



Balaghat Shikshan Sanstha, Naldurg's  
**YESHWANTRAO CHAVAN MAHAVIDYALAYA**  
 Tuljapur  
 Department of Botany



### Programme Specific Outcome

**PSO1. Domain knowledge:** Apply the knowledge of fundamental and advanced science for the wellbeing of the human.

**PSO2. Understanding the various plant groups:** The basic knowledge and evolution of different plant groups like Bacteria, Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms will be given to students.

**PSO3. Understanding the structures of plant body:** The detailed morphological, anatomical, palynological, embryological structures will give the understanding about the plant body.

**PSO4. Understanding processes in plant body:** The mechanism of anabolic and catabolic activities, cell divisions and growth in plant bodies will be explained to increase the production of crop plants.

**PSO5. Understanding properties and uses of plants to maintain health:** The properties and uses of common medicinal plants, spices, vegetables will be explain to maintain the good health.

**PSO5. Enriching knowledge related with agriculture:** Use of established knowledge regarding mannuaring, composting, use of bio fertilizers and ecofriendly Insecticides and pesticides for the sustainable development.

### Course Outcome

Sr. No	Class	Paper Type	Paper Title	Course Outcomes
1	<b>B.Sc.F.Y. Sem.-I</b>	Mejor : Botany DSC- 1	Morphology of Angiosperms	On the successful completion of the course, student will able to – <ul style="list-style-type: none"> <li>➤ Describe morphological peculiarities of vegetative organs of angiosperms.</li> <li>➤ Describe morphological peculiarities of reproductive organs of angiosperms.</li> <li>➤ Know the diagnostic features of plant species.</li> </ul>
2		Practical's Based on DSC-1	Morphology of Angiosperms	On the successful completion of the course, student will able to – <ul style="list-style-type: none"> <li>➤ Describe morphological peculiarities of vegetative organs of angiosperms.</li> <li>➤ Describe morphological peculiarities of reproductive organs of angiosperms.</li> <li>➤ Know the diagnostic features of plant species.</li> </ul>
3		GE/OE-1	Seed production and preservation	: On the completion of this course, student will – <ol style="list-style-type: none"> <li>1. Insist on quality seed production</li> </ol>



			technique	<ol style="list-style-type: none"> <li>Increase the production of quality seeds.</li> <li>Will know the best natural practices to store the seeds for longer period.</li> </ol>
4		SEC-1: Skill Enhancement Course	Fungal diseases of crop plants and their management	<p>After learning this course, students will</p> <ol style="list-style-type: none"> <li>Identify Fungal Diseases of Crop plants of the region.</li> <li>Treat the Fungal Diseases of Crop plants.</li> <li>Manage the crops in their agriculture field from fungal disease.</li> </ol>
5		SEC-2: Practical	Practical's Based on SEC-1	<p>After learning this course, students will</p> <ol style="list-style-type: none"> <li>Identify Fungal Diseases of Crop plants of the region.</li> <li>Treat the Fungal Diseases of Crop plants.</li> <li>Manage the crops in their agriculture field from fungal disease.</li> </ol>
6	<b>B.Sc.F.Y. Sem.-II</b>	Mejor-Botany-DSC-3	Diversity of Cryptogams-I	<p>After the completion of the course, the learners would be able to –</p> <ul style="list-style-type: none"> <li>➤ Classify lichens, algae and fungi up to orders according to system of classification proposed by G.M.Smith (1950), Alexopoulos and Mims (1979).</li> <li>➤ Classify and describe the morphology, structure, life cycle of some lichens, algae, fungi and gymnosperms.</li> <li>➤ Exemplify lichens, algae and fungi of economic importance.</li> <li>➤ Identify common plant diseases and devise the suitable control measures.</li> </ul>
7		DSC-4	Practical's based on DSC-3	<p>After the completion of the course, the learners would be able to –</p> <ul style="list-style-type: none"> <li>➤ Classify lichens, algae and fungi up to orders according to system of classification proposed by G.M.Smith (1950), Alexopoulos and Mims (1979).</li> <li>➤ Classify and describe the morphology, structure, life cycle of some lichens, algae, fungi and gymnosperms.</li> <li>➤ Exemplify lichens, algae and fungi of economic importance.</li> <li>➤ Identify common plant diseases and devise the suitable control measures.</li> </ul>
8		GE/OE-2	Pomology	<p>On the completion of this course, the student will –</p> <ul style="list-style-type: none"> <li>➤ Enrich the knowledge about horticultural principles and practices relevant to fruit fruit cultivation and</li> </ul>



				<p>will take initiative to cultivate fruits.</p> <ul style="list-style-type: none"> <li>➤ Will apply fundamental aspects of orchard operations and its management.</li> <li>➤ Will become expert in plant propagation techniques.</li> </ul>
9		VSC-1	Bio fertilizer technique	<p>On the successful completion of the course, student will be able to –</p> <ul style="list-style-type: none"> <li>➤ Acquire the knowledge of bio fertilizer technique.</li> <li>➤ Learn laboratory skill, lab organization and nutritional importance of different bio fertilizers</li> <li>➤ Understand about the bio fertilizer technique- isolation, identification, screening and cultivation, methods and its economic importance.</li> </ul>
10		VSC-2	Bio fertilizer technique	<p>On the successful completion of the course, student will be able to –</p> <ul style="list-style-type: none"> <li>➤ Acquire the knowledge of bio fertilizer technique.</li> <li>➤ Learn laboratory skill, lab organization and nutritional importance of different bio fertilizers</li> <li>➤ Understand about the bio fertilizer technique- isolation, identification, screening and cultivation, methods and its economic importance.</li> </ul>
11	<b>B.Sc.S.Y. Sem.-III</b>	BOT/DSC/T /200	Diversity of Cryptogams-II	<p>After successful completion of the module, the learner will be able to</p> <ul style="list-style-type: none"> <li>➤ Gain knowledge about diversity among the bryophytes and pteridophytes with their general characters</li> <li>➤ Understand the classification of bryophytes and pteridophytes based on their structure, reproduction and life cycles.</li> <li>➤ Evaluate the ecological, ethnic and economic value of bryophytes and pteridophytes.</li> </ul>
12		BOT/DSC/T /201	Plant Ecology	<p>After successful completion of the module, the learner will be able to</p> <ul style="list-style-type: none"> <li>➤ Interpret complex ecological disasters to explain plant distribution pattern across different spatial scales.</li> <li>➤ Assess how plant functional traits influence community assembly,</li> </ul>



				<p>ecosystem processes and evolutionary adaptations.</p> <ul style="list-style-type: none"><li>➤ Design field based research protocols to investigate plant-environment relationships.</li><li>➤ Critically evaluate primary literature in plant ecology and synthesize current understanding of major ecological concepts.</li><li>➤ Predict potential impacts of global environmental change on plant communities and ecosystem functions.</li></ul>
13		BOT/DSC/P/226	Diversity of Cryptogams-II	<ul style="list-style-type: none"><li>➤ Identify members of bryophytes and pteridophytes using morphological and anatomical characteristics.</li><li>➤ Demonstrate proficiency in preparing temporary and permanent slides of cryptogamic structures.</li><li>➤ Compare reproductive structures of different cryptogamic groups and explain their evolutionary significance.</li><li>➤ Analyse and interpret the life cycles of representative cryptogamic species.</li><li>➤ Document and maintain the record of cryptogamic diversity through field collection and laboratory observation.</li></ul>
14		BOT/DSC/P/227	Plant Ecology	<ul style="list-style-type: none"><li>➤ Students will be able to collect, analyze and interpret quantitative data on plant.</li><li>➤ Student will gain proficiency in identifying local flora and understanding their ecological roles within different ecosystem types.</li><li>➤ Students will develop technical skills in using field and laboratory equipments essential for plant ecological research.</li><li>➤ Students will effectively communicate scientific findings through formal lab reports, data visualization and presentations that adhere to ecological research standards.</li><li>➤ Students will evaluate how anthropogenic factors influence</li></ul>



				plant communities and apply ecological principles to conservation and restoration planning.
15		Minor: BOT/Mn/T/ 200	Fundamentals of Soil Science	After completion of the course, students will be able to- <ul style="list-style-type: none"><li>➤ Explain the processes of soil formation and development.</li><li>➤ Evaluate physical and chemical properties of soils.</li><li>➤ Interpret basic soil classification systems.</li><li>➤ Assess soil fertility status and nutrient requirement.</li><li>➤ Apply soil science principles in agricultural and environmental contexts.</li></ul>
16		Minor: BOT/Mn/T/ 200	Organic Farming	After completion of the course, students will be able to- <ul style="list-style-type: none"><li>➤ This course will address the ethical implications of organic farming, such as fair trade practices, social responsibility and community involvement.</li><li>➤ Gain information about the impact of organic farming and indigenous practices on environment.</li><li>➤ Students will learn about marketing organic products, understanding consumer demand and the economic aspects of organic farming.</li><li>➤ Students will gain a thorough understanding of the principles and philosophy behind organic farming, including the importance of sustainability, biodiversity and ecological balance.</li><li>➤ Learners will explore the significance of soil health in organic farming and various methods to enhance soil fertility through composting, cover cropping and crop rotation.</li></ul>
17		GE/OE: BOT/GE/O E/T/200	Fruit Preservation	After completion of the course, students will be able to- <ul style="list-style-type: none"><li>➤ Explain various principles and methods of fruit preservation</li><li>➤ Identify appropriate preservation techniques for different fruits.</li></ul>



				<ul style="list-style-type: none"> <li>➤ Understand quality standards and safety measures.</li> <li>➤ Apply knowledge of packaging and storage requirements.</li> <li>➤ Evaluate preserved fruit products for for quality paramaters.</li> </ul>
18		VSC: BOT/VSC/T /200	Mushroom Cultivation	<p>After completion of the course, students will be able to-</p> <ul style="list-style-type: none"> <li>➤ Identify various types and categories of mushrooms.</li> <li>➤ Demonstrate various types of mushroom cultivation technologies.</li> <li>➤ Value the economic factors associated with mushroom cultivation.</li> <li>➤ Device new methods and strategies to contribute to mushroom production.</li> </ul>
19		VSC: BOT/VSC/P /226	Mushroom Cultivation	<ul style="list-style-type: none"> <li>➤ Introduce students to the fundamentals of mushroom cultivation.</li> <li>➤ Provides hands-on training in mushroom cultivation techniques.</li> <li>➤ Develops skills in identifying edible and non-edible mushrooms.</li> <li>➤ Explore the economic and nutritional significance of mushrooms.</li> <li>➤ Encourage sustainable and eco-friendly mushroom production.</li> </ul>
20	<b>B.Sc.S.Y. Sem.-IV</b>	BOT/DSC/T /250	Gymnosperms and Paleobotany	<p>After completion of the course, students will be able to</p> <ul style="list-style-type: none"> <li>➤ Identify and classify major gymnosperm groups based on their distinctive morphological, anatomical and reproductive features.</li> <li>➤ Explain the evolutionary significance of Gymnosperms and interpret their phylogenetic relationship with other plant groups.</li> <li>➤ Analyze and describe fossil plant specimens using appropriate technology and techniques, relating them to extant taxa.</li> <li>➤ Apply paleobotanical principles to reconstruct past environments and understand plant evolution through</li> </ul>



				<ul style="list-style-type: none"> <li>➤ geological time.</li> <li>➤ Demonstrate proficiency in laboratory and field techniques related to Gymnosperm and fossil plant studies, including preservation and demonstration of specimens.</li> </ul>
21		BOT/DSC/T/251	Plant Physiology	<p>After completion of the course, students will be able to</p> <ul style="list-style-type: none"> <li>➤ Apply concepts of plant water relations to explain phenomena such as wilting, stomatal regulation and drought adaptation strategies.</li> <li>➤ Evaluate plant nutritional status and diagnose nutrient deficiency symptoms based on physiological knowledge.</li> <li>➤ Interpret experimental data from physiological studies on photosynthesis, respiration and carbon allocation patterns.</li> <li>➤ Predict plant growth and development responses to various hormonal treatments and environmental conditions.</li> <li>➤ Design strategies to enhance plant productivity and stress tolerance based on physiological principles.</li> </ul>
22		BOT/DSC/P/276	Gymnosperms and Paleobotany	<p>After completion of the course, students will be able to</p> <ul style="list-style-type: none"> <li>➤ Identify and classify major gymnosperm taxa based on their vegetative and reproductive structures.</li> <li>➤ Demonstrate proficiency in preparing and analyzing microscopic sections of gymnosperm tissues and interpreting their anatomical significance.</li> <li>➤ Apply paleobotanical techniques to identify, describe and classify fossil plant specimens from different geological eras.</li> <li>➤ Explain the evolutionary significance of key morphological and anatomical features in gymnosperms and their fossil ancestors.</li> </ul>
23		BOT/DSC/P	Plant	After completion of the course, students will be



		/277	Physiology	<p>able to</p> <ul style="list-style-type: none"> <li>➤ Students will be able to independently design, execute and troubleshoot experiments related to key plant physiological processes.</li> <li>➤ Students will demonstrate competence in data collection, analysis and presentation of results in scientific report format.</li> <li>➤ Student will explain the physiological mechanism underlying plant growth, development and adaptation to changing environmental conditions.</li> <li>➤ Students will critically evaluate scientific literature in plant physiology and apply this knowledge their own experimental work.</li> <li>➤ Students will collaborate effectively in teams to conduct complex experiments and communicate findings through oral presentations and written reports.</li> </ul>
24		Minor: BOT/Mn/25 0	Medicinal Plants	<p>After completion of the course, students will be able to</p> <ul style="list-style-type: none"> <li>➤ Classify the drug plants</li> <li>➤ Identify the medicinal plants, know the active principles, properties and uses of medicinal plants.</li> <li>➤ Utilize the medicinal plants as home remedy against the common diseases and disorders.</li> </ul>
25		Minor: BOT/Mn/25 1	Landscape Gardening	<p>After completion of the course, students will be able to</p> <ul style="list-style-type: none"> <li>➤ Describe and differentiate between the types of gardens.</li> <li>➤ Practice different methods for propagation of plants.</li> <li>➤ Execute several nursery and gardening operations.</li> <li>➤ Assess growing conditions of different horticultural plants, their general requirements and understand their role in landscaping.</li> </ul>
26		GE/OE: BOT/GE/O E/T/250	Herbal Cosmetics	<p>After completion of the course, students will be able to</p> <ul style="list-style-type: none"> <li>➤ Know the Indian herbs used as Cosmetics.</li> </ul>



				<ul style="list-style-type: none"> <li>➤ Identify the Indian herbs; know their active principles, properties and uses.</li> <li>➤ Prepare and utilize the Herbal Home Cosmetics.</li> </ul>
27		SEC BOT/SEC/T /250	Herbarium Technique and Plant Preservation	<p>After completion of the course, students will be able to</p> <ul style="list-style-type: none"> <li>➤ Preserve the plant specimens for all biological studies.</li> <li>➤ Preserve the plant specimens belonging to different plant groups.</li> <li>➤ Prepare Herbarium specimens and can deposit in resosible Herbaria.</li> </ul>
28		SEC BOT/SEC/T /276	Herbarium Technique and Plant Preservation	<ul style="list-style-type: none"> <li>➤ Students will be able to systematically collect and preserve plant specimens using standard herbarium techniques.</li> <li>➤ Develop expertise in proper identification, labelling and documentation of herbarium specimens.</li> <li>➤ Understood the role of herbaria in botanical research, ecological studies and biodiversity conservation.</li> <li>➤ Skilled in different plant preservation techniques, including dry and wet preservation methods.</li> <li>➤ Prepare a well organized herbarium and contribute to plant taxonomy and conservation efforts.</li> </ul>
29	<b>B.Sc.T.Y. Sem.V</b>	BOT-511	Cell Biology and Molecular Biology	<p>After completion of the course, students will be able to</p> <ul style="list-style-type: none"> <li>➤ Structure and functions of cell and cell organelles.</li> <li>➤ Cell cycle and types of cell division.</li> <li>➤ Molecular features of a cell.</li> <li>➤ Transcription and translation in a cell.</li> </ul>
30		BOT-512(C)	Mycology and Plant Pathology	<p>After completion of the course, students will be able to</p> <ul style="list-style-type: none"> <li>➤ Study of applied mycology.</li> <li>➤ Study of fundamentals of plant pathology.</li> <li>➤ Study of various plant diseases caused by plant pathogens.</li> </ul>
31		BOT-521	Lab course based on 511	<ul style="list-style-type: none"> <li>➤ Study of plant cell structure.</li> <li>➤ Study of micrographs of cell organelles.</li> <li>➤ Micrographs of viruses, bacteria and</li> </ul>



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				<p>Cyanobacteria.</p> <ul style="list-style-type: none"> <li>➤ Mitosis in plant cells.meiosis in plant cells.</li> <li>➤ Study of karyotype by ideogram.</li> </ul>
32		BOT-522 (C)	Lab course based on 512 (C)	<ul style="list-style-type: none"> <li>➤ Study of Koch's postulates.</li> <li>➤ Mushroom cultivation.</li> <li>➤ Symptoms, causal organism and control measures of various crop plant diseases.</li> </ul>
33		BOT-513 SEC	SEC 3(E) Vermicomposting and Bio fertilizers	<ul style="list-style-type: none"> <li>➤ Understanding source of vermicompost, the earthworm.</li> <li>➤ Study of vermicomposting methods and practice.</li> <li>➤ Concept of bio fertilizers.</li> <li>➤ Source of bio fertilizers. \</li> <li>➤ Application of bio fertilizers.</li> </ul>
34	<b>B.Sc.T.Y. Sem.VI</b>	BOT-611	Genetics and Evolution	<p>After completion of the course, students will be able to</p> <ul style="list-style-type: none"> <li>➤ Study of laws of inheritance and interaction of genes.</li> <li>➤ Mechanism of sex determination.</li> <li>➤ Study of x-linked and Y-linked genes.</li> <li>➤ Study of genetic disorders.</li> <li>➤ Study structure and function of genes.</li> <li>➤ Study of evolutionary thoughts.</li> </ul>
35		BOT-612 (C)	Microbiology and Disease Management	<p>After completion of the course, students will be able to</p> <ul style="list-style-type: none"> <li>➤ Study of Microbiology and Microbial Techniques.</li> <li>➤ Understand methods of disease management.</li> <li>➤ Inform different types of pesticides, herbicides, bactericides, fungicides, nematicides etc.</li> <li>➤ Understand biological control of crop plant diseases.</li> <li>➤ Well known information about use of agrochemicals according to environment.</li> </ul>
36		BOT-621	Lab Course based on BOT-611	<ul style="list-style-type: none"> <li>➤ Preparation to attempt questions (Quiz) on all related topics of genetics.</li> <li>➤ Understand working of laws of inheritance.</li> <li>➤ Solving the problems on interaction of genes.</li> <li>➤ Different problems on sex linked inheritance.</li> <li>➤ Will give solution on genetic problems.</li> </ul>
37		BOT-622	Lab Course	<ul style="list-style-type: none"> <li>➤ Study of fungicides.</li> </ul>



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		(C)	based on BOT-612 (C)	<ul style="list-style-type: none"><li>➤ Preparation of fungicides.</li><li>➤ Isolation and preparation of biocontrol agents.</li><li>➤ Principle and working of plant protection equipment.</li><li>➤ Demonstration of aerobiological technique.</li><li>➤ Calibration of microscope.</li><li>➤ Study of pathogens on seeds and fruits in local market.</li><li>➤ Preparation of stains, sterile media and mounting media</li></ul>
38		BOT-613 SEC	SEC 4 (G) Horticulture	<ul style="list-style-type: none"><li>➤ Concept, branches and carrier opportunities in horticulture.</li><li>➤ Characteristics of soil useful in horticulture.</li><li>➤ Application of fertilizers and manures.</li><li>➤ Practices undertaken during cultivation.</li><li>➤ Familiar about various horticultural plants.</li></ul>

  
**Head**

Department of Botany  
Yeshwantrao Chavan  
Mahavidyalaya, Tuljapur



**PRINCIPAL**  
Yeshwantrao Chavan  
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**Tuljapur**  
**Department of Chemistry**



## Programme Specific Outcome

Program Specific Outcomes (PSOs) represent what students should be able to do by the time they graduate with a degree in Chemistry. These bridges the gap between general education and the specialized technical skills required in the lab and the field.

Here is a standard list of PSOs for a Chemistry program:

Program Specific Outcomes (PSOs)

**\* PSO 1: Core Theoretical Knowledge**

Develop a systematic and coherent understanding of the fundamental concepts in Organic, Inorganic, Physical, Analytical, and Environmental Chemistry. Students will be able to apply chemical principles to solve complex qualitative and quantitative problems.

**\* PSO 2: Laboratory Proficiency and Safety**

Master the use of standard glassware, chemicals, and sophisticated analytical instrumentation (such as UV-Vis, FTIR, and HPLC). Students will demonstrate the ability to perform experiments accurately, maintain rigorous lab records, and strictly adhere to chemical safety protocols.

**\* PSO 3: Analytical and Critical Thinking**

Ability to interpret spectroscopic data, determine molecular structures, and analyze the kinetics and thermodynamics of chemical reactions. This includes the capacity to evaluate scientific literature critically and design hypothesis-driven experiments.

**\* PSO 4: Environmental and Social Responsibility**

Understand the impact of chemical processes on the environment and the importance of Green Chemistry. Students will be equipped to develop sustainable chemical practices and assess the ethical implications of chemical applications in industry and medicine.

**\* PSO 5: Research and Technical Communication**

Acquire the skills to document scientific findings clearly and communicate chemical concepts effectively through technical reports, research papers, and oral presentations.

**\* PSO 6: Instrumental Techniques and Technology**

Apply modern computational tools and software to model chemical structures and predict reactivity. Students will bridge the gap between traditional "wet chemistry" and modern digital analysis.

Why these matter

These outcomes ensure that a graduate isn't just "good at tests," but is actually ready for a career in pharmaceuticals, forensic science, environmental protection, or academia.

Would you like me to tailor these PSOs to a specific level of study, such as a B.Sc. (Undergraduate) or an M.Sc. (Postgraduate) program?



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Sr. No	Class	Paper Type	Paper Title	Course Outcomes
1	B.Sc I Sem-I	Theory DSC-I	Fundamental Of Chemistry	<b>Course Outcomes</b> i) Understand the changes in periodic properties in modern periodic table ii) Understand the different types of electron displacement in a molecule iv) Differentiate between inductive, electromeric, resonance, and mesomeric effects.
2	B.Sc.I Sem-I	Practical DSC-2	Lab-Course-I	i) To maintain accurate and thorough records of experimental data, and analyze results to draw meaningful conclusions. ii) To apply critical thinking skills to identify and address challenges that may arise during experiments, showcasing the ability to troubleshoot and optimize procedures. iii) To prepare solution of desired concentration.
3	B.Sc.I Sem-I	Skill enhancement course(Theory)	Water treatment and analysis	Course outcomes i) Resources and properties of water ii) Understand the different pollutants iii) Understand treatment of domestic and industrial water iv) Understand the sources of water pollution
4	B.Sc.I Sem-I	Skill enhancement course (Practical)	Water treatment and analysis	i) Resources and properties of water ii) Understand the different pollutants iii) Understand treatment of domestic and industrial water
5	B.Sc.I Sem-I	Generic /OE	Herbal Chemistry	i) Acquainted with importance of herbal drugs, CO2: ii) know the different sources of herbal medicine and their preparation CO3: iii) acquire the knowledge of organic farming CO4:



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Sr. No	Class	Paper Type	Paper Title	Course Outcomes
1	B.Sc I Sem-II	Theory DSC-3	Fundamental Of Chemistry-2	Course Outcomes i) Identify the type bond ii) Predict the shape and geometry and bond angle in a molecule iii) Understand the factors affecting ionic bond formation
2	B.Sc.I Sem-II	(Practical) DSC-4	Lab-Course-II	i) Acquire skills in common techniques for the Volumetric estimations of inorganic compound ii) Acquire skills in common techniques preparation and purification of organic compounds. iii) Assess the effectiveness of purification techniques iv) Develop precision in measuring and recording physical constants
3	B.Sc.I Sem-II	VSC-1(B) (Theory)	Soap and detergents	i) Can gain the information about soaps, detergents and shampoos. ii) Can Acquire knowledge of basic concepts and techniques of soap and detergent industry. iii) Get hands training of analysis of soaps and detergents. iv) Aware about environmental aspects of detergents.
4	B.Sc.I Sem-II	VSC-2(B) (Practical)	Soap and detergents	iv) Can gain the information about soaps, detergents and shampoos. v) Can Acquire knowledge of basic concepts and techniques of soap and detergent industry. vi) Get hands training of analysis of soaps and detergents.
5	B.Sc.I Sem-II	Generic /OE	Herbal Chemistry-II	iv) acquainted with importance of herbal drugs, v) know the different sources of herbal medicine and their preparation vi) Acquire the knowledge of



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				vii) organic farming Know about the Indian system of drugs ayurveda, Unani, siddha and homeopathy
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1	B.Sc-II Sem-III	CHE/DSC /T/ 200	Organic Chemistry	1. Understand the structure of benzene and its derivatives. 2. Understand the aromatic and ant aromatic compounds. 3. Understand that different name reactions are involved in organic chemistry. 4. Apply the mechanism of organic reaction mechanisms. 5. Understand preparations and reactions of alcohols, carboxylic acids, aldehydes and ketones. 6. Understand the nomenclature of organic compounds.
2	B.Sc-II Sem-III	CHE/DSC /P/226	Organic Chemistry	1. Understand the stoichiometry. 2. Understand the isolation of organic compound. 3. Develop basic skills in organic synthesis. 4. Develop the skill of purification of compounds by using Thin Layer chromatography and crystallization. 5. Develop the separation technique skills of organic compounds. 6. Develop the skill for element detection and functional group detection in organic compounds.

Sr. No	Class	Paper Type	Paper Title	Course Outcomes
1	B.Sc-II Sem-III	CHE/DSC /T/ 201	Physical Chemistry	1. Understand the phase equilibrium. 2. Understand and apply concept of conductance and conductometry. 3. Understand and apply laws of quantum theory. 4. Apply the mathematical equation for quantum chemistry. 5. Understand and apply photochemical concept and laws 6. Understand use the fluorescence, phosphoresce and chemiluminescence
2	B.Sc-II Sem-III	CHE/DSC /P/227:	Physical Chemistry	1. Understand the chemical kinetics of reaction. 2. Select and apply method for determining viscosity and surface tension. 3. Calibrate and Use Ph meter. 4. Use conduct meter and colorimeter. 5. Develop the skill in handling potentiometer.



				6. Develop the skill for determination of heterogeneous equilibrium.
	B.Sc-II Sem-III	CHE/MN/ T/200	Concepts of Chemistry I	1. Apply knowledge of carbohydrates, amino acids and proteins for dietary analysis 2. Understand that different name reactions are involved in organic chemistry. 3. Apply the mechanism of organic reaction mechanisms. 4. Understand preparations and reactions of alcohols, carboxylic acids, aldehydes and ketones. 5. Understand the nomenclature of organic compounds
	B.Sc-II Sem-III	CHE/MN/ T/201	Concepts of Chemistry II	1. Understand the principles of electrolytic conduction. 2. Apply the principles of electrolytic conduction. 3. Analyse the phenomenon related to atomic structure. 4. Remember the various laws of photochemistry. 5. Evaluate the photochemical processes.
	B.Sc-II Sem-III	CHEM/V SC/T/201	Sauces and Ketchups	1. Get basic knowledge of various Sauce and ketchups 2. Understand the adulteration of common foods and their adverse impact on health. 3. Comprehend certain skills of detecting adulteration of common foods. 4. Know the basic laws and procedures regarding food adulteration and consumer protection. Apply the knowledge of food adulteration to other kinds of adulteration.
	B.Sc-II Sem-III	CHE/VSC /P/227:	SAUCE AND KETCHUPS	1. Know the basic and procedures regarding food adulteration. 2. Comprehend certain skills of detecting adulteration of common foods. 3. Analyse the quality and adulteration of various food materials. 4. Perform practical's skillfully related to sauce and ketchups. 5. Detects skillfully adulterants in given sample by using chemical test. 6. Understand the exact chemical reaction involved in food adulteration chemical tests.
	B.Sc-II Sem-IV	CHE/DSC /T/250	Inorganic Chemistry	1. To understand transition elements and its characteristic properties. 2. Understand the assumptions and Werner's coordination theory. 3. Understand the different types of isomerism. 4. Differentiate between VBT and CFT. 5. Understand the formation of outer and inner orbital complexes. 5. Understand the basic concepts of volumetric analysis.



B.Sc-II Sem-IV	CHE/DSC /P/ 276	Inorganic Chemistry) Lab Course 7	<ol style="list-style-type: none"><li>1. Understand synthesis of coordination compounds and metal and ligand bonding.</li><li>2. Understand the principle of gravimetric analysis and able to estimate Ni, Cu, Fe, Al, Ba, Ca, Mn and Zn</li><li>3. Know how to prepare coordination complexes</li><li>4. Know how to calculation of Experiments.</li></ol>
B.Sc-II Sem-IV	CHE/DSC /T/251	APPLIED CHEMISTRY	<ol style="list-style-type: none"><li>1. Know the different analytical spectroscopic techniques.</li><li>2. Understand the phenomenon used in the UV-Visible Spectroscopy</li><li>3. Understand the interaction of radiation with matter.</li><li>4. Able to interpreting UV-Visible, IR spectra.</li><li>5. Understand the methods of formation, structure and properties of the intermediate.</li></ol> Understand the principle used in IR and Raman Spectroscopy
B.Sc-II Sem-IV	CHE/DSC /P/277	Lab Course - Applied chemistry	<ol style="list-style-type: none"><li>1. To consistently follow established SOPs for various chemical analyses.</li><li>2. To know the handling of various sophisticated analytical instruments.</li><li>3. To maintain accurate and thorough records of experimental data, and analyze results to draw Meaningful conclusions.</li><li>4. To apply critical thinking skills to identify and address challenges that may arise during experiments, showcasing the ability to troubleshoot and optimize procedures.</li><li>5. To gain insights into how chemical lab practices are applied in professional research or industrial settings, preparing them for future careers in diverse scientific and industrial fields.</li><li>6. Students will exhibit ethical conduct in all features of laboratory work, highlighting integrity, accountability, and professionalism</li></ol>
B.Sc-II Sem-IV	CHEM/M N/T/250 :	Concepts of Chemistry III	<ol style="list-style-type: none"><li>1. To understand transition elements and its characteristic</li><li>2. Understand the assumptions and Werner's coordination theory.</li><li>3. Understand the different types of isomerism.</li><li>4. Differentiate between VBT and CFT.</li><li>5. Understand the formation of outer and inner orbital complexes.</li><li>6. Understand the basic concepts of Lanthanides and Actinides.</li></ol>
B.Sc-II Sem-IV	CHE/MN/ T/251	Concepts of Chemistry IV	<ol style="list-style-type: none"><li>1. Understand the interaction of EMR and matter.</li><li>2. Get idea about relationship between Wavenumbers.</li><li>3. Understand energy transitions, absorption and emission spectral phenomenon</li></ol>
B.Sc-II Sem-IV	CHE/SEC/ /T/250	Lab Safety and Laboratory	<ol style="list-style-type: none"><li>1. To consistently follow the established safety protocols.</li><li>2. To recognize hazards and implement safety</li></ol>



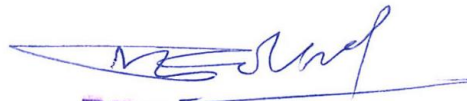
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			Practices	measures. 3. To apply thinking skills to administer first aid for fire and chemical exposure. 4. To enhance workplace safety. Able to dispose of hazardous chemicals/waste.
	B.Sc-II Sem-IV	CHE/SEC/ P//276	Lab Safety and Laboratory Practices	1. Understand various safety symbols, chemical packaging information. 2. Understand the precautionary measures required when handling hazardous substances. 3. To perform first aid effectively for chemical accidents. 4. Understand best practices for the disposal of hazardous chemicals

  
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## Programme Specific Outcome

### (B.Sc. I Electronics as per NEP 2020)

1. Domain knowledge: Apply the knowledge of electronics fundamental and advanced areas of Electronics to provide comprehensive solution of problems in complex electronics.
2. Problem Analysis: Identify electronics related problems at varied complexity and analyze the same to formulate/ develop substantiated conclusion using first principles of Electronics
3. Design Development of solutions: Design/ develop solutions for problems at varied complexity in various areas of Electronics to address changing challenges put forward by market demand/ stakeholder
4. Conduct Investigation of complex problems: Use established knowledge and methods to design of experiments, analyze resulting data and interpret the same to provide valid conclusions.
5. Modern tools: Create, select, and apply appropriate techniques, resources, and modern electronics and relevant IT tools including prediction and modeling to complex electronics technology related activities with clear understanding of the limitations.



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### Course Outcome

Sr. No	Class	Paper Type	Paper Title	Course Outcomes
1	B.Sc. I	Theory	Network Analysis and semiconductor Devices	<b>students able to:</b> <ul style="list-style-type: none"><li>• Apply network theorems to analyze electronic circuits.</li><li>• Understand working of diodes and transistor configurations.</li><li>• Analyze regulated and unregulated power supplies.</li><li>• Design basic electronic circuits using components and theorems.</li><li>• Develop low-cost power supply systems.</li></ul>
2	B.Sc. I	Practical	Based on- Network Analysis and semiconductor Devices	<b>students able to:</b> <ul style="list-style-type: none"><li>• Perform experiments on diodes, transistors, and JFET characteristics.</li><li>• Measure electrical parameters such as resistance, voltage, and current.</li><li>• Build and test rectifiers, regulators, and power supply circuits.</li></ul>



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3	B.Sc. I	Theory	Electronic Measurement and Instrumentation	<b>students able to:</b> <ul style="list-style-type: none"><li>• Understand units, scientific notation, and measurement principles.</li><li>• Identify and explain components of CRO and measuring instruments.</li><li>• Use analogue meters for voltage, current, and resistance measurement.</li><li>• Measure voltage, frequency, and phase using CRO.</li><li>• Analyze errors and troubleshoot basic measurement systems.</li></ul>
4	B.Sc. I	Practical	Based on- Electronic Measurement and Instrumentation	<b>students able to:</b> <ul style="list-style-type: none"><li>• Use basic electrical measuring instruments such as galvanometer, voltmeter, and ammeter.</li><li>• Determine electrical parameters using LCR bridge and electronic testers.</li><li>• Test diodes, transistors, and ICs and analyze their characteristics.</li><li>• Measure voltage, frequency, and phase using CRO.</li><li>• Perform experiments accurately and interpret results.</li></ul>
5	B.Sc. I	Theory	Electrical Equipment and Maintenance	<b>students able to:</b> <ul style="list-style-type: none"><li>• Understand the principles and operation of Testing Equipments.</li><li>• Demonstrate proficiency in using series test lamps for single-phase circuits.</li><li>• Explain the functioning and application of overload switches, electromagnetic relays, and Miniature Circuit Breakers (MCBs).</li><li>• Identify different types, specifications, and</li></ul>



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				<p>maintenance procedures for each testing equipment</p> <ul style="list-style-type: none"> <li>Analyze common troubleshooting techniques for diagnosing faults in testing equipment.</li> </ul>
6	B.Sc. I	Theory	Digital Electronics – I	<p><b>students able to:</b></p> <ul style="list-style-type: none"> <li>Apply the basic concepts of number system, logic gates and combinational logic circuits to solve complex problems in electronics circuits.</li> <li>Analyze various logic gates and combinational logic circuits to identify various issues in digital networking.</li> <li>Design various digital circuits using logical gates and combinational logic circuits.</li> <li>Design and develop cost-effective digital devices based on adder and subtractor.</li> </ul>
7	B.Sc. I	Practical	Based on Digital Electronics – I	<p><b>students able to:</b></p> <ul style="list-style-type: none"> <li>Design &amp; analyze basic logic gates (NOT, OR, AND, NAND, NOR, Ex-OR, Ex-NOR) using diodes, transistors or 74XX ICs.</li> <li>Verify the universal properties of NAND &amp; NOR gates.</li> <li>Implement combinational circuits like half adder, half subtractor, full adder &amp; full subtractor using logic gates.</li> <li>Document six experiments in a journal and get it certified by the department head.</li> </ul>
8	B.Sc. I	Theory (VSC)	Power Supplies	<p><b>students able to:</b></p> <ul style="list-style-type: none"> <li>Understand various components used in power supply.</li> <li>Understand the specification, use of Inverter and UPS.</li> <li>Analyse various types of power supplies. Design and develop a power supply.</li> </ul>
9	B.Sc. I	Practical	Based on Power Supplies	<p><b>students able to:</b></p>



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				<ul style="list-style-type: none"><li>• Understand PCB basics &amp; fabrication methods.</li><li>• Perform PCB etching using HCl acid. Solder &amp; de-solder components on PCB.</li><li>• Use soldering &amp; de-soldering tools effectively.</li><li>• Assemble &amp; de-assemble components on PCB.</li></ul>
10	B.Sc. I	Theory	Electrical Equipment Maintenance-II”:	<b>students able to:</b> <ul style="list-style-type: none"><li>• Understand the principle of operation of electrical appliances.</li><li>• Identify and describe the various aspects of electrical appliances and their functions.</li><li>• Differentiate between types and specifications of electrical appliances.</li><li>• Demonstrate knowledge of maintenance practices and troubleshooting methods for electrical appliances.</li></ul>

### Programme Specific Outcome

#### (B.Sc. II Electronics as per NEP2020)

- Introduce the students to various fundamental concept of amplifier and make eligible them for design and construct various amplifier circuit
- Introduce the students to various advanced concept of digital electronics and make able to understand working of logic gates
- Analyze AC and DC circuits using laws and theorems.
- Explain working of diodes, transistors, and amplifiers.
- Perform laboratory experiments safely and accurately.
- Solve numerical problems related to electronics systems.
- Understand units, scientific notation, and measurement principles.
- Identify and explain components of CRO and measuring instruments.
- Use analogue meters for voltage, current, and resistance measurement.
- Measure voltage, frequency, and phase using CRO.
- Analyze errors and troubleshoot basic measurement systems.



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## Course Outcome

Sr. No	Class	Paper Type	Paper Title	Course Outcomes
1	B.Sc. II	SUB/DSC/T/200	Amplifiers	<b>students able to:</b> <ul style="list-style-type: none"><li>• Understand biasing methods and working of transistor amplifiers.</li><li>• Analyze small signal amplifier circuits and their performance.</li><li>• Design basic amplifier and feedback circuits.</li><li>• Explain operation of multistage transistor amplifiers.</li><li>• Apply amplifier concepts to solve practical electronic problems.</li></ul>
2	B.Sc. II	SUB/DSC/T/201	Digital Electronics II	<b>students able to:</b> <ul style="list-style-type: none"><li>• Understand and explain the principles and operation of</li></ul>



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				<p>different types of flip-flops (SR, JK, D, and T) and their triggering methods.</p> <ul style="list-style-type: none"><li>• Analyze and design digital circuits using flip-flops, counters, and shift registers.</li><li>• Identify and solve timing and synchronization issues in digital systems, including memory elements.</li><li>• Design efficient and cost-effective digital devices based on registers, counters, and logic circuits.</li></ul>
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3	B.Sc. II	SUB/DSC/P/226	Practical based on amplifiers	<p>students will be able to:</p> <ul style="list-style-type: none"><li>• Construct and test CE and FET amplifiers and obtain their frequency response and bandwidth.</li><li>• Analyze the performance of amplifiers with and without feedback by plotting frequency response curves.</li><li>• Design and study multistage RC-coupled amplifiers and determine voltage gain and bandwidth.</li><li>• Build and evaluate CB and emitter follower circuits for signal amplification characteristics.</li></ul>
4	B.Sc. II	SUB/DSC/P/227	Practical based on Digital Electronics II	<p><b>Students able to:</b></p> <ul style="list-style-type: none"><li>• Construct and analyze different types of flip-flops (JK, T, and D) using ICs and verify their truth tables.</li><li>• Design and test binary adders and subtractors and interpret their logical operations.</li><li>• Build and study synchronous and asynchronous counters and understand their counting sequences.</li><li>• Implement serial-in serial-out, parallel-in parallel-out, and serial-in parallel-out shift registers.</li><li>• Design and verify MOD counters and up/down counters for digital applications.</li></ul>



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5	B.Sc. II	SUB/MN/T 200	Power Supplies	<b>Students able to</b> <ul style="list-style-type: none"><li>• Explain power supply fundamentals</li><li>• Identify power supply types</li><li>• Explain power supply components</li><li>• Understand power supply design</li></ul>
6	B.Sc. II	SUB/MN/T 201	Consumer Electronics -I	<b>Students able to</b> <ul style="list-style-type: none"><li>• Understand various sensors and their applications.</li><li>• Understand various parts and their functions of microphone &amp; speakers.</li><li>• Understand working of amplifier, mp3 players.</li><li>• Understand working of TV.</li></ul>
7	B.Sc. II	SUB/VSC/T/200	Electrical Wiring-I	<b>Students able to</b> <ul style="list-style-type: none"><li>• Identify &amp; comprehend the key principles of electrical wiring.</li><li>• Evaluate &amp; select appropriate electrical wiring components.</li><li>• Test the performance of common &amp; domestic electrical wiring.</li><li>• 4. Locate faults at the electrical wiring level.</li></ul>
8	B.Sc. II	SUB/VSC/P/200	Practical Based on Electrical Wiring	<b>Students are able and prepare for</b> <ul style="list-style-type: none"><li>• Safety &amp; Earthing</li><li>• Personal Protection</li><li>• Rescue Techniques</li><li>• Fire Extinguishers</li><li>• Electrical Tools: Demonstrate and use various electrical tools.</li><li>• Wire Types: Understand different types of wires and their applications.</li></ul>
9	B.Sc. II	SUB/DSC/T/250	Linear Integrated Circuit.	<b>Students able to:</b> <ul style="list-style-type: none"><li>• Understand and analyze the IC 741 operational amplifier and its characteristics.</li><li>• Design the solution for linear &amp; non-linear applications using</li></ul>



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				<p>IC741.</p> <ul style="list-style-type: none"><li>• Apply linear integrated circuits in various electronic systems, including audio amplifiers, power supplies, and signal processing system.</li><li>• Explain the principles of oscillation and design various oscillator circuits.</li><li>• Understand and analyze the IC 555 and its use in various applications.</li></ul>
10	B.Sc. II	SUB/DSC/T/250	8086 Microprocessor	<p><b>Students able to:</b></p> <ul style="list-style-type: none"><li>• Draw timing diagram and write programs using 8086.</li><li>• Distinguish between the different modules of operation of microprocessors.</li><li>• Evaluate the appropriateness of a memory expansion interface based on the address reference with particular application.</li><li>• Apply the above concepts to real world electrical and electronics problems and applications.</li><li>• Communicate technical information related to the 8086 microprocessor effectively.</li></ul>
11	B.Sc. II	SUB/DSC/P/276 (Practical)	Practical based on- Linear Integrated Circuit.	<p><b>Students able to:</b></p> <ul style="list-style-type: none"><li>• Analyze and design Op-Amp configurations as non-inverting &amp; inverting amplifiers.</li><li>• Implement Op-Amp circuits for arithmetic operations (adder &amp; subtractor).</li><li>• Design and evaluate Op-Amp integrator &amp; differentiator circuits.</li><li>• Build and test Op-Amp based special circuits – Schmitt trigger &amp; oscillators (Wien Bridge, phase shift).</li><li>• Use Op-Amp to construct an analogue computer for simple equations &amp; a low-voltage DC voltmeter.</li></ul>



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12	B.Sc. II	SUB/DSC/P/276 (Practical)	Practical based on- 8086 Microprocessor	<b>Students able to:</b> <ul style="list-style-type: none"><li>• Add 8-bit/16-bit numbers &amp; sum arrays.</li><li>• Separate positive/negative numbers.</li><li>• Find factorial of a number.</li><li>• Transfer data between two registers (no third).</li><li>• Compute average of N numbers.</li><li>• Check even/odd &amp; store result (00/FF).</li><li>• Move data string from one location to another.</li><li>• Perform one-byte BCD addition.</li><li>• Sort 8-bit array in ascending order.</li></ul>
13	B.Sc. II	Minor (SUB/Mn/T/250) Theory	Digital Electronics	<b>Students able to:</b> <ul style="list-style-type: none"><li>• Apply the basic concepts of number system, logic gates and combinational logic circuits to solve complex problems in electronics circuits.</li><li>• Analyze various logic gates and combinational logic circuits to identify various issues in digital networking.</li><li>• Design various digital circuits using logical gates and combinational logic circuits.</li><li>• Design and develop a cost-effective digital devices based on adder and subtractor.</li></ul>



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14	B.Sc. II	Minor SUB/Mn/T/251 Theory	Public Telephone Network	<ul style="list-style-type: none"><li>• The course outcomes are:</li><li>• Learn the operation and basic functions of a standard telephone set.</li><li>• Learn telephone circuit, message, and message channel.</li><li>• 3. Able to learn the block diagram of a telephone set.</li></ul>
15	B.Sc. II	SUB/SEC/T/250 Theory	Digital Inverter – II	<b>Students able to:</b> <ul style="list-style-type: none"><li>• Explain the basic principles of rechargeable batteries, including their operation, types, and applications.</li><li>• Identify the key components of rechargeable batteries, including the positive electrode, negative electrode, electrolyte, and separator.</li><li>• Explain the basic principles of battery chargers, including their operation, types, and applications.</li><li>• Discuss the importance of charging algorithms, charging modes, and safety features in determining the performance and safety of battery chargers.</li><li>• Recognize the concept of Integrated Circuits (IC's) in the inverter.</li></ul>
16	B.Sc. II	SUB/SEC/P/276 Practical	Practical based on Digital Inverter – II	<b>Students are able</b> To design, analyze, and experimentally investigate the operation of digital inverters and battery systems, including charging/discharging characteristics and MOSFET-based inverter performance, thereby applying practical skills for real-world electronic circuits.



## Programme Specific Outcome

- PSO1. Domain knowledge: Apply the knowledge of electronics fundamental, and advanced areas of Electronics to provide comprehensive solution of problems in complex electronics.
- PSO2. Problem Analysis: Identify electronics related problems at varied complexity and analyze the same to formulate/ develop substantiated conclusion using first principles of Electronics.
- PSO3. Design Development of solutions: Design/ develop solutions for problems at varied complexity in various areas of Electronics to address changing challenges put forward by market demand/ stakeholder.
- PSO4. Conduct Investigation of complex problems: Use established knowledge and methods to design of experiments, analyze resulting data and interpret the same to provide valid conclusions.
- PSO5. Modern tools: Create, select, and apply appropriate techniques, resources, and modern electronics and relevant IT tools including prediction and modeling to complex electronics technology related activities with clear understanding of the limitations.

## Course Outcome

Sr. No	Class	Paper Type	Paper Title	Course Outcomes
1	B.Sc. III	ELE-511: A1. Theory	Power Electronic	<b>Students are able to</b> <ul style="list-style-type: none"><li>• Analyze and test the power semiconductor devices and their applications.</li><li>• Compare and contrast various power semiconductor devices according to their applications.</li><li>• Have confidence in dealing with high-power equipment and upgrade their performance.</li><li>• Use the knowledge acquired through this lab to design circuits which are useful in day-to-day life.</li></ul>
2	B.Sc. III	ELE-521: A1 Practical	Based on power Electronics	<b>Students are able to</b> <ul style="list-style-type: none"><li>• Understand and analyze SCR, UJT, DIAC, and TRIAC characteristics.</li><li>• Design and evaluate a half-wave</li></ul>



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				<p>rectifier using SCR.</p> <ul style="list-style-type: none"><li>• Implement power control circuits using SCRs and UJT.</li><li>• Apply TRIAC for light-dimmer applications.</li></ul>
3	B.Sc. III	ELE-512: A2 Theory	Microcontroller-I	<p><b>Students are able to</b></p> <ul style="list-style-type: none"><li>• Design and develop automated system based on 8051 Microcontroller.</li><li>• Apply the basics of number system to solve arithmetic and logical operations of 8051 microcontrollers.</li><li>• Develop assembly language programming for 8051 microcontrollers.</li><li>• Analyse and debug assembly language programme for 8051 microcontroller</li></ul>



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4	B.Sc. III	ELE-522: A2 Practical	Based on Microcontroller-I	<b>Students are able to</b> Design and implement microcontroller-based programs for interfacing and control of digital devices using Atmel 89C51
5	B.Sc. III	ELE-513 SEC-3 (F) Theory	Solar Devices	<b>Students are able to</b> <ul style="list-style-type: none"> <li>• Understand the concept of various laws related to solar engineering was studied in detail.</li> <li>• Understand the basic behind radiation and the solar energy collecting devices were learnt in detail.</li> <li>• Explain the concept of various laws related to solar engineering.</li> <li>• Outline the basic idea of solar energy collecting as well as energy storage devices.</li> </ul>
6	B.Sc. III	ELE-611: A3 Theory	Microcontroller-II	<b>Students are able to</b> <ul style="list-style-type: none"> <li>• Design and develop automated system based on 8051 Microcontroller.</li> <li>• Apply the basics of number system to solve arithmetic and logical operations of 8051 microcontrollers.</li> <li>• Develop assembly language programming for 8051 microcontrollers.</li> </ul>
7	B.Sc. III	ELE-621: A3 Practical	Based on Microcontroller-II	<b>Students are able to</b> <ul style="list-style-type: none"> <li>• Implement microcontroller (ATMEL89C51) based projects involving DAC, waveform generation, motor control &amp; interfacing</li> </ul>
8	B.Sc. III	ELE-612: A4 Theory	Instrumentation	<b>Students are able to</b> <ol style="list-style-type: none"> <li>1. Understand the physics of pressure, temperature, level and flow measurement; mechanical and electrical aspects of instruments used to control dynamics of processes. Dynamics of automatic control including proportional control, automatic reset, derivative action and integral timing.</li> <li>2. Demonstrate knowledge of commonly used process measurement devices, control methods and strategies, and the proper selection, identification, design,</li> </ol>



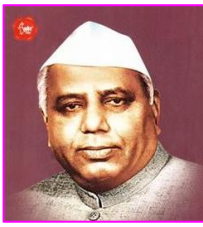
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				installation and operation of instrumentation.  3. Demonstrate knowledge of industrial process valve maintenance and instrumentation, including calibration, configuration, troubleshooting, and use of valves with instrumentation theory.  4. Demonstrate knowledge of basic fundamentals, terms, and units of DC and AC electrical theory. Graduates will have the ability to use test equipment, hand tools and technical knowledge.
9	B.Sc. III	ELE-622: A4 Practical	Based on Instrumentation	<b>Students are able to</b> 1. Design & analyze temperature sensors (IC AD590, PT100, thermistor). 2. Implement & evaluate light sensors (photo diode, photo transistor, photo voltaic cell). 3. Document & certify all six experiments in a lab journal for assessment.
10	B.Sc. III	ELE-613- SEC-4 G	Design and Fabrication of PCB	<b>Students are able to</b> 1. Understand basics of PCB. 2. Know about the PCB design technology. 3. Know about different soldering techniques.

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## Programme Specific Outcome

1. Identify and classify different fish species based on their morphological characteristics and ecological preferences
2. Analyse fish population dynamics using statistical methods and modelling techniques to assess stock status and sustainability.
3. Design and implement fishery management plans that promote sustainable harvesting practices and conservation of fish stocks.
4. Evaluate the environmental impact of fishing activities on aquatic ecosystems and develop strategies for mitigating negative effects.
5. Demonstrate proficiency in fish health management by identifying common diseases, parasites, and pathogens affecting aquaculture and wild fish populations

## Course Outcome

Sr. No	Class	Paper Type	Paper Title	Course Outcomes
1	<a href="#">B.Sc I</a> Sem-I	Theory	Taxonomy and anatomy of fish	The citizenship and society: Apply broad understanding of ethical and professional skill in science subjects in the context of global, economic. environmental and societal realities while encompassing relevant contemporary
2	<a href="#">B.Sc I</a> Sem-I	Practical	FISH/DSC-2	Environment and sustainability: Apply broad understanding of impact of science subjects in a global, economic, environmental and societal context and demonstrate the knowledge of, and need for sustainable development. Ethics: Apply ability to develop sustainable practical solutions for science subject related problems



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				within positive professional and ethical boundaries.
3	B.Sc –I Sem-I	Theory	VSC-1	Removal of weeds reduces oxygen depletion and eliminates noxious odors caused by decaying vegetation. Clearing weeds increases the storage capacity of reservoirs, tanks and ponds
4	B.Sc –I Sem-I	Practical	VSC-1	Collected weeds prevent the accumulation of nutrients thus reducing the risk of harmful algal blooms.
5	B.Sc –I Sem-I	Theory	GE/OE	Demonstrate a comprehensive understanding of the endocrine system in fishes, including the major hormone-producing glands and their functions.
6	<u>B.Sc</u> I Sem-II	Theory	Limnology	Individual and team work: Function effectively as a leader and as well as team member in diverse/ multidisciplinary environments.
7	<u>B.Sc</u> –I Sem-II	Practical	FISH/DSC-4	Communication: Communicate effectively on complex science subject related activities with the scientific community in particular and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
8	B.Sc-I Sem-II	Theory	SEC-1	Determination of wild vs formed status using stable isotopes analysis. Determining the exploitation status and maximum sustainable yield of harvested species.
9	B.Sc-I Sem-II	Practical	SEC-1	Specific Identification of species with high parvalbumin content.
10	B.Sc-I	Theory	GE/OE	Understand the key concepts and



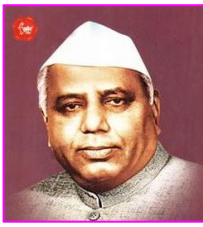
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	Sem-II			principles of aquatic pollution, including sources, pathways, and impacts on aquatic ecosystems.
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Sr. No	Class	Paper Type	Paper Title	Course Outcomes
1	B.Sc-II Sem-III	Theory	Fresh water fish breeding tech & hatcheries	Explain the Principles of Fish Reproduction - Understand the biological and environmental factors influencing freshwater fish breeding. Demonstrate Various Breeding Techniques - Apply natural, hormone-induced, and artificial breeding
2	B.Sc-II Sem-III	Practical	Fresh water fish breeding tech & hatcheries	Demonstrate water quality analysis- Measure and maintain essential water parameters such as temperature, pH, dissolved oxygen and ammonia levels for optimal fish health. Handle and manage aquaculture systems
3	B.Sc-II Sem-III	Theory	Fundamentals of aquaculture	Understand the Basic Concepts of Aquaculture - Explain the principles, history, and significance of aquaculture in global and local contexts. Differentiate Various Aquaculture Systems - Identify and compare different types of aquaculture systems, such as freshwater, brackish water, and marine farming.
4	B.Sc-II Sem-III	Practical	Fundamentals of aquaculture	Identify and handle common aquaculture species including freshwater and marine fishes, crustaceans and mollusks. Demonstrate basic aquaculture practices such as pond preparation, water quality testing,



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				feeding, and health management of aquatic organisms.
5	B.Sc-II Sem-III	Theory (min)	Culture of shell fishes	Ability to manage broodstock, control breeding to manage broodstock, control breeding cycles & manage larval rearing to ensure a consistent year-round supply of seed. Knowledge of how to properly site and manage forms to avoid adverse impact on benthic communities.
6	B.Sc-II Sem-III	Theory (min)	Aquatic ecology	Understanding the structure & function of aquatic ecosystem, including nutrient cycling, biodiversity and ecosystem services. Ability to use appropriate equipment to sample water quality, Identify organisms & analyze data for as mentioned in Wageningen University & Research's practical course description.
7	B.Sc-II Sem-III	Theory VSC	Manufacturing of fish byproducts	Understand the utilization of fish byproducts- explain the conomic and environmental benefits of processing fish waste into value-added products. Apply Processing Techniques – Demonstrate knowledge of manufacturing fish meal, fish oil, fish silage, fish gelatin and other byproducts.
8	B.Sc-II Sem-III	Practical VSC	Manufacturing of fish byproducts	Identify and classify fish by-products. After completing this course, the student will be able to identify fish by-products and understand their uses and commercial value. Demonstrate processing Techniques.



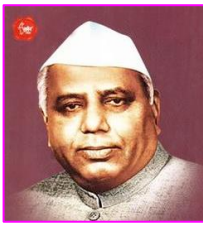
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				Student will be able to perform practical steps involved in the extraction and preparation of fish by-products such as fish oil, fish meal and collagen.
9	B.Sc-II Sem-III	Theory	GE/OE	Understand basic concepts of organic fertilizers, their types, composition, and advantages over chemical fertilizers. Explain raw materials used in organic fertilizer production such as agricultural waste, animal manure, compost, vermicompost and bio-residues.

Sr. No	Class	Paper Type	Paper Title	Course Outcomes
1	B.Sc-II Sem-IV	Theory	Indian Fisheries and Mariculture	Explain the status and Importance of Indian Fisheries – Describe the scope, diversity and economic significance of inland, marine and coastal fisheries in India. Apply Mariculture Techniques – Demonstrate knowledge of cage culture, pen culture and open-sea farming for sustainable marine fish production.
2	B.Sc-II Sem-IV	Practical	Indian Fisheries and Mariculture	Identify and Classify Aquatic Species – Recognize important fish and shellfish species used in aquaculture and mariculture. Manage Aquaculture Systems – Apply techniques for pond preparation, stocking, feeding and water quality management.
3	B.Sc-II Sem-IV	Theory	Fish Pathology	Identify and Diagnose Fish Diseases – Recognize symptoms and apply diagnostic techniques to detect bacterial, viral, fungal and parasitic infections in fish. Understand Disease Causation and



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				Transmission – Explain the factors influencing fish diseases, including environmental stress, poor nutrition, and pathogen transmission.
4	B.Sc-II Sem-IV	Practical	Fish Pathology	Comprehension of the interaction between host, pathogen and environment, including the role of stress in disease development. Ability to isolate, culture and characterize bacterial pathogens & identify parasite.
5	B.Sc-II Sem-IV	Theory (min)	Preparation of Value added products	Ability to innovate and create new, consumer appealing products. (eg. Jams, pickles, fortified foods) to meet market needs. Participants will learn to increase the value of raw produce, converting low-profit aquacultural goods into high value items thus increasing income for farmers & processors.
6	B.Sc-II Sem-IV	Theory (min)	Fish spoilage, preservations and quality issues	Identify the three basic mechanisms of fish spoilage. Enzymatic autolysis, microbial growth and oxidation. Understand factors affecting spoilage such as species, fish freshness, handling practices & temperature.
7	B.Sc-II Sem-IV	Theory VSC	Fish preservation and processing technology	Skills convert low-value fish or secondary raw material into high-value products like fillets, surimi, breaded products ready to eat/ready to cook meals and specialized snacks. Utilize Modern Technology – Operate preservation and processing equipment for efficient fish production.
8	B.Sc-II	Practical	Fish	Understanding of modern



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	Sem-IV	VSC	preservation and processing technology	packaging technologies, include modified atmosphere packaging, vacuum packaging & active packaging to maintain quality.
9	B.Sc-II Sem-IV	Theory	GE/OE	<p>Explain different aquarium types (freshwater, marine, planted, reef).</p> <p>Identify suitable tank shapes, sizes and materials.</p> <p>Choose appropriate glass/acrylic thickness, sealants, frames and supports.</p> <p>Understand properties of materials used in aquarium construction.</p>

Sr. No	Class	Paper Type	Paper Title	Course Outcomes
1	B.Sc-III Sem-V	Theory	Fish Technology and Processing	Competency in implementing food safety quality assurance & management systems to meet international market standards. Proficiency in operating sophisticated processing machinery instruments & analytical techniques for such as accelerated freeze drying.
2	B.Sc-III Sem-V	Practical	Fish Technology and Processing	Ability to apply techniques like freezing, canning, drying, smoking and curing to enhance shelf life and product quality. Expertise in developing value-added products, utilizing fish processing by products (fish meal, oil) & creating specialized items like surimi.
3	B.Sc-III Sem-V	Theory	Aquaculture Technique and fish nutrition	Understanding how different nutrient sources, including protein-rich ingredients affect fish growth, health & meat quality. Analyse economic factors such as feed conversion ratio and cost-



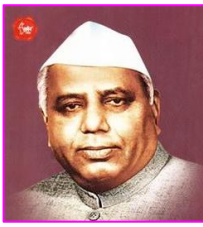
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				benefit analyse to enhance profitability and food security.
4	B.Sc-III Sem-V	Practical	Aquaculture Technique and fish nutrition	Mastery of hatchery management breeding & rearing techniques for various aquatic species including larval rearing & wearing. Skills to design, operate and manage modern aquaculture systems such as recirculating aquaculture systems biotic and aquaponics to maximize efficiency and minimize environmental impact.
5	B.Sc-III Sem-V	Theory (SEC)	Fish feed production	Participants learn to identify select and utilize local, cost-effective ingredients to create nutritious, balanced diets tailored to specific fishlike stages. Programs aim to significantly reduce the cost of aquaculture production as food often represents 60-80% of total operating expenses. This leads to higher profit margins for farmers.

Sr. No	Class	Paper Type	Paper Title	Course Outcomes
1	B.Sc-III Sem-VI	Theory	Fish Biology	Assessing fish populations, stock assessment & applying conservation strategies to marine and freshwater ecosystem. Capacity to conduct independent research, analyze ecological data & use statistical tools for monitoring fishery resources.
2	B.Sc-III Sem-VI	Practical	Fish Biology	Proficiency in fish taxonomy, morphology, anatomy, physiology & development process. Ability to manage fin fish aquaculture including breeding, seed production, nutrition &



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				disease diagnostics.
3	B.Sc-III Sem-VI	Theory	Aquarium keeping and rearing of ornamental fishes	Developing sustainable livelihoods to understanding complex biological and environmental systems. Knowledge of both freshwater & marine ornamental fish species, their habitats & compatibility for community tanks.
4	B.Sc-III Sem-VI	Practical	Aquarium keeping and rearing of ornamental fishes	Proficiency in designing, building & installing home and public aquaria including glass, acrylics & cement cisterns. Mastery of setting up and maintaining filtration systems (biological, chemical, mechanical) creation, lighting & heaters to maintain optimal water quality.

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### Programme Specific Outcomes (PSOs)

On completion of the 03/04 years Degree in B.Sc. (Mathematics) **students will be able to:**

**PSO 1. Disciplinary Knowledge:** Bachelor degree in mathematics is the culmination of in-depth knowledge of Algebra, Calculus, Geometry, differential equations and several other of pure and applied mathematics. This also leads to study the related areas.

**PSO 2. Critical thinking and analytical reasoning:** The students undergoing this Programme acquire ability to critical thinking and logical reasoning and capability of recognising and distinguishing and various aspects of real life problems.

**PSO 3. Problem solving:** the mathematical knowledge gained by the students through this programme develops an ability to analyse the problems, identify and define appropriate computing requirements for its solutions. This programme enhances students overall developments.

**PSO 4. Research related skills:** The completing this programme develops the capability of inquiring about appropriate questions relating to the mathematical concepts in different areas of Mathematics. Ability to pursue advanced studies and research in pure and applied Mathematical sciences.

**PSO 5. Information/digital literacy:** The completion of this programme will enable the learner to use appropriate software's to solve system of algebraic equations and differential equatins.

**PSO 6. Self-directed learning:** The students completing this programme will develop ability of working independently and to make an in-depth study of various notions of Mathematics.

### Course Outcome

Sr. No	Class	Paper Type	Paper Title	Course Outcomes
1	<b>B.Sc.I, Sem.-I</b>	DSC1:	Calculus	i) Find derivative of hyperbolic, inverse hyperbolic functions and $n$ th derivatives of given functions. ii) Find the Maclaurin's series expansion of of functions. iii) Find the partial derivatives of functions. Determine areas of plane regions, length of curves and volume of solid of revolution.
2		DSC-2	Lab course based on DSC-1	i) Find derivative of hyperbolic, inverse hyperbolic functions and $n$ th derivatives of given functions. ii) Find the Maclaurin's series expansion of of functions. ii)Find the partial derivatives of functions. iv)Determine areas of plane regions, length of



				curves and volume of solid of revolution.
3		GE/OE-1	Business Mathematics-I	<ol style="list-style-type: none"><li>1. i Apply knowledge of ratios and proportions.</li><li>2. Apply currency and discounts to business</li><li>3. Identify the function and linear functions.</li><li>4. Apply the identified functions to cost and profit.</li></ol>
4		SEC 1:	Combinatorial Mathematics	<ol style="list-style-type: none"><li>1. Apply permutation and combinations</li><li>2. Find the number of circular permutations</li><li>3. Find the number of ways of selections out of given things.</li><li>4. Apply pigeonhole principle and inclusion-exclusion principle.</li></ol>
5		* SEC-2:Practical	Combinatorial Mathematics (Lab course)	<ol style="list-style-type: none"><li>1. Apply permutation and combinations</li><li>2. Find the number of circular permutations</li><li>3. Find the number of ways of selections out of given things.</li><li>4. Apply pigeonhole principle and inclusion-exclusion principle.</li></ol>
6	<b>B.Sc.I, Sem.-II</b>	DSC-3:	Differential Equations	<ol style="list-style-type: none"><li>1. Determine the solution of first order linear differential equation.</li><li>2. Determine the solution of exact differential equations.</li><li>3. Determine the solution of linear equation with constant coefficients using general and short method.</li><li>4. Determine the solution of linear homogeneous differential equation.</li></ol>
7		DSC-4	DSC-4: Differential Equations(lab course)	On completion of the course, students will be able to, <ol style="list-style-type: none"><li>i. Understanding of interference and diffraction phenomena through hands-on experimentation.</li><li>ii. Appreciation of practical applications of optical instruments across various scientific disciplines.</li><li>iii. Proficiency in conducting precise measurements and observations using optical instruments.</li><li>iv. Analyze experimental results critically and compare them with theoretical expectations.</li></ol>
8		GE/OE-2 Matrices	GE/OE-2 Matrices	<ol style="list-style-type: none"><li>1. Apply the operations of matrices.</li><li>2. Apply the properties of matrices.</li><li>3. Find the determinants of square matrices and minors.</li></ol>



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				4. Solve system of equations..
9		VSC-1	VSC-1 Basic statistics	1. Determine the mean, mode, median and deviation for the given data. Apply the concept of probability.
10		VSC-2	Practical's Basic statistics	1. Determine the mean, mode, median and deviation for the given data. 2. Apply the concept of probability.

Sr. No	Class	Paper Type	Paper Title	Course Outcomes
11	B.SC.II	MAT/DSC/T/200	Number Theory	After completion of the course, students will be able to - i) Find the gcd & lcm of integers. ii) Find solution of linear Diophantine equations. iii) Solve the linear congruences. iv) Solve the system of linear congruences. v) Evaluate $1.0.\mu,\emptyset$ for a given number
12	B.SC.II	MAT/DSC/T/201	Partial Differential Equations	After completion of the course, students will be able to - i) Solve Lagrange's equation ii) Find the solutions such as complete integral, singular integral and general integral. iii) Determine the solution of partial differential equations using Charpit's Method. iv) Describe and apply Monge's Method
13	B.SC.II	MAT/DSC/P/226	Lab Course Based on MAT/DSC/T/200	After completion of the course, students will be able to - i) Determine gcd & Icm of integers using Euclidean Algorithm. ii) Find Solution of Linear Equation using Method of linear Diophantine Equation. iii) Solve the system of linear Congruences. iv) Find the remainder using Wilson's theorem. v) Evaluate sum of divisors and the number of divisors of a given number.
14	B.SC.II	MAT/DSC/P/227	Lab Course Based on MAT/DSC/T/201	After completion of the course, students will be able to - i) Solve Lagrange's equation ii) Find the solutions such as complete integral, singular integral and general integral. iii) Determine the solution of partial differential equations using Charpit's Method. iv) Describe and apply Monge's Method
15	B.SC.II	MAT/Mn/T/200	Logic and Sets	After completion of the course, students will be able to - i) Construct the truth tables of given proposition. ii) Prove equivalence of two given propositions. iii) Prove the properties of set operations. iv) Find Cartesian product of two sets.
16	B.SC.II	MAT/Mn/T/201	Vector Algebra	After completion of the course, students will be able to - i) Define scalar, vector and angle between two vectors



				ii) Find the directional cosine of the line iii) Find the scalar triple product and vector triple product
17	B.SC.II	MAT/VSC/ T/200	Numerical Methods-I	After completion of the course, students will be able to – i) Analyze the error in numerical methods ii) Construct interpolating polynomial when the points are equally spaced iii) Obtain interpolating polynomial when the points are unequally spaced
18	B.SC.II	MAT/VSC/ T/201	Introduction to R and Basic Statistics using R-I	After completion of the course, students will be able to – i) Write simple R program ii) Demonstrate how to install and configure Rstudio. iii) Analyse data and generate reports based on the data. iv) Perform basic statistical tests, calculate descriptive statistics. v) Write programs in R for basic concepts in statistics
19	B.SC.II	MAT/VSC/ P/226	Lab Course Based on MAT/VSC/T/ 200	After completion of the course, students will be able to – i) Analyze the error in numerical methods ii) Construct interpolating polynomial when the points are equally spaced iii) Obtain interpolating polynomial when the points are unequally spaced iv) Apply numerical methods using mathematical software
20	B.SC.II	MAT/VSC/ P/227	Lab Course Based on MAT/VSC/T/ 201	After completion of the course, students will be able to – i) Write simple R program ii) Demonstrate how to install and configure Rstudio iii) Analyse data and generate reports based on the data iv) Perform basic statistical tests, calculate descriptive statistics v) Write programs in R for basic concepts in statistics
21	B.SC.II	MAT/GE/O E/T/200	Mathematics for Competitive Examinations- I	After completion of the course, students will be able to i) Understand and apply fundamental mathematical concepts essential for various competitive exams ii) Apply logical reasoning, analytical thinking, and problem solving techniques to tackle quantitative aptitude questions efficiently iii) Improve calculation speed and accuracy iv) Apply problem solving strategies and computational skills to solve problems v) Demonstrate a strong foundation in mathematical concepts



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22	B.SC.II	MAT/DSC/ T/250	Algebra	After completion of the course, students will be able to – i) Identify and apply group structure properties ii) Identify and apply subgroup, normal subgroup and quotient group properties. iii) Define and construct homomorphism of groups. iv) Define and construct homomorphism and isomorphism of rings and characterize integral domains
23	B.SC.II	MAT/DSC/ T/251	Integral Transforms	After completion of the course, students will be able to - Fourier i) Apply the Laplace transform for various functions. ii) Obtain the inverse Laplace transform. iii) Find the solution of differential equations by using Laplace transform. iv) Find the Fourier transform for various functions, Fourier sine and cosine transforms of functions
24	B.SC.II	MAT/DSC/ P/276	Lab Course based on MAT/DSC/T/250	After completion of the course, students will be able to – i) Identify and apply group structure properties. ii) Identify and apply subgroup, normal subgroup and quotient group properties. iii) Define and construct homomorphism of groups. iv) domains Define and construct homomorphism and isomorphism of rings and characterize integral
25	B.SC.II	MAT/DSC/ P/277	Lab Course based on MAT/DSC/T/251	After completion of the course, students will be able to – i) Apply the Laplace transform for various functions. ii) Obtain the inverse Laplace transform. iii) Find the solution of differential equations by using Laplace transform. iv) Find the Fourier transform for various functions, Fourier sine and cosine transforms of functions
26	B.SC.II	MAT/Mn/T /250	Discrete Mathematics	After completion of the course, students will be able to i) Identify the types of relation and function. ii) Prove laws of Boolean algebra. iii) Apply the laws of Boolean algebra. iv) Apply logic gates to adder, encoder and decoder.
27	B.SC.II	MAT/Mn/T /251	Vector Calculus	After completion of the course, students will be able to – i) Find the derivatives and partial derivatives of vector-valued functions of three variables ii) Define and apply the gradient, divergence and curl operators iii) Evaluate line and surface integrals.
28	B.SC.II	MAT/SEC/ T/250:	: Numerical Methods-II	After completion of the course, students will be able to – i) Apply numerical methods and find the integration



				<p>by numerical methods</p> <p>ii) Derive and apply numerical methods to find the roots of algebraic and transcendental equations</p> <p>iii) Apply numerical methods to obtain numerical solution of ordinary differential equations</p>
29	B.SC.II	MAT/SEC/T/251	Introduction to R and Basic Statistics using R-II	<p>After completion of the course, students will be able to –</p> <p>i) Perform matrix operation using R</p> <p>ii) Plot various plots using R</p> <p>iii) Edit plots using R</p> <p>iv) Determine linear regression using R</p>
30	B.SC.II	MAT/SEC/P/276	Lab Course Based on MAT/SEC/T/250	<p>After completion of the course, students will be able to –</p> <p>i) Apply numerical methods and find the integration by numerical methods</p> <p>ii) Derive and apply numerical methods to find the roots of algebraic and transcendental equations</p> <p>iii) Apply numerical methods to obtain numerical solution of ordinary differential equations</p> <p>iv) Use of mathematical software for numerical methods</p>
31	B.SC.II	MAT/SEC/P/277	Lab Course Based on MAT/SEC/T/251	<p>After completion of the course, students will be able to</p> <p>i) Determine distribution function.</p> <p>ii) Determine mathematical expectation, variance and covariance.</p> <p>iii) Apply the concept of theoretical and continuous distribution.</p> <p>iv) Determine correlation coefficient.</p> <p>v) Use statistical softwares.</p>
32	B.SC.II	MAT/GE/OE/T/250	Mathematics for Competitive Examinations-II	<p>After completion of the course, students will be able to –</p> <p>i) Apply problem solving strategies and computational skills to solve problems</p> <p>ii) Apply various Verbal &amp; Non- Verbal Reasoning techniques</p> <p>iii) Improve calculation speed and accuracy</p> <p>iv) Understand and apply fundamental mathematical concepts essential for various competitive examinations</p> <p>v) Demonstrate a strong foundation in mathematical concepts</p>
33	B.Sc.III	MAT604	Mathematical Statistics-II	<p>CO1: Understand the basics of probability and operations of probability</p> <p>CO2: Understand and identify the random variables, probability density function</p> <p>CO3: Determine the mathematical expectation, variance and moment generation function</p> <p>CO4: Study and apply various distributions to analyze</p>



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34	B.Sc.III	MAT501	Real Analysis-I [Core course]	CO1:Define and recognize bounded, convergent, divergent, Cauchy, and monotonic sequences. CO2:Define and recognize convergent, divergent, alternating series and limit comparison tests for conditional convergence and absolute convergence of an infinite series of real numbers. CO3:Determine the Jacobian of Implicit and explicit functions and condition for Jacobian to be vanish.
35	B.Sc.III	MAT503P	Lab Course-III	CO1:Define and recognize bounded, convergent, divergent, Cauchy, and monotonic sequences. CO2:Define and recognize convergence and divergence of series. CO3:Determine the Jacobian of Implicit and explicit function. CO4: Describe group and subgroup. CO5: Explain Normal subgroup and Quotient groups. CO6: Define Ring and some special types of rings. CO7: Describe Ideals and Maximal Ideals.
36	B.Sc.III	MAT504	Mathematical Statistics-I	CO 1: Understand the concept of frequency distribution CO 2: Find the arithmetic mean, harmonic mean, mode, median, quartile CO 3: Find measure of dispersion, moments, skewness and Kurtosis etc. CO 4: Fit the data using curve fitting and least square method
37	B.Sc.III	MAT601	Real Analysis-I	CO1:Understand the basic concepts of metric spaces and their properties CO2: Understand properties of Riemann integrable functions, and applications of the fundamental theorems of calculus CO3: Find the Fourier series of some standard functions and its applications.
38	B.Sc.III	MAT602	Ordinary Differential Equations	CO1: Classify and identify the types of functions CO2: Solve the first and second order differential equations CO3: Solve initial value problems and study properties of solutions of IVP. CO4: Find the Wronskian of the solutions
39	B.Sc.III	MAT-603P	Lab Course-IV	CO1: Describe several basic concepts of metric spaces and their properties. CO2:Understand properties of Riemann integrable functions, and applications of the fundamental theorems of calculus CO3: Find the Fourier series of some standard functions and its applications CO4: Classify and identify the types of functions CO5:Solve the First and second order differential



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				equations CO6:Solve initial value problems and study properties of solutions of IVP CO7:Find the Wronskian of the solutions
40	B.Sc.III	MAT604	Mathematical Statistics-II	CO1: Understand the basics of probability and operations of probability CO2:Understand and identify the random variables, probability density function CO3:Determine the mathematical expectation, variance and moment generation function CO4: Study and apply various distributions to analyze the data

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### Programme Specific Outcome

The students who completing the B.Sc. programme have the following outcomes.

1. To develop scientific attitude, provide knowledge of scientific and technological concepts of physics.
2. To enrich knowledge through problem solving, minor/major projects, seminars, tutorials, participation in scientific events, study visits etc.
3. To learn various experimental and computational tools thereby developing analytical abilities.
4. To train students in skills suitable to research, education, industry and market.
5. To help students to build-up a progressive and successful career in physics.
6. Generic elective courses are offered to provide multidisciplinary or interdisciplinary education to students.
7. Skill based courses are aimed to provide hands on training, competencies and skills to students.

### Course Outcome

Sr. No	Class	Paper Type	Paper Title	Course Outcomes
1	<b>B.Sc.I, Sem.-I</b>	Mejor : Physics DSC- 1	Mechanics and Properties of Matter	After completion of the course, students will be able to – i. Understand Newton's laws of motion. ii. Recognize different forces existing in nature and their physical significance. iii. Acquire deep knowledge of physical quantities such as elasticity, viscosity, and surface tension. iv. Develop the capacity to investigate and analyze daily problems related to mechanical Movement.
2		Practical's Based on DSC-1		i. Understand gravitational acceleration through pendulum analysis and learn material stiffness and viscosity determination techniques. ii. Explore rotational dynamics through flywheel experiments for moment of inertia and torsional property analysis. iii. Develop instrument precision skills via least count analysis, crucial for physics and related field pursuits.



3		GE/OE-1	Everyday Physics	<p>i. Imparts essential physics principles to real-world contexts such as transportation fundamentals, sports analysis, and sustainable weather solutions.</p> <p>ii. Students understand concepts like linear and circular motion, friction, energy/momentum, applying them to transportation and sports.</p> <p>iii. Students explore sustainable weather management and green energy technologies, gaining practical knowledge about home electricity systems.</p>
4		*SEC-1: Skill Enhancement Course	Basic Instrumentation Skill	<p>After completion of the course, students will be able to –</p> <p>i. Understand gravitational acceleration through pendulum analysis and learn material stiffness and viscosity determination techniques.</p> <p>ii. Explore rotational dynamics through flywheel experiments for moment of inertia and torsional property analysis.</p> <p>iii. Develop instrument precision skills via least count analysis, crucial for physics and related field pursuits.</p>
5		* SEC-2: Practical	Practical's Based on SEC-1	<p>After completion of the course, students will be able to –</p> <p>i. Employ digital multimeters for measuring DC voltages, currents, resistance, and AC voltages.</p> <p>ii. Acquire advanced knowledge in circuit tracing and troubleshooting techniques for electronic equipment, including understanding the operation of signal and pulse generators.</p> <p>iii. Conduct frequency measurements using oscilloscopes and analyze and compare two frequencies using oscilloscope analysis.</p>
6	<b>B.Sc.I, Sem.-II</b>	Mejor-Physics-DSC-3	Optics	<p>On completion of the course, students will be able to,</p> <p>i. Acquire the basic concept of optics and its applications.</p> <p>ii. Explain how image formation takes place in lenses.</p> <p>iii. Understand the operations of many modern optical devices.</p> <p>iv. Understand the optical phenomenon such as interference and diffraction.</p>



7		DSC-4	<b>Practical's based on DSC-3</b>	On completion of the course, students will be able to, i. Understanding of interference and diffraction phenomena through hands-on experimentation. ii. Appreciation of practical applications of optical instruments across various scientific disciplines. iii. Proficiency in conducting precise measurements and observations using optical instruments. iv. Analyze experimental results critically and compare them with theoretical expectations.
8		GE/OE-2	Physics in Sports	i. Explain how Newton's laws relate to athletic performance. ii. Evaluate sports equipment design and performance. iii. Assess the effects of environmental conditions on athletic performance. iv. Apply strategies for optimizing performance in various conditions.
9		VSC-1	Electrical measurements	i. Understand and apply fundamental electrical measurement concepts. ii. Gain the skill in selecting appropriate measurement methods and minimizing errors. iii. Understanding of electrical device characteristics and their role in measurement circuits. iv. Calibrate instruments and verify their accuracy against standards.
10		VSC-2	Practical's Based on VSC-1	On completion of the course, students will be able to, i. Student develop the skill reading the electrical instruments. ii. Minimization of errors and get exposure to know the idea of measurements. iii. To do handling and repair the electrical instruments.
11	<b>B.Sc.II Sem.-III</b>	PHY/DSC/T /200	Modern Physics	After successful completion of this course students will be able to - Able to explain the factors influencing photoelectric effect, explain the experimental setup and apply it for applications - Understand the fundamentals of lasers, laser systems, their characteristics and diversified applications including industry, medicine and Défense - Use this knowledge for applications of lasers in specific fields of their interest



				<ul style="list-style-type: none"><li>- Solve numerical problems on the photoelectric effect, X-rays, and lasers.</li></ul>
12		PHY/DSC/T/201	Electricity and Magnetism	<p>On successful completion of this course students will be able to</p> <ul style="list-style-type: none"><li>- Develop an understanding on the concepts of electricity and magnetism.</li><li>- To understand the knowledge of various mathematical operations required for electrostatics and magnetostatics.</li><li>- Explain the fundamental concepts and operations of vector analysis.</li><li>- To increase the ability to perform calculations of various mathematical expressions and laws.</li><li>- To develop ability among the students to identify, remember and grasp the definitions and laws of electricity and magnetism.</li></ul>
13		PHY/DSC/T/226	Practical's	<p>On successful completion of this course students will be able to:</p> <ul style="list-style-type: none"><li>- Verify the inverse square law and measure Planck's constant using the photoelectric effect.</li><li>- Compare luminous intensities of different light sources using photocells.</li><li>- Understand and apply the principles of laser optics for diffraction, beam divergence, and precision measurements.</li><li>- Analyse experimental data from photocell and laser-based experiments to draw meaningful conclusions about physical constants.</li></ul>
14		PHY/DSC/T/227	Practical's	<p>On successful completion of this course students will be able to:</p> <ul style="list-style-type: none"><li>- Measure the energy band gap of a semiconductor and analyze temperature dependence.</li><li>- Perform accurate resistance and capacitance measurements using bridge methods.</li><li>- Determine high resistance and absolute capacity of a condenser using B.G. techniques.</li><li>- Investigate transient behavior in RC circuits and determine <math>e/m</math> using Thomson's method.</li></ul>
15		Minor, PHY/Mn/T/200	Soil Physics	<p>On successful completion of this course students will be able to:</p> <ul style="list-style-type: none"><li>- Explain the fundamental concepts, importance, and interdisciplinary interactions of soil physics.</li><li>- Describe soil formation, profile development, texture, and methods for particle size analysis.</li><li>- Analyze soil physical properties, including density, porosity, structure, and water content.</li><li>- Interpret the energy state of soil water, soil-</li></ul>



				moisture potential, and measurement techniques.
16		Minor, PHY/Mn/T/ 201	Digital Electronics	On successful completion of this course students will be able to: - Describe and explain the fundamentals of digital electronics. - Perform number system conversions and basic logic operations. - Design and simulate simple combinational and sequential logic circuits. - Recognize the importance of digital systems in scientific research and experiments.
17		GE/OE,PHY/GE/OE/T/ 200	Data Analysis Techniques Using Excel	1. Understand and apply basic Excel functionalities for data management. 2. Perform data cleaning, sorting, filtering, and visualization techniques. 3. Use statistical functions for data interpretation and decision-making. 4. Create professional reports and dashboards. 5. Utilize Excel for business and social science applications.
18		VSC PHY/VSC/T /200	Solar Cell Devices	1. Explain the principles of photovoltaic energy conversion. 2. Identify and compare materials used in various types of solar cells. 3. Demonstrate an understanding of solar cell fabrication and testing techniques. 4. Analyze solar cell performance using key metrics like efficiency and fill factor. 5. Discuss challenges and future trends in solar cell technology.
19		VSC PHY/VSC/T /226	Practical	1. Analyze the I-V characteristics of a solar cell and determine key performance parameters. 2. Evaluate the effect of light intensity and temperature variations on solar cell efficiency. 3. Compare the electrical behavior of solar cells connected in series and parallel configurations. 4. Interpret spectral response and quantum efficiency data for solar cell performance assessment.
20	<b>B.Sc.II, Sem.-IV</b>	PHY/DSC/T /250	Heat and Thermodynamics	1. Understand the concepts of heat and thermodynamics. 2. Describe and apply the physical concepts of heat, and laws of thermodynamics. 3. Develop ability among the students to identify, remember and grasp the meanings, definitions and laws of heat and thermodynamics. 4. Perform calculations of heat conduction in



				various geometries.
21		PHY/DSC/T/251	Electrodynamics	<ul style="list-style-type: none"><li>- Apply Gauss's law to calculate electric fields.</li><li>- Explain and derive Maxwell's equations.</li><li>- Analyze electromagnetic waves in different media.</li><li>- Solve problems on induction and displacement current.</li><li>- Use Poynting's theorem for energy flow analysis.</li></ul>
22		PHY/DSC/T/276	Practical's	<ol style="list-style-type: none"><li>1. Understand the theoretical principles of basic practical Physics.</li><li>2. Develop awareness of minimizing errors.</li><li>3. Handle carefully various instruments.</li><li>4. Correlate theoretical concepts with the help of experiments.</li><li>5. Gain knowledge about heat, conduction of heat, thermal conductivity of different materials and other phenomena of heat.</li></ol>
23		PHY/DSC/T/277	Practical's	<ol style="list-style-type: none"><li>1. Measure and analyze the magnetic properties of materials using a magnetometer.</li><li>2. Determine inductance and charge sensitivity using bridge and galvanometer techniques.</li><li>3. Verify the capacities of condenser using De'Sauty's method.</li><li>4. Determine the AC mains frequency using a sonometer experiment.</li></ol>
24		Minor PHY/Mn/T/250	Nuclear Chemistry	<ol style="list-style-type: none"><li>1. Understand the principles of radioactivity and radioactive decay, including half-life and radioactive equilibrium, and their applications in various fields.</li><li>2. Analyze nuclear reactions, including fission and fusion, and evaluate the processes and energy changes involved in nuclear reactors and radiation chemistry.</li><li>3. Apply the use of radioactive isotopes and tracers in medicine, agriculture, analytical chemistry, and age determination techniques.</li></ol>
25		Minor PHY/Mn/T/251	Thermal Physics	<ol style="list-style-type: none"><li>1. Explain and apply the concepts of temperature, thermometers, and various temperature scales.</li><li>2. Develop proficiency in calculating and interpreting thermal conductivity using different methods.</li><li>3. Apply the laws of thermodynamics to various thermodynamic processes and calculate work done in specific processes.</li><li>4. Students will be capable of using and understanding temperature measurement techniques and solving problems related to heat</li></ol>



Balaghat Shikshan Sanstha, Naldurg's  
**YESHWANTRAO CHAVAN MAHAVIDYALAYA**



**Tuljapur**  
**Department of Physics**

				transfer and thermodynamics.
26		GE/OE PHY/GE/O E/T/250	Renewable energy	<ol style="list-style-type: none"> <li>1. Understand different energy sources, their availability, and the advantages and limitations of renewable energy sources.</li> <li>2. Explain the working principles of wind and geothermal energy systems, along with their benefits and limitations.</li> <li>3. Learn about biomass and biogas-based energy production, their conversion processes, and applications.</li> </ol>
27		SEC PHY/SEC/T /250	Drone Technology	<ol style="list-style-type: none"> <li>1. Understand the basic principles, components, and navigation systems of Drones.</li> <li>2. Identify various applications of Drones in businesses, commerce, and industries like Agriculture and Logistics.</li> <li>3. Recognize the legal, safety, and ethical guidelines for responsible Drone operation.</li> </ol>
28		SEC PHY/SEC/T /277	Practical's	<ol style="list-style-type: none"> <li>1. Demonstrate the ability to operate Drones using Android-based applications.</li> <li>2. Apply Drone technology for tasks such as aerial photography, videography, and route planning.</li> <li>3. Analyze and utilize data collected through drones for real-world applications in businesses, commerce, and industries.</li> </ol>
29	<b>B.Sc.III Sem.V</b>	PHY-511	Classical and Quantum Mechanics	<ol style="list-style-type: none"> <li>1. Idea and concepts in classical physics.</li> <li>2. Basic concepts in Vibrational principle and Principle of Least Actions.</li> <li>3. Difference between classical and quantum mechanical theory and approach.</li> <li>4. Linear Vector Space, operators and tools to calculate Eigen values.</li> <li>5. Various techniques to solve time dependent and time independent Schrodinger equations using different coordinate systems.</li> </ol>
30		PHY-512	Electrodynamics	<ol style="list-style-type: none"> <li>1. The difference between static and dynamical systems.</li> <li>2. Maxwell's equations and time-varying fields.</li> <li>3. Gauges in electrodynamics, retarded potentials and its applications.</li> <li>4. Radiation from time varying source, charged particle dynamics and relativistic electrodynamics.</li> </ol>
31		PHY-521	Lab course 7,Based on PHY-511	<ol style="list-style-type: none"> <li>1. Determination of thermal conductivity of a bad conductor using Lees' disc method – yields the thermal conductivity value of the material and an understanding of heat flow in poor conductors.</li> </ol>



				<p>2. Measurement of Stefan's constant using a thermocouple – provides an experimental value of Stefan's constant and validates the Stefan-Boltzmann law.</p> <p>3. Determination of the coefficient of thermal conductivity of copper by Searl's apparatus – gives the thermal conductivity of copper and insight into heat conduction in good conductors.</p> <p>4. Measurement of Young's modulus (Y) by Koenig's method – yields the elastic modulus of the material and experience with dynamic mechanical testing</p>
32		PHY- 522	Lab course 8, Based on PHY-512	<p>1. Understanding of magnetic field measurements – experiments like the field along the axis of a circular coil and the B-H curve help students analyze magnetic field behavior.</p> <p>2. Determination of electromagnetic properties – experiments such as finding mutual inductance, self-inductance, and charge sensitivity enable quantification of circuit parameters.</p> <p>3. Measurement of physical constants – experiments like determining the absolute value of BH and BV or AC frequency give practical experience in obtaining fundamental physical values.</p> <p>4. Application of electronic circuits – experiments involving a bridge rectifier teach students about AC–DC conversion and circuit analysis.</p>
33		SEC-513	SEC-1(A) : Soil Physics	<p><b>1. Understanding Soil Physical Properties</b> Learners understand soil texture, structure, porosity, bulk density, and soil consistency, and how these properties affect plant growth and water movement.</p> <p><b>2. Knowledge of Soil–Water Relationships</b> Students can explain water infiltration, percolation, capillary action, field capacity, and wilting point, and how water is stored and moves in soil.</p> <p><b>3. Ability to Measure Soil Physical Parameters</b> Learners gain practical skills in measuring soil moisture content, bulk density, hydraulic</p>



				<p>conductivity, and soil compaction.</p> <p>4. <b>Understanding Soil–Air and Temperature Dynamics</b> Students understand soil aeration, gas exchange, and soil temperature variations, and how they influence root development and microbial activity.</p> <p>5. <b>Application to Agriculture and Environmental Management</b> Learners can apply soil physics principles to irrigation planning, drainage design, erosion control, and sustainable land management.</p>
34	<b>B.Sc.III, Sem.VI</b>	PHY-611	Atomic, Molecular Physics	<ol style="list-style-type: none"><li>1. Gain the thorough understanding of the basic structure of hydrogen like atoms.</li><li>2. Learn the selection rules for two-electron atoms and many-electron atoms.</li><li>3. Apply various molecular spectroscopy principles.</li><li>4. Apply knowledge of physics to become successful in national level examinations.</li></ol>
35		PHY-612	Optical Fiber and Communication	<ol style="list-style-type: none"><li>1. Realize the significance of optical fiber communications.</li><li>2. Design the optical system.</li><li>3. Understand the construction and working of optical fiber cable.</li><li>4. Develop the knowledge of fibre fabrication.</li><li>5. Identify and understand the needs of OFC.</li></ol>
36		PHY-621	Lab Course-9 Based on PHY- 611	<ol style="list-style-type: none"><li>1. Understanding optical dispersion: Experiments like Cauchy's constant and Hartmann dispersion formula help students determine material dispersion properties and relate refractive index with wavelength.</li><li>2. Spectroscopic measurements: Using a spectrometer and grating enables accurate measurement of wavelengths of spectral lines and determination of optical constants.</li><li>3. Laser optics analysis: Studying laser diffraction patterns (e.g., laser's A pattern) teaches principles of diffraction and interference in coherent light.</li><li>4. Optical fiber characterization: Experiments on numerical aperture and bending loss in multimode fibers provide insight into fiber-optic light transmission and loss mechanisms.</li></ol>



Balaghat Shikshan Sanstha, Naldurg's  
**YESHWANTRAO CHAVAN MAHAVIDYALAYA**




**Tuljapur**  
**Department of Physics**

				<p>5. Capacitance comparison: The De Sauty method experiments teach techniques for comparing capacitor values and understanding electrical circuit measurements.</p> <p>6. Skill development: Overall, the lab course builds experimental skills, data analysis, and application of theoretical physics concepts to real-world measurements.</p>
37		PHY-622	Lab Course-10, Based on PHY-612	<p>1. Full wave rectifier with <math>\pi</math> filter – Understands AC-to-DC conversion, ripple reduction, and filter design.</p> <p>2. High resistance by leakage through condenser – Learns measurement of high resistances and insulation properties.</p> <p>3. e-by Millikan's oil drop method – Determines the elementary charge <math>e</math> and practices precise charge measurement.</p> <p>4. R.I. of optical fibre – Studies refractive index and light propagation in optical fibers.</p> <p>5. Maxwell's bridge – Measures inductance and understands AC bridge circuits.</p> <p>6. Transistorized regulated power supply using Zener diode – Designs and analyses voltage regulation circuits.</p> <p>7. Study of CRO – Familiarizes with cathode-ray oscilloscope operation for waveform analysis.</p> <p>8. Measure phase difference between current and voltage using CRO – Learns phase relationships in AC circuits.</p> <p>9. Study Lissajous figures – Analyses frequency and phase relations using oscilloscope patterns.</p>
38		SEC-613	SEC-2(C) : Basics of space science	<p>1. Understand the formation and evolution of the solar system.</p> <p>2. Understand the significance of the Sun within the solar system and grasp foundational concepts of solar astronomy and observational techniques.</p> <p>3. Identify and describe the various celestial bodies in the solar system.</p> <p>4. Analyze the historical perspectives on the solar system and comprehend the motion of planets.</p>

  
Head

Department of Physics  
Yeshwantrao Chavan  
Mahavidyalaya, Tuljapur

  
PRINCIPAL  
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### Programme Specific Outcome

1. PO1. The citizenship and society: Apply broad understanding of ethical and professional skill in science subjects in the context of global, economic, environmental and societal realities while encompassing relevant contemporary issues.
2. PO2. Environment and sustainability: Apply broad understanding of impact of science subjects in a global, economic, environmental and societal context and demonstrate the knowledge of, and need for sustainable development.
3. PO3. Ethics: Apply ability to develop sustainable practical solutions for science subject related problems within positive professional and ethical boundaries.
4. PO4. Individual and teamwork: Function effectively as a leader and as well as team member in diverse/ multidisciplinary environments.
5. PO5. Communication: Communicate effectively on complex science subject related activities with the scientific community in particular and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
6. PO6. Project management and finance: Demonstrate knowledge and understanding of the first principles of science and apply these to one's own work as a member and leader in a team, to complete project in any environment.
7. PO7. Life-long learning: Recognize the need for lifelong learning and have the ability to engage in independent and lifelong learning in the broadcast context of technological change.



## Course Outcome

Sr. No	Class	Paper Type	Paper Title	Course Outcomes
1	B.Sc. I SEM-I	Theory	<b>DSC-:</b> Animal Diversity -I	<b>Course Outcomes:</b> <ol style="list-style-type: none"><li>1. Explain the general organization of unicellular and multicellular animals.</li><li>2. Identify the diversity, adaptations, and ecological importance of invertebrates.</li><li>3. Demonstrate knowledge of biodiversity and its importance in conservation.</li></ol>
2	B.Sc. I SEM-I	Practical	<b>DSC-:</b> Animal Diversity -I	<b>Course Outcomes:</b> <ol style="list-style-type: none"><li>1. Understand the classification, habits, and habitats of invertebrates.</li><li>2. Explain the life cycle and pathogenicity of parasites and vectors.</li><li>3. Identify common animals and understand their ecological importance.</li></ol>
3	B.Sc. I SEM-II	Theory	<b>DSC-:</b> Animal Diversity -II	<b>Course Outcomes:</b> <ol style="list-style-type: none"><li>1. Explain the general structural organization of vertebrates.</li><li>2. Identify vertebrate diversity, migration patterns, and adaptive radiation.</li><li>3. Demonstrate knowledge of biodiversity and its role in conservation.</li><li>4. Understand the biological importance of species and apply suitable conservation strategies.</li></ol>
4	B.Sc. I SEM-II	Practical	<b>DSC-:</b> Animal Diversity -II	<b>Course Outcomes (COs):</b> <ol style="list-style-type: none"><li>1. On completion of the course, students will be able to understand systemic position, habit and habitat of vertebrate animals.</li><li>2. Understand the adaptive features of fishes, birds.</li><li>3. Understand the physiological and anatomical study of vertebrate animals.</li><li>4. Develop skills to recognize biodiversity of animals and their importance.</li></ol>
5	B.Sc. I SEM-I	Theory	<b>SEC-1</b> Bee Keeping	<b>Course Outcomes:</b> <ol style="list-style-type: none"><li>1. Differentiate between various honey bee castes.</li><li>2. Use artificial hives for beekeeping.</li><li>3. Apply techniques of honey purification and processing.</li><li>4. Construct and maintain artificial beehives.</li></ol>



				<ol style="list-style-type: none"> <li>Pursue self-employment through beekeeping.</li> <li>Establish a beekeeping equipment business to support farmers and beekeepers.</li> </ol>
6	B.Sc. I SEM-I	Theory	<b>GE-</b> Vectors, Diseases and Manage ment	<p><b>Course Outcomes:</b></p> <ol style="list-style-type: none"> <li>Develop awareness of causative agents and control measures of common vector-borne diseases.</li> <li>Identify vectors and recognize disease symptoms.</li> <li>Understand feeding mechanisms and modes of disease transmission.</li> <li>Apply chemical, biological, and IPM strategies for vector management.</li> </ol>
7	B.Sc. I SEM-I	Practical	<b>SEC-2</b> Bee Keeping	<p><b>Course Outcomes:</b></p> <ol style="list-style-type: none"> <li>The learner will able to differentiate in different types of honey bee castes.</li> <li>Learner will be able to use the artificial hive for beekeeping</li> <li>Learner will be able to use the technique of honey purification and processing.</li> <li>Learner will be able to construct the artificial honey hive and maintain it.</li> <li>Learner if is not employed can find own employment by doing Bee keeping</li> <li>Lerner can start own beekeeping equipment agency for farmers or beekeepers</li> </ol>
	B.Sc. I SEM-II	Theory/	<b>GE-</b> Dairy productio n Technolo gy	<p>Course Outcomes (COs):</p> <ol style="list-style-type: none"> <li>On completion of the course, students will be able to Understand the pre-requisites for starting a Dairy farm.</li> <li>Recognize different breeds of Cows &amp; buffaloes following safety precautions Prepare and give recommended feed and water for livestock</li> <li>Maintain health of livestock along with productivity Vaccination of cattle, nutrients requirements</li> <li>Entrepreneurship i.e., Effectively market dairy products</li> <li>Ensure safe and clean dairy farm and Standard safety measures to be taken in establishing an industry.</li> <li>Efficiently start and manage to establish or develop a Dairy Industry.</li> </ol>
8	B.Sc. I SEM-II	Theory/ Practical	<b>VSC-</b> Aquariu m fish keeping.	<p><b>Course Outcomes:</b></p> <ol style="list-style-type: none"> <li>Explore career and business opportunities in the aquarium fish industry.</li> <li>Understand fish breeding techniques and fish feed</li> </ol>



				<p>technology.</p> <ol style="list-style-type: none"> <li>3. Identify common fish diseases and their management.</li> <li>4. Apply proper fish transportation techniques for marketing.</li> </ol>
9	B.Sc. II SEM-III	Theory	<b>DSC- Cell Biology</b>	<p><b>Course Outcomes:</b></p> <ol style="list-style-type: none"> <li>1. Understand the importance of cell as a structural and functional unit of life.</li> <li>2. The students understand and compare between the prokaryotic and eukaryotic system and Extrapolates the life to the aspect of development.</li> <li>3. The cellular mechanisms and its functioning depends on endo-membranes and structures.</li> <li>4. They are best studied with microscopy.</li> </ol>
10	B.Sc. II SEM-III	Theory	<b>DSC- Animal Physiology I</b>	<p><b>Course Outcomes:</b></p> <ol style="list-style-type: none"> <li>1. Know mechanism of body functions and the basic knowledge of chemistry of biomolecules.</li> <li>2. Students can enlist various sensory receptors in human body and describe the structure and Functioning of the sense organs-eye, ear, nose, tongue and skin.</li> <li>3. To understand the functions of important physiological systems including the digestive, cardio-respiratory, renal, reproductive, nervous and muscular systems.</li> <li>4. To analyze the life sustaining, controlling and coordinating systems</li> </ol>
11	B.Sc. II SEM-III	Theory	<b>Minor- Fundamentals of Biochemistry</b>	<p><b>Course Outcomes -</b></p> <ol style="list-style-type: none"> <li>1. Understand the principles of various fields of chemistry and biology (organic chemistry, analytical ,chemistry, biochemistry, genetics, metabolism, and molecular biology).</li> <li>2. Apply modern instrumentation theory and practice to biochemical problems.</li> <li>3. On completion of the course the student should be able to know mechanism of body functions and the basic knowledge of chemistry of biomolecule.</li> </ol>
12	B.Sc. II SEM-III	Theory	<b>Minor- Value added products of animal</b>	<p><b>Course Outcomes –</b></p> <ol style="list-style-type: none"> <li>1. Apply knowledge and skill to establish its own apiary or provides services to apiary.</li> <li>2. Learn various product of honey bees and value addition in these products, create scope for entrepreneurship.</li> <li>3. Meat products and milk products and Poultry Products processing help in boosting entrepreneurial attitude amongst students wherein they can generate resources of</li> </ol>



				their own.
13	B.Sc. II SEM-III	Theory	VSC- Vermicomposting	<b>Course Outcomes –</b> <ol style="list-style-type: none"><li>1. Acquire a critical knowledge on role of earth worms in making organic matter from biodegradable wastes.</li><li>2. Understand the biology of some important species of earth worms used in vermiculture.</li><li>3. Acquire skills on production of vermicompost.</li><li>4. Explain benefits and problems with vermiculture and vermicompost,</li></ol>
14	B.Sc. II SEM-III	Theory	GE- Environment and public health	<b>Course Outcomes -</b> <ol style="list-style-type: none"><li>1. Students will be able to understand environmental pollution, global warming, climate change and its effects.</li><li>2. As a result, individuals develop a deeper understanding of environmental issues and have the skills to make informed and responsible decisions.</li><li>3. Students will be able to understand interrelationships between a multitudes of factors that can have understanding different types of diseases.</li></ol>
15	B.Sc. II SEM-IV	Theory	DSC- Genetics	<b>Course Outcomes -</b> <ol style="list-style-type: none"><li>1. This course covers genetics, the science of heredity from its basic principles to the mostrecent advances in the field,</li><li>2. Imparts basic knowledge of classical (transmission) and molecular genetics.</li><li>3. After completion of the course, students will be able to-</li><li>4. Comprehensive, detailed understanding of the chemical basis of heredity.</li><li>5. Comprehensive and detailed understanding of genetic methodology and how quantification of heritable traits in families and populations provides insight into cellular and molecular mechanisms.</li></ol>
16	B.Sc. II SEM-IV	Theory	DSC- Animal Diversity II	<b>Course Outcomes -</b> <ol style="list-style-type: none"><li>1. Know mechanism of body functions and the basic knowledge of chemistry of biomolecules.</li><li>2. Students can enlist various sensory receptors in human body and describe the structure and functioning of the sense organs-eye, ear, nose, tongue and skin.</li><li>3. Students can identify properties of hormones and mention their nature and manner of functioning.</li><li>4. Know the effects of over functioning (hyperactivity) and</li></ol>



				hypoactivity (under functioning) of pituitary and thyroid.
17	B.Sc. II SEM- IV	Theory	<b>Minor- Economic Zoology</b>	<ol style="list-style-type: none"> <li>1. Course Outcomes</li> <li>2. This course focuses on the application of zoological knowledge for the benefit of humankind, particularly in relation to human economy, health, and overall welfare.</li> <li>3. It emphasizes the cultivation and mass production of useful organisms for human use, as well as the management, control, and eradication of harmful organisms.</li> <li>4. The course highlights the multidisciplinary nature of Economic Zoology, covering important applied fields such as sericulture, apiculture, aquaculture, pisciculture, and poultry farming.</li> <li>5. After completing the course, students will be able to:</li> <li>6. Understand the economic importance of both higher and lower organisms.</li> <li>7. Explain the role of various organisms in supporting human welfare and economic development.</li> <li>8. Apply zoological principles to the sustainable utilization and management of beneficial organisms.</li> <li>9. Develop a critical understanding of the contribution of organisms to the welfare of society.</li> </ol>
18	B.Sc. II SEM- IV	Theory	<b>Minor- Agricultural Entomology</b>	<p><b>Course Outcomes (COs): -</b></p> <ol style="list-style-type: none"> <li>1. After completion of the course students will be acquainted with various insect-pests of horticultural crops their damage symptoms.</li> <li>2. Students will be able to identify the common natural enemies of crop pests.</li> <li>3. They acquire the knowledge of mass production of egg, common predators, microbes and their laboratory hosts.</li> <li>4. The students will be acquainted with the different means of insect-pest management in agricultural crops.</li> <li>5. They will also learn about the different application techniques of insecticides, their dosages, different types of chemical application appliances etc. under field condition.</li> </ol>
19	B.Sc. II SEM- IV	Theory	<b>GE-Food Nutrition and Health</b>	<p><b>Course Outcomes (COs): -</b></p> <ol style="list-style-type: none"> <li>1. After completion of the course, students will be able to -</li> <li>2. Have a better understanding of the association of food and nutrition in promoting healthy living.</li> <li>3. Think more holistically about the relationship between nutrition science, and social and health issues.</li> <li>4. Move on to do post-graduation studies and apply for jobs as food safety officers, food analysts, food inspectors,</li> </ol>



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				food safety commissioners or controllers for jobs in organizations like FSSAI.
20	B.Sc. II SEM-IV	Theory	SEC- Fish Hatchery Manage ment	<b>Course Outcomes (COs):</b> <ol style="list-style-type: none"> <li>1. After completion of the course, students will be able to -</li> <li>2. Understand different types of fish hatcheries and their operation.</li> <li>3. Gain the knowledge about isolation, preservation and collection of pituitary Understand behavior of spawn in relation to hydro biological characters</li> </ol>
21	B.Sc. III SEM-V	Theory	DSE- Animal Physiolo gy-I	<b>Course Outcomes (COs):</b>  After completion of the course, students will be able to- <ol style="list-style-type: none"> <li>1. Understand the nutrition and physiology of digestion in man.</li> <li>2. Describe the structure and respiratory mechanism and transport of gases.</li> <li>3. Learn the structure and working of mammalian heart, blood composition and clotting mechanism.</li> </ol>
22	B.Sc. III SEM-V	Theory	DSE- Fishery Science-I	<b>Course Outcomes -</b> <ol style="list-style-type: none"> <li>1. Develop a scientific understanding of inland and marine fisheries and their potential for fish production.</li> <li>2. Gain knowledge of finfish and shellfish fisheries.</li> <li>3. Identify marine, brackish water, and freshwater fish species.</li> <li>4. Understand the inland and marine fishery resources of India.</li> </ol>
23	B.Sc. III SEM-V	Theory	SEC- Vermico mpost and Vermicul ture	<b>Course Outcomes:</b> <ol style="list-style-type: none"> <li>1. Students at the successful completion of the course will be able to:</li> <li>2. Acquire a critical knowledge on role of earth worms in making organic matter fro</li> <li>3. biodegradable wastes. 2. Understand the biology of some important species of earth worms used in vermiculture.</li> <li>4. Acquire skills on production of vermicompost.</li> <li>5. 4. Explain benefits and problems with vermiculture and vermicompost.</li> </ol>
24	B.Sc. III SEM- VI	Theory	DSE- Animal Physiolo gy-II	<ol style="list-style-type: none"> <li>1. <b>Course Outcomes (COs):</b> Understand the structure and functional organization of major organ systems and receptor systems in mammals.</li> <li>2. Explain the physiological mechanisms of excretion,</li> </ol>



				<p>nervous coordination, muscle function, sensory reception, and reproduction.</p> <ol style="list-style-type: none"><li>3. Describe the structure and function of the kidney, and understand the concepts of osmoregulation and homeostasis.</li><li>4. Illustrate the structure of neurons, synapses, muscles, eye, and ear along with their physiological roles.</li><li>5. Understand the processes of gametogenesis, hormonal regulation, reproductive cycles, and methods of contraception.</li></ol>
25	B.Sc. III SEM- VI	Theory	DSE- Fishery Science- II	<p><b>Course Outcomes:</b> After completion of the course, students will be able to:</p> <ol style="list-style-type: none"><li>1. Develop a scientific outlook and awareness of freshwater fish farming.</li><li>2. Understand the functioning of fish hatcheries and fish seed production techniques.</li><li>3. Identify major freshwater fish species.</li><li>4. Recognize common fish diseases and their control measures.</li><li>5. Evaluate the impact of exotic fishes on Indian freshwater fish fauna.</li></ol>
26	B.Sc. III SEM- VI	Theory	SEC- Aquarium fish keeping	<p><b>Course Outcomes:</b></p> <ol style="list-style-type: none"><li>1. After completion of the course, students will be able to:</li><li>2. Understand the principles and scope of ornamental fish culture and aquarium fish keeping.</li><li>3. Identify common freshwater and marine ornamental fish species suitable for aquaria.</li><li>4. Design, set up, and maintain different types of aquaria.</li><li>5. Manage water quality, filtration systems, and aquarium plants.</li><li>6. Apply proper feeding, breeding, and health management practices for ornamental fishes.</li><li>7. Recognize common diseases of aquarium fishes and implement preventive and control measures.</li><li>8. Understand the economic importance and entrepreneurship opportunities in the ornamental fish industry.</li></ol>