydrate, amide/urea, carboxylic acid, aniline, and aldehydes	10

Total Hours: 30 Hours

Swami RamanandTeerthMarathwada University, Nanded

Faculty of Science & Technology B.Sc. Third Year - Dyes and Drugs Principles of Drug Design

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYEET1351
Year of Implementation	Academic Year 2026-2027
Semester	VI
Paper Type	Elective Core
Credits	2
Total Hours	30 Hours
Formative Assessment Marks	20
Summative Assessment Marks	30
Total Marks	50

Course Objectives:

- To understand the rational approach to drug design.
- To learn methods of drug design and development.
- To study physicochemical factors affecting biological activity.
- To introduce molecular modelling and structure-based drug design.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Explain the rational approach to drug design and the role of lead compounds and prodrugs.	Understand	PO1, PO10
CO2	Discuss major methods of drug design and development.	Understand / Analyze	PO2, PO10
CO3	Explain physicochemical and stereochemical factors governing biological activity of drugs.	Understand / Analyze	PO3, PO12
CO4	Describe molecular modelling, receptor sites, and ligand design in modern drug discovery.	Analyze	PO5, PO10

Detailed Syllabus:

Unit No.	Unit Title	Topics	Hours
I	A Rational Approach to Drug Design	Introduction; analogues and prodrugs; concept of lead; factors governing drug design; rational approach to drug design - quantum mechanical, molecular orbital, and molecular connectivity approaches.	7
II	Methods of Drug Design	Drug design by variation, disjunction, and conjunction; drug design and development; molecular hybridization; rigidity and flexibility in drug design; tailoring of drugs.	7
III	Physicochemical Factors and Biological Activities	Physical properties; features governing drug action at active site; structurally specific and non-specific drugs; Meyer-Overton and Meyer-Hemmi theories; Ferguson's theory; Van der Waals constants; absorption, distribution, metabolism, excretion; isosterism and bio-isosterism; stereoDyes and Drugs and drug action; conformational flexibility and rigidity; chemical properties.	8
IV	Molecular Modelling and Drug Design	Introduction; methodologies in molecular modelling; known receptor sites; 3D structure of macromolecular targets; structure-based drug design; ligand-receptor recognition; active site characterisation;	8

		hydrogen bonding and other group binding sites; electrostatic and hydrophobic fields; design of ligands; unknown receptor sites; pharmacophore and binding-site models.	
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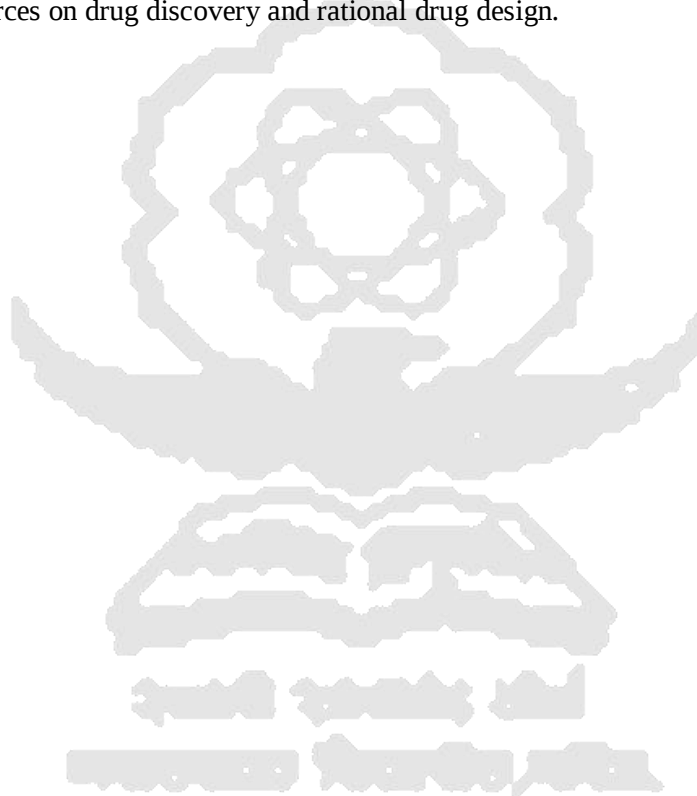
Total Hours: 30 Hours

Recommended Textbooks:

1. Standard texts on medicinal Dyes and Drugs and drug design.
2. Rama RaoNadendla, Principles of Organic Medicinal Dyes and Drugs.
3. Contemporary references on molecular modelling and structure-based drug design.

E-Resources / MOOCs:

1. SWAYAM / NPTEL resources on medicinal Dyes and Drugs and molecular modelling.
2. Relevant online resources on drug discovery and rational drug design.



Swami RamanandTeerthMarathwada University, Nanded

Faculty of Science & Technology B.Sc. Third Year - Dyes and Drugs Chemistry of Natural Drugs

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYEET1352
Year of Implementation	Academic Year 2026-2027
Semester	VI
Paper Type	Elective Core (Alternative Option)
Credits	2
Total Hours	30 Hours
Formative Assessment Marks	20
Summative Assessment Marks	30
Total Marks	50

Course Objectives:

- To understand the concept of natural drugs and Ayurveda.
- To learn natural drugs from alkaloids, terpenoids, and glycosides.
- To study natural drugs derived from steroids and essential oils.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Explain the concept, sources, and importance of natural drugs.	Understand	PO1, PO12
CO2	Describe alkaloids and glycosides with examples, structures, and uses.	Understand / Analyze	PO1, PO3
CO3	Discuss terpenoids, essential oils, and steroids with their medicinal significance.	Understand / Apply	PO1, PO12
CO4	Relate natural products Dyes and Drugs with traditional systems such as Ayurveda.	Analyze	PO9, PO12

Detailed Syllabus:

Unit No.	Unit Title	Topics	Hours
I	Introduction to Natural Drugs	Natural drugs obtained from plants, animals, minerals, marine organisms, and microorganisms; importance of natural drugs; relationship with traditional medicine and Ayurveda.	7
II	Alkaloids Glycosides	Definition, properties, examples, structures, and uses of morphine, quinine, and caffeine; general extraction methods introduction to glycosides; types such as cardiac and anthraquinone glycosides; examples including Digitalis and Senna.	8
III	Steroids	introduction to steroids; four fused ring system; examples such as cholesterol, estrogen, and testosterone; medicinal importance and hormone therapy.	7
IV	Terpenoids, Essential Oils,	Introduction to terpenoids; examples with structures and uses such as menthol and camphor;.	8

Total Hours: 30 Hours

Recommended Textbooks:

1. O. P. Agrawal, Natural Products.
2. Sujata V. Bhat, A. Nagsampagi and MeenakshiShivkumar, Dyes and Drugs of Natural Products.

3. Standard texts on pharmacognosy and Ayurveda.

E-Resources / MOOCs:

1. SWAYAM / NPTEL resources on natural products Dyes and Drugs.
2. Relevant e-PG Pathshala resources on pharmacognosy and natural drugs.



Swami RamanandTeerthMarathwada University, Nanded

Faculty of Science & Technology

B.Sc. Third Year - Dyes and Drugs

Practical Based on SDYEET1351

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYEET1351
Year of Implementation	Academic Year 2026-2027
Semester	VI
Paper Type	Elective Core Practical
Credits	2
Total Hours	30 Hours
Formative Assessment Marks	20
Summative Assessment Marks	30
Total Marks	50

Course Objectives:

- To perform formulation of selected compounds and preparations of medical importance.
- To learn basic practical techniques relevant to pharmaceutical Dyes and Drugs.
- To identify and prepare medicinal formulations as prescribed in the syllabus.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Prepare selected pharmaceutical preparations of medicinal importance.	Apply	PO4, PO12
CO2	Demonstrate basic formulation techniques used in pharmaceutical Dyes and Drugs.	Apply	PO4, PO7
CO3	Prepare and handle common medicinal formulations safely and accurately.	Apply / Analyze	PO4, PO7

List of Experiments / Practicals:

Sr. No.	Title of Experiment / Practical	Hours
1	Preparation of ascorbic acid injection	4
2	Preparation of calcium gluconate injection	4
3	Preparation of sodium chloride injection	4
4	Preparation of simple syrup	4
5	Preparation of aqueous iodine solution	4
6	Preparation of calamine lotion	4
7	Preparation of sulphur ointment	4
8	Preparation of magnesium hydroxide mixture	4
9	Preparation of turpentine liniment	4
10	Preparation of effervescent granules	4
11	Preparation of dusting powder	4
12	Preparation of ORS powder	4
13	Preparation of iodine throat paint	4
14	Preparation of chlorhexidine mouthwash	4

Total Hours:30 Hours

Swami RamanandTeerthMarathwada University, Nanded

Faculty of Science & Technology

B.Sc. Third Year - Dyes and Drugs

Practical Based on SDYEET1351

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYEET1352
Year of Implementation	Academic Year 2026-2027
Semester	VI
Paper Type	Elective Core Practical
Credits	2
Total Hours	30 Hours
Formative Assessment Marks	20
Summative Assessment Marks	30
Total Marks	50

Course Objectives:

- To perform preformulation of tablets
- To learn basic identification of drugs
- To prepare medicinal formulations as tablets
- To learn packaging and labeling techniques.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Perform preformulation of tablets	Apply	PO4, PO12
CO2	learn basic identification of drugs	Apply	PO4, PO7
CO3	learn packaging and labeling techniques.	Apply / Analyze	PO4, PO7

List of Experiments / Practicals:

Sr. No.	Title of Experiment / Practical	Hours
	Section A: Tablet Making (Formulation & Evaluation)	
	Preformulation Studies	
1	Identification of drug (organoleptic properties)	2
2	Solubility testing	2
3	Bulk density & tapped density	2
4	Preparation of Tablets	2
5	Preparation of granules	3
6	Drying and sieving	2
7	Compression of Tablets	3
8	Use of single punch tablet machine	2
9	Adjusting hardness and thickness	2
	Tablet Coating (Basic Introduction)	
10	Sugar coating (demonstration)	2

11	Enteric coating (theory + demo if possible)	2
12	Packaging Techniques	3
13	Labeling Requirements	3

Total Hours: 30 Hours



Swami RamanandTeerthMarathwada University, Nanded
Faculty of Science & Technology
B.Sc. Third Year - Dyes and Drugs
Study of Expectorants and Antitussives / Study of Antiviral Drugs

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYEVC1351
Year of Implementation	Academic Year 2026-2027
Semester	VI
Paper Type	Core Major / VEC
Credits	2
Total Hours	30
Formative Assessment Marks	20
Summative Assessment Marks	30
Total Marks	50

Course Objectives:

- To study the classification and action of expectorants and antitussives.
- To understand the Dyes and Drugs and therapeutic uses of selected drugs.
- To introduce antiviral drugs and their mechanism of action as an alternative option.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Classify expectorants and antitussive agents and explain their therapeutic relevance.(Activity needed)	Understand	PO1, PO12
CO2	Discuss selected drugs with reference to synthesis/study, uses, and mechanism of action..(Activity needed)	Understand / Analyze	PO1, PO3
CO3	Explain the classification and mechanism of action of antiviral drugs as an alternative option..(Activity needed)	Understand / Analyze	PO1, PO12
CO4	Prepare charts/activities demonstrating mechanisms of action and applications of these drugs.(Activity needed).	Apply / Create	PO8, PO10

Detailed Syllabus:

Unit No.	Unit Title	Topics	Hours
I	Expectorants and Antitussives	Introduction and classification - sedative expectorants, stimulant (irritant) expectorants, and centrally acting antitussive agents..(Activity needed)	7
II	Study of Selected Drugs	Study / synthesis, uses, and mechanism of action of noscapine, acetylcysteine, bromhexine, ammonium chloride, ipecacuanha, cocillana, potassium iodide, creosote, eucalyptol, terpin hydrate, sulfogaiacol, benzonatate, carbetapentane, and dextromethorphan..(Activity needed)	7
III	Alternative	Introduction; replication and transformation; classification of	8

	Option - Study of Antiviral Drugs	antiviral agents; substances that inhibit early stages of viral replication, interfere with viral nucleic acid replication, or affect translation on cell ribosomes; study of amantadine, idoxuridine, acyclovir, vidarabine, ribavirin, methisazone, and arildone..(Activity needed)	
IV	Activities	Students are expected to perform a minimum of six activities / preparations or prepare charts on the mechanism of action as prescribed by the department..(Activity needed)	8

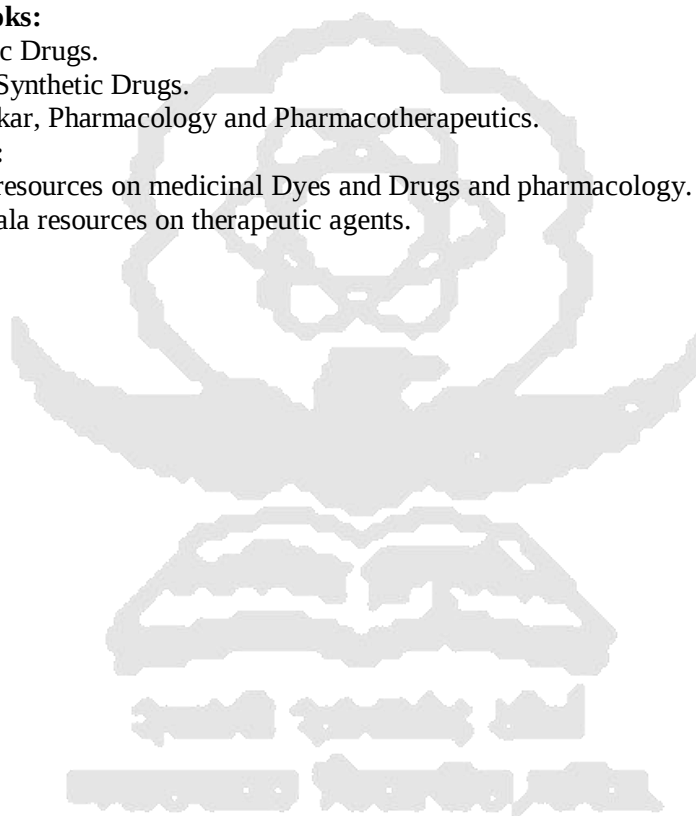
Total Hours: 60

Recommended Textbooks:

1. Rajbir Singh, Synthetic Drugs.
2. Gurdeep R. Chatwal, Synthetic Drugs.
3. Satoskar and Bhandarkar, Pharmacology and Pharmacotherapeutics.

E-Resources / MOOCs:

1. SWAYAM / NPTEL resources on medicinal Dyes and Drugs and pharmacology.
2. Relevant e-PG Pathshala resources on therapeutic agents.



Swami RamanandTeerthMarathwada University, Nanded

Faculty of Science & Technology B.Sc. Third Year - Dyes and Drugs On Job Training

Name of the Program	B.Sc. (Dyes and Drugs), Third Year
Course Code	SDYEOJ1351
Year of Implementation	Academic Year 2026-2027
Semester	VI
Paper Type	Core Major / OJT
Credits	4
Total Hours	60 Hours
Formative Assessment Marks	20
Summative Assessment Marks	30
Total Marks	50

Course Objectives:

- To bridge classroom theory with the industrial world.
- To boost interest in practical applications of the subject.
- To foster observation skills.
- To provide practical work experience.

Course Outcomes (COs):

After completing this course, students will be able to:

CO No.	Upon completion of this course, students will be able to:	Bloom's Level	PO Mapped
CO1	Relate classroom learning with industrial practice.	Apply	PO2, PO12
CO2	Develop work discipline, safety awareness, and technical skills.	Apply / Analyze	PO7, PO11
CO3	Prepare an OJT report and presentation.	Apply / Create	PO8, PO11
CO4	Demonstrate readiness for professional work environments.	Analyze	PO9, PO11

Detailed Syllabus:

Unit No.	Unit Title	Topics	Hours
A	Industrial Training	Practical training in industry to develop technical skills, work discipline, safety practices, and real-time problem-solving abilities.	20
B	Industrial Exposure	Exposure to industrial processes, equipment handling, documentation, and teamwork for professional readiness.	20
C	Reporting and Presentation	Preparation of OJT report and PowerPoint presentation on the training experience.	20

Total Hours: 30 Hours

Recommended Textbooks:

1. Relevant industry manuals and departmental OJT guidelines.
2. Standard references related to dyes, drugs, and pharmaceutical industries.

E-Resources / MOOCs:

1. Institutional ICT resources for report writing and presentation.
2. Relevant SWAYAM / NPTEL resources on industrial Dyes and Drugs and workplace practices.