



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. BIOCHEMISTRY

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 analyze, synthesize 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*)

Program Educational Objectives (PEOs)

The students will be able to

- apply fundamental knowledge related to pure sciences in an interdisciplinary manner for providing innovative solutions to need based problems for national and global impact.
- analyze scientific data, draw objective conclusions related to Biochemistry and apply this knowledge for human welfare.
- gain domain knowledge and know-how for successful career in academia and industry.

Key Components of the Mission Statement	PEO1	PEO2	PEO3
Enhancing understanding of biochemistry, molecular biology, and science	√	√	√
To develop entrepreneur skill	√	√	√
Innovative research and careers, to create a positive impact on society	√	√	√

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. Biochemistry programme the students will be able to

PO1 - *Disciplinary Knowledge*

PSO 1: Apply the fundamental knowledge of Biochemistry incorporated with knowledge in related courses that would enable them to comprehend the emerging and advanced biochemical concepts in life sciences to pursue higher studies.

PO2 – *Communication Skills*

PSO 2: Apply the acquired conceptual knowledge with communicative skills by connecting disciplinary and interdisciplinary aspects of Biochemistry, Microbiology, Biotechnology and Biology which can be extended to society.

PO3 – *Scientific Reasoning and Problem Solving*

PSO 3.a: Evaluate the need and impact of scientific solutions on the environment and society, keeping in view of their sustainable development and to have entrepreneurial skills acquired by skill oriented course

PSO 3.b: Strengthen their biochemical, biological and chemical sciences experimental techniques to meet future challenges in their career.

PO4 – *Critical Thinking and Analytical Reasoning*

PSO 4.a: Analyze the techniques, reactions and concepts in various fields of Biochemistry and to provide valid suggestions to the industry.

PSO 4.b: Apply the principles of various fields of biochemistry to provide cost efficient solutions in life science related issues for the betterment of society

PO5 – *Digital Literacy, Self - Directed and Lifelong Learning*

PSO 5.a: Use standard laboratory protocols of Biochemistry and biology and apply computers for data acquisition through available softwares.

PSO 5.b: Apply various technical knowledge with more parameters and updating their academics as lifelong learning activities.

PO6 – *Co-operation/Team Work and Multicultural Competence*

PSO 6: Uphold leadership qualities, team spirit and good interpersonal skills in team works.

PO7 – *Moral and Ethical Awareness*

PSO 7: Follow the global standards of codes of conduct in life science community and practice the imbibed moral values in their profession and society to maintain sustainable environment.



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`Semester I	BIOMOLECULES	Hours/Week: 4	
Core Course1		Credits: 4	
Course Code 20UBCC11		Internal 25	External 75

COURSE OUTCOMES

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

CO1: explain the various elements present in the biomolecules such as carbohydrates, proteins, lipids, nucleic acids and vitamins, their occurrence and classification [K1].

CO2: identify various molecular structures and to understand monomers, polymers and isomeric forms. [K2]

CO3: Explain the properties of biomolecules. [K2]

CO4: Apply the role of biomolecules in life. [K3]

CO5: correlate fundamental properties of biomolecules, their role in chemical reactions within living system and to prevent diseases. [K4]

Course Code 20UBCC11	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO1	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5.a	PSO 5.b	PSO6	PSO7
CO1	H	H	M	M	L	L	H	M	L	L
CO2	H	H	H	M	M	L	H	M	L	L
CO3	H	H	H	M	M	M	H	H	L	L
CO4	H	H	H	M	H	M	H	H	L	M
CO5	H	H	H	M	H	M	H	H	L	H



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Semester I	BIOCHEMICAL TECHNIQUES	Hours/Week: 4	
Core Course 2		Credits: 4	
Course Code		Internal	External
20UBCC12		25	75

COURSE OUTCOMES

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

CO1 : explain the basic principles of Biochemical Techniques. [K1]

CO2 : determine the applications of biochemical techniques in various fields. [K2]

CO3 : extract various biomolecules using biochemical techniques. [K2]

CO4 : apply various biochemical Techniques in analytical Laboratories. [K3]

CO5 : demonstrate various analytical techniques to interpret biological studies. [K4]

Course Code 20UBCC12	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO3 3.a	PSO3 3.b	PSO 4.a	PSO 4.b	PSO 5.a	PSO 5.b	PSO 6	PSO7
CO1	H	H	M	H	H	M	H	H	L	M
CO2	H	M	H	H	H	H	H	H	L	M
CO3	H	H	M	H	H	H	H	H	L	M
CO4	H	H	H	H	M	H	H	H	L	M
CO5	H	H	H	M	H	H	H	M	L	H



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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	M	M	H	M	L	L	L
CO2	H	M	H	M	L	L	L
CO3	H	M	H	M	M	L	M
CO4	H	M	H	M	M	L	M
CO5	H	M	H	M	M	L	M



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Semester I	VALUE EDUCATION (2020 -21 onwards)	Hours/Week: 2	
Ability Enhancement Compulsory Course		Credits: 2	
Course Code 20UGVE11		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	ENZYMES	Hours/Week: 4	
Core Course-4		Credits: 4	
Course Code 20UBCC21		Internal 25	External 75

COURSE OUTCOMES

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

- CO1 : define the fundamentals of enzymology and the importance of enzymes in biological reactions. [K1]
- CO2 : understand the enzyme classification, functions, isolation, extraction and Purification. [K2]
- CO3 : infer the enzyme catalysed reactions and the factors affecting enzymatic actions. [K2]
- CO4 : apply biochemical calculation for enzyme kinetics to understand the mechanism of enzyme action. [K3]
- CO5 : illustrate the major applications of enzymes in industry and medicine. [K4]

Course Code 20UBCC21	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO3 3.a	PSO3 3.b	PSO 4.a	PSO 4.b	PSO 5.a	PSO 5.b	PSO6	PSO7
CO1	H	H	M	H	H	M	H	H	L	M
CO2	H	M	H	H	H	H	H	H	L	M
CO3	H	H	M	H	H	H	H	H	L	M
CO4	H	H	H	H	M	H	H	H	L	M
CO5	H	H	H	M	H	H	H	M	L	H



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Semester II	METABOLISM	Hours/Week: 4	
Core Course-5		Credits: 4	
Course Code 20UBCC22		Internal 25	External 75

COURSE OUTCOMES

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

- CO1 : explain all metabolic pathways of carbohydrates, lipid, amino acids, purine and pyrimidine. [K1]
- CO2 : discuss and elaborate the bioenergetics of TCA cycle, oxidation, reduction, purine and pyrimidine. [K2]
- CO3 : identify the pathways of ETC, oxidative phosphorylation HMP, ketone body metabolism, glycerol metabolism, glycine, cysteine metabolism. [K2]
- CO4 : differentiate and correlate the pathways of ETC, oxidative phosphorylation HMP, glycogenolysis, glycogenesis, triglycerides, phospholipids, cholesterol metabolism, protein, carbohydrate and fat metabolism. [K3]
- CO5 : illustrate the various metabolic pathways of carbohydrate, protein, lipid and Nucleic acids. [K4]

Course Code 20UBCC22	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO3 3.a	PSO 3 3.b	PSO 4.a	PSO 4.b	PSO 5.a	PSO 5.b	PSO 6	PSO 7
CO1	H	M	H	H	H	M	L	M	L	H
CO2	H	H	H	M	M	M	L	L	L	H
CO3	H	H	H	H	H	H	L	M	L	H
CO4	H	H	H	M	H	M	L	L	L	H
CO5	H	M	H	H	M	H	L	M	L	H



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Semester II	METABOLISM	Hours/Week: 4	
Core Course-5		Credits: 4	
Course Code 20UBCC22N		Internal 25	External 75

COURSE OUTCOMES

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

CO1: recall all metabolic pathways of carbohydrates, lipid, amino acids, purine and pyrimidine. [K1]

CO2: discuss and elaborate the bioenergetics of TCA cycle, oxidation, reduction, purine and pyrimidine. [K2]

CO3: identify the pathways of ETC, oxidative phosphorylation HMP, ketone body metabolism, glycerol metabolism, glycine, cysteine metabolism. [K2]

CO4: differentiate and correlate the pathways of ETC, oxidative phosphorylation HMP, glycogenolysis, glycogenesis, triglycerides, phospholipids, cholesterol metabolism, protein, carbohydrate and fat metabolism. [K3]

CO5: illustrate the various metabolic pathways of carbohydrate, protein, lipid and Nucleic acids. [K4]

Course Code (20UBCC22N)	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO1	PSO2	PSO3a	PSO3b	PSO4a	PSO4b	PSO5a	PSO5b	PSO6	PSO7
CO 1	H	M	H	H	H	M	L	M	L	H
CO 2	H	H	H	M	M	M	L	L	L	H
CO 3	H	H	H	H	H	H	L	M	L	H
CO 4	H	H	H	M	H	M	L	L	L	H
CO 5	H	M	H	H	M	H	L	M	L	H



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Semester I/II	CORE PRACTICAL - I BIOMOLECULES	Hours/Week: 2	
Core Course-3		Credits: 2	
Course Code 20UBCC21P		Internal 40	External 60

COURSE OUTCOMES

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

- CO1: apply the principle and procedure to detect various biomolecules present in the given sample. [K3]
- CO2: identify the given spotters and comment on them with illustrations. [K3]
- CO3: observe the reactions of the biomolecules through various biochemical tests and prepare various biochemical polymers from natural sources. [K3]
- CO4: infer the findings of the biochemical reactions, report the results and complete the record note book. [K3]
- CO5: analyze and compare the properties of various biomolecules. [K4]

Course Code 20UBCC21P	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5.a	PSO 5.b	PSO 6	PSO 7
CO1	H	H	M	L	--	L	-	-	M	M
CO2	H	H	L	H	H	H	L	M	M	--
CO3	H	H	L	H	H	H	M	M	M	L
CO4	H	H	L	H	H	H	M	H	H	--
CO5	H	H	L	H	H	H	H	H	H	M



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Semester II	ENDOCRINOLOGY	Hours/Week: 2	
SEC -1		Credits: 2	
Course Code 20UBCS21		Internal 40	External 60

COURSE OUTCOMES

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

- CO1 : recall about hypothalamus and different endocrine glands and their role in regulating homeostasis. [K1]
- CO2 : explain about the biosynthetic pathways, structure, secretion and functions of hormones. [K2]
- CO3 : develop the knowledge on mechanism of action of hormones and their effect on target cells. [K2]
- CO4 : analyse the important hormonally regulated physiological processes and disorders. [K3]
- CO5 : correlate symptoms of major disorders associated with selected endocrine gland. [K4]

Course Code	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO	PSO
20UBCS21	1	2	3.a	3.b	4.a	4.b	5.a	5.b	6	7
CO1	H	H	M	L	L	L	L	L	-	-
CO2	H	H	L	-	-	-	-	L	-	-
CO3	H	H	L	-	-	-	-	L	L	-
CO4	H	H	L	L	M	L	-	L	-	-
CO5	H	H	L	M	M	H	M	H	L	-



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Semester II	ENDOCRINOLOGY	Hours/Week: 2	
SEC -1		Credits: 2	
Course Code 20UBCS21N		Internal 40	External 60

COURSE OUTCOMES

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

CO1:recall about hypothalamus and different endocrine glands and their role in regulating homeostasis. [K1]

CO2:explain about the biosynthetic pathways, structure, secretion and functions of hormones. [K2]

CO3:develop the knowledge on mechanism of action of hormones and their effect on target cells. [K2]

CO4:analyse the important hormonally regulated physiological processes and disorders. [K3]

CO5:correlate symptoms of major disorders associated with selected endocrine gland. [K4]

Course Code (20UBCS21N)	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO1	PSO2	PSO 3a	PSO 3b	PSO 4a	PSO 4b	PSO 5a	PSO 5b	PSO6	PSO7
CO 1	H	H	M	L	L	H	L	L	--	--
CO 2	H	H	L	M	M	H	L	M	L	L
CO 3	H	H	L	M	M	M	M	M	L	--
CO 4	H	H	L	M	M	H	M	H	--	M
CO 5	H	H	L	M	M	H	M	H	L	H



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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	M	M	H	M	L	L	L
CO2	M	M	H	M	L	L	M
CO3	H	M	H	H	M	L	H
CO4	H	M	H	H	M	L	H
CO5	H	M	H	H	H	L	H



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Semester II	VOLUMETRIC ANALYSIS	Hours/Week: 2	
Allied Course Practical -I		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	M	H	M	L	L	M
CO2	M	M	H	M	M	M	H
CO3	M	M	H	M	M	M	H
CO4	H	M	H	M	L	M	H
CO5	H	M	H	M	L	M	H



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Semester III	IMMUNOLOGY	Hours/Week: 5	
Core Course -5		Credits: 5	
Course Code 20UBCC31		Internal 25	External 75

COURSE OUTCOMES

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

- CO1 : describe the structure and functions of major lymphatic systems including biochemical and cellular mechanisms for maintaining homeostasis and the reasons for vaccination. [K1].
- CO2 : outline the key mechanisms and cellular players of innate and adaptive immunity and how they relate. [K2]
- CO3 : apply the mechanism of Ag-Ab interaction in various immunoassay techniques and their applications [K3].
- CO4 : analyse how the immune responses by CD4 and CD8 T cells, and B cells are initiated and regulated in hypersensitivity, autoimmune diseases and transplantation reactions. [K4].
- CO5 : relate the basic immunological principles in research and in clinical diagnosis /applied science. [K5]

Course Code 20UBCC31	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4. b	PSO 5.a	PSO 5.b	PSO 6	PSO 7
CO1	H	H	L	M	L	L	-	-	M	H
CO2	H	H	M	L	L	L	-	L	M	-
CO3	H	H	H	H	L	L	-	M	H	H
CO4	H	H	L	M	L	L	-	L	M	-
CO5	H	H	H	M	L	L	M	M	M	M



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Semester III	CELL BIOLOGY	Hours/Week: 4+2(P)	
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	NUTRITION	Hours/Week: 2	
SEC -2		Credits: 2	
Course Code 20UBCS31		Internal 40	External 60

COURSE OUTCOMES

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

- CO1 : remember the sources and requirement of major and minor nutrients. [K1]
- CO2 : understand the different food groups, role of food and nutrition in health and its functions. [K2]
- CO3 : apply the concepts of nutritional status and energy needs in various stages of human life. [K3]
- CO4 : analyze the nutritional challenges to improve the overall health of individuals to combat diseases. [K4]
- CO5 : infer the Nutrition care process to deliver safe and effective nutritional care. [K4]

Course Code 20UBCS31	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO3 3.a	PSO3 3.b	PSO 4.a	PSO 4 .b	PSO 5.a	PSO 5.b	PSO 6	PSO 7
CO1	M	M	M	L	L	M	-	-	L	M
CO2	H	L	M	M	M	M	M	M	M	-
CO3	M	M	M	M	M	M	-	M	M	-
CO4	H	H	H	H	M	H	M	L	M	M
CO5	H	M	H	M	H	H	L	-	-	-



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Semester III	WOMEN AND HEALTH	Hours/Week: 2	
Non Major Elective Course -1		Credits: 2	
Course Code 20UBCN31		Internal 40	External 60

COURSE OUTCOMES

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

- CO1 : recall the female physiology, hormones, problems associated with women health. [K1]
- CO2 : relate the problems associated with female hormone imbalance and pregnancy. [K2]
- CO3 : indicate the health complications of women associated with age. [K2]
- CO4 : sketch the importance of nutrients, vaccines and diagnostic tests in women health. [K3]
- CO5 : apply the knowledge about women health to prevent diseases and create awareness. [K3]

Course Code 20UBCN31	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	M	L	L	L	L	M	L
CO2	M	M	L	L	L	M	L
CO3	M	M	L	L	M	M	L
CO4	M	M	L	L	H	M	L
CO5	M	M	M	L	H	M	L



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Semester III	HUMAN RIGHTS	Hours/Week: 1
Generic Elective Course - 1		Credit : 1
Course Code 20UGEH31		Internal 100

COURSE OUTCOMES

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

CO1: recall the importance of Human Rights as a citizen. [K1]

CO2: recognise the concepts, laws and violations of Human Rights. [K1]

CO3: summarise their knowledge on evolution and growth Human Rights. [K2]

CO4: paraphrase the historical values of Human Rights in Peace building. [K2]

CO5: identify the works of National and Human Rights. [K3]

Course Code 20UGEH31	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	M	-	-	-	-	-
CO2	H	M	-	-	-	-	-
CO3	H	M	-	-	-	M	-
CO4	H	M	-	-	M	M	H
CO5	H	M	-	-	M	M	H



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Semester IV	FOOD SCIENCE	Hours/Week: 5	
Core Course -6		Credits: 5	
Course Code 20UBCC41		Internal 25	External 75

COURSE OUTCOMES

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

- CO1 : state the nutritional value of foods and the scientific aspects of food safety and quality for mankind. [K1]
- CO2 : explain the basic strategies of food processing, preservation and storage. [K2]
- CO3 : illustrate the various processes used in food industry for food safety and quality. [K3]
- CO4 : analyses the laws and techniques used for food processing, packaging, labeling and quality checking. [K4]
- CO5 : evaluate the effects of adulterants, GM foods and chemicals on mankind and environment. [K5]

Course Code 20UBCC4 1	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4 b	PSO 5.a	PSO 5.b	PSO 6	PSO 7
CO1	H	H	M	H	H	M	L	H	L	M
CO2	H	M	M	M	M	M	L	H	L	L
CO3	H	H	M	H	H	H	L	H	L	M
CO4	H	H	H	H	M	H	L	H	L	L
CO5	H	H	H	M	H	H	L	M	L	H



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Semester IV	PRINCIPLES OF FOOD SCIENCE	Hours/Week: 5	
Core Course -6		Credits: 5	
Course Code 22UBCC41		Internal 25	External 75

COURSE OUTCOMES

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

- CO1 : state the factors influencing food processing, preservation , storage and cooking quality of different foods , scientific aspects of food safety , laws and quality for mankind. [K1]
- CO2 : explain the basic strategies of cooking methods ,food preservation, processing, storage, detection of adulterants, food standards. [K2]
- CO3 : illustrate the various processes used in food industry for food safety, quality also the laws for food processing, preservation , storage.[K3]
- CO4 : analyze various cooking methods , food and beverage preparations, and the laws and techniques used for food processing, packaging, labeling and quality checking. [K4]
- CO5 : evaluate the food standards , cooking methods, effects of adulterants, proper storage , preservation ,processing of food and also the effect of GM foods on mankind and environment. [K5]

Course Code (22UBCC41)	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO1	PSO2	PSO3 3.a	PSO3 3.b	PSO 4a	PSO 4 b	PSO 5a	PSO 5b	PSO6	PSO7
CO 1	H	H	M	H	H	M	L	H	L	M
CO 2	H	M	M	M	M	M	L	H	L	L
CO 3	H	H	M	H	H	H	L	H	L	M
CO 4	H	H	H	H	M	H	L	H	L	L
CO 5	H	H	H	M	H	H	L	M	L	H



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VIRUDHUNAGAR - 626 001

Semester IV	APPLIED BIOLOGY	Hours/Week: 4+2(P)	
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	Allied Biology Practical – I Cell Biology and Applied Biology	Hours/Week: 2	
Allied Course		Credits: 2	
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 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	BIOSTATISTICS	Hours/Week: 2	
SEC -3		Credits: 2	
Course Code 20UBCS41		Internal 40	External 60

COURSE OUTCOMES

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

- CO1 : observe the methods of data collection, sampling, analysis and interpretation in biology. [K1]
- CO2 : paraphrase the formulas for different statistical methods to interpret biological data. [K2]
- CO3 : apply appropriate statistical method in problem solving. [K3]
- CO4 : interpret the knowledge of probability, symmetry, averages and dispersion in science experiments. [K3]
- CO5 : classify the statistical methods to interpret biological data. [K4]

Course Code 20UBCS41	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4. b	PSO 5.a	PSO 5b	PSO 6	PSO 7
CO1	H	M	M	L	M	M	M	M	-	M
CO2	H	M	L	L	L	M	M	M	M	M
CO3	H	M	L	L	L	M	M	M	M	M
CO4	H	H	L	L	L	M	M	M	M	M
CO5	H	H	M	L	M	M	M	M	-	M



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Semester IV	BIOSTATISTICS	Hours/Week: 2	
SEC -3		Credits: 2	
Course Code 20UBCS41N		Internal 40	External 60

COURSE OUTCOMES

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

CO1:observe the methods of data collection, sampling, analysis and interpretation in biology. [K1]

CO2:paraphrase the formulas for different statistical methods to interpret biological data. [K2]

CO3:apply appropriate statistical method in problem solving. [K3]

CO4:interpret the knowledge of probability, symmetry, averages and dispersion in science experiments. [K3]

CO5:classify the statistical methods to interpret biological data. [K4]

Course Code (20UBCS41N)	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3.a	PSO 3.b	PSO 4a	PSO 4 b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO 1	H	M	M	L	M	M	M	M	-	M
CO 2	H	M	L	L	L	M	M	M	M	M
CO 3	H	M	L	L	L	M	M	M	M	M
CO 4	H	H	L	L	L	M	M	M	M	M
CO 5	H	H	M	L	M	M	M	M	-	M



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Semester IV	BIOCHEMISTRY PRACTICAL II BIOCHEMICAL ANALYSIS OF METABOLITES	Hours/Week: 2	
Core Course		Credits: 2	
Course Code 20UBCC41P		Internal 40	External 60

COURSE OUTCOMES

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

- CO1: apply the principles and procedures in quantitative determination of biochemical metabolites. [K3]
- CO2: use colorimetry to detect the concentration of unknown compounds using a standard graph. [K3]
- CO3: measure the quantity of electrolytes using flame photometry in food stuffs. [K3]
- CO4: estimate the biomolecules in biological samples and complete the record work. [K3]
- CO5: analyse the role of reagents and biochemical techniques in nutritional analysis. [K4]

Course Code 20UBCC41P	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5.a	PSO 5.b	PS O6	PSO 7
CO1	M	M	M	M	M	M	-	-	M	-
CO2	H	M	H	H	H	H	-	-	H	-
CO3	H	H	M	H	H	H	H	H	H	-
CO4	H	H	H	H	M	H	H	H	H	M
CO5	H	H	H	H	H	H	H	M	H	M



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Semester IV	Internship / Field Project (2020 -21 onwards)	Hours/Week: 0
PART IV		Credit: 1
Course Code 20UBCI41G		Internal 100

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 20UBCI41G	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	LIFE STYLE ASSOCIATED DISORDERS	Hours/Week: 2	
Non Major Elective Course -2		Credits: 2	
Course Code 20UBCN41		Internal 40	External 60

COURSE OUTCOMES

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

- CO1 : recall the health problems associated with modern life style. [K1]
- CO2 : relate the impact of modern lifestyle on health. [K2]
- CO3 : classify the life style associated disorders. [K2]
- CO4 : illustrate the sources, causes, symptoms, diagnosis and treatment for various life style associated disorders. [K3]
- CO5 : identify and develop a method to prevent life style associated disorders. [K3]

20UBCN41	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	M	M	L	M	-	L
CO2	H	M	L	L	M	-	L
CO3	H	M	M	L	M	-	L
CO4	H	M	M	L	M	L	L
CO5	H	M	M	M	M	-	L



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Semester IV	ADOLESCENT PSYCHOLOGY	Hours/Week: 1	
Generic Elective-		Credits: 1	
Course Code 20UGEA43		Internal 100	External -

Course Outcomes

On completion of the course, students will be able to

CO1: describe the concept, characteristics, developmental tasks, various challenges and self identity of adolescents and state the meaning of counselling and counsellor. [K1]

CO2: explain the various domains of growth and development and self-identity, types of autonomy, self-governance and self-regulation skills and challenges of adolescents. [K2]

CO3: discuss the development of self -identity among adolescents, styles of counselling and qualities of a good counsellor. [K2]

CO4: identify the various problems of adolescents and find the measurements to combat it. [K3]

CO5: find the techniques to improve the self -esteem, self -reliance and to overcome the family conflicts by the adolescents to enhance the lifestyle and build the new strategies of counselling to compete with the survival fittest. [K3]

Course Code 20UGEA43	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	M	M	L	L	M	L	L
CO2	H	M	M	L	H	L	M
CO3	H	M	M	L	H	L	M
CO4	H	M	M	M	H	L	H
CO5	H	M	M	H	H	L	H



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Semester V		Hours/Week: 4	
Core course: 7		Credits: 4	
Course Code 20UBCC51		Internal 25	External 75

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: State the principles of genome organization, origin of nucleic acids replication, transcription, translation, and gene expression. [K1]

CO2: Understand the mechanisms of replication, transcription, translation, gene expression, genome organisation and the nucleic acids evolution. [K2]

CO3: Identify the organic evolution of nucleic acids and the molecular mechanisms in prokaryotes. [K3]

CO4: Illustrate the normal and abnormal events of central dogma, genome organization and genetic material evolution. [K4]

CO5: Interpret the cell functions at the molecular level with respect to nucleic acids origin, replication, transcription, translation, genome organisation and gene expression. [K5]

Course Code 20UBCC51	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3.a	PSO 3.b	PSO 4a	PSO 4 b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	H	H	H	H	H	H	M	L	-
CO2	H	H	H	H	H	H	H	M	L	L
CO3	H	H	H	H	H	H	H	M	L	L
CO4	H	H	H	H	H	H	H	M	L	L
CO5	H	H	H	H	H	H	H	M	L	L



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Semester V	MICROBIOLOGY	Hours/Week: 4	
Core course: 8		Credits: 4	
Course Code 20UBCC52		Internal 25	External 75

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: describe the classification, structural organization, microscopic analysis, growth and reproduction, industrial and medical traits of microbes. [K1]

CO2: interpret the structural organization, classification and microscopic identification, growth requirements, reproduction, harmful and beneficial aspects of microorganisms. [K2]

CO3: sketch the structure and functions, growth and reproduction, microscopic analysis, harmful and industrial applications of microbes. [K3]

CO4: analyze the structural organization, classification and microscopic identification, growth and reproduction, harmful and beneficial aspects of microorganisms. [K4]

CO5: evaluate the classification, structure, modes of nutrition and reproduction, merits and demerits of microbes. [K5]

Course Code 20UBCC52	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3.a	PSO 3.b	PSO 4a	PSO 4 b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	H	H	H	H	M	M	M	-	-
CO2	H	M	H	H	M	M	M	M	M	L
CO3	H	H	H	H	M	M	M	M	M	M
CO4	H	H	H	H	M	M	M	M	L	M
CO5	H	M	H	H	M	M	M	M	L	M



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Semester V	PHARMACOLOGY	Hours/Week: 4	
Core course 9		Credits: 4	
Course Code 20UBCC53		Internal 25	External 75

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: understand the basic principles and concepts of Pharmacology. [K1]

CO2: explain the drug metabolism, pharmacological action of drugs on various systems of the body, drug interactions, adverse drug reactions, drug dependence and tolerance, drug designing, development and toxicity due to over dosage. [K2]

CO3: relate the pharmacological action of drugs with their metabolism, interaction with receptor, adverse reactions, dependence and tolerance, drug designing, development and toxic effects of drugs. [K3]

CO4: interpret the over dosage toxicity due to pharmacological action of drugs, interactions, adverse reactions, dependence and tolerance to modify drug design and development. [K4]

CO5: evaluate the drug design and development using the pharmacokinetic and dynamic principles, pharmacological actions, interactions with receptors, adverse reactions, dependence and tolerance of drugs and toxic effects. [K5]

Course Code 20UBCC53	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3.a	PSO 3.b	PSO 4a	PSO 4 b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	H	M	H	H	M	H	H	L	L
CO2	H	M	H	H	H	H	H	H	L	L
CO3	H	H	M	H	H	H	H	H	L	M
CO4	H	H	H	H	M	H	H	H	L	M
CO5	H	H	H	M	H	H	H	M	L	H



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Semester V	PROJECT	Hours/Week: 0
Core course 10		Credits: 1
Course Code 20UBCC5PR		Internal 100

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: make use of the theoretical knowledge to analyse the biological samples. [K3]

CO2: discover the inter disciplinary knowledge to carry out the project work for the welfare of the society. [K3]

CO3: execute the technical skills in handling the equipments during the analysis of the Biological samples. [K3]

CO4: Analyze the results of the project work that is being executed and to correlate them for improving the society. [K4]

CO5: Develop an insight into the experiments carried out during the project work and conclude the findings with the existing results. [K5]

Course Code 20UBCC5PR	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3.a	PSO 3.b	PSO 4a	PSO 4 b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	H	M	H	H	M	H	H	H	L
CO2	H	M	H	H	H	H	H	H	H	L
CO3	H	H	M	H	H	H	H	H	H	M
CO4	H	H	H	H	M	H	H	H	M	M
CO5	H	H	H	M	H	H	H	M	H	H



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Semester V	HUMAN PHYSIOLOGY	Hours/Week: 4	
DSEC -1		Credits: 4	
Course Code 20UBCE51		Internal 25	External 75

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: state the structure of important physiological systems including the cardio-respiratory, renal, digestive, nervous, and reproductive systems. [K1]

CO2: explain the principles, functions and the structures of the human body. [K2]

CO3: Relate cardio- respiratory, renal, digestive, nervous, and reproductive systems of the human system. [K3]

CO4: analyze the relationship between anatomy and physiology of the human system. [K4]

CO5: interpret the composition and mechanism of various organs in the human body. [K5]

Course Code 20UBCE51	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3a	PSO 3b	PSO 4a	PSO 4b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	H	M	M	M	H	L	L	-	L
CO2	H	H	M	M	M	H	-	M	-	L
CO3	H	H	M	M	M	M	M	M	-	M
CO4	H	H	H	H	H	H	H	M	L	L
CO5	H	H	M	M	M	M	M	M	-	M



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Semester V	GENETICS	Hours/Week: 4	
DSEC -1		Credits: 4	
Course Code 20UBCE52		Internal 25	External 75

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: Define history of genetics, karyotyping, linkages, chromosome number and allele frequency. [K1]

CO2: Explain Mendelism, segregation, dominance, independent assortment, epistasis, sex determination, linkages, cytogenetics, pedigree analysis, coupling repulsion theories, ploidies, an Hardy- Weinberg's equation an variation. [K2]

CO3: Apply Laws of Mendel – law of segregation, law of dominance and law of independent assortment, linkages, mutations and variations. [K3]

CO4: Examine Mendelian laws, traits, epistasis, chromosomal aberrations, crossing over and speciation. [K4]

CO5: Evaluate Chromosomal inheritance, cytogenetics in medicine, syndromes, genetic mapping, chromosomal aberrations, significance of mutations' Hardy Weinberg's law in and factors producing changes in population. [K5]

Course Code 20UBCE52	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3.a	PSO 3.b	PSO 4a	PSO 4 b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	H	H	H	H	M	M	H	-	-
CO2	H	H	H	H	H	M	H	H	M	L
CO3	H	H	H	M	M	H	H	M	M	M
CO4	H	M	H	H	H	H	H	H	L	M
CO5	H	M	H	H	M	M	M	M	L	M



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VIRUDHUNAGAR - 626 001

Semester V	MOLECULAR BIOPHYSICS	Hours/Week: 4	
DSEC -1		Credits: 4	
Course Code 20UBCE53		Internal 25	External 75

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: Remember different atomic system, different coupling schemes and their interactions with magnetic and electric field, and learn the Laws and functions and their relations of thermodynamics in Bioenergetics in biological systems. [K1]

CO2: Understand the Fundamentals of physical phenomenon associated with biological reactions with the basic laws and explore the concept of Biophysics. [K2]

CO3: Apply the principles of Bio physics in analytical determination of biomolecules and life processes, theoretical modelling techniques involved in biomolecular system. [K3]

CO4: Analyse the Structural and molecular properties of biomolecules in Biological process and various methods in the Biophysical analysis and Contemporary issues on atomic and Molecular physics. [K4]

CO5: Evaluate the applications of physics in biological sciences needed to develop the new approach in the academic and Industrial Research. [K5]

Course Code 20UBCE53	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3.a	PSO 3.b	PSO 4a	PSO 4 b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	H	H	H	H	M	M	H	-	-
CO2	H	H	H	H	H	M	H	H	M	L
CO3	H	H	M	M	M	H	H	M	M	M
CO4	H	H	H	H	H	H	M	H	L	M
CO5	H	M	H	H	M	M	M	M	L	M



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VIRUDHUNAGAR - 626 001

Semester V	BIOINFORMATICS	Hours/Week: 2	
SEC-4		Credits: 2	
Course Code 20UBCS51		Internal 40	External 60

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: write the basic concepts of bioinformatics, networks, sequence database, various alignment technique and phylogenetic analysis. [K1]

CO2: understand the concept of computer, information networks, sequence databases, sequence alignment techniques, tools, construction of phylogenetic tree. [K2]

CO3: outline the overview of networks, database, sequence alignment, usage of Matrix, multiple sequence alignment and application of bioinformatics. [K2]

CO4: apply the concept about alignment algorithms, matrix, networks, phylogenetic trees in structural prediction and evolutionary relationship. [K3]

CO5: analyze the role of bioinformatics, pairwise database searching tools, networks and methods of phylogenetic trees. [K4]

Course Code 20UBCS51	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3a	PSO 3b	PSO 4a	PSO 4 b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	H	M	M	H	M	H	H	H	L
CO2	H	H	M	M	H	H	H	H	M	L
CO3	H	H	H	H	H	H	H	H	H	L
CO4	H	H	H	H	H	H	H	H	H	H
CO5	H	H	H	H	H	H	H	H	H	H



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VIRUDHUNAGAR - 626 001

Semester V	MOLECULAR BASIS OF NON- INFECTIOUS HUMAN DISEASES	Hours/Week: 2	
SEC-5		Credits: 2	
Course Code 20UBCS52		Internal 40	External 60

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: define the nutritional requirements, the molecular defects behind nutritional disorders, protein and lifestyle associated disorders, metabolic disorders, monogenic disorders and cancer. [K1]

CO2: associate the genetic abnormalities with the nutritional, protein and lifestyle related, metabolic and monogenic disorders and cancer. [K2]

CO3: describe the genetics behind life style associated non infectious diseases. [K2]

CO4: interpret the non-infectious human diseases from their genetic defects. [K3]

CO5: evaluate the abnormalities of noninfectious human diseases. [K4]

Course Code 20UBCS52	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3.a	PSO 3.b	PSO 4a	PSO 4 b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	H	H	H	H	M	H	H	L	L
CO2	H	M	H	H	H	H	H	H	L	M
CO3	H	H	M	H	H	H	H	H	L	M
CO4	H	H	H	H	M	H	H	H	L	M
CO5	H	H	H	M	H	H	H	M	L	M



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VIRUDHUNAGAR - 626 001

Semester V	EMERGENCY CARE	Credits: 2
EXTRA CREDIT COURSE 1		
Course Code 20UBCO51		Internal 100

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: Identify the basic Concepts of first aid, minor and major emergencies, first aid during special conditions , certifications and organisations. [K1]

CO2: Demonstrate the first aid during major and minor emergencies and discuss the certifications and organisations. [K2]

CO3: Apply the principles of first aid during minor and major emergencies. [K3]

CO4: Analyse the first aid training methods and plan to render the first aid in special conditions and disasters. [K4]

CO5: Evaluate the guidelines for first aid offered by various national and international Organizations ,first aid during minor and major emergencies. [K5]

Course Code 20UBCO51	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PS O 2	PSO 3a	PSO 3b	PSO 4a	PSO 4b	PSO 5a	PSO 5b	PSO 6	PS O 7
CO1	H	H	H	H	H	M	H	M	M	H
CO2	H	H	H	H	H	M	M	M	M	H
CO3	H	H	H	H	H	H	M	M	H	H
CO4	H	H	H	H	H	M	H	M	M	H
CO5	H	H	H	H	H	M	M	M	M	H



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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	BIOTECHNOLOGY	Hours/Week: 5	
Core Course-11		Credits: 4	
Course Code 20UBCC61		Internal 25	External 75

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: Remember the basic principles and practices of microbiological, molecular and analytical methods, which are extensively used in biotechnology. [K1]

CO2: Understand the Basic concepts of biotechnological tool and its mechanism in host cell, Developments made in the field of biotechnology for use in human welfare and solving problems in the society. [K2]

CO3: Apply the knowledge in the basics of research and development in biotechnological field and integrate scientific and technological knowledge on the use of bioprocesses for industrial products. [K3]

CO4: Analyze the applications of Genetic engineering in biological research and biotechnological industries for entrepreneurial development and investigate the different strategies of recombinant DNA technology and resolve the problems encountered. [K4]

CO5: Evaluate the biological science techniques that manipulate living organisms and biological systems to produce novel products in the field of microbial, plant, animal and environmental biotechnology and Examine the results behind the molecular and microbiological techniques for the development of new techniques in future. [K5]

Course Code 20UBCC61	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO3 3.a	PSO3 3.b	PSO 4a	PSO 4 b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	H	H	H	H	M	M	H	M	H
CO2	H	H	H	H	H	M	H	H	M	L
CO3	H	H	H	H	M	H	H	M	M	M
CO4	H	M	H	H	H	H	H	H	L	M
CO5	H	M	H	H	M	M	M	M	L	M



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VIRUDHUNAGAR - 626 001

Semester VI	PLANT BIOCHEMISTRY	Hours/Week: 5	
Core Course-12		Credits: 4	
Course Code 20UBCC62		Internal 25	External 75

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: write about various components of plant cell, photosynthetic process, importance of mineral nutrients, plant hormones, growth & reproduction in plants, basics of plant tissue culture. [K1]

CO2: explain the structure and function of plant cell components, pathways of photosynthesis, photorespiration, N₂ fixation, sulphur assimilation process, physiological role of mineral nutrients and plant hormones, basic technique of plant tissue culture. [K2]

CO3: illustrate the plant cell organelles, photosynthesis mechanism, fixation and assimilation of minerals, growth & reproduction of plants, plant tissue culture. [K3]

CO4: analyse the plant cell structure, photosynthesis pathway, nitrogen and sulphur metabolism, growth, reproduction of plants, plant tissue culture. [K4]

CO5: evaluate the role of subcellular organelles of plant cell, photosynthesis mechanism, mineral nutrients and plant hormones, physiology of growth and reproduction, plant tissue culture technique. [K5]

Course Code 20UBCC62	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3a	PSO 3b	PSO 4a	PSO 4b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	H	M	M	L	L	-	M	L	L
CO2	H	H	M	M	M	L	-	M	L	L
CO3	H	H	M	L	M	M	-	H	L	L
CO4	H	H	H	M	H	M	L	H	L	M
CO5	H	H	H	M	H	M	L	H	L	H



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Semester VI	CLINICAL BIOCHEMISTRY	Hours/Week: 5	
Core Course-13		Credits: 4	
Course Code 20UBCC63		Internal 25	External 75

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: describe the clinical aspects of various diseases. [K1]

CO2: Understand the biochemical mechanisms and pathophysiological processes

responsible for the metabolic, inherited disorders and infectious diseases. [K2]

CO3: apply the knowledge of aetiology, pathology, diagnosis and interpretation of diseases

which helpful the students for further employment in basic research and the health profession. [K3]

CO4: analyse the variations in the levels of biochemical constituents and their relationship

with various diseases. [K4]

CO5: critically evaluate the role of clinical biochemistry in screening, diagnosis and

monitoring of various diseases. [K5]

Course Code 20UBCC63	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3a	PSO 3b	PSO 4a	PSO 4 b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	H	H	H	M	M	M	H	M	M
CO2	H	H	H	H	M	H	M	H	M	M
CO3	H	H	H	H	H	H	H	H	H	H
CO4	H	H	H	H	H	H	H	H	H	H
CO5	H	H	H	H	H	H	H	H	H	H



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VIRUDHUNAGAR - 626 001

Semester V	CLINICAL BIOCHEMISTRY	Hours/Week: 3	
Core course Practical:3		Credits: 3	
Course Code 20UBCC61P		Internal 40	External 60

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: Apply the principles and procedures in qualitative and quantitative determination of unknown constituents in the biological samples. [K3]

CO2: Make use of enzyme assay and colorimetric principles to detect the concentration of unknown components in the biological samples. [K3]

CO3: Identify the normal and abnormal parameters of biological samples using colorimetry and other basic biochemical methods. [K3]

CO4: Observe and calculate the results for the colorimetry, ESR, hemoglobin estimation, and enzyme assays of biological samples and to complete the record work. [K3]

CO5: Infer the normal and abnormal parameters of biological samples analyzed by colorimetry and other basic biochemical methods for enzyme assay hemoglobin estimation and ESR. [K4]

Course Code 20UBCC61P	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3.a	PSO 3.b	PSO 4a	PSO 4 b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	H	H	H	H	H	H	M	M	H
CO2	H	H	H	H	H	H	H	M	M	H
CO3	H	H	H	H	H	H	H	M	M	H
CO4	H	H	H	H	H	H	H	M	M	H
CO5	H	H	H	H	H	H	H	M	M	H



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VIRUDHUNAGAR - 626 001

Semester VI	MICROBIOLOGY PRACTICAL	Hours/Week: 3	
Core Course Practical-4		Credits: 3	
Course Code 20UBCC62P		Internal 40	External 60

COURSE OUTCOMES

On completion of the course the students will be able to

- CO1 : apply the working principle of different laboratory equipment's and techniques used in microbiology, plant biochemistry and immunology in various fields of biology. [K3]
- CO2 : sketch the schema chart of different microbiological, immunological and plant biochemistry techniques. [K3]
- CO3 : illustrate the observations of various microbiological, immunological and plant biochemistry techniques. [K3]
- CO4 : interpret the result and inference of different techniques used in microbiology, immunology and plant biochemistry. [K3]
- CO5 : criticize the different microbiological, immunological and plant biochemistry techniques. [K4]

Course Code 20UBCC62P	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3.a	PSO 3.b	PSO 4a	PSO 4 b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	M	H	H	H	M	M	M	H	M
CO2	H	M	M	H	H	M	M	M	H	M
CO3	H	M	M	M	H	M	M	M	H	H
CO4	H	M	H	M	H	M	M	M	H	M
CO5	H	M	M	M	H	M	M	M	H	H



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Semester VI	BIOINFORMATICS PRACTICAL	Hours/Week: 2	
Core Course Practical-5		Credits: 2	
Course Code 20UBCC63P		Internal 40	External 60

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: apply the principle and the protocols for sequence retrieval from NCBI. [K3]

CO2: construct the methodologies for accessing proteomic & Similarity search tools. [K3]

CO3: interpret the results of retrieved and aligned sequences from Genbank & analysis of protein sequence and complete the record work notebook. [K3]

CO4: infer the basic tools to retrieve and visualise the biological sequences from NCBI, expasy and other different databases. [K3]

CO5: Analyse the role of bioinformatics, biological databases and alignment tools in research and development of drugs for the human kind. [K4]

Course Code 20UBCC63P	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3a	PSO 3b	PSO 4a	PSO 4 b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	H	M	M	H	L	H	H	H	H
CO2	H	H	M	M	H	H	H	H	M	H
CO3	H	H	H	H	H	H	H	H	H	H
CO4	H	H	H	H	H	H	H	H	H	H
CO5	H	H	H	H	H	H	H	H	H	H



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VIRUDHUNAGAR - 626 001

Semester VI	MEDICAL LABORATORY TECHNOLOGY	Hours/Week: 5	
DSEC-2		Credits: 4	
Course Code 20UBCE61		Internal 25	External 75

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: Describe the techniques involved in the collection and analysis of different samples from human. [K1]

CO2: Understand the basic methods involved in the collection, processing, storage, preservation and investigation of various biological specimens. [K2]

CO3: Apply the laboratory procedures to diagnose diseases. [K3]

CO4: analyse the biochemical, immunological and histopathological examinations for the screening , prognosis and diagnosis of various diseases. [K4]

CO5: Evaluate the various laboratory procedures in the diagnosis of diseases. [K5]

Course Code 20UBCE61	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3a	PSO 3b	PSO 4a	PSO 4 b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	H	H	H	M	M	L	H	L	M
CO2	H	H	M	H	M	M	M	H	L	M
CO3	H	H	H	H	M	M	M	H	L	M
CO4	H	H	H	H	M	H	H	H	M	H
CO5	H	H	H	H	H	H	H	H	M	H



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VIRUDHUNAGAR - 626 001

Semester VI	BIOFERTILIZERS AND BIOPESTICIDES	Hours/Week: 5	
DSEC -2		Credits: 4	
Course Code 20UBCE62		Internal 25	External 75

COURSE OUTCOMES

On completion of the course the students will be able to

CO 1: Recall the role of the microorganisms as biofertilizers and biopesticides. [K1]

CO 2: Explain the biofertilizer and biopesticides preparation process. [K2]

CO 3: Identify the importance of microbial inoculants for the preparation of biofertilizer and biopesticides. [K3]

CO 4: Analyze the applications of biofertilizers and biopesticides. [K4]

CO 5: Interpret the importance of biofertilizers and biopesticide preparation. [K5]

Course Code 20UBCE62	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3a	PSO 3b	PSO 4a	PSO 4b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	H	M	M	M	H	H	H	-	L
CO2	H	H	H	M	M	M	H	M	-	L
CO3	H	H	H	M	M	M	M	M	L	L
CO4	H	H	H	M	M	H	H	H	L	L
CO5	H	H	H	M	H	M	M	M	M	-



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Semester VI	TOXICOLOGY	Hours/Week: 5	
DSEC -2		Credits: 4	
Course Code 20UBCE63		Internal 25	External 75

COURSE OUTCOMES

On completion of the course the students will be able to

CO1: Write the classification of toxicants, mechanism, fate, evaluation of toxicity and toxic effects of metals and pesticides. [K1]

CO2: Understand the route, site of exposure of xenobiotic in humans, tolerance, Biotransformation and organ toxicity. [K2]

CO3: Apply the concept of toxicants involved in ADME in human and its impact in Environment. [K3]

CO4: analyze the impact of toxicants in human and environment. [K4]

CO5: evaluate the techniques, methods of toxicity, fate of xenobiotic in human body and Environment. [K5]

Course Code 20UBCE63	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3a	PSO 3b	PSO 4a	PSO 4 b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	H	H	M	H	M	H	H	M	L
CO2	H	H	H	M	H	H	H	H	M	L
CO3	H	H	H	H	H	H	H	H	H	L
CO4	H	H	H	H	H	H	H	H	H	H
CO5	H	H	H	H	H	H	H	H	H	H



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Semester VI	FORENSIC SCIENCE	Hours/Week: 2	
SEC -6		Credits: 2	
Course Code		Internal	External
20UBCS61		40	60

COURSE OUTCOMES

On completion of the course the students will be able to

CO1 -Identify the role and scientific principles of crime scene investigation, finger printing evidence collection, legal procedures and techniques related to investigation. [K1]

CO2 - Outline the legal procedures, sociological aspects of crime, importance of the finger printing techniques, evidences and relate them with various offenses. [K2]

CO3 - Demonstrate the legal procedures, physical evidence recognition, collection, preservation and admissibility of biological evidence using latest techniques. [K2]

CO4- Determine the biological basis of finger printing, legal procedures for investigating non- sexual and sexual offences, identification & comparison of evidences. [K3]

CO5- Infer the legal ethics involved in forensic evidences due to sociological aspects that provoke crime and justify the truth with finger printing. [K4]

Course Code 20UBCS61	PO1	PO2	PO3		PO4		PO5		PO6	PO7
	PSO 1	PSO 2	PSO 3.a	PSO 3.b	PSO 4a	PSO 4 b	PSO 5a	PSO 5b	PSO 6	PSO 7
CO1	H	H	M	H	H	H	H	H	M	H
CO2	H	H	M	H	H	H	H	H	M	H
CO3	H	H	M	H	H	H	H	H	M	H
CO4	H	H	M	H	H	H	H	H	M	H
CO5	H	H	M	H	H	H	H	H	M	H