

**Dr. V. S. Krishna Govt. Degree College (A)
Visakhapatnam**

DEPARTMENT OF BIOTECHNOLOGY



BOARD OF STUDIES 2018-19

POs & COs

Department of Biotechnology

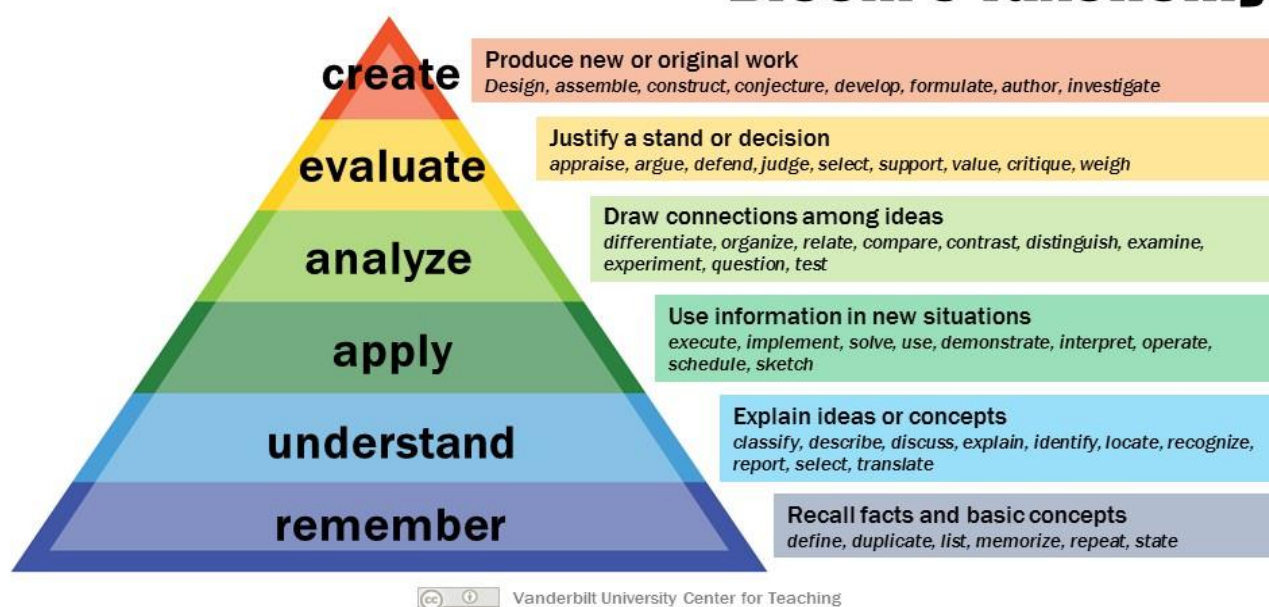
Programme Name: **BSc. Biotechnology**

Programme outcomes

PO 1	Critical Thinking: Ability to take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
PO 2	Effective Communication: Ability to speak, read, write, and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media, and technology.
PO 3	Social Interaction: Ability to elicit views of others, mediate disagreements and help reach conclusions in group settings.
PO 4	Effective Citizenship: Ability to demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
PO 5	Ethics: Ability to recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.
PO 6	Environment and Sustainability: Ability to understand the issues of environmental contexts and sustainable development
PO 7	Employability skills: Equipping graduates with the essential abilities and knowledge to excel in their chosen careers
PO 8	Entrepreneurship skills: Seeks to empower students with the competencies needed to be successful entrepreneurs, enabling them to launch, operate, and innovate in their own businesses or entrepreneurial ventures.
PO 9	Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes

Programme specific outcomes:	
PSO1	A student should be able to understand basic concepts in Biochemistry, Molecular Biology, Microbiology, rDNA technology and Industrial Technology
PSO2	A student should be able to design, execute, record and analyse the results of various experiments conducted during Practicals
PSO3	A student should be able to enter a workplace with the theory and practical knowledge in pharmaceuticals, environment related techniques and other related multidisciplinary areas.
PSO4	A Student should gain proficiency in regulations in safe handling of chemicals as well as biosafety issues relating to experiments
PSO5	Enabling students to develop an inquisitive attitude towards Biotechnology as an interesting and valuable subject of study.

Bloom's Taxonomy



Levels of Bloom's Taxonomy

Level-1	Knowledge/Remember
Level-2	Understand
Level-3	Application
Level-4	Analyze
Level-5	Evaluation
Level-6	Create

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DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER I

Course I - MICROBIOLOGY & CELL BIOLOGY

Course Outcomes:

Course Outcome Weighted Average: 1.881048387

Course outcomes - Corelation with Blooms Taxonomy levels		CO Learning Level Index	CO Attainment
CO1. Explain the different types of microscopes with their significance and importance.	L-2, L-3	2.5	2.2007
CO2. Explain basic microbial nutrition requirements and nutritional classification of bacteria and describe microbial growth, control (physical and chemical), maintenance of pure cultures and analyze cultural activity.	L-2, L-4	3	2.0409
CO3. Compare and contrast, structures and purposes of prokaryotic and eukaryotic cells and list their similarities and differences.	L-1, L-2, L-4	2.3	2.2647
CO4. Explain and draw the structures of cell organelles and locate their parts along with functions.	L-1, L-2, L-3	2	2.3606
CO5. Explain overall mechanism of sequential events of cell growth and cell division cycles.	L-2, L-4	3	2.0409

CO-PO Mapping									
1-Low, 2- Moderate, 3- High, ‘- ‘No Correlation									
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
CO 1	3	1	1	1	0	1	1	1	2
CO 2	2	1	1	1	0	1	1	1	2
CO 3	2	1	1	1	0	1	1	1	2
CO 4	2	1	1	1	0	1	1	1	2
CO 5	2	1	1	1	0	1	1	1	2
Total	11	5	5	5	0	5	5	5	10

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘-‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	1	3
CO2	3	3	1	1	3
CO3	3	3	1	1	3
CO4	3	3	1	1	3
CO5	3	3	1	1	3
Total	15	15	5	5	15

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B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER II

Course II – MACROMOLECULES, ENZYMOLOGY, BIOENERGETICS

Course Outcomes:

Course Outcome Weighted Average: 2.175

Course outcomes – Correlation with Blooms Taxonomy levels		CO Learning Level Index	CO Attainment
CO1. Explain and classify different types of biomolecules (Amino acids, proteins, carbohydrates, lipids and vitamins)along with their significance	L-1, L-2	1.5	2.6464
CO2. Illustrate chemical structure of nitrogen bases, DNA and forces stabilizing the DNA	L-3, L-4	3.5	2.1750
CO3. Differentiate between different forms of DNA	L-1, L-2, L-4	2.3	2.4579
CO4. Explain enzymes with classification and nomenclature, enzyme kinetics	L-1, L-2, L-3	2	2.5286
CO5. Explain enzyme inhibition types along with significance.	L-1, L-2, L-3	2	2.5286

CO-PO Mapping									
1-Low, 2- Moderate, 3- High, ‘-‘ No Correlation									
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
CO 1	3	1	1	1	0	1	1	1	2
CO 2	3	1	1	1	0	1	1	1	2
CO 3	3	1	1	1	0	1	1	1	2
CO 4	3	1	1	1	0	1	1	1	2
CO 5	3	1	1	1	0	1	1	1	2
Total	15	5	5	5	0	5	5	5	10

CO-PSO Mapping					
1-Low, 2- Moderate, 3- High, ‘-‘ No Correlation					
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	1	1	1	3
CO 2	3	1	1	1	3
CO 3	3	1	1	1	3
CO 4	3	1	1	1	3
CO 5	3	1	1	1	3
Total	15	5	5	5	15

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B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER III

Course III – BIOPHYSICAL TECHNIQUES

Course Outcomes:

Course Outcome Weighted Average: 2.312903226

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Explain the differentiate absorption and emission spectra.	L-2, L-3	2.5	2.5092
CO2. Illustrate each region of electromagnetic spectrum for spectroscopy	L-2, L-4	3	2.4111
CO3. Explain and relate the concepts of radioactivity and its applications.	L-1, L-2, L-4	2.3	2.5485
CO4. Illustrate and differentiate blotting techniques along with their applications and significance	L-1, L-2, L-3	2	2.6074
CO5. Identify and differentiate working principle, instrumentation and applications of various bio-analytical instruments.	L-2, L-4	3	2.4111

CO-PO Mapping									
1-Low, 2- Moderate, 3- High, '-' 'No Correlation									
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
CO 1	3	1	1	1	0	1	1	1	2
CO 2	3	1	1	1	0	1	1	1	2
CO 3	3	1	1	1	0	1	1	1	2
CO 4	3	1	1	1	0	1	1	1	2
CO 5	3	1	1	1	0	1	1	1	2
Total	15	5	5	5	0	5	5	5	10

CO-PSO Mapping					
1-Low, 2- Moderate, 3- High, ‘-‘ No Correlation					
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	1	1	1	3
CO 2	3	1	1	1	3
CO 3	3	1	1	1	3
CO 4	3	1	1	1	3
CO 5	3	1	1	1	3
Total	15	5	5	5	15

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B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER IV

Course IV – Immunology

Course Outcomes:

Course Outcome Weighted Average: 2.089415323

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Level Learning Index	CO Attainment
CO1. Define central immunological principles and concepts.	L-2, L-3	2.5	2.3496
CO2. Illustrate immunological processes and, identify immune responses at a cellular level and molecular level.	L-2, L-4	3	2.2195
CO3. Describe the roles of the immune system in both maintaining health and contributing to disease and the triggering and regulation of immune responses.	L-1, L-2, L-4	2.3	2.4016
CO4. Understand the preparation and role of vaccines	L-1, L-2, L-3	2	2.4797
CO5. Understand the application of different immunological techniques.	L-2, L-4	3	2.2195

CO-PO Mapping									
1-Low, 2- Moderate, 3- High, ‘-‘ No Correlation									
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
CO 1	1	1	1	1	1	3	1	1	1
CO 2	1	1	1	1	1	1	1	3	1
CO 3	1	1	1	1	1	1	1	3	1
CO 4	2	1	1	1	1	1	1	1	2
CO 5	1	1	1	1	1	3	1	1	1
Total	6	5	5	5	5	9	5	9	6

CO-PSO Mapping					
1-Low, 2- Moderate, 3- High, ‘-‘ No Correlation					
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	1	1	1	3
CO 2	3	1	1	1	3
CO 3	3	1	1	1	3
CO 4	3	1	1	1	3
CO 5	3	1	1	1	3
Total	15	5	5	5	15

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**B.Sc BIOTECHNOLOGY
SEMESTER V**

Course V – MOLECULAR BIOLOGY

Course Outcomes:

Course Outcome Weighted Average: 2.285294118

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Explain the concept of gene and gene architecture.	L-2, L-4	3	2.3873
CO2. Demonstrate the overview of the central dogma of life and various molecular events.	L-2, L-4	3	2.3873
CO3. Illustrate molecular events in DNA synthesis, RNA synthesis and the role of different enzymes.	L-1, L-2, L-4	2.3	2.5303
CO4. Illustrate molecular events in protein synthesis and the role of different enzymes.	L-1, L-2, L-4	2.3	2.5303
CO5. Explain the regulation of gene expression in prokaryotes using operon concept.	L-2, L-4	3	2.3873

CO-PO Mapping									
1-Low, 2- Moderate, 3- High, ‘-’ No Correlation									
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
CO 1	3	1	1	1	1	1	1	1	3
CO 2	3	1	1	1	1	1	1	1	3
CO 3	3	1	1	1	1	1	1	1	3
CO 4	3	1	1	1	1	1	1	1	3
CO 5	3	1	1	1	1	1	1	1	3
Total	15	5	5	5	5	5	5	5	15

CO-PSO Mapping					
1-Low, 2- Moderate, 3- High, ‘-’ No Correlation					
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	1	1	1	3
CO 2	3	1	1	1	3
CO 3	3	1	1	1	3
CO 4	3	1	1	1	3
CO 5	3	1	1	1	3
Total	15	5	5	5	15

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B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER - V

Course VIA-ELECTIVE 1 – rDNA Technology

Course Outcomes:

Course Outcome Weighted Average: 2.311764706

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. To understand the fundamental principles and techniques of recombinant DNA technology, including gene cloning, vectors, restriction enzymes, and polymerase chain reaction (PCR).	L-2, L-3, L-4	3	2.4100
CO2. To develop practical laboratory skills in manipulating DNA, such as cloning, transformation, gel electrophoresis, and DNA sequencing	L-2, L-3, L-4	3	2.4100
CO3. To apply rDNA technology in various fields such as medicine, agriculture, and environmental science.	L-1, L-2, L-4	2.3	2.5477
CO4. To design experiments, analyze data, and troubleshoot experimental issues. This is essential for conducting independent research and addressing real-world biological problems.	L-1, L-2, L-3	2.3	2.5477
CO5. To explore the ethical, legal, and social implications of rDNA technology. This includes understanding the regulatory frameworks, the potential risks and benefits of genetic engineering, and the importance of ethical considerations in scientific research.	L-2, L-4	3	2.4100

CO-PO Mapping									
1-Low, 2- Moderate, 3- High, ‘-‘ No Correlation									
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
CO 1	3	1	1	1	1	1	3	1	2
CO 2	3	1	1	1	1	1	3	1	2
CO 3	3	1	1	1	1	1	3	1	2
CO 4	3	1	1	1	1	1	3	1	2
CO 5	3	1	1	1	1	1	3	1	2
Total	15	5	5	5	5	5	15	5	10

CO-PSO Mapping					
1-Low, 2- Moderate, 3- High, ‘-‘ No Correlation					
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	1	1	1	3
CO 2	3	1	1	1	3
CO 3	3	1	1	1	3
CO 4	3	1	1	1	3
CO 5	3	1	1	1	3
Total	15	5	5	5	15

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B.Sc BIOTECHNOLOGY

SEMESTER - V

Course VIB-ELECTIVE 2 – GENETICS

Course Outcomes:

Course Outcome Weighted Average: 2.46

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Explain the structure and functions of genes and chromosomes	L-2, L-3	2.5	2.6143
CO2. Understand the laws and concepts of Mendelian inheritance, deviation from Mendel laws, concepts of linkage, autosomal and allosomal inheritance, and sex determination in different organisms	L-2, L-4	3	2.5371
CO3. Perform Karyotyping of different chromosome sets	L-1, L-2, L-4	2.3	2.6451
CO4. Understand the mechanism of different transposable elements and their roles.	L-1, L-2	1.5	2.7686
CO5. Explain the concept of DNA damage and Repair	L-2, L-4	3	2.5371

CO-PO Mapping									
1-Low, 2- Moderate, 3- High, '-' 'No Correlation									
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
CO 1	3	1	1	1	1	1	1	1	3
CO 2	3	1	1	1	1	1	1	1	3
CO 3	3	1	1	1	1	1	1	1	3
CO 4	3	1	1	1	1	1	1	1	3
CO 5	3	1	1	1	1	1	1	1	3
Total	15	5	5	5	5	5	5	5	15

CO-PSO Mapping					
1-Low, 2- Moderate, 3- High, ‘-‘ No Correlation					
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	1	1	1	3
CO 2	3	1	1	1	3
CO 3	3	1	1	1	3
CO 4	3	1	1	1	3
CO 5	3	1	1	1	3
Total	15	5	5	5	15

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DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER - VI

Course VII – PLANT AND ANIMAL BIOTECHNOLOGY

Course Outcomes:

Course Outcome Weighted Average: 2.690322581

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Understand the key developments in the sphere of Plant biotechnology.	L-2, L-3	2.5	2.7788
CO2. Illustrate the in vitro propagation of plants and their maintenance.	L-2, L-4	3	2.7345
CO3. Understand Tissue culture technique	L-1, L-2, L-4	2.3	2.7965
CO4. Understand the principles of intellectual property in the context of industrial biotechnology.	L-1, L-2, L-3	2	2.8230
CO5. Understand the ethics, biosafety measures concerned with biotechnology.	L-2, L-4	3	2.7345

CO-PO Mapping									
1-Low, 2- Moderate, 3- High, ‘- ‘No Correlation									
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
CO 1	1	1	1	1	1	1	3	1	1
CO 2	1	1	1	1	1	1	3	1	1
CO 3	1	1	1	1	1	1	3	1	1
CO 4	1	1	1	1	1	1	3	1	1
CO 5	1	1	1	1	1	1	3	1	1
Total	5	5	5	5	5	5	15	5	5

CO-PSO Mapping					
1-Low, 2- Moderate, 3- High, ‘-‘ No Correlation					
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	1	1	1	3
CO 2	3	1	1	1	3
CO 3	3	1	1	1	3
CO 4	3	1	1	1	3
CO 5	3	1	1	1	3
Total	15	5	5	5	15

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B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER - VI

PAPER VIII CLUSTER-8 -A1: CELL BIOLOGY

Course Outcomes:

Course Outcome Weighted Average: 2.76666667

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Understand the ultra structures and purposes of prokaryotic and eukaryotic cells .	L-1, L-2	1.5	2.9000
CO2. Compare and contrast prokaryotic and eukaryotic cells .	L-1, L-2	1.5	2.9000
CO3. Explain and draw the structures of cell organelles and locate their parts along with functions.	L-1, L-2, L-4	2.3	2.8466
CO4. Explain overall mechanism of sequential events of cell growth and cell division cycles.	L-1, L-2, L-3	2	2.8666
CO5. Explain the structure, types and functions of genes and chromosomes	L-2, L-4	3	2.7999

CO-PO Mapping									
1-Low, 2- Moderate, 3- High, '-' 'No Correlation									
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
CO 1	3	1	1	1	1	1	1	1	3
CO 2	3	1	1	1	1	1	1	1	3
CO 3	3	1	1	1	1	1	1	1	3
CO 4	3	1	1	1	1	1	1	1	3
CO 5	3	1	1	1	1	1	1	1	3
Total	15	5	5	5	5	5	5	5	15

CO-PSO Mapping					
1-Low, 2- Moderate, 3- High, ‘-‘ No Correlation					
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	1	1	1	3
CO 2	3	1	1	1	3
CO 3	3	1	1	1	3
CO 4	3	1	1	1	3
CO 5	3	1	1	1	3
Total	15	5	5	5	15

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DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER - VI

PAPER VIII CLUSTER-8 -A2: GENE BIOTECHNOLOGY

Course Outcomes:

Course Outcome Weighted Average: 2.774666667

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Explain the structure and functions of genes and chromosomes	L-2, L-3	2.5	2.8390
CO2. Understand the laws and concepts of Mendelian inheritance, deviation from Mendel laws, concepts of linkage, autosomal and allosomal inheritance, and sex determination in different organisms	L-2, L-4	3	2.8068
CO3. Perform Karyotyping of different chromosome sets	L-1, L-2, L-4	2.3	2.8519
CO4. Understand the mechanism of different transposable elements and their roles	L-1, L-2	1.5	2.9034
CO5. Explain the concept of DNA damage and Repair	L-2, L-4	3	2.8068

CO-PO Mapping									
1-Low, 2- Moderate, 3- High, '-' 'No Correlation									
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
CO 1	3	1	1	1	1	1	1	1	3
CO 2	3	1	1	1	1	1	1	1	3
CO 3	3	1	1	1	1	1	1	1	3
CO 4	3	1	1	1	1	1	1	1	3
CO 5	3	1	1	1	1	1	1	1	3
Total	15	5	5	5	5	5	5	5	15

CO-PSO Mapping					
1-Low, 2- Moderate, 3- High, ‘-‘ No Correlation					
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	1	1	1	3
CO 2	3	1	1	1	3
CO 3	3	1	1	1	3
CO 4	3	1	1	1	3
CO 5	3	1	1	1	3
Total	15	5	5	5	15

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DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER - VI, PAPER VIII

CLUSTER-8 -A3: BIOSTATISTICS AND BIOINFORMATICS

Course Outcomes:

Course Outcome Weighted Average: 2.748461538

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. To become familiar with a variety of currently available genomic and proteomic databases.	L-2, L-3	2.5	2.8203
CO2. To be able to search and retrieve information from genomic and proteomic databases (e.g. GenBank, Swiss-Prot)	L-2, L-4	3	2.7843
CO3. To analyze their search results using software available on the internet (e.g. BLAST, ClustalW).	L-1, L-2, L-4	2.3	2.8347
CO4. To compare and analyze biological sequences and how to interpret the results of their analyses.	L-1, L-2, L-3	2	2.8562
CO5. Explain and draw the structures of cell organelles and locate their parts along with functions.	L-2, L-4	3	2.7843

CO-PO Mapping									
1-Low, 2- Moderate, 3- High, '-' 'No Correlation									
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
CO 1	3	1	1	1	1	1	1	1	3
CO 2	3	1	1	1	1	1	1	1	3
CO 3	3	1	1	1	1	1	1	1	3
CO 4	3	1	1	1	1	1	1	1	3
CO 5	3	1	1	1	1	1	1	1	3
Total	15	5	5	5	5	5	5	5	15

CO-PSO Mapping					
1-Low, 2- Moderate, 3- High, ‘-‘ No Correlation					
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	1	1	1	3
CO 2	3	1	1	1	3
CO 3	3	1	1	1	3
CO 4	3	1	1	1	3
CO 5	3	1	1	1	3
Total	15	5	5	5	15

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DEPARTMENT OF BIOTECHNOLOGY



BOARD OF STUDIES 2019-20

PO & CO

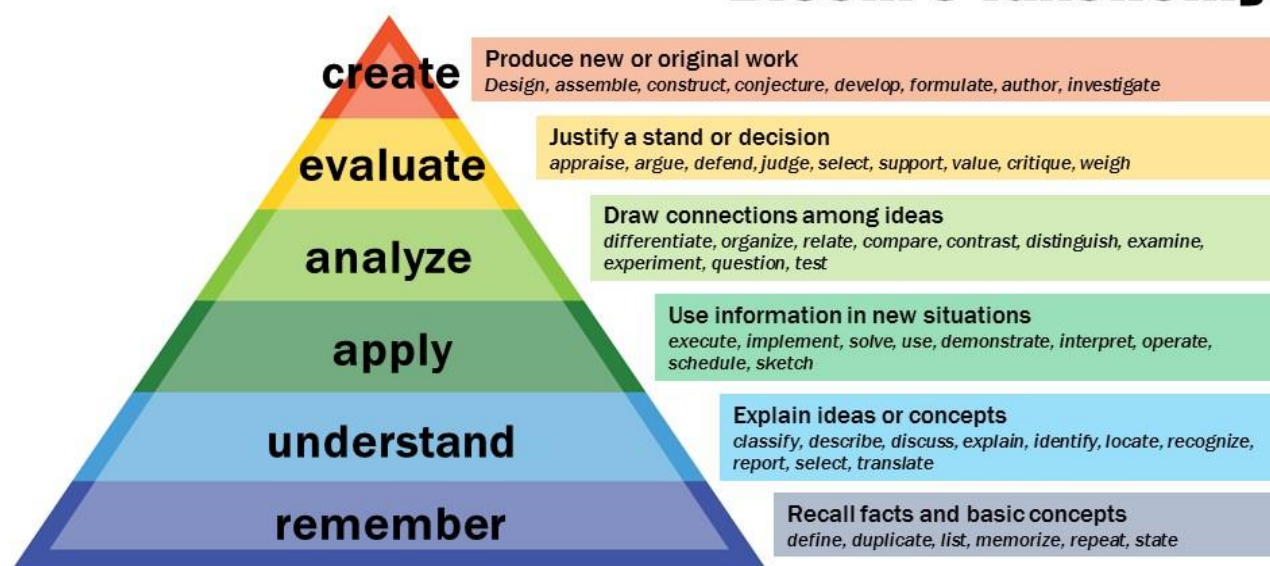
Programme outcomes

Department of Biotechnology	
Programme Name: BSc. Biotechnology	
PO1	Critical Thinking: Ability to take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
PO2	Effective Communication: Ability to speak, read, write, and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
PO3	Social Interaction: Ability to elicit views of others, mediate disagreements and help reach conclusions in group settings.
PO4	Effective Citizenship: Ability to demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
PO5	Ethics: Ability to recognize different value systems including your own, understand the dimensions of your decisions, and accept responsibility for them.
PO6	Environment and Sustainability: Ability to understand the issues of environmental contexts and sustainable development
PO7	Employability skills: Equipping graduates with the essential abilities and knowledge to excel in their chosen careers
PO8	Entrepreneurship skills: Seeks to empower students with the competencies needed to be successful entrepreneurs, enabling them to launch, operate, and innovate in their own businesses or entrepreneurial ventures.
PO9	Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes

Programmespecificoutcomes:	
PSO1	Astudentshouldbeabletounderstand basic concepts in Biochemistry, Molecular Biology, Microbiology, rDNA technology and Industrial Technology
PSO2	Astudentshouldbe able to design, execute, record and analyse the results of various experiments conducted during Practicals
PSO3	A student should be able to enter a workplace with the theory and practical knowledge in pharmaceuticals,environment related techniques and other related multidisciplinary areas.
PSO4	A Student should gain proficiency in regulations in safe handling of chemicals as well s biosafety issues relating to experiments
PSO5	Enablingstudentstodevelopaninquisitive attitude towardsBiotechnologyasaninteresting andvaluablesubjectofstudy.

Levels of Bloom's Taxonomy

Bloom's Taxonomy



Vanderbilt University Center for Teaching

Level-1	Knowledge/Remember
Level-2	Understand
Level-3	Application
Level-4	Analyze
Level-5	Evaluation
Level-6	Create

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DEPARTMENTOFBIOTECHNOLOGY

B.Sc BIOTECHNOLOGYSYLLABUS

SEMESTER I

Course I-MICROBIOLOGY&CELLBIOLOGY

Course Outcomes:

Course Outcome Weighted Average: 2.1272

Courseoutcomes - CorelationwithBloomsTaxonomy levels		CO Learning Level Index	CO Attainment
CO1. Explain the different types of microscopes withtheir significance and importance.	L-2,L-3	2.5	2.3766
CO2. Explain basic microbial nutrition requirements and nutritional classification of bacteria and describe microbial growth, control (physical and chemical), maintenance of pure cultures and analyze cultural activity.	L-2,L-4	3	2.2519
CO3. Compare and contrast, structures and purposes of prokaryotic and eukaryotic cells and list their similarities and differences.	L-1, L-2, L-4	2.3	2.4264
CO4. Explain and draw the structures of cell organelles and locate their parts along with functions.	L-1,L-2, L-3	2	2.5013
CO5. Explain overall mechanism of sequential events of cell growth and cell division cycles.	L-2,L-4	3	2.2519

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	0	1	1	1	2
CO2	2	1	1	1	0	1	1	1	2
CO3	2	1	1	1	0	1	1	1	2
CO4	2	1	1	1	0	1	1	1	2
CO5	2	1	1	1	0	1	1	1	2
Total	11	5	5	5	0	5	5	5	10

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	1	3
CO2	3	3	1	1	3
CO3	3	3	1	1	3
CO4	3	3	1	1	3
CO5	3	3	1	1	3
Total	15	15	5	5	15

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DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER II

**CourseII–MACROMOLECULES, ENZYMOLOGY,
BIOENERGETICS**

Course Outcomes:

Course Outcome Weighted Average: 1.886

Courseoutcomes–Correlation withBloomsTaxonomy levels		CO Learning Level Index	CO Attainment
CO1. Explain and classify different types of biomolecules (Amino acids, proteins, carbohydrates, lipids and vitamins)along with their significance	L-1,L-2	1.5	2.5226
CO2. Illustrate chemical structure of nitrogen bases, DNA and forces stabilizing the DNA	L-3,L-4	3.5	1.8860
CO3. Differentiate between different forms of DNA	L-1, L-2, L-4	2.3	2.2679
CO4. Explain enzymes with classification and nomenclature, enzyme kinetics	L-1,L-2, L-3	2	2.3634
CO5. Explain enzyme inhibition types along with significance.	L-1, L-2, L-3	2	2.3634

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	0	1	1	1	2
CO2	3	1	1	1	0	1	1	1	2
CO3	3	1	1	1	0	1	1	1	2
CO4	3	1	1	1	0	1	1	1	2
CO5	3	1	1	1	0	1	1	1	2
Total	15	5	5	5	0	5	5	5	10

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘-‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

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DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER III

CourseIII–BIOPHYSICAL TECHNIQUES

Course Outcomes:

Course Outcome Weighted Average: 1.9727

Course outcomes–Mapping with Blooms Taxonomy levels		CO Learning Level Index	CO Attainment
CO1. Explain the differentiate absorption and emission spectra.	L-2,L-3	2.5	2.2662
CO2. Illustrate each region of electromagnetic spectrum for spectroscopy	L-2,L-4	3	2.1195
CO3. Explain and relate the concepts of radioactivity and its applications.	L-1, L-2, L-4	2.3	2.3249
CO4. Illustrate and differentiate blotting techniques along with their applications and significance	L-1,L-2, L-3	2	2.4130
CO5. Identify and differentiate working principle, instrumentation and applications of various bio-analytical instruments.	L-2,L-4	3	2.1195

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	0	1	1	1	2
CO2	3	1	1	1	0	1	1	1	2
CO3	3	1	1	1	0	1	1	1	2
CO4	3	1	1	1	0	1	1	1	2
CO5	3	1	1	1	0	1	1	1	2
Total	15	5	5	5	0	5	5	5	10

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

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B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER IV

Course IV– Immunology

Course Outcomes:

Course Outcome Weighted Average: 2.0058

Courseoutcomes–MappingwithBloomsTaxonomy levels		CO Level Learning Index	CO Attainment
CO1. Define central immunological principles and concepts.	L-2,L-3	2.5	2.2899
CO2. Illustrate immunological processes and, identify immune responses at a cellular level and molecular level.	L-2,L-4	3	2.1478
CO3. Describe the roles of the immune system in both maintaining health and contributing to disease and the triggering and regulation of immune responses.	L-1, L-2, L-4	2.3	2.3467
CO4. Understand the preparation and role of vaccines	L-1,L-2, L-3	2	2.4319
CO5. Understand the application of different immunological techniques.	L-2,L-4	3	2.1478

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	1	1	1	1	1	3	1	1	1
CO2	1	1	1	1	1	1	1	3	1
CO3	1	1	1	1	1	1	1	3	1
CO4	2	1	1	1	1	1	1	1	2
CO5	1	1	1	1	1	3	1	1	1
Total	6	5	5	5	5	9	5	9	6

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘-‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

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DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY

SEMESTER V

Course V– MOLECULAR BIOLOGY

Course Outcomes:

Course Outcome Weighted Average: 2.2852

Course outcomes–Mapping with Blooms Taxonomy levels		CO Learning Level Index	CO Attainment
CO1. Explain the concept of gene and gene architecture.	L-2,L-4	3	2.3873
CO2. Demonstrate the overview of the central dogma of life and various molecular events.	L-2,L-4	3	2.3873
CO3. Illustrate molecular events in DNA synthesis, RNA synthesis and the role of different enzymes.	L-1, L-2, L-4	2.3	2.5303
CO4. Illustrate molecular events in protein synthesis and the role of different enzymes.	L-1,L-2, L-4	2.3	2.5303
CO5. Explain the regulation of gene expression in prokaryotes using operon concept.	L-2,L-4	3	2.3873

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	3
CO2	3	1	1	1	1	1	1	1	3
CO3	3	1	1	1	1	1	1	1	3
CO4	3	1	1	1	1	1	1	1	3
CO5	3	1	1	1	1	1	1	1	3
Total	15	5	5	5	5	5	5	5	15

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘-‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

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DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER - V

Course VIA-ELECTIVE 1–rDNA Technology

Course Outcomes:

Course Outcome Weighted Average: 2.3117

Course outcomes–Mapping with Blooms Taxonomy levels		CO Learning Level Index	CO Attainment
CO1. To understand the fundamental principles and techniques of recombinant DNA technology, including gene cloning, vectors, restriction enzymes, and polymerase chain reaction (PCR).	L-2,L-3, L-4	3	2.4100
CO2. To develop practical laboratory skills in manipulating DNA, such as cloning, transformation, gel electrophoresis, and DNA sequencing	L-2,L-3, L-4	3	2.4100
CO3. To apply rDNA technology in various fields such as medicine, agriculture, and environmental science.	L-1, L-2, L-4	2.3	2.5477
CO4. To design experiments, analyze data, and troubleshoot experimental issues. This is essential for conducting independent research and addressing real-world biological problems.	L-1,L-2, L-3	2.3	2.5477
CO5. To explore the ethical, legal, and social implications of rDNA technology. This includes understanding the regulatory frameworks, the potential risks and benefits of genetic engineering, and the importance of ethical considerations in scientific research.	L-2,L-4	3	2.4100

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘-‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	3	1	2
CO2	3	1	1	1	1	1	3	1	2
CO3	3	1	1	1	1	1	3	1	2
CO4	3	1	1	1	1	1	3	1	2
CO5	3	1	1	1	1	1	3	1	2
Total	15	5	5	5	5	5	15	5	10

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘-‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

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DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY

SEMESTER - V

CourseVIB-ELECTIVE 2–GENETICS

Course Outcomes:

Course Outcome Weighted Average: 2.46

Courseoutcomes–Mapping with Blooms Taxonomy levels		CO Learning Level Index	CO Attainment
CO1. Explain the structure and functions of genes and chromosomes	L-2,L-3	2.5	2.6143
CO2. Understand the laws and concepts of Mendelian inheritance, deviation from Mendel laws, concepts of linkage, autosomal and allosomal inheritance, and sex determination in different organisms	L-2,L-4	3	2.5371
CO3. Perform Karyotyping of different chromosome sets	L-1, L-2, L-4	2.3	2.6451
CO4. Understand the mechanism of different transposable elements and their roles.	L-1,L-2	1.5	2.7686
CO5. Explain the concept of DNA damage and Repair	L-2,L-4	3	2.5371

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	3
CO2	3	1	1	1	1	1	1	1	3
CO3	3	1	1	1	1	1	1	1	3
CO4	3	1	1	1	1	1	1	1	3
CO5	3	1	1	1	1	1	1	1	3
Total	15	5	5	5	5	5	5	5	15

CO-PSOMapping					
1-Low,2-Moderate, 3-High, '-NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

Dr.V.S.KRISHNA GOVERNMENT DEGREE AND PG COLLEGE(A), VSKP

DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER - VI

CourseVII–PLANT AND ANIMAL BIOTECHNOLOGY

Course Outcomes:

Course Outcome Weighted Average: 2.782

Courseoutcomes–MappingwithBloomsTaxonomy levels		CO Learning Level Index	CO Attainment
CO1. Understand the key developments in the sphere of Plant biotechnology.	L-2,L-3	2.5	2.8443
CO2. Illustrate the in vitro propagation of plants and their maintenance.	L-2,L-4	3	2.8131
CO3. Understand Tissue culture technique	L-1, L-2, L-4	2.3	2.8567
CO4. Understand the principles of intellectual property in the context of industrial biotechnology.	L-1,L-2, L-3	2	2.8754
CO5. Understand the ethics, biosafety measures concerned with biotechnology.	L-2,L-4	3	2.8131

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	1	1	1	1	1	1	3	1	1
CO2	1	1	1	1	1	1	3	1	1
CO3	1	1	1	1	1	1	3	1	1
CO4	1	1	1	1	1	1	3	1	1
CO5	1	1	1	1	1	1	3	1	1
Total	5	5	5	5	5	5	15	5	5

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

Dr.V.S.KRISHNA GOVERNMENT DEGREE AND PG COLLEGE(A), VSKP

DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER - VI

PAPERVIII CLUSTER-8-A1:CELL BIOLOGY

Course Outcomes:

Course Outcome Weighted Average: 2.7666

Courseoutcomes–MappingwithBloomsTaxonomy levels		CO Learning Level Index	CO Attainment
CO1. Understand the ultra structures and purposes of prokaryotic and eukaryotic cells .	L-1,L-2	1.5	2.9000
CO2. Compare and contrastprokaryotic and eukaryotic cells .	L-1,L-2	1.5	2.9000
CO3. Explain and draw the structures of cell organelles and locate their parts along with functions.	L-1, L-2, L-4	2.3	2.8466
CO4. Explain overall mechanism of sequential events of cell growth and cell division cycles.	L-1,L-2, L-3	2	2.8666
CO5. Explain the structure, types and functions of genes and chromosomes	L-2,L-4	3	2.7999

CO-PSOMapping					
1-Low,2-Moderate, 3-High, '- 'NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

PO Attainment									
1-Low,2-Moderate, 3-High, '- 'NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	3	3	1	1	1
CO2	3	1	1	1	3	3	1	1	1
CO3	3	1	1	1	3	3	1	1	1
CO4	3	1	1	1	3	3	1	1	1
CO5	3	1	1	1	3	3	1	1	1
Total Attainment	15	5	5	5	15	15	5	5	5

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DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER - VI

PAPERVIII CLUSTER-8-A2: GENE BIOTECHNOLOGY

Course Outcomes:

Course Outcome Weighted Average: 2.7746

Courseoutcomes–MappingwithBloomsTaxonomy levels		Average level Weightage	CO Attainment
CO1. Explain the structure and functions of genes and chromosomes	L-2,L-3	2.5	2.8319
CO2. Understand the laws and concepts of Mendelian inheritance, deviation from Mendel laws, concepts of linkage, autosomal and allosomal inheritance, and sex determination in different organisms	L-2,L-4	3	2.7982
CO3. Perform Karyotyping of different chromosome sets	L-1, L-2, L-4	2.3	2.8453
CO4. Understand the mechanism of different transposable elements and their roles	L-1,L-2	1.5	2.8991
CO5. Explain the concept of DNA damage and Repair	L-2,L-4	3	2.7982

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	3
CO2	3	1	1	1	1	1	1	1	3
CO3	3	1	1	1	1	1	1	1	3
CO4	3	1	1	1	1	1	1	1	3
CO5	3	1	1	1	1	1	1	1	3
Total	15	5	5	5	5	5	5	5	15

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

Dr.V.S.KRISHNA GOVERNMENT DEGREE AND PG COLLEGE(A), VSKP

DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER - VI, PAPERVIII

CLUSTER-8-A3: BIOSTATISTICS AND BIOINFORMATICS

Course Outcomes:

Course Outcome Weighted Average: 2.7484

Courseoutcomes–Mapping with Blooms Taxonomy levels		CO LearningLevel Index	CO Attainment
CO1. To become familiar with a variety of currently available genomic and proteomic databases.	L-2,L-3	2.5	2.8203
CO2. To be able to search and retrieve information from genomic and proteomic databases (e.g. GenBank, Swiss-Prot)	L-2,L-4	3	2.7843
CO3. To analyze their search results using software available on the internet (e.g. BLAST, ClustalW).	L-1, L-2, L-4	2.3	2.8347
CO4. To compare and analyze biological sequences and how to interpret the results of their analyses.	L-1,L-2, L-3	2	2.8562
CO5. Explain and draw the structures of cell organelles and locate their parts along with functions.	L-2,L-4	3	2.7843

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘-‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	3
CO2	3	1	1	1	1	1	1	1	3
CO3	3	1	1	1	1	1	1	1	3
CO4	3	1	1	1	1	1	1	1	3
CO5	3	1	1	1	1	1	1	1	3
Total	15	5	5	5	5	5	5	5	15

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘-‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

**Dr. V. S. Krishna Govt. Degree College (A)
Visakhapatnam**

DEPARTMENT OF BIOTECHNOLOGY



BOARD OF STUDIES 2020-21

COs & POs

Department of Biotechnology

Programme Name: **BSc. Biotechnology**

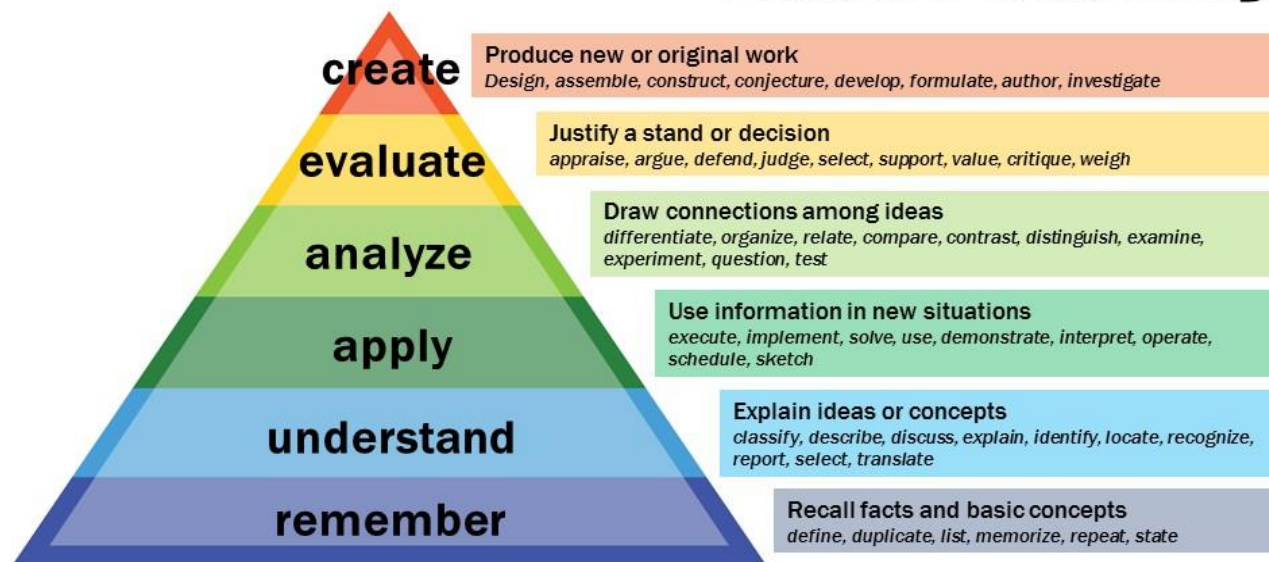
Programme outcomes

PO1	Critical Thinking: Ability to take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
PO2	Effective Communication: Ability to speak, read, write, and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media, and technology.
PO3	Social Interaction: Ability to elicit views of others, mediate disagreements and help reach conclusions in group settings.
PO4	Effective Citizenship: Ability to demonstrate empathetic social concern and equity centered national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
PO5	Ethics: Ability to recognize differential systems including your own, m.
PO6	Environment and Sustainability: Ability to understand the issues of environmental contexts and sustainable development
PO7	Employability skills: Equipping graduates with the essential abilities and knowledge to excel in their Chosen careers
PO8	Entrepreneurship skills: Seeks to empower students with the competencies needed to be successful entrepreneurs, enabling them to launch, operate, and innovate in their own businesses or entrepreneurial ventures.
PO9	Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes

Programme specific outcomes:	
PSO1	A student should be able to understand basic concepts in Biochemistry, Molecular Biology, Microbiology, rDNA technology and Industrial Technology
PSO2	A student should be able to design, execute, record and analyse the results of various experiments conducted during Practicals
PSO3	A student should be able to enter a workplace with the theory and practical knowledge in pharmaceuticals, environment related techniques and other related multidisciplinary areas.
PSO4	A Student should gain proficiency in regulations in safe handling of chemicals as well as biosafety issues relating to experiments
PSO5	Enabling students to develop an inquisitive attitude towards Biotechnology as an interesting and valuable subject of study.

Levels of Bloom's Taxonomy

Bloom's Taxonomy



Vanderbilt University Center for Teaching

Level-1	Knowledge/Remember
Level-2	Understand
Level-3	Application
Level-4	Analyze
Level-5	Evaluation
Level-6	Create

Dr.V.S.KRISHNA GOVERNMENT DEGREE AND PG COLLEGE(A),

VSKP

DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER I

Course I-MICROBIOLOGY & CELLBIOLOGY

Course Outcomes:

Course Outcome Weighted Average: 2.025

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Explain the different types of microscopes with their significance and importance.	L-2,L-3	2.5	2.3036
CO2. Explain basic microbial nutrition requirements and nutritional classification of bacteria and describe microbial growth, control (physical and chemical), maintenance of pure cultures and analyze cultural activity.	L-2,L-4	3	2.1643
CO3. Compare and contrast, structures and purposes of prokaryotic and eukaryotic cells and list their similarities and differences.	L-1, L-2, L-4	2.3	2.3593
CO4. Explain and draw the structures of cell organelles and locate their parts along with functions.	L-1,L-2, L-3	2	2.4429
CO5. Explain overall mechanism of sequential events of cell growth and cell division cycles.	L-2,L-4	3	2.1643

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	2
CO2	2	1	1	1	1	1	1	1	2
CO3	2	1	1	1	1	1	1	1	2
CO4	2	1	1	1	1	1	1	1	2
CO5	2	1	1	1	1	1	1	1	2
Total	11	5	5	5	5	5	5	5	10

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	1	3
CO2	3	3	1	1	3
CO3	3	3	1	1	3
CO4	3	3	1	1	3
CO5	3	3	1	1	3
Total	15	15	5	5	15

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B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER II

**CourseII–MACROMOLECULES, ENZYMOLOGY, BIOENERGETICS&
METABOLISM**

Course Outcomes:

Course Outcome Weighted Average: 2.0455

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Explain and classify different types of biomolecules (Amino acids, proteins, carbohydrates, lipids and vitamins)along with their significance	L-1,L-2	1.5	2.5909
CO2. Illustrate chemical structure of nitrogen bases, DNA and forces stabilizing the DNA	L-3,L-4	3.5	2.0455
CO3. Differentiate between different forms of DNA	L-1, L-2, L-4	2.3	2.3728
CO4. Explain enzymes with classification and nomenclature, enzyme kinetics	L-1,L-2, L-3	2	2.4546
CO5. Explain enzyme inhibition types along with significance.	L-1, L-2, L-3	2	2.4546

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	2
CO2	3	1	1	1	1	1	1	1	2
CO3	3	1	1	1	1	1	1	1	2
CO4	3	1	1	1	1	1	1	1	2
CO5	3	1	1	1	1	1	1	1	2
Total	15	5	5	5	5	5	5	5	10

CO-PSO Mapping					
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

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B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER III

CourseIII–BIOPHYSICAL TECHNIQUES

Course Outcomes:

Course Outcome Weighted Average: 2.0455

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Explain the differentiate absorption and emission spectra.	L-2,L-3	2.5	2.3182
CO2. Illustrate each region of electromagnetic spectrum for spectroscopy	L-2,L-4	3	2.1819
CO3. Explain and relate the concepts of radioactivity and its applications.	L-1, L-2, L-4	2.3	2.3728
CO4. Illustrate and differentiate blotting techniques along with their applications and significance	L-1,L-2, L-3	2	2.4546
CO5. Identify and differentiate working principle, instrumentation and applications of various bio-analytical instruments.	L-2,L-4	3	2.1819

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	2
CO2	3	1	1	1	1	1	1	1	2
CO3	3	1	1	1	1	1	1	1	2
CO4	3	1	1	1	1	1	1	1	2
CO5	3	1	1	1	1	1	1	1	2
Total	15	5	5	5	5	5	5	5	10

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

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DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER IV

Course IV– rDNA Technology

Course Outcomes:

Course Outcome Weighted Average: 2.7574

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Explain the differentiate absorption and emission spectra.	L-2,L-3, L-4	3	2.7921
CO2. Illustrate each region of electromagnetic spectrum for spectroscopy	L-2,L3,L-4	3	2.7921
CO3. Explain and relate the concepts of radioactivity and its applications.	L-1, L-2, L-4	2.3	2.8406
CO4. Illustrate and differentiate blotting techniques along with their applications and significance	L-1,L-2, L-3	2.3	2.8406
CO5. Identify and differentiate working principle, instrumentation and applications of various bio-analytical instruments.	L-2,L-4	3	2.7921

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	3	1	2
CO2	3	1	1	1	1	1	3	1	2
CO3	3	1	1	1	1	1	3	1	2
CO4	3	1	1	1	1	1	3	1	2
CO5	3	1	1	1	1	1	3	1	2
Total	15	5	5	5	5	5	5	5	10

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

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DEPARTMENT OF BIOTECHNOLOGY

**B.Sc BIOTECHNOLOGY
SEMESTER IV**

Course V – MOLECULAR BIOLOGY

Course Outcomes:

Course Outcome Weighted Average: 2.3857

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Explain the concept of gene and gene architecture.	L-2,L-4	3	2.4735
CO2. Demonstrate the overview of the central dogma of life and various molecular events.	L-2,L-4	3	2.4735
CO3. Illustrate molecular events in DNA synthesis, RNA synthesis and the role of different enzymes.	L-1, L-2, L-4	2.3	2.5963
CO4. Illustrate molecular events in protein synthesis and the role of different enzymes.	L-1,L-2, L-4	2.3	2.5963
CO5. Explain the regulation of gene expression in prokaryotes using operon concept.	L-2,L-4	3	2.4735

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	3
CO2	3	1	1	1	1	1	1	1	3
CO3	3	1	1	1	1	1	1	1	3
CO4	3	1	1	1	1	1	1	1	3
CO5	3	1	1	1	1	1	1	1	3
Total	15	5	5	5	5	5	5	5	15

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	1	3
CO2	3	3	1	1	3
CO3	3	3	1	1	3
CO4	3	3	1	1	3
CO5	3	3	1	1	3
Total	15	15	5	5	15

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DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER – V

Course VI – BIOINFORMATICS AND BIOSTATISTICS

Course Outcomes:

Course Outcome Weighted Average: 2.9608

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. To become familiar with a variety of currently available genomic and proteomic databases.	L-2,L-4	3	2.9664
CO2. To be able to search and retrieve information from genomic and proteomic databases (e.g. GenBank, Swiss-Prot),	L-2,L-4	3	2.9664
CO3. and to analyse their search results using software available on the internet (e.g. BLAST, ClustalW).	L-1, L-2, L-4	2.3	2.9742
CO4. To compare and analyse biological sequences and how to interpret the results of their analyses.	L-1,L-2, L-4	2.3	2.9742
CO5. To calculate Mean,Median,Mode, ANOVA and t Test	L-2,L-4	3	2.9664

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	3
CO2	2	1	1	1	1	1	1	1	3
CO3	2	1	1	1	1	1	1	1	3
CO4	2	1	1	1	1	1	1	1	3
CO5	2	1	1	1	1	1	1	1	3
Total	11	5	5	5	5	5	5	5	15

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	1	3
CO2	3	3	1	1	3
CO3	3	3	1	1	3
CO4	3	3	1	1	3
CO5	3	3	1	1	3
Total	15	15	5	5	15

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DEPARTMENT OF BIOTECHNOLOGY
B.Sc BIOTECHNOLOGY SYLLABUS
SEMESTER V

Course VII – INTRODUCTION TO DRUG DISCOVERY

Course Outcomes:

Course Outcome Weighted Average: 2.9217

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. To become familiar with a variety of currently available genomic and proteomic databases.	L-2,L-4	3	2.9329
CO2. To be able to search and retrieve information from genomic and proteomic databases (e.g. GenBank, Swiss-Prot),	L-2,L-4	3	2.9329
CO3. and to analyse their search results using software available on the internet (e.g. BLAST, ClustalW).	L-1, L-2, L-4	2.3	2.9485
CO4. To compare and analyse biological sequences and how to interpret the results of their analyses.	L-1,L-2, L-4	2.3	2.9485
CO5. To calculate Mean,Median,Mode, ANOVA and t Test	L-2,L-4	3	2.9329

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	3
CO2	3	1	1	1	1	1	1	1	3
CO3	3	1	1	1	1	1	1	1	3
CO4	3	1	1	1	1	1	1	1	3
CO5	3	1	1	1	1	1	3	1	3
Total	15	5	5	5	5	5	7	5	15

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘-‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

**Dr. V. S. Krishna Govt. Degree College (A)
Visakhapatnam**

DEPARTMENT OF BIOTECHNOLOGY



BOARD OF STUDIES 2021-22

COs & POs

Department of Biotechnology

Programme Name: **BSc. Biotechnology**

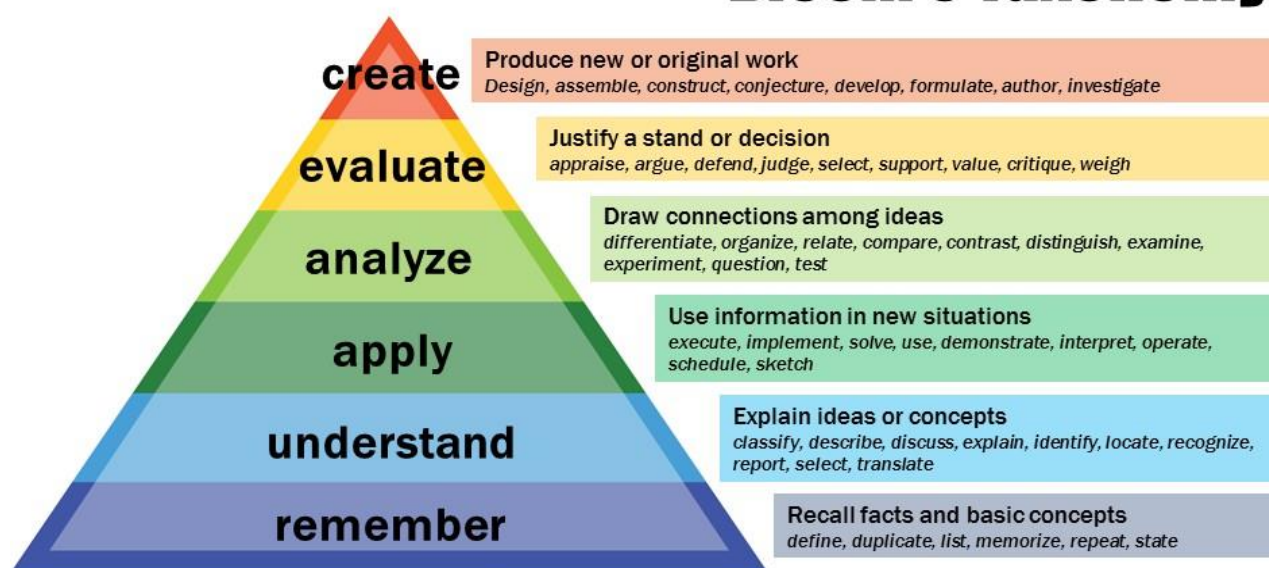
Programme outcomes

PO1	Critical Thinking: Ability to take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
PO2	Effective Communication: Ability to speak, read, write, and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media, and technology.
PO3	Social Interaction: Ability to elicit views of others, mediated in agreements and help reach conclusions in group settings.
PO4	Effective Citizenship: Ability to demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
PO5	Ethics: Ability to recognize different value systems including your own, understand the oral dimensions of your decisions, and accept responsibility for them.
PO6	Environment and Sustainability: Ability to understand the issues of environmental contexts and sustainable development.
PO7	Employability skills: Equipping graduates with the essential abilities and knowledge to excel in their Chosen careers.
PO8	Entrepreneurship skills: Seeks to empower students with the competencies needed to be successful entrepreneurs, enabling them to launch, operate, and innovate in their own businesses or entrepreneurial ventures.
PO9	Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes.

Programmespecificoutcomes:	
PSO1	A student should be able to understand basic concepts in Biochemistry, Molecular Biology, Microbiology, rDNA technology and Industrial Technology
PSO2	A studentshould be able to design, execute, record and analyse the results of various experiments conducted during Practicals
PSO3	A student should be able to enter a workplace with the theory and practical knowledge in pharmaceuticals, environment related techniques and other related multidisciplinary areas.
PSO4	A Student should gain proficiency in regulations in safe handling of chemicals as well s biosafety issues relating to experiments
PSO5	Enabling students to develop an inquisitive attitude towards Biotechnology as an interesting and valuable subject of study.

Levels of Bloom's Taxonomy

Bloom's Taxonomy



Vanderbilt University Center for Teaching

Level-1	Knowledge/Remember
Level-2	Understand
Level-3	Application
Level-4	Analyze
Level-5	Evaluation
Level-6	Create

Dr.V.S.KRISHNA GOVERNMENT DEGREE AND PG COLLEGE (A), VSKP

DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER I

Course I-MICROBIOLOGY&CELLBIOLOGY

Course Outcomes:

Course Outcome Weighted Average:2.153

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Explain the different types of microscopes with their significance and importance.	L-2,L-3	2.5	2.3950
CO2. Explain basic microbial nutrition requirements and nutritional classification of bacteria and describe microbial growth, control (physical and chemical), maintenance of pure cultures and analyze cultural activity.	L-2,L-4	3	2.2740
CO3. Compare and contrast, structures and purposes of prokaryotic and eukaryotic cells and list their similarities and differences.	L-1, L-2, L-4	2.3	2.4434
CO4. Explain and draw the structures of cell organelles and locate their parts along with functions.	L-1,L-2, L-3	2	2.5160
CO5. Explain overall mechanism of sequential events of cell growth and cell division cycles.	L-2,L-4	3	2.2740

CO-POMapping									
1-Low,2-Moderate, 3-High, '-' 'NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	2
CO2	2	1	1	1	1	1	1	1	2
CO3	2	1	1	1	1	1	1	1	2
CO4	2	1	1	1	1	1	1	1	2
CO5	2	1	1	1	1	1	1	1	2
Total	11	5	5	5	5	5	5	5	10

CO-PSOMapping					
1-Low,2-Moderate, 3-High, '-' 'NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	1	3
CO2	3	3	1	1	3
CO3	3	3	1	1	3
CO4	3	3	1	1	3
CO5	3	3	1	1	3
Total	15	15	5	5	15

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DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER II

CourseII–MACROMOLECULES,ENZYMOLGY,BIOENERGETICS & METABOLISM

Course Outcomes:

Course Outcome Weighted Average: 2.525

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Explain and classify different types of biomolecules (Amino acids, proteins, carbohydrates, lipids and vitamins)along with their significance	L-1,L-2	1.5	2.7964
CO2. Illustrate chemical structure of nitrogen bases, DNA and forces stabilizing the DNA	L-3,L-4	3.5	2.5250
CO3. Differentiate between different forms of DNA	L-1, L-2, L-4	2.3	2.6879
CO4. Explain enzymes with classification and nomenclature, enzyme kinetics	L-1,L-2, L-3	2	2.7286
CO5. Explain enzyme inhibition types along with significance.	L-1, L-2, L-3	2	2.7286

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	2
CO2	3	1	1	1	1	1	1	1	2
CO3	3	1	1	1	1	1	1	1	2
CO4	3	1	1	1	1	1	1	1	2
CO5	3	1	1	1	1	1	1	1	2
Total	15	5	5	5	5	5	5	5	10

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

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DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER III

CourseIII–BIOPHYSICAL TECHNIQUES

Course Outcomes:

Course Outcome Weighted Average: 2.0139

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Explain the differentiate absorption and emission spectra.	L-2,L-3	2.5	2.2956
CO2. Illustrate each region of electromagnetic spectrum for spectroscopy	L-2,L-4	3	2.1548
CO3. Explain and relate the concepts of radioactivity and its applications.	L-1, L-2, L-4	2.3	2.3520
CO4. Illustrate and differentiate blotting techniques along with their applications and significance	L-1,L-2, L-3	2	2.4365
CO5. Identify and differentiate working principle, instrumentation and applications of various bio-analytical instruments.	L-2,L-4	3	2.1548

CO-POMapping									
1-Low,2-Moderate, 3-High, '-' 'NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	2
CO2	3	1	1	1	1	1	1	1	2
CO3	3	1	1	1	1	1	1	1	2
CO4	3	1	1	1	1	1	1	1	2
CO5	3	1	1	1	1	1	1	1	2
Total	15	5	5	5	5	5	5	5	10

CO-PSOMapping					
1-Low,2-Moderate, 3-High, '-' 'NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

Dr.V.S.KRISHNA GOVERNMENT DEGREE AND PG COLLEGE(A),VSKP
DEPARTMENT OF BIOTECHNOLOGY
B.Sc BIOTECHNOLOGYS YLLABUS
SEMESTER IV
Course IV– rDNA Technology

Course Outcomes:

Course Outcome Weighted Average: 2.0727

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Explain the differentiate absorption and emission spectra.	L-2,L-3, L-4	3	2.2052
CO2. Illustrate each region of electromagnetic spectrum for spectroscopy	L-2, L3,L-4	3	2.2052
CO3. Explain and relate the concepts of radioactivity and its applications.	L-1, L-2, L-4	2.3	2.3906
CO4. Illustrate and differentiate blotting techniques along with their applications and significance	L-1,L-2, L-3	2.3	2.3906
CO5. Identify and differentiate working principle, instrumentation and applications of various bio-analytical instruments.	L-2,L-4	3	2.2052

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘-’NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	3	1	2
CO2	3	1	1	1	1	1	3	1	2
CO3	3	1	1	1	1	1	3	1	2
CO4	3	1	1	1	1	1	3	1	2
CO5	3	1	1	1	1	1	3	1	2
Total	15	5	5	5	5	5	15	5	10

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘-’NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

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DEPARTMENT OF BIOTECHNOLOGY
B.Sc BIOTECHNOLOGY
SEMESTER IV
Course V– MOLECULAR BIOLOGY

Course Outcomes:

Course Outcome Weighted Average: 2.3156

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Explain the concept of gene and gene architecture.	L-2,L-4	3	2.4134
CO2. Demonstrate the overview of the central dogma of life and various molecular events.	L-2,L-4	3	2.4134
CO3. Illustrate molecular events in DNA synthesis, RNA synthesis and the role of different enzymes.	L-1, L-2, L-4	2.3	2.5503
CO4. Illustrate molecular events in protein synthesis and the role of different enzymes.	L-1,L-2, L-4	2.3	2.5503
CO5. Explain the regulation of gene expression in prokaryotes using operon concept.	L-2,L-4	3	2.4134

CO-POMapping									
1-Low,2-Moderate, 3-High, '-' 'NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	3
CO2	3	1	1	1	1	1	1	1	3
CO3	3	1	1	1	1	1	1	1	3
CO4	3	1	1	1	1	1	1	1	3
CO5	3	1	1	1	1	1	1	1	3
Total	15	5	5	5	5	5	5	5	15

CO-PSOMapping					
1-Low,2-Moderate, 3-High, '-' 'NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	1	3
CO2	3	3	1	1	3
CO3	3	3	1	1	3
CO4	3	3	1	1	3
CO5	3	3	1	1	3
Total	15	15	5	5	15

Dr.V.S. KRISHNA GOVERNMENT DEGREE AND PG COLLEGE (A),VSKP

DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER – V

Course VI – BIOINFORMATICS AND BIOSTATISTICS

Course Outcomes:

Course Outcome Weighted Average: 2.9608

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. To become familiar with a variety of currently available genomic and proteomic databases.	L-2,L-4	3	2.9664
CO2. To be able to search and retrieve information from genomic and proteomic databases (e.g. GenBank, Swiss-Prot)	L-2,L-4	3	2.9664
CO3. and to analyse their search results using software available on the internet (e.g. BLAST, ClustalW).	L-1, L-2, L-4	2.3	2.9742
CO4. To compare and analyse biological sequences and how to interpret the results of their analyses.	L-1,L-2, L-4	2.3	2.9742
CO5. To calculate Mean,Median,Mode, ANOVA and t Test	L-2,L-4	3	2.9664

CO-POMapping									
1-Low,2-Moderate, 3-High, '-' 'NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	3
CO2	2	1	1	1	1	1	1	1	3
CO3	2	1	1	1	1	1	1	1	3
CO4	2	1	1	1	1	1	1	1	3
CO5	2	1	1	1	1	1	1	1	3
Total	11	5	5	5	5	5	5	5	15

CO-PSOMapping					
1-Low,2-Moderate, 3-High, '-' 'NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	1	3
CO2	3	3	1	1	3
CO3	3	3	1	1	3
CO4	3	3	1	1	3
CO5	3	3	1	1	3
Total	15	15	5	5	15

Dr. V. S. KRISHNA GOVERNMENT DEGREE AND PG COLLEGE (A), VSKP
DEPARTMENT OF BIOTECHNOLOGY
B.Sc BIOTECHNOLOGY SYLLABUS
SEMESTER V

Course VII – INTRODUCTION TO DRUG DISCOVERY

Course Outcomes:

Course Outcome Weighted Average: 2.7856

Course outcomes - Correlation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. To become familiar with a variety of currently available genomic and proteomic databases.	L-2,L-4	3	2.8162
CO2. To be able to search and retrieve information from genomic and proteomic databases (e.g. GenBank, Swiss-Prot),	L-2,L-4	3	2.8162
CO3. and to analyse their search results using software available on the internet (e.g. BLAST, ClustalW).	L-1, L-2, L-4	2.3	2.8591
CO4. To compare and analyse biological sequences and how to interpret the results of their analyses.	L-1,L-2, L-4	2.3	2.8591
CO5. To calculate Mean,Median,Mode, ANOVA and t Test	L-2,L-4	3	2.8162

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	3
CO2	3	1	1	1	1	1	1	1	3
CO3	3	1	1	1	1	1	1	1	3
CO4	3	1	1	1	1	1	1	1	3
CO5	3	1	1	1	1	1	3	1	3
Total	15	5	5	5	5	5	7	5	15

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

**Dr. V. S. Krishna Govt. Degree College (A)
Visakhapatnam**

DEPARTMENT OF BIOTECHNOLOGY



BOARD OF STUDIES 2022-23

POs & COs

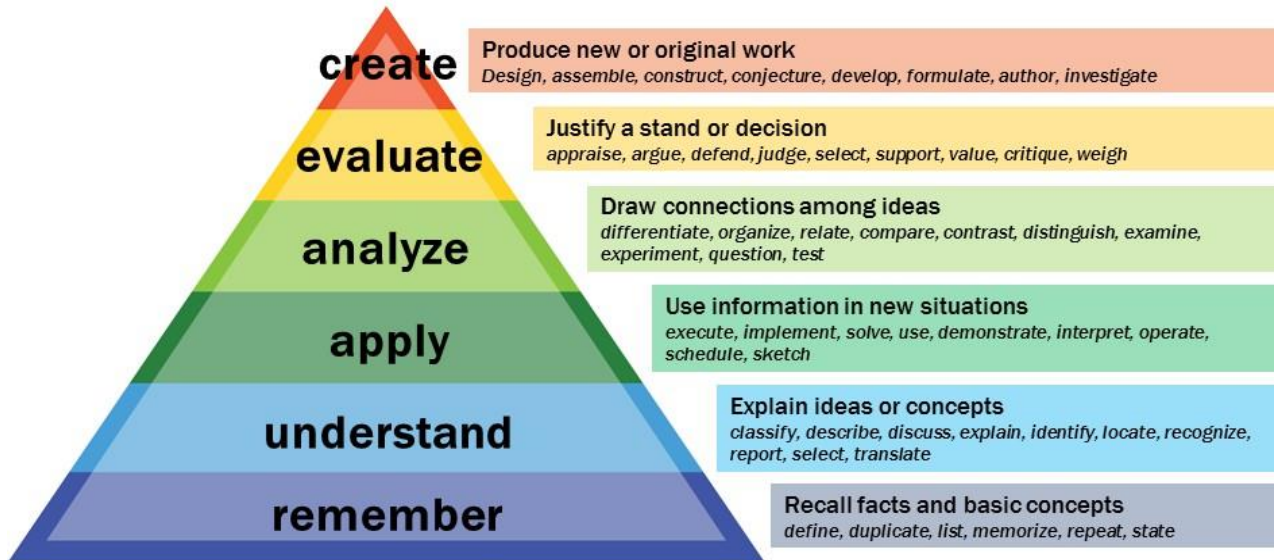
Department of Biotechnology

Programme Name: **BSc. Biotechnology**

Programme outcomes

PO1	Critical Thinking: Ability to take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
PO2	Effective Communication: Ability to speak, read, write, and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media, and technology.
PO3	Social Interaction: Ability to elicit views of others, mediated agreements and help reach conclusions in group settings.
PO4	Effective Citizenship: Ability to demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
PO5	Ethics: Ability to recognize different value systems including your own, understand the oral dimensions of your decisions, and accept responsibility for them.
PO6	Environment and Sustainability: Ability to understand the issues of environmental contexts and sustainable development
PO7	Employability skills: Equipping graduates with the essential abilities and knowledge to excel in their Chosen careers
PO8	Entrepreneurship skills: Seeks to empower students with the competencies needed to be successful entrepreneurs, enabling them to launch, operate, and innovate in their own businesses or entrepreneurial ventures.
PO9	Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes

Bloom's Taxonomy



Vanderbilt University Center for Teaching

L-1	Knowledge/Remember
L-2	Understand
L-3	Application
L-4	Analyze
L-5	Evaluation
L-6	Create

Dr.V.S.KRISHNA GOVERNMENT DEGREE AND PG COLLEGE(A), VSKP

DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER I

Course I – CELL BIOLOGY & GENETICS

Course Outcomes

Course Outcome Weighted Average: 1.8977

Course outcomes - Corelation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1.Compare and contrast, ultra structures and purposes of prokaryotic and eukaryotic cells and list their similarities and differences.	L-2,L-3	2.5	2.2126
CO2.Explain and draw the structures of cell organelles and locate their parts along with functions.	L-2,L-4	3	2.0552
CO3. Explain overall mechanism of sequential events of cell growth and cell division cycles.	L-1, L-2, L-4	2.3	2.2756
CO4. Explain the structure and functions of genes and chromosomes	L-1,L-2, L-3	2	2.3701
CO5. Understand the laws and concepts of Mendelian inheritance, deviation from Mendel laws, concepts of linkage, autosomal and allosomal inheritance and sex determination in different organisms	L-2,L-4	3	2.0552

CO-PO Mapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	2
CO2	2	1	1	1	1	1	1	1	2
CO3	2	1	1	1	1	1	1	1	2
CO4	2	1	1	1	1	1	1	1	2
CO5	2	1	1	1	1	1	1	1	2
Total	11	5	5	5	5	5	5	5	10

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘-‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	1	3
CO2	3	3	1	1	3
CO3	3	3	1	1	3
CO4	3	3	1	1	3
CO5	3	3	1	1	3
Total	15	15	5	5	15

Dr.V.S.KRISHNA GOVERNMENT DEGREE AND PG COLLEGE(A), VSKP

DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER II

Course II – MICROBIOLOGY AND IMMUNOLOGY

Course Outcomes:

Course Outcome Weighted Average: 2.0142

Courseout comes - Correlation with Blooms Taxonomy	Levels	CO Learning Level Index	CO Attainment
CO1.Explain basic microbial nutrition requirements and nutritional classification of bacteria.	L-1,L-2	1.5	2.5775
CO2.Illustrate microbial growth, control (physical and chemical), and maintenance of pure cultures and analyze cultural activity.	L-3,L-4	3.5	2.0142
CO3.Define central immunological principles and concepts.	L-1, L-2, L-4	2.3	2.3522
CO4. Illustrate immunological processes and identify immune responses at a cellular L and molecular L. Explain enzymes with classification and nomenclature, enzyme kinetics	L-1,L-2, L-3	2	2.4367
CO5. Illustrate immunological processes and identify immune responses at a cellular L and molecular L.	L-1, L-2, L-3	2	2.4367

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	2
CO2	3	1	1	1	1	1	1	1	2
CO3	3	1	1	1	1	1	1	1	2
CO4	3	1	1	1	1	1	1	1	2
CO5	3	1	1	1	1	1	1	1	2
Total	15	5	5	5	5	5	5	5	10

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

Dr V.S.KRISHNA GOVERNMENT DEGREE AND PG COLLEGE (A), VSKP

DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS
SEMESTER III

Course III: BIOCHEMISTRY AND BIOPHYSICAL TECHNIQUES

Course Outcomes:

Course Outcome Weighted Average: 2.5054

Courseout comes - Corelation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Explain various metabolic pathways with significance and regulation	L-2,L-3	2.5	2.6467
CO2.Explain various metabolic pathways with significance and regulation	L-2,L-4	3	2.5761
CO3. Illustrate each region of electromagnetic spectrum for spectroscopy	L-1, L-2, L-4	2.3	2.6750
CO4. Explain and relate the concepts of radioactivity and its applications.	L-1,L-2, L-3	2	2.7174
CO5. Illustrate and differentiate blotting techniques along with their applications and significance	L-2,L-4	3	2.5761

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	2
CO2	3	1	1	1	1	1	1	1	2
CO3	3	1	1	1	1	1	1	1	2
CO4	3	1	1	1	1	1	1	1	2
CO5	3	1	1	1	1	1	1	1	2
Total	15	5	5	5	5	5	5	5	10

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

Dr.V.S.KRISHNA GOVERNMENT DEGREE AND PG COLLEGE(A),VSKP

DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER IV

Course IV – MOLECULAR BIOLOGY AND RECOMBINANT DNA TECHNOLOGY

Course Outcomes

Course Outcome Weighted Average: 1.881

Courseoutcomes - CorelationwithBloomsTaxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Illustrate molecular events in DNA synthesis, RNA synthesis, and protein synthesis and the role of different enzymes.	L-2,L-3, L-4	3	2.0409
CO2. Explain the regulation of gene expression in prokaryotes using the operon concept.	L-2,L3,L-4	3	2.0409
CO3. To apply rDNA technology in various fields such as medicine, agriculture, and environmental science.	L-1, L-2, L-4	2.3	2.2647
CO4. To design experiments, analyze data, and troubleshoot experimental issues. This is essential for conducting independent research and addressing real-world biological problems.	L-1,L-2, L-3	2.3	2.2647
CO5. Toexplore the ethical, legal, and social implications of rDNA technology. This includes understanding the regulatory frameworks, the potential risks and benefits of genetic engineering, and the importance of ethical considerations in scientific research.	L-2,L-4	3	2.0409

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	3	1	2
CO2	3	1	1	1	1	1	3	1	2
CO3	3	1	1	1	1	1	3	1	2
CO4	3	1	1	1	1	1	3	1	2
CO5	3	1	1	1	1	1	3	1	2
Total	15	5	5	5	5	5	15	5	10

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

Dr.V.S.KRISHNA GOVERNMENT DEGREE AND PG COLLEGE(A), VSKP

DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY

SEMESTER IV

Course V – BASICS IN BIOTECHNOLOGY

Course Outcomes:

Course Outcome Weighted Average: 1.881

Course outcomes - Corelation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. Be familiar with fermentation technology and the issues surrounding industrial scale up.	L-2,L-4	3	
CO2. Know how animal cells can be used as vehicles for the production of products of interest for industry and medicines.	L-2,L-4	3	
CO3. Understand the key developments in the sphere of Plant biotechnology.	L-1, L-2, L-4	2.3	
CO4.Understand the principles of intellectual property in the context of industrial biotechnology.	L-1,L-2, L-4	2.3	
CO5.Understandthe ethics concerned with biotechnology.	L-2,L-4	3	

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘ - ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	3
CO2	3	1	1	1	1	1	1	1	3
CO3	3	1	1	1	1	1	1	1	3
CO4	3	1	1	1	1	1	1	1	3
CO5	3	1	1	1	1	1	1	1	3
Total	15	5	5	5	5	5	5	5	15

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘ - ‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

Dr.V.S.KRISHNA GOVERNMENT DEGREE AND PG COLLEGE(A),VSKP

DEPARTMENT OF BIOTECHNOLOGY

B.Sc BIOTECHNOLOGY SYLLABUS

SEMESTER – V

Course VI – BIOINFORMATICS AND BIOSTATISTICS

Course Outcomes:

Course Outcome Weighted Average: 1.881

Courseoutcomes - CorelationwithBloomsTaxonomy Levels		CO Learning Level Index	CO Attainment
CO1. To become familiar with a variety of currently available genomic and proteomic databases.	L-2,L-4	3	2.0409
CO2. To be able to search and retrieve information from genomic and proteomic databases (e.g. GenBank, Swiss-Prot),	L-2,L-4	3	2.0409
CO3. To analyse their search results using software available on the internet (e.g. BLAST, ClustalW).	L-1, L-2, L-4	2.3	2.2647
CO4. To compare and analyse biological sequences and how to interpret the results of their analyses.	L-1,L-2, L-4	2.3	2.2647
CO5. To calculate Mean,Median,Mode, ANOVA and t Test	L-2,L-4	3	2.0409

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘No Correlation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	3
CO2	3	1	1	1	1	1	1	1	3
CO3	3	1	1	1	1	1	1	1	3
CO4	3	1	1	1	1	1	1	1	3
CO5	3	1	1	1	1	1	1	1	3
Total	15	5	5	5	5	5	5	5	15

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15

Dr. V. S. KRISHNA GOVERNMENT DEGREE AND PG COLLEGE (A), VSKP
DEPARTMENT OF BIOTECHNOLOGY
B.Sc BIOTECHNOLOGY SYLLABUS
SEMESTER V

Course VII – INTRODUCTION TO DRUG DISCOVERY

Course Outcomes:

Course Outcome Weighted Average: 1.881

Course outcomes - Corelation with Blooms Taxonomy Levels		CO Learning Level Index	CO Attainment
CO1. To enable to explore bioinformatics web portals, databases and tools.	L-2,L-4	3	2.0409
CO2. To perform various insilico analysis for gene structure and function prediction, target identification for drug designing	L-2,L-4	3	2.0409
CO3. To gain insights to interpret the output from bioinformatics tools to make meaningful predictions in Drug discovery.	L-1, L-2, L-4	2.3	2.2647
CO4. To compare and analyse biological sequences and how to interpret the results of their analyses.	L-1,L-2, L-4	2.3	2.2647
CO5. To understand molecular docking and QSAR	L-2,L-4	3	2.0409

CO-POMapping									
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	1	1	1	1	1	1	1	3
CO2	3	1	1	1	1	1	1	1	3
CO3	3	1	1	1	1	1	1	1	3
CO4	3	1	1	1	1	1	1	1	3
CO5	3	1	1	1	1	1	3	1	3
Total	15	5	5	5	5	5	7	5	15

CO-PSOMapping					
1-Low,2-Moderate, 3-High, ‘- ‘NoCorrelation					
	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	1	1	3
CO2	3	1	1	1	3
CO3	3	1	1	1	3
CO4	3	1	1	1	3
CO5	3	1	1	1	3
Total	15	5	5	5	15