



V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A' Grade (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

PEOs, POs, PSOs and COs

B.Sc. BIOTECHNOLOGY

Programme Educational Objectives (PEOs)

PEOs are broad statements that describe the career and professional achievements, that the Programme is preparing the graduates to achieve within the first few years after graduation. PEOs are framed for each Programme and should be consistent with the Mission of the Institution.

Programme Outcomes (POs)

POs shall be based on Graduate Attributes (GAs) of the Programme. The GAs are the attributes expected of a graduate from a Programme in terms of knowledge, skills, attitude and values. The Graduate Attributes include Disciplinary Knowledge, Communication Skills, Critical Thinking, Problem Solving, Analytical Reasoning, Research Related Skills, Co-operation/Team Work, Scientific Reasoning, Reflective Thinking, Information/Digital Literacy, Multicultural Competence, Moral and Ethical Awareness/Reasoning, Leadership Qualities and Lifelong Learning.

On successful completion of the Programme, the students will be able to

- 1 Apply effectively the acquired knowledge and skill in the field of Arts, Physical Science, Life Science, Computer Science, Commerce and Management for higher studies and employment. (*Disciplinary Knowledge*)
- 2 Communicate proficiently and confidently with the ability to express original/complex ideas effectively in different situations. (*Communication Skills*)
- 3 Identify, formulate and solve problems in real life situations scientifically/systematically by adapting updated skills in using modern tools and techniques. (*Scientific Reasoning and Problem Solving*)

- 4 Critically analyse, synthesise and evaluate data, theories and ideas to provide valid suggestions for the betterment of the society. (*Critical Thinking and Analytical Reasoning*)
- 5 Use ICT in a variety of self-directed lifelong learning activities to face career challenges in the changing environment. (*Digital Literacy, Self - directed and Lifelong Learning*)
- 6 Self-manage and function efficiently as a member or a leader in diverse teams in a multicultural society for nation building. (*Co-operation/Team Work and Multicultural Competence*)
- 7 Uphold the imbibed ethical and moral values in personal, professional and social life for sustainable environment. (*Moral and Ethical Awareness*)

Programme Educational Objectives (PEOs)

The students will be able to

- To acquire knowledge and sound understanding of concepts in various branches of Biotechnology and exhibit their abilities and skills leading to professional to become competent professionals
- To employ their knowledge and technical skills in their profession for problem solving
- To sustain the standards of the profession concerned with ethical consideration

Key Components of the Mission Statement	PEO1	PEO2	PEO3
conceptual knowledge	√	√	-
Problem solving	√	√	-
socio-ethical consideration	-	√	√

Programme Specific Outcomes (PSOs)

Based on the Programme Outcomes, Programme Specific Outcomes are framed for each UG Programme. Programme Specific Outcomes denote what the students would be able to do at the time of graduation. They are Programme specific. It is mandatory that each PO should be mapped to the respective PSO.

On completion of B.Sc. Biotechnology Programme, the students will be able to

PO1: Disciplinary knowledge

PSO1a: Apply the knowledge on fundamental concepts of life sciences such as Biochemistry, Microbiology, Genetics and Molecular biology and its related courses in higher studies.

PSO1b: Understand the principles and handling of various instruments used in Biochemistry, Microbiology and chemistry laboratory and to equip the practical skills in Biotechnology

PO2: Communication Skills.

PSO2: Explain various concepts and processes of Biological sciences both in verbal and written form and illustrate the techniques related to Biotechnology.

PO3: Scientific Reasoning and Problem Solving

PSO3a: apply their theoretical knowledge and transferable skills to identify and solve problems in day today life

PSO3b: Employ interdisciplinary knowledge to provide better solutions and new ideas in various branches of Biotechnology innovatively to work in a biotechnology laboratory or in an industry

PO4: Critical thinking and Analytical Reasoning

PSO4a: critically think and apply the concepts in life sciences in identifying the problems which can be addressed through Biotechnology

PSO4b: Analyse the organization of plant, animal and microbes from cellular level upto genome level and their inter relationship to exploit them for various research and development activities

PO5: Digital Literacy, Self - directed and Lifelong learning

PSO5: Make use of modern ICT tools and to adapt to the technological advancements in the emerging areas of Biotechnology.

PO6: Cooperation / Team Work and Multi-Cultural Competence

PSO6: Work effectively as a member or leader of a team in institution, industry, Society through the acquired skills from paper presentation, Industrial visit and Internship programme.

PO7: Moral and Ethical awareness

PSO7: Understand the IPR, ethics in life science and adapting ecofriendly techniques for sustainable development.



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Semester II	BIOCHEMISTRY	Hours/Week: 4	
Core Course -1		Credits: 4	
Course Code 20UBOC11		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: define the classification and structure of biomolecules such as carbohydrates, proteins, nucleic acids, enzymes and lipids. [K1]

CO2: describe the chemistry of biomolecules, metabolism and mechanism of enzyme action. [K2]

CO3: explain the relationship between biomolecules, mechanism of enzyme action and the metabolism. [K2]

CO4: apply the knowledge of chemistry and properties of biomolecules such as Carbohydrates, proteins, nucleic acids, enzymes and lipids. [K3]

CO5: analyze the metabolic pathways of various biomolecules. [K4]

Course Code 20UBOC11	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO5	PSO6	PSO7
CO1	H	-	H	L	L	L	L	L	-	-
CO2	H	M	H	L	L	M	L	M	-	-
CO3	H	M	L	L	L	H	M	L	-	-
CO4	H	M	M	M	M	M	H	M	-	-
CO5	H	M	H	M	H	L	M	M	-	-



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Semester I	FUNDAMENTALS OF GENETICS	Hours/Week: 4	
Core Course-2		Credits: 4	
Course Code 20UBOC12		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: recall the key concepts of Genetics. [K1]

CO2: summarise the historical development of Genetics, inheritance, variation, Sex determination, chromosomal mapping and evolution. [K2]

CO3: outline the Mendelian and non Mendelian inheritance, allelic interaction, linkage and population genetics. [K2]

CO4: explain the concepts of genetics using specific examples or by solving simple genetic problems. [K3]

CO5: analyze the Mendelian laws, allelic interaction, sex linkage, chromosomal mapping and evolution. [K4]

Course Code 20UBOC12	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO5	PSO6	PSO7
CO1	H	-	H	-	M	H	-	-	-	-
CO2	H	-	H	M	M	H	M	-	-	-
CO3	H	-	H	M	M	H	M	M	-	-
CO4	H	M	H	M	H	H	M	-	-	-
CO5	H	L	M	M	H	H	M	L	-	-



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Semester I	ALLIED COURSE I- ORGANIC, INORGANIC AND PHYSICAL CHEMISTRY – I	Hours/Week: 4	
Allied Course -I		Credits: 4	
Course Code 20UCHA11		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: define the basic principles, statements, laws and theories in chemistry. [K1]

CO2: understand the fundamental concepts in organic, inorganic and physical chemistry. [K2]

CO3: illustrate the preparations, uses and applications of polymers, hydrogen and water, various metallurgical process, bonding theories, colloids, sols, emulsion and gels. [K2]

CO4: predict the type of reactions involved in polymers preparation, utility of biomedical polymers, suitable process for metal extraction and water purification, shape of molecules using VSEPR, VB and MO theories, properties of gaseous and colloidal substances. [K3]

CO5: analyze different methodology of preparing polymers, separation of metals from their ores, water purification processes, various bonding theories, gas laws and properties of various colloids, applications of colloids and biomedical polymers. [K4]

Course Code 20UCHA11	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	M	M	L	M	M	H
CO2	H	M	M	L	M	M	H
CO3	M	M	M	L	H	M	H
CO4	M	M	M	L	H	M	H
CO5	M	M	M	L	H	M	H

Semester I	VALUE EDUCATION (2020 -21 onwards)	Hours/Week: 2	
Ability Enhancement Compulsory Course		Credits: 2	
Course Code 20UGVE11 20UBCC11		Internal 100	External -

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: describe the general human values and their associated values that are essential to make them committed and responsible individuals. [K1]

CO2: indicate the importance and benefits of upholding human values. [K2]

CO3: explain the steps to be taken for upholding human values and human rights. [K2]

CO4: practice the individual values needed for maintaining harmonious relationship with members of family, institution, organization or society for preserving and transmitting its tradition and culture. [K3]

CO5: uphold the legal, moral, ethical and spiritual values for nurturing health and happiness leading to national integrity and peace and for the existence of human beings with humanity. [K3]

Course Code 20UGVE11	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	M	-	-	L	-	H
CO2	H	M	-	-	L	-	H
CO3	H	M	-	-	L	-	H
CO4	H	M	-	-	H	H	H
CO5	H	M	-	-	L	H	H



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Semester II	MOLECULAR BIOLOGY	Hours/Week: 4	
Core Course-3		Credits: 4	
Course Code 20UBOC21		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: recall the basic concepts in Molecular biology. [K1]

CO2: outline the process of DNA replication, transcription, translation, mutation and gene regulation. [K2]

CO3: explain the mechanism of DNA replication, transcription, translation, mutation and gene regulation. [K2]

CO4: apply the concepts of central dogma of life, gene mutations and regulation. [K3]

CO5: analyze the various steps involved in DNA replication, transcription, translation, mutation and gene regulation and molecular level import export functioning of the cell.

Course Code 20UBOC21	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO5	PSO6	PSO7
CO1	H	-	H	H	-	-	H	-	-	-
CO2	H	L	H	H	L	-	H	L	-	-
CO3	H	-	H	H	M	M	-	-	-	-
CO4	H	-	H	H	L	H	L	M	-	-
CO5	H	-	H	M	M	H	H	H	-	-



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Semester II	MOLECULAR BIOLOGY	Hours/Week: 4	
Core Course-3		Credits: 4	
Course Code 20UBOC21N		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: recall the basic concepts in Molecular biology. [K1]

CO2: outline the process of DNA replication, transcription, translation, mutation and gene regulation. [K2]

CO3: explain the mechanism of DNA replication, transcription, translation, mutation and gene regulation. [K2]

CO4: apply the concepts of central dogma of life, gene mutations and regulation.[K3]

CO5: analyze the various steps involved in DNA replication, transcription, translation, mutation and gene regulation and molecular level import export functioning of the cell. [K4]

Course Code 20UBOC21N	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	-	H	H	-	-	H	-	-	-
CO2	H	L	H	H	L	-	H	L	-	-
CO3	H	-	H	H	M	M	-	-	-	-
CO4	H	-	H	H	L	H	L	M	-	-
CO5	H	-	H	M	M	H	H	H	-	-



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Semester II	FOOD BIOTECHNOLOGY	Hours/Week: 4	
Core Course-4		Credits: 4	
Course Code 20UBOC22		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: recall the composition, preservation, processing, and packaging of food products and IPR. [K1]

CO2: explain the basic principles in food industry and the role of biotechnology in various stages of food product development [K2]

CO3: summarize the food ingredients, methods of preservation, processing, packaging and labeling of foods. [K2]

CO4: apply the knowledge of food chemistry, food preservation, food processing and food packaging for exploiting agricultural commodities effectively. [K3]

CO5: examine the methods of food preservation, processing, food industry operation and appraise the IPR, ethical issues in the development of GM foods. [K4]

Course Code 20UBOC22	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO5	PSO6	PSO7
CO1	H	M	H	H	H	L	L	-	-	L
CO2	H	M	H	H	H	L	L	-	L	-
CO3	H	L	H	H	H	L	L	-	L	H
CO4	H	M	H	H	H	L	H	-	L	-
CO5	H	M	H	H	H	L	H	-	M	H



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Semester II	PLANT AND ANIMAL DIVERSITY	Hours/Week: 4	
Core Course-4		Credits: 4	
Course Code 22UBOC22		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: recall the classification and diversity of plant and animal kingdom. [K1]

CO2: explain the economic importance and the characteristic features of various groups of plants and animals [K2]

CO3: Explain the morphology and life cycle of plants and animals [K2]

CO4 : apply the knowledge of biodiversity to explore and conserve plants and animals. [K3]

CO5: Assess the classification and applications of plant and animal kingdom [K4]

Course Code 22UBOC22	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	H	-	L	L	-	L	-	-
CO2	H	H	M	-	-	L	-	L	-	-
CO3	H	M	M	-	L	-	-	L	L	-
CO4	H	H	M	L	L	L	L	L	L	-
CO5	H	L	M	L	M	L	-	L	L	-



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Semester II	ALLIED COURSE I- ORGANIC, INORGANIC AND PHYSICAL CHEMISTRY – II	Hours/Week: 4	
Allied Course -I		Credits: 4	
Course Code 20UCHA21		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: know about the basic concepts in organic, inorganic and physical chemistry. [K1]

CO2: understand the chemical constituent in oils, fats, soaps, detergents, biomolecules, fuels, fertilizers and pollutants. [K2]

CO3: identify the methods of preparation for organic and inorganic compounds, sources, effects and control measures of pollutions, methods for removal of salt from water. [K2]

CO4: comprehend the classification of biomolecules, fuels, fertilizers, catalyst, pollutions, application of adsorption and biomolecule. [K3]

CO5: analyze the oils, fats and biomolecules functions, sources of pollutions, characteristics of catalysts and the effects with control measures for various pollution. [K4]

Course Code 20UCHA21	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	H	M	L	L	M	H
CO2	H	H	M	L	L	M	H
CO3	H	H	M	L	L	M	H
CO4	H	H	M	L	L	M	H
CO5	H	H	M	L	L	M	H



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Semester II	VOLUMETRIC ANALYSIS	Hours/Week: 2	
Allied Course I Practical Course		Credits: 2	
Course Code 20UCHA21P		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: apply the Principles involved in the Volumetric analysis. [K3]

CO2: find out the strength of standard solutions. [K3]

CO3: estimate the amount of the substance present in the given solution by volumetric analysis. [K3]

CO4: determine the concentration of the unknown solutions. [K4]

CO5: analyse and evaluate the accuracy of the results. [K4]

Course Code 20UCHA21P	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	H	M	H	H	H	H
CO2	H	H	M	H	M	H	H
CO3	H	H	M	H	H	H	H
CO4	H	H	M	H	H	H	H
CO5	H	H	L	H	H	H	H



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Semester II	BIO INSTRUMENTATION	Hours/Week: 2	
Skill Enhancement Course-1		Credits: 2	
Course Code 20UBOS21		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: define the basic principles and terminologies associated with colorimetry, chromatography, centrifugation, electrophoresis and tracer techniques. [K1]

CO2: describe the components of instruments and their maintenance. [K2]

CO3: explain the operation methods of instruments. [K2]

CO4: apply the knowledge of biotechniques to estimate and separate biomolecules following good laboratory practices. [K3]

CO5: compare the merits of bio instruments and their applications in laboratory. [K4]

Course Code 20UBOS21	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO5	PSO6	PSO7
CO1	H	H	H	-	L	L	-	L	-	-
CO2	H	H	M	-	-	L	-	L	-	M
CO3	H	M	M	-	L	-	-	L	L	-
CO4	H	H	M	L	L	L	L	L	L	M
CO5	H	L	M	L	M	L	-	L	L	M



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Semester II	BIO INSTRUMENTATION	Hours/Week: 2	
Skill Enhancement Course-1		Credits: 2	
Course Code 20UBOS21N		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: define the basic principles and terminologies associated with colorimetry, chromatography, centrifugation, electrophoresis and tracer techniques. [K1]

CO2: describe the components of instruments and their maintenance. [K2]

CO3: explain the operation methods of instruments. [K2]

CO4: apply the knowledge of biotechniques to estimate and separate biomolecules following good laboratory practices. [K3]

CO5: compare the merits of bio instruments and their applications in the laboratory. [K4]

Course Code 20UBOS21N	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	H	-	L	L	-	L	-	-
CO2	H	H	M	-	-	L	-	L	-	M
CO3	H	M	M	-	L	-	-	L	L	-
CO4	H	H	M	L	L	L	L	L	L	M
CO5	H	L	M	L	M	L	-	L	L	M



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Semester I&II	Lab in Biochemistry, Genetics, Molecular Biology and Food Biotechnology	Hours/Week: 2	
Core Practical-I		Credits: 2	
Course Code 20UBOC21P		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: apply the basic concepts learnt in theory for the estimation of biomolecules and to solve simple problems in Genetics. [K3]

CO2: identify and explain the salient features of the given spotters. [K3]

CO3: make use of formula, tables and graphs for the estimation of biomolecules. [K3]

CO4: infer the result and complete the record work. [K3]

CO5: analyse the problems and situations in the related subject area. [K4]

Course Code 20UBOC21P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO5	PSO6	PSO7
CO1	H	H	H	L	L	L	L	L	-	-
CO2	H	H	H	L	L	H	M	-	-	-
CO3	H	H	H	M	H	H	M	-	M	L
CO4	M	H	H	H	H	H	M	L	M	L
CO5	M	H	H	H	H	H	M	L	M	L



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Semester III	MICROBIOLOGY	Hours/Week: 5	
Core Course-6		Credits: 5	
Course Code 20UBOC31		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: recall the fundamental concepts in microbiology. [K1]

CO2: describe the history of microbiology, microscopy, classification, cultivation, lifecycle, growth and nutritional requirements of microorganisms. [K2]

CO3: explain the contributions of microbiologists, working of Microscopy, identification of the microbes, sterilization techniques, lifecycle and interaction of microorganisms. [K3]

CO4: analyze the history, ultrastructure of microbes, cultivation, life cycle, function and clinically important microbes. [K4]

CO5: determine the interaction and relationship of microbes, host and the factors affecting growth of microorganisms. [K5]

Course Code 20UBOC31	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO5	PSO 6	PSO 7
CO1	H	-	H	-	L	M	-	-	-	-
CO2	H	M	H	H	M	-	L	-	-	L
CO3	H	H	H	M	H	H	L	M	-	-
CO4	H	M	H	L	L	H	-	M	-	L
CO5	H	L	H	H	L	-	H	M	-	L



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Semester III	BIOFERTILIZER TECHNOLOGY	Hours/Week: 2	
Skill Enhancement Course-II		Credits: 2	
Course Code 20UBOS31		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: recall the bio fertilizer types, organic manures, marketing and storage. [K1]

CO2: explain the various microbial sources of fertilizers, their cultivation, and utilization in organic farming practices. [K2]

CO3: employ the knowledge of current understanding of biofertilisers, nitrogen fixation at gene level and mass production of bio fertilizers. [K3]

CO4: illustrate the identification, mass production and application of biofertilisers for various crops. [K3]

CO5: analyse the problems related to organic cultivation, biofertilizers usage and give suggestions. [K4]

Course Code 20UBOS31	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	L	H	M	M	L	-	M	L	-
CO2	H	L	H	M	L	L	-	M	L	-
CO3	H	M	H	M	M	M	L	M	L	-
CO4	H	M	H	M	M	M	L	M	-	-
CO5	H	M	H	H	H	H	L	-	L	M



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VIRUDHUNAGAR - 626 001

Semester III	CELL BIOLOGY	Hours/Week: 4	
Allied Course		Credits: 4	
Course Code 20UBIA31		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

- CO1 : state the basic cytological techniques. [K1]
- CO2 : explain the origin, structure and chemistry of each organelles. [K2]
- CO3 : interpret the functions of cell organelles. [K2]
- CO4 : identify the importance of cell as a basic unit of life. [K3]
- CO5 : distinguish the harmful viruses, cancer cells and living with hygienic Environment. [K4]

Course Code 20UBIA31	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	M	M	M	L	L	-
CO2	H	M	M	M	L	L	-
CO3	H	M	M	M	L	L	-
CO4	H	M	M	M	L	L	-
CO5	H	M	M	M	L	L	-



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Semester III	INFECTIOUS DISEASES	Hours/Week: 2	
Non Major Elective Course -I		Credits: 2	
Course Code 20UBON31		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: define the ubiquitous nature and characteristics of pathogens and its life cycle.

[K1]

CO2: describe the causes and epidemiology of various infectious Diseases. [K2]

CO3: outline the pathogenesis and symptoms of transmissible diseases. [K2]

CO4: explain the laboratory identification of bacterial, fungal and viral diseases.

[K3]

CO5: illustrate the preventive methods, diagnosis and treatment of communicable diseases. [K3]

Course Code 20UBON31	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	H	M	M		-	-
CO2	H	H	M	M	-	-	-
CO3	M	H	M	M	-	-	-
CO4	M	M	M	M	L	-	-
CO5	L	M	M	M	L	-	L



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VIRUDHUNAGAR - 626 001

Semester III	WOMEN STUDIES	Hours/Week: 1
Generic Elective Course-1		Credit : 1
Course Code 20UGEW32		Internal 100

COURSE OUTCOMES

On completion of the course, the students will be able to

CO 1: state the significance of Women Studies in establishing Gender Justice. [K1]

CO 2: identify the multi-faceted role of Women in the Current Scenario. [K1]

CO 3: summarise their knowledge on Women Studies and Women Rights. [K2]

CO 4: illustrate the challenges and strategies in upholding Women Empowerment.

[K2]

CO 5: manipulate awareness on policies, schemes, atrocities and legal protection for Women. [K3]

Course Code 20UGEW32	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	M	-	-	-	-	M
CO2	H	M	-	-	-	M	-
CO3	H	M	-	-	L	L	M
CO4	H	M	-	-	L	-	-
CO5	H	M	-	-	L	M	M



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VIRUDHUNAGAR - 626 001

Semester IV	RECOMBINANT DNA TECHNOLOGY	Hours/Week: 5	
Core Course-8		Credits: 5	
Course Code 20UBOC41		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: define the main principles, methods for preparation and cloning of

DNA in various organisms. [K1]

CO2: outline the tools and methods of gene transfer involved in r-DNA

technology and recombinant products. [K2]

CO3: illustrate the types of vectors, restriction enzymes and the transfer of DNA

into the host cell. [K3]

CO4: analyze the vectors, Restriction enzymes, gene transfer methods and

the recombinant products. [(K4]

CO5: evaluate the suitability of vectors, restriction endonucleases, methods of gene

transfer for the production of recombinant products. [K5]

Course Code 20UBOC41	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	-	H	-	L	M	M	L	-	-
CO2	H	-	H	H	M	M	M	-	-	-
CO3	H	L	H	H	M	M	M	L	-	-
CO4	H	L	H	H	M	M	L	L	-	-
CO5	H	L	M	H	M	L	L	L	-	L



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VIRUDHUNAGAR - 626 001

Semester IV	RECOMBINANT DNA TECHNOLOGY	Hours/Week: 5	
Core Course-8		Credits: 5	
Course Code 20UBOC41N		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: define the main principles, methods for preparation and cloning of DNA in various organisms. [K1]

CO2: outline the tools and methods of gene transfer involved in r-DNA technology and recombinant products. [K2]

CO3: illustrate the types of vectors, restriction enzymes and the transfer of DNA into the host cell. [K3]

CO4: analyze the vectors, Restriction enzymes, gene transfer methods and the recombinant products. [(K4]

CO5: evaluate the suitability of vectors, restriction endonucleases, methods of gene transfer for the production of recombinant products. [K5]

Course Code 20UBOC41N	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	-	H	-	L	M	M	L	-	-
CO2	H	-	H	H	M	M	M	-	-	-
CO3	H	L	H	H	M	M	M	L	-	-
CO4	H	L	H	H	M	M	L	L	-	-
CO5	H	L	M	H	M	L	L	L	-	L



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VIRUDHUNAGAR - 626 001

Semester IV	APPLIED BIOLOGY	Hours/Week: 4	
Allied Course		Credits: 4	
Course Code 20UBIA41		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, students will be able to

- CO1 : find the applied areas of Biology. [K1]
- CO2 : learnt skills related to laboratory as well as industries based work. [K2]
- CO3 : explain the applications areas of Biology in various industries and how to become an entrepreneur. [K2]
- CO4 : solve the issues related to the applied areas of Biology. [K3]
- CO5 : analyze the applied potential areas/branches of Biology. [K4]

Course Code 20UBIA41	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	M	L	L	L	L	-
CO2	H	M	M	M	L	L	-
CO3	H	M	M	M	L	L	-
CO4	M	M	M	M	L	L	-
CO5	M	M	M	M	M	L	-



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Semester IV	MUSHROOM CULTIVATION	Hours/Week: 2	
Skill Enhancement Course-3		Credits: 2	
Course Code 20UBOS41		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: recall the identification, cultivation, economics and nutritional value of mushrooms. [K1]

CO2: describe the edible mushrooms, their production, profit and food value of mushrooms. [K2]

CO3: illustrate the cultivation methods, and the operation of mushroom industry and nutritional benefits of mushrooms. [K3]

CO4: investigate the edibility of mushrooms, mushroom cultivation system for various types of mushrooms and mushroom industry. [K3]

CO5: analyze the mushroom industry operation, cultivation methods, value added products and recipes from mushroom. [K4]

Course Code 20UBOS41	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	L	H	-	-	H	H	-	-	-
CO2	H	M	L	L	H	-	L	L	-	L
CO3	H	M	H	H	L	M	H	-	-	L
CO4	H	H	H	M	M	L	M	H	-	-
CO5	H	H	H	M	H	M	M	M	-	L



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Semester IV	LAB IN MICROBIOLOGY AND RECOMBINANT DNA TECHNOLOGY	Hours/Week: 2	
Core Practical-II		Credits: 2	
Course Code 20UBOC41P		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: apply the basic concepts learnt in theory for the practicals related to isolation, characterization and cultivation of microbes. [K3]

CO2: identify the given spotters and explain. [K3]

CO3: experiment with the isolation of bacteria, bacterial staining methods, antibacterial activity of plant extracts and molecular techniques. [K3]

CO4: infer the results and complete the record work. [K3]

CO5: analyse the problems and situations in related subject area. [K4]

Course Code 20UBOC41P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	H	M	M	-	L	L	M	L
CO2	M	H	H	M	L	-	L	L	H	L
CO3	M	H	H	M	L	M	L	L	H	L
CO4	L	H	H	M	L	M	L	L	H	-
CO5	M	H	H	M	L	M	L	L	H	M



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Semester IV	Allied Biology Practical – I Cell Biology and Applied Biology	Hours/Week: 2	
Allied Course		Credits: 1	
Course Code 20UBIA41P		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: apply the basic concepts learnt in biology for the preparation of slides. [K3]

CO2: identify and dissect the biological specimens and to draw the anatomical features. [K3]

CO3: observe and comment on the biological specimens. [K3]

CO4: infer about the mitotic cell division stage and completion of the record work. [K3]

CO5: analyze and categorize the functions of cell organelles and in the related area. [K4]

Course Code 20UBIA41P	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	M	H	M	L	M	L
CO2	H	M	H	M	L	M	L
CO3	H	M	H	M	L	M	L
CO4	H	M	H	M	L	M	L
CO5	H	M	H	M	L	M	L



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Semester IV	ORGANIC FARMING	Hours/Week: 2	
Non Major Elective Course - 2		Credits: 2	
Course Code 20UBON41		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: recall the principles of organic farming, organic inputs, cultivation methods and organic certification process. [K1]

CO2: outline the advantages of organic farming, organic plant protection and nutrient management, and the agencies involved in organic certification. [K2]

CO3: describe the types of organic farming, standards for organic fertilisers, pesticides, organic cultivation of crops and its marketing. [K2]

CO4: explain the types and significance of organic farming, organic plant protection and production and the certification of organic products for marketing. [K3]

CO5: apply the knowledge of organic farming in organic cultivation system, certification Process. [K3]

Course Code 20UBON41	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	H	L	L	-	-	L
CO2	H	M	L	L	-	-	-
CO3	H	H	M	L	-	-	-
CO4	H	H	H	L	-	-	M
CO5	H	H	M	L	L	-	M



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Semester IV	Internship / Field Project (2020 -21 onwards)	Hours/Week: 0
PART IV		Credit: 1
Course Code 20UBOI41G		Internal 100 External 60

COURSE OUTCOMES

On completion of the Internship/Field Project, students will be able to

CO1: relate their theoretical insights with hands-on experience. [K3]

CO2: develop technical skills to their respective field of study. [K3]

CO3: demonstrate the attributes such as observational skills, team spirit and inter personal skills built through site visits. [K3]

CO4: exhibit the written communication skills acquired through internship/field project. [K3]

CO5: analyze the observations and results and communicate their academic and technological knowledge appropriately oral means. [K4]

Course Code 20UBOI41G	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	M	M	M	M	H	-
CO2	H	M	M	M	M	H	
CO3	H	M	-	-	-	H	
CO4	H	H	M	M	-	M	H
CO5	H	M	H	H	M	-	



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Semester IV	CONSTITUTION OF INDIA	Hours/Week: 1
Generic Elective Course		Credit : 1
Course Code 20UGEC41		Internal 100

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: identify the importance of Constitution in a State. [K1]

CO2: recognize the concepts and features of Indian constitutions. [K1]

CO3: discuss the forms and functions of Government and its political institutions. [K2]

CO4: trace the functions of legislative, executive and judiciary in the Constitution. [K2]

CO5: construct knowledge over the Indian Constitution. [K3]

Course Code 20UGEC41	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	M	-	-	-	-	M
CO2	H	M	-	-	-	-	M
CO3	H	M	-	-	-	M	M
CO4	H	M	-	-	-	-	M
CO5	H	M	-	-	M	M	M



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Semester V	ANIMAL BIOTECHNOLOGY	Hours/Week: 4	
Core Course- 7		Credits: 4	
Course Code 20UBOC51		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO 1: recall the fundamentals of animal cell culture, cell lines and genetic engineering.

[K1]

CO 2: Explain about the cell lines, stem cells, genetically modified animals and IPR. [K2]

CO 3: Describe the transgenic animals and its production techniques for various animals and their applications with ethical consideration. [K3]

CO 4: Analyse the cell culture methods, various applications of stem cells and transgenic animals in Biotechnology. [K4]

CO 5: Evaluate the need for bioethics in animal Biotechnology and evaluate the patenting aspects of biotechnological products. [K5]

Course Code 20UBOC51	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	H	M	M	-	L	L	H	L
CO2	M	H	H	M	L	-	L	L	H	L
CO3	M	H	H	M	L	M	L	L	H	L
CO4	L	H	H	M	L	M	L	L	H	L
CO5	M	H	H	M	L	M	L	L	H	H



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VIRUDHUNAGAR - 626 001

Semester V	IMMUNOLOGY	Hours/Week: 4	
Core Course- 8		Credits: 4	
Course Code 20UBOC52		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: define the basic concepts of Immunology. [K1]

CO2: explain the structural properties and functions of immune cells and antigen antibody interaction. [K2]

CO3: discuss the complement system and immunological disorders. [K3]

CO4: examine the immunological response and regulation and malfunction of immune system. [K4]

CO5: assess the techniques involved in antigen – antibody interactions immunological disorders. [K5]

Course Code 20UBOC52	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	M	M	H	M	M	-	L	H	-
CO2	M	H	H	M	L	-	L	L	H	-
CO3	M	H	H	M	L	M	L	L	H	-
CO4	L	H	H	M	L	M	L	L	H	-
CO5	M	H	H	M	L	M	L	L	H	-



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Semester V	PLANT BIOTECHNOLOGY	Hours/Week: 4	
Core Course- 9		Credits: 4	
Course Code 20UBOC53		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: define the concepts in Plant Biotechnology. [K1]

CO2: describe the micropropagation techniques, plant genome and genetically modified plants. [K2]

CO3: Explain plant tissue culture techniques for conservation of endangered plants and development of crop improvement. [K3]

CO4: analyze the use of plant tissue and cell culture techniques in crop improvement. [K4]

CO5: evaluate the plant tissue culture techniques and gene transfer techniques. [K5]

Course Code 20UBOC53	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	L	H	-	-	M	M	-	L	-
CO2	H	H	H	-	-	H	M	-	L	-
CO3	H	L	H	M	L	H	M	M	-	-
CO4	H	M	H	H	M	H	L	-	M	-
CO5	H	M	M	H	M	H	M	-	M	L



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Semester V	GENOMICS AND PROTEOMICS	Hours/Week: 4	
DSEC- 1		Credits: 4	
Course Code 20UBOE51		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: Recall the concept of genomes, proteomes and meta genomes. [K1]

CO2: Understand the methods used in the sequencing of genomes, proteomes and meta genome. [K2]

CO3: Apply the knowledge gained from the history and genome projects. [K3]

CO4: Analyse genome and proteome structure organization using tools and software. [K4]

CO5: Predict the structure of genomes, proteomes and meta genomes. [K5]

Course Code 20UBOE51	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	-	H	M	M	L	H	M	-	-
CO2	H	H	M	H	L	H	H	M	L	-
CO3	H	-	M	H	H	H	M	M	L	M
CO4	M	H	M	H	M	M	M	H	-	-
CO5	H	M	M	H	M	H	M	H	M	L



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Semester V	MARINE BIOTECHNOLOGY	Hours/Week: 4	
DSEC- 1		Credits: 4	
Course Code 20UBOE52		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: Explain principle features of marine biodiversity their cultivation and application.

[K1]

CO2: Describe the marine living organisms and their utilization in terms of industrial products in conserving marine environment. [K2]

CO3: Explain the utilization of marine organisms in industrial product development, bioremediation. [K3]

CO4: Analyse the significance of marine natural resources, mass cultivation methods and bioremediation of marine pollution. [K4]

CO5: Solve the problems related to marine environment Conservation. [K5]

Course Code 20UBOE52	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	-	H	M	M	L	H	M	-	-
CO2	H	H	M	H	L	H	H	M	L	-
CO3	H	-	M	H	H	H	M	M	L	M
CO4	M	H	M	H	M	M	M	H	-	-
CO5	H	M	M	H	M	H	M	H	M	L



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VIRUDHUNAGAR - 626 001

Semester V	NANOBIOTECHNOLOGY	Hours/Week: 4	
DSEC – 1		Credits: 4	
Course Code 20UMBE53		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: Relate the basic concepts of Nanotechnology- Biotechnology for biomedical application. [K1]

CO2: Understand the production and Characterization Techniques of nanomaterials and their influences on human health. [K2]

CO3: Apply the nanomedicine in drug delivery based on classification and assess their Environmental risks. [K3]

CO4: Analyse the characterised nanomaterials in treating diseases and their impact in Environment. [K4]

CO5: Interpret the application of classified nanomaterials and comment their toxic effects. [K5]

Course Code 20UMBE53	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1a	PSO 1b	PSO 2	PSO 3a	PSO 3b	PSO 4a	PSO 4b	PSO 5	PSO 6	PSO 7
CO1	H	L	H	L	M	H	M	M	L	M
CO2	H	L	M	L	H	M	L	M	-	-
CO3	H	M	M	H	M	H	L	L	-	-
CO4	M	M	M	L	M	M	L	L	-	-
CO5	L	L	M	M	L	H	M	L	L	-



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VIRUDHUNAGAR - 626 001

Semester V	MEDICAL CODING AND CLINICAL RESEARCH	Hours/Week: 2	
SEC- 04		Credits: 2	
Course Code 20UBOS51		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: define the basic concepts in medical coding and clinical research. [K1]

CO2: describe the types of coding and clinical trials in drug development process with ethics. [K2]

CO3: summarize the diagnostic codes and Pharmacovigilance study in drug development process. [K2]

CO4: explain CPT codes and drug development process in clinical research and ethics. [K3]

CO5: Analyse the coding accuracy, coding rituals, modifiers and Pharmacovigilance study. [K4]

Course Code 20UBOS51	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	M	H	L	M	M	M	L	M	-
CO2	H	L	M	L	M	L	-	-	M	H
CO3	M	L	H	L	L	L	-	-	L	L
CO4	M	L	H	L	L	M	-	-	-	H
CO5	L	L	H	M	M	M	L	-	M	-



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VIRUDHUNAGAR - 626 001

Semester V	HERBAL TECHNOLOGY	Hours/Week: 2	
SEC- 05		Credits: 2	
Course Code 20UBOS52		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: Recall the traditional medicine system and herbal drug extraction and manufacturing process. [K1]

CO2: explain about the classification of drugs, active principles testing and functional foods drugs. [K2]

CO3: summarize the significance of herbal medicine, GMP, patenting and regulations. [K2]

CO4: analyze the cultivation of herbal drug extraction process, nutraceuticals, patenting and regulations. [K3]

CO5: assess the suitable extraction process of herbal plants, GMP and regulation for drug manufacturing. [K4]

Course Code 20UBOS52	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	L	H	M	L	M	M	L	L	L
CO2	H	M	H	M	L	M	H	-	-	L
CO3	H	M	H	M	L	M	H	-	L	M
CO4	H	M	L	L	M	L	H	-	L	H
CO5	H	M	L	L	M	L	L	-	M	H



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Semester V	STEM CELL TECHNOLOGY	Hours/Week: 0	
Extra credit course		Credits: 2	
Course Code 20UBOO51		Internal 100	

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: Recall the basics of stem cell technology. [K1]

CO2: explain about the classification of stem cells, their differentiation and applications.

[K2]

CO3: summarize the significance of stem cell technology in modern medical field and the

Ethical regulations. [K3]

CO4: analyze the types of stem cells, its use in gene therapy and ethical issues. [K4]

CO5: assess the therapeutic applications of stem cells. [K5]

Course Code 20UBOO51	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	L	H	M	L	M	M	L	L	H
CO2	H	M	H	M	L	M	H	-	-	L
CO3	H	M	H	M	L	M	H	-	L	M
CO4	H	M	L	L	M	L	H	-	L	H
CO5	H	M	L	L	M	L	L	-	M	H



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VIRUDHUNAGAR - 626 001

Semester V	PROJECT	Hours/Week: -	
Core Course - 10		Credits: 1	
Course Code 20UBO5PR		Internal 40	External 60

COURSE OUTCOMES

On completion of the project, the students will be able to

CO1: apply the basic concepts learnt to select projects in Biotechnology and interdisciplinary fields. [K3]

CO2: apply the theoretical knowledge to design experiments to measure the required parameters accordingly. [K3]

CO3: execute the technical skills in handling the equipment, apparatus, and exhibit written communication skill acquired in the related project work illustrate the work done by them by means of graphs tables and figures. [K3]

CO4: analyze the results. and communicate academic and technological knowledge orally. [K4]

CO5: assess the project to meet the challenges at higher education level/societal level. [K5]

Course Code 20UBO5PR	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	H	M	L	M	M	L	L	L
CO2	H	H	H	M	L	M	H	-	-	L
CO3	H	H	H	M	L	M	H	-	L	M
CO4	H	H	H	L	M	L	H	-	L	-
CO5	H	H	H	L	M	L	L	-	M	-



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VIRUDHUNAGAR - 626 001

Semester V	ENVIRONMENTAL STUDIES	Hours/Week: 2	
PART IV		Credits: 1	
Course Code 20UGES51		Internal 100	External -

COURSE OUTCOMES

On completion of the course, students will be able to

CO1 : State the social aspects of the environment, the present condition of the earth and the impact of human activities locally and globally. [K1]

CO2 : Explain the biodiversity conservation, environmental hazards and current possible disasters. [K2]

CO3 : Describe the need for sustainable development. [K2]

CO4 : Solve the environmental associated problems. [K3]

CO5 : Identify environmental legislations and management strategies. [K3]

Course Code 20UGES51	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1	H	H	L	L	L	-	L
CO 2	H	H	L	L	L	-	-
CO 3	H	H	L	L	L	-	-
CO 4	H	H	H	H	L	-	-
CO 5	H	H	H	H	L	-	H



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VIRUDHUNAGAR - 626 001

Semester VI	BIOINFORMATICS	Hours/Week: 5	
Core Course – 11		Credits: 4	
Course Code 20UBOC61		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: Describe the basics of bioinformatics. [K1]

CO2: Explain the various types of biological databases alignment methods and prediction tools. [K2]

CO3: Make use of databases and tools for alignment and structure prediction. [K3]

CO4: Analyze sequence alignments and perform database searching. [K4]

CO5: Perform multiple sequence alignment using visualization tools. [K5]

Course Code 20UBOC61	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	M	H	H	L	M	H	M	L	-
CO2	M	L	H	H	M	M	H	M	L	-
CO3	L	L	H	H	M	M	H	M	L	-
CO4	L	L	H	H	M	M	H	M	L	-
CO5	L	L	H	H	M	M	H	M	L	L



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VIRUDHUNAGAR - 626 001

Semester VI	ENVIRONMENTAL BIOTECHNOLOGY	Hours/Week: 5	
Core Course – 12		Credits: 4	
Course Code 20UBOC62		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: Recollect the energy resources and methods used to conserve them and waste treatment. [K1]

CO2: Describe the utilization of biomass, various methods used in the treatment of wastes and biocontrol. [K2]

CO3: Apply biotechnological methods for energy conversion, waste reduction, ecofriendly mining and biocontrol of plant pathogens. [K3]

CO4: Compare the various biotechnological processes in waste renewal and reduction and ecofriendly agricultural and industrial processes. [K4]

CO5: evaluate the given conditions or situations related to environmental biotechnology and give solutions. [K5]

Course Code 20UBOC62	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
	CO1	M	-	H	L	M	L	-	-	L
CO2	H	H	H	H	M	M	-	L	L	M
CO3	H	L	M	H	M	M	L	-	-	H
CO4	H	-	M	H	H	M	L	L	M	H
CO5	H	M	H	H	M	H	M	M	M	M



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VIRUDHUNAGAR - 626 001

Semester VI	INDUSTRIAL BIOTECHNOLOGY	Hours/Week: 5	
Core Course- 13		Credits: 4	
Course Code 20UBOC63		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: Describe the historical developments in fermentation, screening of industrially important microbes, bioreactors and the processes involved in biotechnology industry. [K1]

CO2: Explain the various types of media for microbes parts of fermenter and their operation and product development. [K2]

CO3: Apply various microbes for industrial production and recovery in bioreactors. [K3]

CO4: Analyse the significance of microbes in industries bioreactors suitable for the production of microbial products. [K4]

CO5: Assess the application of microbes in industrial processes and adopt suitable downstream processing. [K5]

Course Code 20UBOC63	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	-	H	-	L	M	-	-	-	-
CO2	H	M	H	H	M	-	L	-	M	L
CO3	H	H	H	M	H	H	L	M	H	-
CO4	H	M	H	L	L	H	-	M	M	L
CO5	H	L	H	H	L	-	H	M	L	L



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VIRUDHUNAGAR - 626 001

Semester VI	PHARMACEUTICAL MICROBIOLOGY	Hours/Week: 5	
DSEC – 2		Credits:4	
Course Code 20UMBE61		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: Recall the principles of pharmacology, concept of drug discovery and identify the specific drugs belong to major drug classes for therapeutic use. [K1]

CO2: Explain the pharmacokinetics and mechanism of drug action at macromolecular levels and understand the tests involved in checking the quality of pharmaceutical product. [K2]

CO3: Apply the knowledge of systemic pharmacology, drug-receptor interactions and its resistance mechanisms to design a novel drug with the aid of computer. [K3]

CO4: Analyse the pharmacotherapy, adverse effects of specific drugs and also categorize the practices to be followed in pharmaceutical industry. [K4]

CO5: Evaluate the ways of specific drug action on microbes and illustrate the stages of drug development. [K5]

Course Code 20UMBE61	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1a	PSO 1b	PSO 2	PSO 3a	PSO 3b	PSO 4a	PSO 4b	PSO 5	PSO 6	PSO 7
CO1	H	L	H	H	M	M	L	H	H	M
CO2	H	H	H	H	H	M	L	M	M	M
CO3	H	H	M	M	H	H	L	L	L	M
CO4	L	M	L	M	M	H	L	L	H	L
CO5	L	H	M	L	M	M	L	L	M	L



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Semester VI	MEDICAL BIOTECHNOLOGY	Hours/Week: 5	
DSEC-02		Credits: 4	
Course Code 20UBOE62		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: understand the molecular basis of human diseases and the applications of medical

Biotechnology in diagnosing, curing genetic disorders and assisted reproduction. [K2]

CO2: summarize the characteristics of autosomal disorders and genetic mutations and therapeutic methods. [K2]

CO3: illustrate the genetic disorders, their root cause, diagnosis, treatment, and ART. [K3]

CO4: analyze the applications of modern technology used to detect and cure genetic disorders and infertility. [K4]

CO5: evaluate the given disease conditions or situations related to medical biotechnology and give suggestions. [K5]

Course Code 20UBOE62	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	-	H	L	M	L	-	L	-	H
CO2	H	L	M	M	M	M	-	L	-	H
CO3	M	L	H	M	M	M	L	M	M	H
CO4	H	-	H	M	H	M	L	L	M	H
CO5	H	M	M	H	M	H	H	M	M	H



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Semester V	IPR, BIOETHICS AND BIOSAFETY	Hours/Week: 5	
DSEC- 02		Credits: 4	
Course Code 20UBOE63		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: Define the various forms of intellectual property, bioethics, biosafety levels, and biohazards. [K1]

CO2: Describe the organizations involved in IPR, Bioethics and Biosafety in India and abroad. [K2]

CO3: Explain the process of patenting, animal welfare and risk assessment. [K3]

CO4: Compare the merits and demerits of IPR, Bioethics and GEOs. [K4]

CO5: Assess the role of IPR, Bioethics and Biosafety procedures in protection of humans and animal rights. [K5]

Course Code 20UBOE63	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	-	H	L	M	L	-	L	-	H
CO2	H	L	M	M	M	M	-	L	-	H
CO3	M	L	H	M	M	M	L	M	M	H
CO4	H	-	H	M	H	M	L	L	M	H
CO5	H	M	M	H	M	H	H	M	M	H



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VIRUDHUNAGAR - 626 001

Semester VI	DNA FINGERPRINTING	Hours/Week:2	
SEC-6		Credits:2	
Course Code 20UBOS61		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: recall the fundamentals and the History of fingerprinting. [K1]

CO2: describe the methods involved in fingerprinting. [K2]

CO3: define the fingerprint patterns and techniques involved in forensics and agriculture genetics. [K2]

CO4: apply DNA fingerprinting in Agriculture, genetics and in forensics. [K3]

CO5: analyse the techniques of DNA fingerprinting, Case studies and applications. [K4]

Course Code 20UBOS61	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	M	L	M	H	M	L	L	L	L
CO2	H	M	-	-	H	M	L	H	L	-
CO3	H	M	-	L	H	M	L	H	H	-
CO4	H	M	-	L	H	M	L	H	H	-
CO5	H	M	L	L	H	M	L	H	H	L



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VIRUDHUNAGAR - 626 001

Semester VI	LAB IN PLANT BIOTECHNOLOGY AND ENVIRONMENTAL BIOTECHNOLOGY	Hours/Week: 3	
Core Practical – 3		Credits: 3	
Course Code 20UBOC61P		Internal 140	External 60

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: Apply the basic concepts learnt in theory for the practicals related to isolation, identification, cultivation of microbes by following the lab safety measures. [K3]

CO2: Identify the given spotters and explain. [K3]

CO3: illustrate the surface sterilization of explants, callus induction, synthetic seed preparation, protoplast and DNA isolation, BOD, COD, TDS of Water samples. [K3]

CO4: Infer the results and completion of record work. [K3]

CO5: Analyse the problems and situations in related subject area. [K4]

Course Code 20UBOC61P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	L	H	L	-	L	L	H	L
CO2	H	H	H	H	H	-	H	H	H	L
CO3	H	H	H	H	H	H	H	H	H	L
CO4	H	H	M	H	M	M	M	M	M	L
CO5	H	H	L	H	L	L	L	L	L	L



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VIRUDHUNAGAR - 626 001

Semester VI	LAB IN ANIMAL BIOTECHNOLOGY AND IMMUNOLOGY	Hours/Week: 3	
Core Practical – 4		Credits: 3	
Course Code 20UBOC62P		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: Apply the basic concepts learnt in theory for the practicals related to animal tissue culture and immunology. [K3]

CO2: Identify the given spotters and explain. [K3]

CO3: perform DNA isolation and immunological techniques. [K3]

CO4: Infer the results and completion of record work. [K3]

CO5: Analyse the problems and situations in related subject area. [K4]

Course Code 20UBOC62P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	L	H	L	-	L	L	H	L
CO2	H	H	H	H	H	-	H	H	H	L
CO3	H	H	H	H	H	H	H	H	H	L
CO4	H	H	M	H	M	M	M	M	M	L
CO5	H	H	L	H	L	L	L	L	L	L



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Semester VI	LAB IN INDUSTRIAL BIOTECHNOLOGY AND BIOINFORMATICS	Hours/Week: 2	
Core Practical – 5		Credits: 2	
Course Code 20UBOC63P		Internal 40	External 160

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: Apply the basic concepts learnt in theory for the practicals related to Industrial biotechnology and bioinformatics. [K3]

CO2: Identify the given spotters and explain. [K3]

CO3: illustrate the isolation of bacteria, growth kinetics bacteria, sequence alignment. [K3]

CO4: Infer the results and completion of record work. [K3]

CO5: analyse the problems and situations in related subject area. [K4]

Course Code 20UBOC63P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	L	H	L	-	L	L	H	L
CO2	H	H	H	H	H	-	H	H	H	L
CO3	H	H	H	H	H	H	H	H	H	L
CO4	H	H	M	H	M	M	M	M	M	L
CO5	H	H	L	H	L	L	L	L	L	L