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	Microbiology	BMBIO20Y101	Fundamentals of Industrial Microbiology &Techniques (Paper - I) (Core Course - 4A)	30				15				5			50	3	1	0	4
		BMBIO20Y102	Microbial Biochemistry and Immunology (Paper-II) (Core Course - 4B)		30				15			5			50	3	1	0	4
		BMBIO20Y103	Paper- I and Paper- II, Practical (Practical 4A & 4B, Core Course 4C)										30	20	50	0	0	2	2
		BMBIO20Y104	Cell Structure and Biology (Paper - III) (Core Course - 4D for Honors)			30				15		5			50	3	1	0	4
		BMBIO20Y105	Paper - III, Practical (Practical 4D for Honours, core Course 4E)										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 (Bhopal Avam Sanchalanal Adhyadesh, 2020

School of Basic and Applied Sciences

Class	**B.Sc. Microbiology**
Semester / Year	**I Year**
Subject & Subject code	**Microbiology - BMBIO20Y101**
Paper	**Fundamentals of Industrial Microbiology &Techniques (Paper - I)**
Max. Marks	30 (ETE) + 20 (IA) = 50

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. Control of microbial growth by physical and chemical methods plus the use of antibiotics and their efficacy testing are 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 of the sample preparation and staining techniques.

3: Acquire knowledge on sterilization techniques with adequate information on sterile and 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: Know about microbial culture media and pure culture techniques for aerobic and anaerobic cultivation methods of bacteria.

Student Learning Outcomes (SLO):

Students will learn about:

1. Nature of Science and Scientific Inquiry 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.

2. 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.

3. Communication Skills: Microbiology majors will demonstrate competence in written and oral communication.

4. Cooperation/Social Responsibility: Microbiology majors should understand and appreciate the value of cooperating and working effectively with peers and be able to demonstrate a commitment to the process of developing such skills.

5. Values: Microbiology majors should identify and discuss the ethical issues and responsibilities of doing science.

Unit	Syllabus	Periods

UNIT - I	**HISTORY AND SCOPE :** History - Spontaneous generation and Biogenesis; Scope and application of Microbiology in human welfare; Development of Microbiology : Contribution of A.V. Leeuwenhock, Alexander Fleming, Louis Pasteur, Robert Koch and Edward Jenner.	15
UNIT - II	**DIVERSITY OF MICROBIAL WORLD- A:** Three kingdom and Whittaker's system of classification. General Characteristics and Structure of Eubacteria - Morphology, Structure of cell wall. Bacteria with unusual Properties : Archaeobacteria, Cyanobacteria, Mycoplasma and Actinomycetes.	15
UNIT - III	**DIVERSITY OF MICROBIAL WORLD- B:** Introduction to Fungi : Classification, general characteristics, reproduction and economic importance. Introduction to Virus, classification, general characteristics, structure and reproduction : T4, TMV. Pox Virus, Prions, Virions, Virusoid and Viriods.	15
UNIT - IV	**MICROBIAL TECHNIQUES :-** Microscopy : History, Principle, Construction and Application of Bright field microscopy. Dark field Microscopy, Phase contrast, Fluorescent Microscopy and electron Microscopy. Software in microscopy. Instumentation : Principle, construction and application of Autoclave, Hot air oven, incubator, B.O.D. incubator, laminar Air Flow, Colorimeter, Spectrophotometer, pH meter, centrifugation and chromatography (TLC)	15
UNIT - V	**MICROBIOLOGICAL METHODS :-** Media Preparation, Concept of sterilization and disinfection; types of culture; Pure culture techniques; Nature of dyes, physical and chemical theories of staining, principle, procedure and application of simple staining negative staining, differential staining. Enrichment culture and micromanipulator; Maintenance and preservation of pure culture.	15

Text Books –

1 Microbiology by Pelczar ,Chan and Kreiz

2 General Microbiology by Stainier Ingharam, Wheelis and Painter.

3 Biology of microoraganism by Brook and Madigan.

4 Fundamental Principles of Bacteriology by A.J.Salle.

5 Introducation of Microbiology by Ingraham and Ingraham.

6 Tools and techniques in Microbiology by Nath and Ingraham.

Reference Books –

1 Hill, New York, (2002).

2 Education, Singapore, (2004).

3 Alcomo, I.E. Fundamentals of Microbiology. VI Edition, Jones and Bartlett Publishers. Sudbury. Massachusetts, (2001).

4 Black J.G.Microbiology-Principlesand Explorations.John Wiley & SonsInc.NewYork, (2002).

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School of Basic And Applied Sciences

Class				**B.Sc.Microbiology**
Semester / Year				**I Year**
Subject & Subject code				**Microbiology- BMBIO20Y102**
Paper				**Microbial Biochemistry and Immunology (Paper-II)**
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. Grasp the basic understanding of carbohydrates.
2. Grasp the information on carbohydrate metabolism.
3. Gain the basic knowledge on protein.
4. Obtain knowledge on structure, classification & biological roles of proteins.
5. Obtaining in-depth information on lipids and their classification.
6. Assimilate knowledge on biosynthesis and metabolism of lipids .
7. Grasp the basic knowledge on DNA & RNA and their biosynthesis
8. Differentiate the humoral and cell mediated immune mechanisms.
9. Know how MHC functions in the immune system.
10. 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.Be able to explain how protein denaturation is performed, describe the structure-function relationship of a protein, and how this relates to the ability to catalyze reactions as an enzyme.
4.Study the properties of carbohydrates, proteins, lipids, cholesterol, DNA, RNA, glycoproteins and glycolipids and their importance in biological systems.
5.Understand the methods of determination of amino acid and nucleotide sequence of proteins and DNA respectively.
6.Demonstrate a thorough knowledge of the intersection between the disciplines of Biology and Chemistry.
7.Compare and contrast innate and adaptive immunity.
8.Describe which cell types and organs present in the immune response.

Shama Megha Mehra

Unit	Syllabus	Periods
UNIT - I	**CARBOHYDRATES :-** Classification, chemical structure and properties of monosaccharides, oligosaccharides and polysaccharides.	15
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. Principles of Biochemistry by A.L. Lehniger.
2. Fudamentalof Biochemistrty by J.L. jain
3. Biochemistry by Voet and Voet.
4. Microbial Genetics by Freifelder
5. Textbook of microbiology 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.

Sharma

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School of Basic And Applied Sciences

Class				**B.Sc. Microbiology**
Semester / Year				**I Year**
Subject & Subject code				**Practical Microbiology- BMBIO20Y103**
Paper				**Paper- I and Paper- II, Practical**
Max. Marks				**50= (30+20)** (ETE+IA)
L	**T**	**P**	**2**	
0	0	2		

PRACTICALS

1 To study safety measure in Laboratory.

2 Study of compound microscope its construction,working,principle,care to be taken while using the microscope . use of oil immersion objective.

3 Study of instruments Autoclave, Hot air oven. Laminar air flow, Colony counter, Incubator, Centrifuge, pH meter, Seitz filter ,Colorimeter and Spectrophotometer.

4 Illustration of cleaning and sterilization of glassware's.

5 To perform basic media preparation .

6 To perform pure culture techniques- Pour Plate, Steak Plate ,Spread Plate and Serial Dilution methods.

7 To perform staining of Bacteria.

8 To perform qualitative and quantitative estimation of carbohydrates.

9 To perform qualitative and quantitative estimation of proteins.

10 To perform qualitative estimation of lipids.

Shama

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School of Basic And Applied Sciences

Class				**B.Sc. Microbiology (Honours)**
Semester/Year				**I Year**
Subject & Subject Code				**Microbiology Honours-BMBIO20Y104**
Paper				**Cell Structure and Biology (Paper - III)**
Max. Marks				30 (ETE) + 20 (IA) = 50
Credit			**Total Credits**	
L	**T**	**P**	**4**	
3	1	0		

Course Objectives:

Students will understand

1. The structures and purpose of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles.
2. How these cellular components are used to generate and utilize energy in cells.

Course Outcome:

At the end of the course, learners will be able

1. To understand the basic unit of themicroorganism.
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. To discuss and differentiate the basic structure and function of cell components in prokaryotes and eukaryotes cells.
8. To analyse the functioning of microbial life at cellular level.

Student Learning Outcomes (SLO):

Students will:

1. Understand and utilize the scientific vocabulary used in communicating information in cell and molecular biology
2. Understand and apply general concepts of cell and molecular biology to relevant, specific problems
3. 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
4. Explain the structure of membranes and intracellular compartments and relate these to function.
5. Summarize the processes of energy transduction in cells and explain their significance.
6. Relate how cell movement and cell-cell communication occur.
7. Outline the processes that control eukaryotic cell cycle and cell death.
8. Link the rapid advances in cell and molecular biology to a better understanding of diseases, including cancer.

Sharma Megha Mehra

Unit	Syllabus	Periods
UNIT - I	Cell Structure and Cell Theory, Structure of Prokaryotic cell- Eubacteria and Archaebacteria. Size, Shape and arrangement of bacterial cells. Gram's positive and Gram's negative bacteria. Structure of Eukaryotic cell - plant cells, animal cells. 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.	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 & Molecular biology by S.C. Rastogy.

3 Molecular Biology of Cells by Alberts's.

4 Cell Biology by P.S. Varma & Agrawal.

Reference Books

1 Benjamin Lewin, GeneVII, Oxford University Press, (2000).

2 Bruce Alberts ,Alexander Johnson, Julian Lewis, Martin Raff , Keith Roberts, Peter Walter, Molecular biology of the Cell, 4th Edition. Garland publishing Inc. (2002).

3 Darnell,Lodishand Baltimore, Molecular Cell Biology, Scientific American Publishing Inc. (2000).

4 Watson J.D,Baker.T.A, Bell.S.P, Gann A. Levine, M. Losick R., Molecular Biology of Gene, 5th Edition. The Benjamin/Cummings Pub.Co.Inc. (2003).

5 Brown T.A., Gene Cloning and DNA analysis. 2nd Edition,ASM press. (2004).

6 Sandy Primrose Principles of Gene Manipulation and Genomics. 7th Ed., Blackwell Publishers. (2006).

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School of Basic And Applied Sciences

Class				**B.Sc. Microbiology (Honours)**
Semester / Year				**I Year**
Subject & Subject code				**Practical Microbiology Honours- BMBIO20Y105**
Paper				**Paper - III, Practical**
Max. Marks				**50= (30+20)** (ETE + IA)
L	**T**	**P**	**1**	
0	0	1		

PRACTICALS

1 To Prepare and Study the different stages of mitosis and Meiosis

2 To Prepare Slide for Study of Stomata.

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

4 Demonstration of Osmosis.

5 Study of plasmolysis and de-plasmolysis.

6 Study of structure of any prokaryotic and Eukaryotic cell.

7 Viable cell counting using haematocytometer.

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

Megha Mehra

Shama