PROCEEDINGS OF THE MEETING OF B.O.S. (UG) IN MICROBIOLOGY AND BIOTECHNOLOGY

The meeting of the B.O.S. (UG) in Microbiologyand Biotechnology was held on **18th June, 2014** in the Department of Microbiology and Biotechnology, Bangalore University, Bangalore. At the outset, the Chairman welcomed the members and initiated the proceedings.

Agenda-1

The Credit Based Semester Scheme for B.Sc. in Microbiology and Biotechnology, the Syllabus (theory and practical) and Scheme of examination for I, II, III & IV Semesters were finalized and approved.

Agenda-2

The panel of examiners for UG Microbiology and Biotechnology (both external and internal) was modified and approved for the year 2014-15.

Agenda-3

The B.O.S. approved the list for the formation of B.O.E. (UG) in Microbiology and Biotechnology for the year 2014-15.

The meeting concluded with the Chairman thanking all the members for their co-operation.

Members present:

1. Dr. Shastri P. S
2. Dr. Jyotsna B. S
3. Dr. Bharathi
4. Smt. Pushpalatha. T
5. Dr. Vijaya. B
6. Dr. ShanthiIyer
7. Dr. S.K. Sarangi

B.Sc. CREDIT BASED SEMESTER SCHEME
BIOTECHNOLOGY (PART 2)
SCHEME OF INSTRUCTIONS AND CREDITS

Paper No.	Title of the paper	Type of paper	Hours/ Week	Duration of Exam (Hours)	IA	Exam	Total Marks	Credits
I Semester								
BTT-101	Cell Biology & Genetics	T	4	3	30	70	100	2
BTP-102	Cell Biology & Genetics	P	3	3	15	35	50	1
Total Marks and Credits for I semester							150	3

Paper No.	Title of the paper	Type of paper	Hours/ Week	Duration of Exam (Hours)	IA	Exam	Total Marks	Credits
II Semester								
BTT-201	General Microbiology & Biostatistics	T	4	3	30	70	100	2
BTP-202	General Microbiology	P	3	3	15	35	50	1
Total Marks and Credits for II semester							150	3

Paper No.	Title of the paper	Type of paper	Hours/ Week	Duration of Exam (Hours)	IA	Exam	Total Marks	Credits
III Semester								
BTT-301	Biological chemistry	T	4	3	30	70	100	2
BTP-302	Biological chemistry	P	3	3	15	35	50	1
Total Marks and Credits for III semester							150	3
Paper No.	**Title of the paper**	**Type of paper**	**Hours/ Week**	**Duration of Exam (Hours)**	**IA**	**Exam**	**Total Marks**	**Credits**
IV Semester								
BTT-401	Molecular biology	T	4	3	30	70	100	2
BTP-402	Molecular biology	P	3	3	15	35	50	1

Total Marks and Credits for IV semester							150	3
Paper No.	**Title of the paper**	**Type of paper**	**Hours/ Week**	**Duration of Exam (Hours)**	**IA**	**Exam**	**Total Marks**	**Credits**
V Semester								
BTT-501	Genetic Engineering & Environ. Biotechnology	T	4	3	30	70	100	2
BTT-502	Immunology & Animal Biotechnology	T	4	3	30	70	100	2
BTP-503	Genetic Engineering & Environ. Biotechnology	P	3	3	15	35	50	1
BTP-504	Immunology & Animal Biotechnology	P	3	3	15	35	50	1
Total Marks and Credits for V semester							300	6

Paper No.	**Title of the paper**	**Type of paper**	**Hours/ Week**	**Duration of Exam (Hours)**	**IA**	**Exam**	**Total Marks**	**Credits**
VI Semester								
BTT-601	Plant Biotechnology	T	4	3	30	70	100	2
BTT-602	Industrial Biotechnology	T	4	3	30	70	100	2
BTP-603	Plant Biotechnology	P	3	3	15	35	50	1
BTP-604	Industrial Biotechnology	P	3	3	15	35	50	1
Total Marks and Credits for VI semester							300	6

Internal assessment:

Theory : (30)

(a) Tests – 10

(b) Assignments - 15

(c) Attendance - 05

Practical : (15)

(a) Tests – 10

(b) Class Records - 05

BANGALORE UNIVERSITY, BANGALORE

Syllabus for B.Sc. BIOTECHNOLOGY
(Credit Based Semester Scheme)

SEMESTER-I

BTT 101 – CELL BIOLOGY AND GENETICS

Total hours: 52

PART A: CELL BIOLOGY

Total hours:28

Unit 1. Cell as a Basic unit of Living Systems

Discovery of cell, The cell Theory.
Ultra structure of an eukaryotic cell- (Both plant and animal cells) 2 Hours

Unit 2. Surface Architecture

Structural organization and functions of plasma membrane and cell wall of eukaryotes.
4 Hours

Unit 3. Cellular Organelles

Structure and functions of cell organelles – Endoplasmic reticulum, Golgi complex, Mitochondria, Chloroplast, Ribosomes, Lysosomes, Peroxisomes, Nucleus (Nuclear envelope with nuclear pore complex, Nucleolus, Nucleoplasm and Chromatin).
Vacuole, Cytosol and Cytoskeleton structures (Microtubules, Microfilaments and Intermediate filaments). 8 Hours

Unit 4. Chromosomes

Discovery, Morphology and structural organization – Centromere, Secondary constriction, Telomere, Chromonema, Euchromatin and Heterochromatin, Chemical composition and Karyotype.
Ultrastructure: Single-stranded and multi-stranded hypothesis, folded- fibre and nucleosome models. 7 Hours
Special type of chromosomes: Salivary gland and Lampbrushchromosmes.

Unit 5. Cell Division

Cell Cycle and regulation, mitosis and meiosis. 5 Hours

Unit 7. Cell Senescence and programmed cell death 2 Hours

PART B: GENETICS

Total Hours: 24

Unit 1. Structure of DNA and RNA – a brief account

2 Hours

Unit 2.Mendelism

Mendel's work, Laws of heredity, Test cross, Incomplete dominance and simple Problems. 3 Hours

Unit 3. Interaction of Genes

Supplementary factors: comb pattern in fowls
Complementary genes- Flower colour in sweet peas
Multiple factors – Skin colour in human beings
Epistasis – Plumage colour in poultry
Multiple allelism: Blood groups in Human beings. 4 Hours

Unit 4. Sex Determination in Plants and animals

Concept of allosomes and autosomes, XX- XY, XX-XO, ZW-ZZ, ZO-ZZ types 2 Hours

Unit 5. Linkage and Crossing Over

Coupling and repulsion hypothesis, Linkage in maize and Drosophila, Mechanism of crossing over and its importance, chromosome mapping-linkage map in maize. 3 Hours

Unit 6. Chromosomal variations

A general account of structural and numerical aberrations, chromosomal evolution of wheat and cotton. 3 Hours

Unit 7. Cytoplasmic Inheritance

Plastid inheritance in Mirabilis, Petite characters in yeast and Kappa particles in paramecium. 2 Hours

Unit 8. Mutations

Types: Spontaneous and induced, Mutagens: Physical and chemical, Mutation at the molecular level, Mutations in plants, animals and microbes for economic benefit of man. 3 Hours

Unit 9. Human Genetics

Karyotype in man, inherited disorders – Allosomal (Klinefelter syndrome and Turner's syndrome), Autosomal (Down syndrome and Cri-Du-Chat Syndrome). 2 Hours

SEMESTER - I

BTP 102 – Cell biology and Genetics

Total units: 15

1. Use of Micrometer and calibration, measurement of onion epidermal cells and yeast 2 Units
2. Cell division: Mitotic and meiotic studies in grasshopper testes, onion root tips and flowerBuds 4 Units
3. Chromosomes: Mounting of polytene chromosomes 1 Unit
4. Buccal smear - Barr bodies 1 Unit
5. Karyotype analysis - Human and Onion 2 Units

Human – Normal and Abnormal – Down and Turner's syndromes (With the help of slides)

6. Simple genetic problems (Problems on Interaction of genes) 1 Unit
7. Isolation of Mitochondria 2 Unit

8. Vital staining of Mitochondria 1 Unit
9. RBC cell count by Haemocytometer 1 Unit

Each student is required to submit 5 permanent slides (mitosis & meiosis- at least two from each)

Practical Examination Scheme

(35 marks)

Major:

Mitosis/Meosis/Polytene Chromosomes/Haemocytometry

(20 marks)

Minor: Answer any two

Barr body/ Karyotype/ Blood smear differential Staining/ Genetic Problem/ Vital Staining of Mitochondria

(15 marks)

Record: To be submitted

REFERENCES:

CELL BIOLOGY

1. Molecular Biology of Cell - Bruce Alberts et al, Garland publications.
2. Animal Cytology and Evolution – MJD, White Cambidge University Publications
3. Molecular Cell Biology –Daniel, Scienific American Books
4. Cell Biology - Jack d Bruke, The William Twilkins Company
5. Principles of Gene Manipulations – Old & Primrose, Black Well Scientific Publications
6. Cell Biology – ambrose&Dorouthy M Easty, ELBS Publications
7. Fundamentals of Cytology – Sharp, McGraw Hill Company
8. Cytology – Willson&Marrison, Reinform Publications
9. Molecular Biology – Smith Faber & Faber Publications
10. Cell Biology & Molecular Biology – EDP Roberties& EMF Roberties, Saunder College.
11. Cell Biology – C.B Powar, Himalaya Publications

GENETICS

1. Basic Genetics – Daniel L. Hartl, Jones &Barlett Publishers USA
2. Human Genetics and Medicine lark Edward Arnold P London
3. Genetics – Monroe W Strickberger, Macmillain Publishers, New York
4. Genes V - Benjamin Lewin, Oxford University Press.
5. Genes I - Benjamin Lewin, Wiley Eastern Ltd., Delhi
6. Genes II - Benjamin Lewin, Wiley & Sons Publications
7. Genes III- Benjamin Lewin, Wiley & Sons Publications
8. Principles of Genetics – Winchester Sinnot& Dom
9. Genetics – Blue print of life by sandhyaMitra, Tata McGraw Hill Publication
10. Genetics – Edgar Altenburg Oxford & IBH publications
11. Principles of Genetics – E.J. Gardener, M.J. Simmons and D.P. Snustad, John Wiley & Son Publications

SEMESTER II

BTT 201- GENERAL MICROBIOLOGY AND BIOSTATISTICS

Total hours: 52

PART A: GENERAL MICROBIOLOGY

Total hours : 37

Unit 1. Introduction and Scope of Microbiology

Definition and history of Microbiology, contributions of Antony van Leeuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister and Alexander Fleming. Importance of Scope of Microbiology as a modern science Branches of Microbiology. 3 Hours

Unit 2. Microscopy

Constructions and working principles of different types of microscopes – Compound, Dark field, Phase contrast, Fluorescence and Electron (Scanning and Transmission) 3 Hours

Unit 3. Microbial Techniques

A). STERILIZATION: Principles and applications of

a. Physical Methods: Autoclave, Hot air oven, laminar airflow, Seitz filter, sintered glass Filter and Membrane filter.
b. Chemical Methods: Alcohol, Aldehydes, Phenols, Halogens and Gaseous agents.
c. Radiation Methods: UV rays and Gamma rays. 4 Hours

B). STAINS AND STAINING TECHNIQUES: Principles of staining, Types of stains- Simple Stains, Structural stains and Differential stains 3 Hours

Unit 4. Microbial Taxonomy

Concepts of Microbial species and strains, Classification of bacteria based on Morphology (Shape and flagella), Staining reaction, nutrition and extreme environment 2 Hours

Unit 5. General Account of Viruses and Bacteria

A. VIRUSES – Structure and classification Plant Viruses – CaMV
Animal Viruses – Hepatitis B
Bacterial Viruses – Lambda phage
B. BACTERIA – Ultra structure of a bacterial cell, cell wall, endospore and capsule 8 Hours

Unit 6. Eukaryotic Microorganism

Salient features, Classification and reproduction of fungi, mycoplasma and algae. 4 Hours

Unit 7. Pathogenic Microorganisms

A. Bacterial diseases of man – Tetanus, Tuberculosis, Typhoid and Cholera
B. Viral diseases: AIDS (HIV). 4 Hours

Unit 8. Microbial Metabolism

A) Respiration: EMP, HMP and ED Pathways, Kreb's cycle, Oxidative Phosphorylation.

B) Bacterial Photosynthesis: Photosynthetic pigments in Prokaryotes, Photophosphorylation & Dark reaction. 6 Hours

PART B-BIOSTATISTICS

Total hours: 15

Unit 1. Importance and application

Tabulation and classification of data, Frequency distribution and Graphical distribution of data. 2 Hours

Unit 2. Measures of Central Tendencies 3 Hours

Mean, Median, Mode and their properties

Unit 3. Measures of Dispersion 3 Hours

Mean deviation, Variance, Standard deviation and Coefficient of Variation

Unit 4. Hypothesis Testing 2 Hours

Student *t* and Chi-square test

Unit 5. Probability and Distribution

Concepts and problems on probability, Binomial, Poisson, Normal Distribution and their applications 5 Hours

BTP 202-GENERAL MICROBIOLOGY

Total Units: 15

1. Safety measures in microbiology laboratory 1 Unit
2. Cleaning and sterilization of glass wares 1 Unit
3. Study of instruments: Compound microscope, Autoclave, Hot air oven, P_H meter, Laminar airflow and centrifuge. 3 Unit
4. Staining Techniques: Simple, Negative staining, Gram staining, Endospore staining fungal Staining, Bacterial mobility by hanging drop method. 2 Unit
5. Media preparation: Nutrient agar, MRBA and Nutrient broth. 2 Unit
6. Isolation of bacteria and fungi from soil, air, and water- dilution and pour plate methods. 2 Unit
7. Estimation of microorganisms - Total Count (haemocytometer) 1 Unit
8. Antibiotic sensitivity test – paper disc method 1 Unit
9. Biochemical tests – starch hydrolysis, catalase & gelatin liquefaction. 1 Unit
10. Study of Rhizobium from root nodules of legumes. I Unit

Practical Examination Scheme

(35 marks)

Major: 20 Marks

Gram Staining & Endospore Staining/ Haemocytometry or Gram Staining/ Endospore staining

Minor: 15 Marks

Answer any two of the following
Instruments (any one)/ culture media / components (any one)
Biochemical tests (any one)
AST

Records: To be submitted

REFERENCES:

MICROBIOLOGY:

1. Microbiology-Pelzer, Chan, Krieg Tata McGraw Hill Publications
2. Microbiology- Concepts and applications by Paul A. Ketchum, Wiley Publications
3. Fundamentals of Microbiology –Furbisher, Saunders & Toppan Publications
4. Microbiology –Ronald M.Atals
5. Introductory Biotechnology-R.B Singh C.B.D. India (1990)
6. Industrial Microbiology-Casual Wiley Eastern Ltd.
7. Fundamentals of Bacteriology - Salley
8. Fontiers in Microbial technology-P.S. Bison, CBS Publishers.
9. Biotechnology, International Trends of perspectives A. T. Bull, G. HollM.D.Lilly Oxford & T Publishers.
10. General Microbiology –C.B. Powar, H.F. Daginawala, Himalayan Publishing House

BIOSTATISTICS:

1. Bliss, C.J.K. (1967) Statistics in Biology, Vol. I McGraw hill. New York.
2. Campbell R.C. (1974) Statistics for Biologists, Cambridge Univ, Press, Cambridge
3. Daniel (1999) Biostatistics (3rd edition) Panima Publishing, Corporation
4. Sward law, A. C. (1985) Practical Statistics for Exponents Biologists, John Wiley and Sons, Inc., NY
5. Khan (1999) Fundamentals of Biostatistics Publishing Corporation.