

**DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL
(SONEPAT)**

**SCHEME OF STUDIES & EXAMINATIONS
Department of Biotechnology
B.Sc. (Hons)-M.Sc. Dual Degree in Biotechnology
(Effective from Session 2017-18)
Semester-II**

Course Opted	Paper Code	Paper Title	Teaching Scheme		Examination Marks			Duration of exam	Credit
			L	P	Sessional Marks	External Marks	Total		
Core Course	DBT102	Basics of Biotechnology	4		25	75	100	3	4
	DBT104	Zoology-I	4		25	75	100	3	4
Generic Elective	DCH112	Chemistry-II	4		25	75	100	3	4
	DMT 104	Mathematics-II	4		25	75	100	3	4
Core Lab	DBT106	Laboratory Techniques in Biotechnology	-	4	20	30	50	3	2
Generic Elective Lab	DCH114	Chemistry Lab-II	-	2	20	30	50	3	1
Ability Enhancement	DEN102	English –II	2	-	20	30	50	3	2
	DBT108	Statistics & Computing Skills in Biotechnology	2	-	20	30	50	3	2
		TOTAL	20	6	180	420	600		23

DBT-102 BASICS OF BIOTECHNOLOGY

B.Sc. (Hons.) – M.Sc. (Biotechnology)

Semester - II

L	P	Credits
4	--	4

Class Work : 25 Marks
Examination Marks : 75 Marks
Total: 100 Marks

Duration of Examination: 3 Hours

TEXT / REFERENCE BOOKS:

1. An Introduction to Biotechnology - Rup Lal
2. A Textbook of Biotechnology - R C Dubey
3. Cytology, Genetics and mol. Biology - P.K. Gupta

LECTUREWISE PROGRAMME: (from 08.01.18 to 27.04.18)

Introduction of the subject (08.01.18) 1

UNIT- I

Introduction to Biotechnology (09.01.18 to 20.01.18)
Definition of biotechnology and the related sciences 1
Historical perspectives of modern and old biotechnology 1
Biotechnology and its connection with other sciences 1
Various Branches of Biotechnology 3
Scope of Biotechnology (23.01.18 to 31.01.18)
Scope and Future of Biotechnology 3

UNIT- II

Nucleic acids as genetic material (02.02.18 to 28.02.18)
Definition of DNA and its components 1
Structure of A, B- and Z-DNA 1
Palindromic sequences of DNA 1
Definition of RNA and its components 1
Structure of RNA (t-RNA, m-RNA and r-RNA) 3
Different factors causing DNA denaturation and renaturation 1
Overview of information flow in biology 1
central dogma of life 1
Basic concepts of recombinant DNA technology 1
Principles of gene cloning 1
Restriction modification systems and use of restriction enzymes in biotechnology 2
Different cloning vectors 3

UNIT – III

Introduction to Animal, Plant and Microbial Biotechnology (1.03.18 to 31.03.18)
Basics of Animal, Plant and Microbial Biotechnology 1
General characteristics of microorganisms 1
Structure of bacteria and viruses 1
Bacterial growth - bacterial growth curve 1
Factors affecting bacterial growth 1
Plant tissue culture techniques 3
In vitro pollination and fertilization in plants 1
Embryo culture and its applications 3
Embryogenesis and organogenesis in plants 1
Micropropagation, haploids and their applications 3
Somaclonal variations and applications 3
Animal cell culture (1.04.18 to 27.04.18)
Basic techniques in animal cell culture 3
Various techniques in organ culture 3

UNIT – IV

Applications of biotechnology in various fields
Applications of biotechnology in Agriculture (GM Foods, GM Crops) 3
Applications of biotechnology in Environment (Waste water and sewage treatment) 3
Applications of biotechnology in Medicine Industry. 3

DBT-104 ZOOLOGY-I
B.Sc. (Hons.) – M.Sc. (Biotechnology)
Semester - II

L **P** **Credits**
4 **--** **4**

Class Work : 25 Marks
Examination Marks : 75 Marks
Total: 100 Marks
Duration of Examination: 3 Hours

Books:-

1. Hyman, L.H. : The Invertebrates Vol. I (McGraw Hill)
2. Hyman; L.H. : The Invertebrates Vol. II (McGraw Hill)
3. Barnes, R.D. : Invertebrate Zoology (W.B.Saunders Co.)
4. Jordan, E. L. : Invertebrate Zoology (S. Chand Co. New Delhi.)
5. Barrington, E.J.W. : Invertebrate Structure and Function.(E.L.B.S)
6. Fred and Theobald, : Economic Zoology
7. Invertebrate Zoology- Jordan E.L. and Verma P.S
8. Biology of Invertebrates – Russel – Hunter
9. Fish Culture – Lagler
10. Hand Book of Animal Husbandary and Dairy –Mudlyer
11. Bee Keeping in India – M.G. Smith
12. Poultry Husbandry – M.A. Jule

LECTUREWISE PROGRAMME: (from 08.01.18 to 27.04.18)

Introduction of the subject (08.01.18) 1

UNIT- I

Concept of animal diversity and its significance (09.01.18 to 30.01.18) 1

Introduction of Animal diversity (Genetic, Species and Ecological Diversity) 3

Animal diversity at global and country level in brief 1

Protozoa : General characters, habit, habitat and distribution 1

Protozoa : Locomotion and osmoregulation 3

Economic importance of protozoans 1

Porifera (01.02.18 to 28.02.18)

Porifera : General characters, habit, habitat and distribution 3

Coral and coral reefs 1

Economic importance of porifera 1

Coelenterata : General characters, habit, habitat and distribution 3

Polymorphism in hydrozoa 1

Economic importance of Coelenterata 1

Helminthes and Annelida (1.03.18 to 31.03.18)

Helminthes: General characters, habit, habitat and distribution 3

Economic importance of helminthes 1

Annelida: General characters, habit, habitat and distribution 3

Economic importance of Annelida 1

Arthropoda and Mollusca (1.04.18 to 27.04.18)

Arthropoda: General character, habit, habitat and distribution 3

Economic importance of silkworm, prawn and lac insect 1

Mollusca : General characters, habit, habitat and distribution 3

Economic importance of molluscs in Pearl industry, shell industry, 1

ornamental value of molluscs 1

UNIT- 3

(09.01.18 to 28.02.18)

Echinodermata: General characters, habit, habitat and distribution, Economic importance 3

Protochordata : General characters, habit, habitat 2

Distribution of Hemichordates, Urochordates and Cephalochordates 3

Study of Foot in Mollusca, 2

Affinities in Hemichordata 2

Amazing invertebrates- Offence and defence mechanism- Ink gland in Sepia, 2

Bioluminescence- Firefly.

UNIT- 4
(01.03.18 to 27.04.18)

Economic Zoology: Economic Fishery :	1
Food value of fishes, Fresh water Fish farming,	2
Construction and Maintenance, Maintenance of glass aquarium and ornamental fishes;	2
Sericulture: Types of Silk moth Morphology of mulberry silk moth, Life cycle, Rearing of silkworm, Economic importance	2
Apiculture: Types and caste, Honey comb , Bee keeping, Economic importance	
Dairy Science: Economics importance-Milk and Milk Products	1
Poultry Science: Poultry breeds-Indigenous and exotic breeds, Feeding, Housing and Management,	2
Food value-egg and meat, Poultry diseases-Small pox and Ranikhet;	1
Goat Farming: Breeds, Feeding, Housing, Economic importance.	2

Evaluation Procedure

1.	Surprise Quiz/ Tutorial Test	5 Marks
2.	Assignment / Project / Performance in the Class	5 Marks
3.	Minor Tests (Two tests having equal weightage) Minor Test I : 14-16 Feb, 2018 Minor Test II : 4 -6 April, 2018	15 Marks
4.	Major test (University Examination)	75 Marks

Award of Grades Based on Absolute Marks: The University is following the system of grading based on absolute marks (after applying moderation if any). Following grading will be done based on the % of marks obtained in all the components of evaluation part of the subject.

A+ (90% - 100 %), A (80% - 89%), B+ (70% - 79%) , B(62% - 69%), C+ (55% - 61%), C (46% - 54%), D (40% - 45), F (Less than 40 %)

For F grade, a candidate shall be required to appear in the major test of concerned course only in the subsequent examination(s) to obtain the requisite marks/grade.

Attendance Record – Candidate should attend at least 75% attendance of the total classes held of the subject

Chamber consultation hour: Any vacant period.

**DBT-106 LABORATORY TECHNIQUES
IN BIOTECHNOLOGY**

B.Sc. (Hons.) – M.Sc. (Biotechnology)

Semester - II

L	P	Credits	Class Work	:	20 Marks
--	4	2	Examination	:	30 Marks
			Total Marks:		50 Marks
			Duration of Examination:		3 Hours

TEXT / REFERENCE BOOKS:

- Lehninger: Principles of Biochemistry (2013) 6th ed., Nelson, D.L. and Cox, M.M., W.H. Freeman and Company (New York), ISBN:13:978-1-4641-0962-1 / ISBN:10:1-4641-0962-1.
- Introductory Practical Biochemistry (2014) ..S.K. Sawhney & R. Singh (Eds) Published by Narosa Publishing House, ISBN 10: 8173193029 / ISBN 13: 9788173193026.

LECTUREWISE PROGRAMME: (from 08.01.18 to 27.04.18)

(08.01.18 to 31.01.18)

Safety measures in laboratories 4

Preparation and handling of solutions 4

Preparation of the buffer at required pH 4

(01.02.18 to 28.02.18)

Studying different parts of Microscope. 4

Studying centrifugation for isolation of different fractions from cells 4

Studying centrifugation for isolation of different fractions from tissues 4

(1.03.18 to 31.03.18)

Studying the absorbance curve of a given sample 4

Studying sterilization techniques 4

Preparation of media for isolation of Bacteria 4

Preparation of media for isolation of fungi 4

(1.04.18 to 27.04.18)

Preparation of media for invitro cultures of Plant cells 4

Preparation of media for invitro cultures of animal cells 4

Preparation of dilutions for the isolation of microbes 4

**DBT-108 STATISTICS AND COMPUTING
SKILLS IN BIOTECHNOLOGY
B.Sc. (Hons.) – M.Sc. (Biotechnology)
Semester - II**

L	P	Credits		Class Work	:	20 Marks
2	--	2		Examination	:	30 Marks
				Total	:	50 Marks
				Duration Examination	:	3 Hours

OBJECTIVES

- To study the basics of statistics and measurement of variations
- To study correlation and its real world application
- To study the basics of computer and its application
- To learn the hardware and networking of computers

OUTCOMES

- Students will be able to understand the basic applications of statistics
- Able to explain correlation and its application
- Able to know the computer characteristics and its application
- Learning of computer hardware and networking

TEXT / REFERENCE BOOKS:

1. Principles of Biostatistics- M. Pagano, Cengage Learning Publishers, 2nd Edition, 2008.
2. Schaum's outline of Probability and Statistics- Tata McGraw Hill, 2004.
3. Introduction to Biostatistics. Glover T. and Mitchell K. (2002). McGraw Hill, New York.
4. Fundamentals of Biostatistics. Rosner Bernard (1999), Duxbury Press.
5. Beginning Perl for bioinformatics- J. Tisdall; Wrox Press Ltd., 2000.
6. Genomic Perl- R.A. Dwyer, Cambridge University Press, 2003.
7. Programming Perl – Larry Wall, Tom Christiansen & John Orwant 3ed 2000- O'Reilly
8. MySQL and mSQL- Yarger O'Reilly Media Publishers, 1999.
9. Programming Perl - Tom Christiansen, Larry. Wall Orielly Publications.

LECTUREWISE PROGRAMME: (from 08.01.18 to 27.04.18)

Unit I

Statistics (08.01.18 to 31.01.18)

Definition, Importance & Limitation, Collection of data and formation of frequency distribution	1
Graphic presentation of Frequency distribution – Graphics, Bars, Histogram, Diagrammatic	1
Measures of Central Tendency – Mean, Median and Mode	2
Partition values – quartiles, deciles and percentiles	1
Measures of variation – Range, IQR, quartile, deciles and percentiles	1
Quartile deviation and standard deviation and Lorenz Curve.	1

Unit II

Correlation Analysis (02.02.18 to 09.03.18)

Correlation Coefficient; Assumptions of Correlation Analysis	2
Coefficients of Determination and Correlation	2
Measurement of Correlation- Karl Person's Methods; Spearman's Rank correlation	2
Concurrent Deviation the Correlation Coefficient	1
Real world Application using IT Tools.	1

Unit-III

Basics of Computer and its Evolution (12.03.18 to 05.04.18)

Evolution of Computer, Data, Instruction and Information, Characteristics	2
Various fields of application of Computers	1
Various Fields of Computer, Input-output Devices (Hardware, Software, Human ware and Firmware)	2
Advantages and Limitations of Computer, Block Diagram of Computer	1
Function of Different Units of Computer, Classification of Computers	1
Different Number System (Decimal, Binary, Octal and hexadecimal) and their Inter Conversion	1

Unit - IV

Memory & Networking (06.04.18 to 27.04.18)

Primary Memory (ROM and its type - PROM, EPROM, EEPROM, RAM)	1
Secondary memory- SASD, DASD Concept, Magnetic Disks - Floppy Disks, Hard Disks, Magnetic Tape	1
Optical Disks - CD ROM and it's type (CD ROM, CD ROM-R, CD ROM-EO, DVD ROM, Flash Memory	2
Networking Concepts, Types of networking (LAN, MAN AND WAN)	1
Analog and Digital Transmission, Different Topologies.	1

Home Assignments : 4 -5 assignments are given during the semester.

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