EKLAVYA UNIVERSITY, DAMOH (M.P.)

Scheme of Examination B.Sc I Year

/For batch admitted in Academic Session 2020-21/

Subject wise distribution of marks and corresponding credits

S. No.	Subject Name	Subject Code	Paper Name	Maximum Marks Allotted											Total Marks	Contact Periods Per week			Total Credits
				Theory Slot									Practical Slot						
				Final Yearly				Half Yearly				Quiz/ Assignment/ Attendence	End Sem	Lab Work/ Sessional		L	T	P	
				P1	P2	P3	P4	P1	P2	P3	P4								
1	Common	BAECC20Y101	Environmental and Disaster Management (University Core Under Ability Enhancement Course (AEC-1)	60				30				10			100	2	0	0	2
		BAECC20Y102	Communication Theory (University Core under Ability Enhancement Course (AEC-2)	60				30				10			100	4	0	0	4
		BYOGA20Y101	Yoga- 1 (University Core)	–	–	–		–	–	–		–	60	40	100	2	0	0	2
2	Biotechnology	BBIOT20Y101	Cell Structure and Biology (Paper- I) (Core Course - 5A)	30				15				5			50	3	1	0	4
		BBIOT20Y102	Microbiology (Paper-II) (Core Course - 5B)		30				15			5			50	3	1	0	4
		BBIOT20Y103	Paper- I and Paper- II, Practical (Practical 5A & 5 B, Core Course 5C)										30	20	50	0	0	2	2
		BBIOT20Y104	Microbial Biochemistry and Immunology (Paper-III) (Core Course - 5D for Honors)			30				15		5			50	3	1	0	4
		BBIOT20Y105	Paper-III, Practical (Practical 5D for Honours, Core Course 5E)										30	20	50	0	0	1	1
3	Common	BASPR20Y101	Assingment Presentation for 3 Core Courses											50	50	0	3	0	3

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiencey Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations.

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ज्ञान प्राप्तये लक्ष्य संधानम्
Estd. by Madhya Pradesh Niji Vishwavidyalaya (Sthapna Avam Sanchalanat Adhyadesh) 2020

School of Basic and Applied Sciences

Class	**B.Sc. (Biotechnology)**
Semester/Year	**I Year**
Subject & Subject Code	**Biotechnology- BBIOT20Y101**
Paper	**Cell Structure and Biology (Paper- I)**
Max. Marks	**30 (ETE) + 20(IA) = 50**

Credit			Total Credits
L	T	P	4
3	1	0	

Course Objectives:

Students will understand the structures and purposes of various components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles . Students will understand how these cellular components are used to generate and utilize energy in cells. Students will understand the cellular components underlying mitotic cell division. Students will apply their knowledge of cell biology to selected examples of changes or losses in cell function. These can include responses to environmental or physiological changes, or alterations of cell function brought about by mutation.

Course Outcome:

At the end of the course, learners will be able to:

1:To understand the basic unit of the organism.
2:To differentiate the organisms by its cell structure.
3:To know Components of the Cell and their division.
4:To Understand about the Nucleic acids.
5:To know the structure of nucleic acid, types of Nucleic acid and its Forms.
6:To explain genome organization in Prokaryotes and Eukaryotes.
7:Discuss and differentiate the basic structure and function of cell components in prokaryotes and eukaryotes cells.
8:Analyse the functioning of life at cellular level.

Student Learning Outcomes (SLO):

Students will:

- Understand and utilize the scientific vocabulary used in communicating information in cell and molecular biology
- Understand and apply general concepts of cell and molecular biology to relevant, specific problems
- Describe and discuss the properties and biological significance of the major classes of molecules found in living organisms and the relationship between molecular structure and biological function
- Represent and illustrate the structural organization of genes and the control of gene expression
- Conceptualize and describe protein structure, folding and sorting
- Explain the structure of membranes and intracellular compartments and relate to their function.
- Summarize the processes of energy transduction in cells and explain their significance.
- Relate how cell movement and cell-cell communication occur and discuss mechanisms of signal transduction
- Outline the processes that control eukaryotic cell cycle and cell death.
- Link the rapid advances in cell and molecular biology to a better understanding of diseases, including cancer.

Unit	Syllabus	Periods

UNIT - I	Cell Structure Theory, Structure of Prokaryotic cell, Eubacteria and Archaebacteria. Size, Shape and arrangement of bacterial cells. Gram's positive and Gram's negative bacterial cell. Difference between prokaryotic and eukaryotic cells.	15
UNIT - II	Structure and function of bacterial cell - flagella, pili. Cell wall, cytoplasmic membrane Nuclear region. Mesosomes, ribosomes, vacuoles. Metachromatic granules. Spores and cysts. Structure and function of eukaryotic cell - Cell wall, cell membrane, mitochondria, chloroplast, endoplamic reticulum, Golgi bodies, nucleus, cytokeleton, microbodies, Centriole, Lysosome.	15
UNIT - III	Cell cycle and cell division – mitosis,meiosis. Anomalies in cell division and associated diseases. Cell synchrony, Cell -Cell interactions, Cell locomotion, Cell differentiation.	15
UNIT - IV	Transport Process - Membrane : Models of membrane structure, Membrane proteins and their properties Membrane carbohydrates and their roles. Transport across membrances. Active and passive diffusion and its mechanisms.	15
UNIT - V	Introduction to Necrosis, Senescence. Apoptosis - Programmed cell death. Mechanism of Apoptosis, Intrinsic & Extrinsic pathways of cell death, Apoptosis in relation to Cancer, Oncogenes - Types of cancer.	15

TEXT BOOKS –

1. Cell and Molecular Biology by P.K. Gupta.
2. Cell and Molecular Biology by S.C. Rastogy.
3. Molecular Biology and of Cells by Alberts's.
4.Cell Biology by P.S. Verma & Agrawal.

REFERENCE BOOKS –

1. Benjamin Lewin, GeneVII, Oxford University Press, (2000).
2. BruceAlberts,AlexanderJohnson,JulianLewis,MartinRaff,KeithRoberts,PeterWalter, Molecular biologyoftheCell, 4th Edition. Garland publishing Inc. (2002).
3. Darnell,LodishandBaltimore, MolecularCellBiology, ScientificAmericanPublishingInc. (2000).
4. Watson.J.D,Baker.T.A,Bell.S.P,Gann.A.Levine.M.Losick.R, Molecular BiologyofGene, 5th Edition. The Benjamin/CummingsPub.Co.Inc. (2003).
5. BrownT.A., GeneCloningand DNA analysis. 2nd Edition,ASMpress. (2004).

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School of Basic and Applied Sciences

Class			**B.Sc. (Biotechnology)**
Semester/Year			**I Year**
Subject & Subject Code			**Biotechnology- BBIOT20Y102**
Paper			**Microbiology (Paper-II)**
Max. Marks			**30 (ETE) + 20(IA)**
Credit			**Total Credits**
L	**T**	**P**	**4**
3	1	0	

Course Objectives:

The candidate will gain knowledge about the structure of bacteria, fungi, algae, protozoa and viruses along with the basic principles of microscopy. Pupil will learn about various method involved in Control of microbial growth by physical and chemical methods plus the use of antibiotics and their efficacy testing are also emphasized. Cultivation of microbes is discussed.

Course Outcome:

At the end of the course, learners will be able to:

1. Gain knowledge on various classes of microorganisms; their structure extracellular and intracellular components, cultural characteristics and their growth conditions.
2. Know about the different parts and working mechanisms of basic light microscope up to electron microscopes with deep knowledge on the sample preparation and various staining techniques.
3. Acquire knowledge on sterilization techniques with adequate information on aseptic conditions.
4. Know about different classes of antibiotics and their mode of actions, treatment strategies and detection of resistant forms of bacteria from clinical settings.
5. Microbial culture media and pure culture techniques for aerobic and anaerobic bacteria.

Student Learning Outcomes (SLO):

Students will develop :

Nature of Science and Scientific Inquiry: Microbiology majors should be able to discuss science and scientific methodology as a way of knowing. Microbiology majors should make observations, develop hypotheses, and design and execute experiments using appropriate methods. They should be able to explain how the nature of science is applied to every day problems.

Laboratory Skills: Microbiology students should master the following laboratory skills: aseptic and pure culture techniques, preparation of and viewing samples for microscopy, use appropriate methods to identify microorganisms, estimate the number of microorganisms in a sample, and use common lab equipment. They should practice safe microbiology, using appropriate protective and emergency procedures.

Problem-Solving Skills: Microbiology majors should be competent problem-solvers. They should be able to assess the elements of a problem and develop and test a solution based on logic and the best possible information. Microbiology students should be able to analyze and interpret results form a variety of microbiological methods, and apply these methods to analogous situations.

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Unit	Syllabus	Periods
UNIT - I	Introduction of Microbiology - History, Applications & Status of Microbiology in India. Classification of Microorganisms - General Features and identification of Bacteria and study of Bergey's manual of systematic study.	15
UNIT - II	Structure and Diversity of Bacteria & Virus, Microbes in extreme environment. Nutritional requirement of microbes. Bacteriology : Morphology and physiology and biochemical study, Archaebacteria. Structure and function of cell organelles.	15
UNIT - III	Structure and Diversity of Algae. Fungi. Protozoans, Mycoplasmas and Extremophiles.General Characteristics. Various methods of staining - simple, Gram staining, endospore. Capsule, flagella and negative staining. Fungal stains. Algal stains.	15
UNIT - IV	Microbial growth - mathematical expression of growth. Growth curve. Factors affecting growth. Batch. Continuous, synchronous and diauxic growth. Quantification of microbial growth. Control of micro organisms - Physical & Chemical, Evaluation of chemical disinfectants tube dilution test. agar diffusion test and phenol - coefficient.	15
UNIT - V	Microbial Nutrition and metabolism - Microbial Metabolism- Concept of Anabolism & catabolism Processes. Nitrogen Fixation - Types and mechanisms, Microbial disease in plants & Animals (Only General concept). Fermentation Process - Fermenter & its microbes of industrial importance.	15

TEXT BOOKS –

1. Applied Microbiology by P.D. Sharma
2. Microbiology Fundamentals & Applications by S.S. Purohit
3. Text book of Microbiology by R.C. Dubey
4. A Text book of Microbiology by Dubey and Maheshwari
5. Microbiology by P.D. Sharma
6. General Microbiology Vol I & II by Pawar & Dagniwala.
7. Modern Concept of Microbiology by H.D. Kumar & Swati Kumar

REFERENCE BOOKS –

1. General Microbiology by Pawar & Dagniwala.
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School of Basic and Applied Sciences

Class				**B.Sc. (Biotechnology)**
Semester/Year				**I Year**
Subject & Subject Code				**Practical Biotechnology- BBIOT20Y103**
Paper				**Paper- I and Paper- II, Practical**
Max. Marks				**50= (30+20)** (ETE + IA)
L	**T**	**P**	**2**	
0	0	2		

PRACTICALS

1 Study of important instruments used in laboratory.
(a) Laminar air flow (b) Incubator (c) Autoclave (d) Spectrophotometer (e) pH Meter
(f) Hot air oven (g) Colony Counter (h) Water both (i) Compound microscope (j) Seitz filter
(k) Camera Leucida

2 Important Glasswares used in laboratory.
(a) Petridish (b) Watch Glass (c) Beakers (d) Culture Tube(e) Slides (f) Measuring Cylinder (g) Test Tube (h) Cavity Slide (i) Screw Cap tube (j) Pipettes (k) Cover Slips (l) Glass Spreader, Loops & Needle (m) Pasteur pipettes (n) Conical Flask (o) Glass jar

3 To study the plant cell structure using various plant materials.

4 Prepare slide for study of stomata.

5 Demonstration of Osmosis.

6 Study of plasmolysis and de-plasmolysis.

7 Study of structure of any prokaryotic and Eukaryotic cell.

8 Viable cell counting using haematocytometer.

9 Measurement of cell by light microscope. Calibration of ocular micrometer, finding out average cell size.

10 Cell division in onion root tip/Allium cipa.

11 Isolation of Microbes from Air, Water and Soil.

12 To Study microbial cell by Monochrome staining and Gram staining.

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School of Basic and Applied Sciences

Class				**B.Sc. Biotechnology (Honours)**
Semester / Year				**I Year**
Subject & Subject code				**Biotechnology Honours - BMBIO20Y104**
Paper				**Microbial Biochemistry and Immunology (Paper-III)**
Max. Marks				**30 (ETE) + 20 (IA) = 50**
Credit			**Total Credits**	
L	**T**	**P**	**4**	
3	1	0		

Course Objectives:

This course deals with characteristics, properties and biological significance of the biomolecules of life. In depth knowledge of the energetic and regulation of different metabolic processes in microorganisms.The candidate will gain knowledge about Immunity, organs of immunity and cells involved. Types of antigens and immunoglobulins. Antigen- antibody reactions and assays. MHC and its significance.

Course Outcome:

At the end of the course, learners will be able to:

1. Basic understanding of carbohydrates.
2. Grasp the information on carbohydrate metabolism.
3. Gain the basic knowledge on protiens.
4. Obtain knowledge on structure, classification & biological roles of proteins.
5. Obtaining in-depth information on lipids and their classification.
6. Assimilate knowledge on biosyntheisi and metabolism of lipids .
7. Grasp the basic knowledge on DNA & RNA and their biosynthesis
8. Know how MHC functions in the immune system.
9. Gain knowledge on vaccines, toxoids and immunotherapy.

Student Learning Outcomes (SLO):

Students will:

1. Be able to describe a standard carbohydrate and the different bonding patterns that lead to different attributes or uses.
2. Be able to describe the four classes of lipids and how each is used in a biological system.
3. They will study the properties of carbohydrates, proteins, lipids, cholesterol, DNA, RNA, glycoproteins and glycolipids and their importance in biological systems.
4. Demonstrate a thorough knowledge of the intersection between the disciplines of Biology and Chemistry.
5. Compare and contrast innate and adaptive immunity.
6. Describe which cell types and organs present in the immune response.

Unit	Syllabus	Periods
UNIT - I	**CARBOHYDRATES :** Classification, chemical structure and properties of monosaccharides, oligosaccharides and polysaccharides.	15

Unit	Syllabus	Periods
UNIT - II	**LIPIDS AND NUCLEIC ACIDS :** Saturated and unsaturated fatty acids- Structure, Classification, Properties and Functions of lipids. Structure and properties of purines and pyrimidines. Structure and types of nucleic acids.	15
UNIT - III	**PROTEINS :** Structure, classification and properties of amino acids. Classification and propeties of proteins- primary, secondary and tertiary structure of proteins.	15
UNIT - IV	**ENZYMES :** Classification of enzymes, coenzymes and cofactors. Mechanism of enzyme action. Competitive and non competitive inhibitions, allosteric regulation of enzymes, isoenzymes, factors affecting enzyme action.	15
UNIT - V	**IMMUNOLOGY :** History & Scope of Immunology. Antigens - types of antigens, antigenic determination, determinants of antigenicity. Antobodies -nature, function, structure of immunoglobulin, types of Ig and abnormal immunoglobulins. Production of vaccines & Monoclonal antibodies. Antigen and antibody reactions - precipitation, agglutination, neutralization, opsonisation. Iimmunodiffusion. Immunoelectrophoresis, ELISA.	15

Text Books–

1 Fudamentalof Biochemistrty by J.L. jain

2 Biochemistry by Voet and Voet.

3 Microbial Genetics by Freifelder

4 Textbook of microbiolog by Dubey and Maheshwari

Reference Books–

1 (2004).

2 Stanbury, Biochemistry

3 Voet. Fundamentals of biochemistry Wiley

4 M.M. Cox, D. L. Nelson.Lehninger's principles of biochemistry. W H Freeman

5 Stryer. Biochemistry W H Freeman .

6 A Biologists guide to principles and techniques of practical biochemistry, K.W. KH Goulding, ELBS edition, 1986

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School of Basic and Applied Sciences

Class				**B.Sc. (Biotechnology Honours)**
Semester/Year				**I Year**
Subject & Subject Code				**Practical Biotechnology Honours - BBIOT20Y105**
Paper				**Paper-III, Practical**
Max. Marks				**30 (ETE) + 20 (IA) =50**
L	**T**	**P**	**1**	
0	0	1		

PRACTICALS

1 Qualitative and Quantiative estimation of carbohydrates.

2 Qualitative and Quantitative estimation of proteins.

3 Qualitative estimation of lipids.

4 Titration of amino acids.

5 Quantitative estimation of carbohydrates by DNSA method.

6 Production of extracellular enzyme Amylase by microorganisms.

7 Determination of acromic point of amylase by iodine.

8 Separation of amino acid by paper chromatography.

9 Reaction of amino acids, sugars and lipids.