EKLAVYA UNIVERSITY, DAMOH (M.P.)

Scheme of Examination B.Sc II 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	BPIND20Y201	Summer Project/Industrial Training												150	0	0	0	11
		BSECA20Y201	Skill Enhancement Course (SEC-1)	60				30				10			100	2	0	0	2
		BSECB20Y202	Skill Enhancement Course (SEC-2)	60				30				10			100	4	0	0	4
		BYOGA20Y201	Yoga- 2 (University Core)	–	–	–		–	–	–		–	60	40	100	2	0	0	2
2	Biotechnology	BBIOT20Y201	Biophysics and Biochemistry (Paper-I) (Core Course - 5A)	30				15				5			50	3	1	0	4
		BBIOT20Y202	Bioinstrumentation, Biostatistics and Bioinformatics (Paper-II) (Core Course - 5B)		30				15						50	3	1	0	4
		BBIOT20Y203	Paper-I & Paper-II , Practical (Practical 5A & 5 B, Core Course 5C)										30	20	50	0	0	2	2
		BBIOT20Y204	Microbial Physiology & Metabolism (Paper-III) (Core Course - 5D for Honors)			30				15		5			50	3	1	0	4
		BBIOT20Y205	Paper-III, Practical (Practical 5D for Honours, Core Course 5E)										30	20	50	0	0	1	1
3	Common	BASPR20Y201	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.

EKLAVYA UNIVERSITY
ज्ञान प्राप्तये लक्ष्य संधानम्

School of Basic and Applied Sciences

Class				**B.Sc. (Biotechnology)**
Semester/Year				**II Year**
Subject & Subject Code				**Biotechnology- BBIOT20Y201**
Paper				**Biophysics and Biochemistry (Paper-I)**
Max. Marks				**30 (ETE) + 20 (IA) =50**
Credit			**Total Credits**	
L	**T**	**P**	**4**	
3	1	0		

Course Objectives:

Biophysicists use the methods of physical science to study the structure and functions of macromolecules and solve problems at the intersection of biological and physical sciences.The main objective of the course is to offer detailed and comprehensive knowledge about the synthesis and degradation pathways of amino acids and nucleotides and their importance in the proper functioning of the cells. This course also interrelates the metabolism of these molecules with respect to health diseases in addition to providing overview of inhibitors of metabolism for treating the diseases of metabolic disorders.

Course Outcome:

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

1. Illustrate the basic principle and techniques to understand the biological problem.
2. Identify the physical principles responsible for maintaining the basic cellular function.
3. Appraise the importance of various biophysical techniques.
4. Practices the techniques of Chromatography and Spectroscopy.
5. Ability to understand fundamental concepts of biology, chemistry and biochemistry.
6. Ability to apply basic principles of chemistry to biological systems and molecular biology.
7. Ability to relate various interrelated physiological and metabolic events.

Student Learning Outcomes (SLO):

Students will develop :

1. Demonstrate a core knowledge base in the theory and practice of modern Biochemistry and Biophysics.
2. Students will function successfully in the laboratory and use safe laboratory practices.
3. Students will critically evaluate data and design experiments to test hypotheses relevant to the practice of Biochemistry and Biophysics.
4. Students will read and evaluate primary literature in the discipline.
5. Students will effectively communicate scientific data and ideas, using various formats appropriate for different target audiences.
6. Students will use databases, computational tools and other online resources effectively.
7. Students will demostrate awareness of ethical issues in the practice of science.

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Estd. by Madhya Pradesh Niji Vishwavidyalaya (Sthapna Avam Sanchalan) Adhiniyam, 2020

School of Basic and Applied Sciences

Class	**B.Sc. (Biotechnology)**
Semester/Year	**II Year**
Subject & Subject Code	**Biotechnology- BBIOT20Y202**
Paper	**Bioinstrumentation, Biostatistics and Bioinformatics (Paper-II)**
Max. Marks	30 (ETE) + 20 (IA) = 50

Credit			Total Credits
L	T	P	4
3	1	0	

Course Objectives:

The course is aimed at introducing the students to the field of Bioinformatics and enable them understand the concepts of statistics in biology.To impart practical exposure upon Bioinformatics tools and data bases.

Course Outcome:

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

1 An understanding of physics in biosensor, electrode.
2. An understanding of biomedical instrumentation principles in aspects of device design and applications.
3. An understanding of the techniques, skills and modern engineering tools necessary for engineering practice.
4. Advanced methods in computational biology,
5. The chemical principles that underlie biochemistry, molecular biology and genomics,
6. The design and implementation of relational databases,
7. Fundamental methods in probability and statistics, and
8. The construction of predictive mathematical models of biological systems.

Student Learning Outcomes (SLO):

Students will develop :

1. know the theory behind fundamental bioinformatics analysis methods.
2. be familiar with widely used bioinformatics databases.
3. know basic concepts of probability and statistics.
4. be able to describe statistical methods and probability distributions relevant for molecular biology data.
5. know the applications and limitations of different bioinformatics and statistical methods.
6. be able to perform and interpret bioinformatics and statistical analyses with real molecular biology data.

Unit	Syllabus	Periods
UNIT - I	Microscopy – Light, phase contrast, fluorescence and : Electron microscopy Centrifugation techniques. Principles types & separation of biological molccules.	15

UNIT - II	Chromatography and Electrophoresis Chromatography : Principles and applications, Principle and application of electrophoresis. Agarose gel electrophoresis, Immuno electrophoresis, Blotting Southren, Western and Northern Blotting.	15
UNIT - III	Spectrophotometry Colorimetry (UV and Visible), Radio and Non radio labeling, Autoradiography	15
UNIT - IV	Biostatistics – Introduction, Scope, application and use of statistic collection and classification of data summarization and presentation of data, Arithmetic mean, median, standard deviation. Probability definition Random variable and its distribution, Binomial probability distribution.	15
UNIT - V	Computers : General introduction (Characteristic, capabilities, generations) hardware : organization of hardware (input devices, memory, control unit arithmetic logic unit, output devices) software : (system software application software, language –low level, high level). Internet application. Basic Bioinformation: Introduction to internet, search Engines (Google.Yahoo, Entrez etc). Biological Database: Sequrence databases (EMBL, GenBank, DDBJ,UNIPROT. PIR TrMBL) Protein family/domain databases (Prosite, Prints, Pfam, Block etc) Cluster databases- An Introduction, Specialises databases (KFGG, etc) Database technologies (Flat –file) Structure databases (PDB)	15

TEXT BOOKS –

1. Intellectual property Rights by Birgitte Anderson, Edward Elgar Publishing.
2. Intellectual property Rights and the Life Science Industries by Graham Dutfield, Ashgate Publishing.
3. Intellectual property Rights- Ganguli – Tata McGraw- Hill.
4. IPR News Letters from GBPUA&T, Pant Nagar.
5. Biosafety in Microbiological and Biomedical Laboratories(BMBL).
6. Biotechnology and Safety Assessment by Thomas, J. A., Fuch, R.L, Academic Press.

REFERENCE BOOKS –

1.A text book of bioinformatics by Sharma& munjal&Shankar.
2.Bioinformatics by CSV Murthy
3.Basic Bioinformatics by S. Ignacimuthus,S.J
4. Bioinformatics: Concepts. Skills and Application By S.C. Rastogi.N. Mendiratta&Parag Rastogi
5. Practical Guide of basic Bioinformatics & Biostatistics By,P.Tiwari & P. Pandey

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School of Basic and Applied Sciences

Class				**B.Sc. (Biotechnology)**
Semester/Year				**II Year**
Subject & Subject Code				**Practical Biotechnology - BBIOT20Y203**
Paper				**Paper-I & Paper-II , Practical**
Max. Marks				**50= (30+20)** (ETE + IA)
L	**T**	**P**	**1**	
0	0	1		

PRACTICALS

1 Principles and working knowledge of instruments like colorimeter, pH meter. Centrifuge. Spectrophotometer, Microscope etc.

2 Qualitative analysis of Carbohydrates, Proteins and Lipids.

3 Quantitative estimation of Protein by Folin – Lowry method.

4 Quantitative estimation of sugar by Nelson Smogyi's method.

5 Determination of enzyme activity by amylase.

6 Study the effect of pH on enzyme activity.

7 Study the effect of tempprerture on enzyme activity.

8 Sepration of amino acids by TLC

9 Separation of leaf pigments by Paper chromatography.

10 Estimation of hemoglobin

11 RBC counting by haematocytometer.

12 WBC counting by Differential/or total cell count.

13 Measurement of bleeding and clotting time.

14 Measurement of Hemin Crystals.

15 Estimation of beta carotene in carrots.

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School of Basic and Applied Sciences

Class				**B.Sc. (Biotechnology Honours)**
Semester / Year				**II Year**
Subject & Subject code				**Biotechnology Honours- BBIOT20Y204**
Paper				**MICROBIAL PHYSIOLOGY & METABOLISM (Paper-III)**
Max. Marks				30 (ETE) + 20 (IA) = 50
Credit			**Total Credits**	
L	**T**	**P**	**4**	
3	1	0		

Course Objectives:

This module gives us detailed knowledge about the growth and metabolism of bacteria. A major goal of Microbial Physiology and Metabolism is to assist scientists in rapidly communicating their research results to other scientists through an open, free-access platform, free from some of the restrictions.

Course Outcome:

On successful completion of the course, the student shall be able to:

1. Describe the nutritional requirements of microbes and the effect of environmental factors on the growth of microorganisms.
2. Classify the various transport mechanisms in microbes.
3. Define the metabolic pathways in microbes.
4. Distinguish between various fermentation mechanisms in microbes.
5. Discuss about anoxygenic and oxygenic photosynthesis in bacteria and cyanobacteria.

Student Learning Outcomes (SLO):

On successful completion of the course, the student shall be able to:

1. Demonstrate the Winogradsky column.
2. Describe the procedure of sterilization.
3. Describe the process of preparation of basic culture media.
4. Demonstrate the basic concept of cultivation of microorganisms
5. Analyse the growth curve of bacteria
6. Describe the effect of environmental factor
7. Learn about the microbial taxonomy, the basics of microbes, microbial growth, microbial diversity its importance and application in day to day life and beneficial versus harmful microorganisms.

Unit	Syllabus	Periods

UNIT - I	**MICROBIAL GROWTH :** Definition of growth, Mathematical nature and expression of growth, Generation time. Growth curve in Bacteria, Measurement of Growth (Cell number, cell mass and cell constituent), Effect of environment on the microbial growth. (temperature, pH and Oxygen), Continuous culture synchronous culture and Batch culture.	15
UNIT - II	**MEMBRANE TRANSPORT PROCESS :** Different models of cell membrane, Biochemical properties of cell membrane, function of cell membrane, Types of cellular transport (diffusion, gaseous exchange, osmosis, plasmolysis, active & passive transport, group translocation)	15
UNIT - III	**BACTERIAL PHOTOSYNTHESIS AND FUELING REACTIONS :** Classification of photosynthetic bacteria (Oxygenic & an oxygenic photosynthetic bacteria). Photosynthetic structure. Photosynthetic pigments. Photosynthetic electron transport system. Mechanism of photosynthesis (Cyclic & Non cyclic).	15
UNIT - IV	**METABOLIC PATHWAYS :** Respiratory Pathways (Glycolysis, Entner Daudoroff pathway, Pentose phosphate pathway, krebs cycle). Calvin cycle, substrate level & oxidative phosphorylation, Fermentation process & products.	15
UNIT - V	**MICROBIAL ASSIMILATION AND BIOENERGETICS :** Assimilation of Ammonia, Nitrogen and sulphate Methanogens and methylotrophs, Principles of Bioenergetics G. endergonic and exergonic reaction. Oxidation reduction reaction. Redoxpotential.	15

Text Books–

1 Doelle, H.W. 1975, Bacterial metabolism 2nd edition Academic press.

2 Moat, A.G. and Foster, J.W. 1988. Microbial physiology, 2nd edition, Springer verlag.

Reference Books–

1 White, D. 2000 Physiology and Biochemistry of Prokaryotes. 2nd edition. Oxford university press New York.

2 Cal well D.R. 1995 Microbial physiology and metabolism. Wm. Brown publishers, England.

3 Madigan, M.T. Martinko J.M. Stahl, D.A. and Clark, D.P. 2012. Brock Biology of Micro- organisms 13th edition, Benjamin Cummings, San Francisco.

Shama

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School of Basic and Applied Sciences

Class				**B.Sc. (Biotechnology Honours)**
Semester/Year				**II Year**
Subject & Subject Code				**Practical Biotechnology Honours - BBIOT20Y205**
Paper				**Paper-III, Practical**
Max. Marks				**50= (30+20)** (ETE + IA)
L	**T**	**P**	**1**	
0	0	1		

PRACTICALS

1. Study of osmosis in bacterial cell.
2. Study of plasmolysis in bacterial cell.
3. Effect of pH on the growth of bacteria on solid media.
4. Effect of salt on growth of microorganisms.
5. Effect of temperature on the growth of microorganisms.
6. Effect of antibiotics on bacterial growth by paper disc method.
7. Measurement of size-Micrometer.

Sharma