

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY



CIRCULAR NO.SU/Sci./M.Sc.Biotech./75/2022

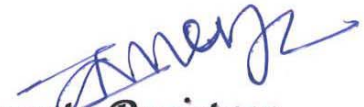
It is hereby inform to all concerned that, the syllabus prepared by the Ad-hoc Board in Biotechnology and recommended by the Dean, Faculty of Science & Technology the Hon'ble Vice-Chancellor has accepted the **Syllabus of M.Sc. Biotechnology Ist to IVth semester for affiliated Colleges and University Department** in his emergency powers under section 12(7) of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as appended herewith.

This shall be effective from the Academic Year 2021-22 and onwards.

All concerned are requested to note the contents of this circular and bring notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO. SU/SCI/2022/7090-97
Date:- 19.01.2022.

*
*
*
*
*
*
*
*
*
*
*


**Deputy Registrar,
Academic Section.**

Copy forwarded with compliments to :-

- 1] **The Principal of all concerned affiliated Colleges,**
Dr. Babasaheb Ambedkar Marathwada University,
- 2] **Head of the Department, Department of Biotechnology,**
Dr. Babasaheb Ambedkar Marathwada University, **Sub Center Osmanabad.**
- 3] **The Director, University Network & Information Centre, UNIC,**
with a request to upload this Circular on University Website.

Copy to :-

- 1] The Director, Board of Examinations & Evaluation, Dr. BAMU, A'bad.
- 2] The Section Officer, [M.Sc. Unit] Examination Branch, Dr. BAMU, A'bad.
- 3] The Programmer [Computer Unit-1] Examinations, Dr. BAMU, A'bad.
- 4] The Programmer [Computer Unit-2] Examinations, Dr. BAMU, A'bad.
- 5] The In-charge, [E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr. BAMU, A'bad.
- 6] The Public Relation Officer, Dr. BAMU, A'bad.
- 7] The Record Keeper, Dr. BAMU, A'bad.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.



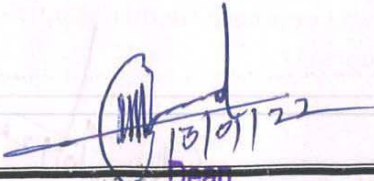
Syllabus of

M.Sc.I & II YEAR

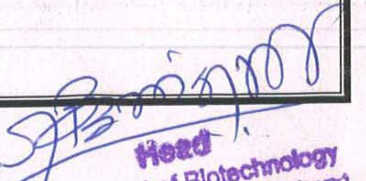
Biotechnology

Semester-I to IV

[*Effective progressively from academic year 2021-2022 &
onwards*]


13/01/22
Dean

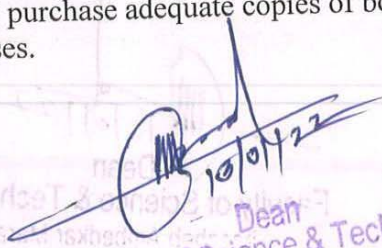
Faculty of Science & Technology
Dr. Babasaheb Ambedkar Marathwada
University, Aurangabad

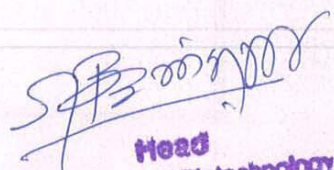

Head
Department of Biotechnology
Dr. Babasaheb Ambedkar Marathwada
University, Sub-Centre Osmanabad

M. Sc. Biotechnology revised syllabus, to be implemented from academic year 2021-2022

A two year M. Sc. Biotechnology course

1. Syllabus structure is for four semesters,
2. Total 108 credits distributed across 4 semesters as 26 I Semester, 26 II Semester, 28 III Semester, and 28 IV Semester
3. This course is assessed for total 2700 marks
4. First consists of four theory (core courses), one foundation course and four laboratory courses.
5. Second semester First consists of four theory (core courses), one skill development course and four laboratory courses.
6. Third semester will have three core courses, one discipline specific elective course, one open elective, one research project based open elective cum discipline specific elective course
7. Fourth semester will have three core courses, one discipline specific elective course, one research project based open elective cum discipline specific elective course
8. Semester end examinations would be conducted at the end of odd as well even semesters,
9. Practical examination would be of two days for each semester, a pair of examiner would be appointed from the panel of examiners approved by university authorities
10. Practical examination all papers will start on day first. Every aspiring student must present on day first. Writing business, such as; approach, principle, requirements, in brief procedure for all four laboratory courses must be done on day I, practical's needing incubations should be started on day I itself, however practical's without incubations can be performed on day I or day II, this would be left at examiners discretion.
11. Each examiner would conduct common viva for both courses, viva may be divided in two days if examiner desires or conducted on day II but no on day I, only.
12. Project should however, be directly related to any of the aspects of theory courses or laboratory courses.
13. Dissertation is divided in two parts . in first stage writing should be as a manuscript submitted by a research student for the approval research proposal to UNIVERSITY. IT MAY INCLUDE AN EXTENSIVE LITERATURE REVIEW, part of experimentation , and further work plan
14. Final dissertation should follow the pattern of an international peer reviewed journal. Regional format would not be entertained. Mentor and student, both, are expected to understand the writing style of research paper (full length) published in Journal titled "Cell". {The cell word should not be mistaken for cell biology books or any such standard or substandard books}.
15. Dissertation would include abstract, introduction, materials and methods, results, discussion, acknowledgments, references in chronological order. The writing should not be less than 4000 words without space, excluding figures and tables.
16. Each centre is expected to purchase permanent mounts, essential instruments and every ingredient required for practicals mentioned in various laboratory courses.
17. Each centre should purchase adequate copies of books mentioned in reference list below theory courses.


10/10/22
Dean
Faculty of Science & Technology
Babasaheb Ambedkar Marathwada
University, Aurangabad


Head
Department of Biotechnology
Dr. Babasaheb Ambedkar Marathwada
University, Sub-Centre Osmanabad

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

M.Sc. Biotechnology

Structure of Syllabus at a Glance

(to be implemented from 2021-2022 onwards)

Paper No.	Title of theory paper	Credits	Marks	Hr/ WK	Type of Course	Assessment (% wise)	REMARK
Semester I						ESA MSA	
BTE-Com	Constitution of India	2	50	2	FOU	100	
BTE 1001	Biomathematics and Biostatistics	4	100	4	CC	80 20	
BTE 1002	Biomolecules and Bioenergetics	4	100	4	CC	80 20	
BTE 1003	Microbiology	4	100	4	CC	80 20	
BTE 1004	Inheritance Biology	4	100	4	CC	80 20	
BTEP-I	Practical Based on Paper BT 1001	2	50	4	PR	100	
BTEP-II	Practical Based on Paper BT 1002	2	50	4	PR	100	
BTEP-III	Practical Based on Paper BT 1003	2	50	4	PR	100	
BTEP-IV	Practical Based on Paper BT 1004	2	50	4	PR	100	
Totals		26	650				
Semester II							
BTE 2001	Molecular Biology	4	100	4	CC	80 20	
BTE 2002	Enzyme Technology	4	100	4	CC	80 20	
BTE 2003	Cell and Developmental Biology	4	100	4	CC	80 20	
BTE 2004	Immunology and Virology	4	100	4	CC	80 20	
BTE 2005	Seminar presentation, research ethics, communication skills and IPR	2	50	2	SDC	100	
BTEP-V	Practical Based on Paper BTE 2001	2	50	4	PR	100	
BTEP-VI	Practical Based on Paper BTE 2002	2	50	4	PR	100	
BTEP-VII	Practical Based on Paper BTE 2003	2	50	4	PR	100	
BTEP-VIII	Practical Based on Paper BTE 2004	2	50	4	PR	100	
Totals		26	650				

[Signature]
Head
 Department of Biotechnology
 Dr. Babasaheb Ambedkar Marathwada
 University, Sub-Centre Cemanatlas

[Signature]
Head
 Faculty of Science & Technology
 Dr. Babasaheb Ambedkar Marathwada
 University

Total Credits : 26 + 26 + 28 + 28 = 108

Total marks : 650+650+700+700 =2700

Abbreviations: FOU- Foundation course CC- Core Course, DSE- Discipline Specific Elective, ESA- End Semester Assessment, MSA- Mid Semester Assessment including internal/continuous assessments SDC- Skill Development Course, OE- Open Elective


13/01/22

Dean
Faculty of Science & Technology



Head
Department of Biotechnology
Dr. Babasaheb Ambedkar Marathwada
University, Sub-Centre Osmanabad

**DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
AURANGABAD [M.S.] INDIA.**



CIRCULAR/SYLL/CONSTITUTION OF INDIA/ I Yr/2020.

It is hereby inform to all concerned that, the Academic Council at its meeting held on 31st December, 2019 **has accepted the Curriculum of "Constitution of India" at First Year College level as per Appendix-'A'.**

This is effective from the Academic Year 2020-21 and Onwards.

All concerned are requested to note the contents of this circular and bring notice to the students, teachers and staff for their information and necessary action.

Encl.: - Syllabus.

University campus,

Aurangabad-431 004.

Ref. No. SU/Con./I Yr/Cur./

2020/ 7416 - 25.

Date: 28.01.2020.

{
{
{
{
{

**Deputy Registrar,
Academic [Syllabus]
Section.**

Copy forwarded with compliments to:-

- 1] **The Principals, all affiliated Colleges,**
Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
- 2] **The Director, University Network & Information Centre, UNIC, with**
a request to upload this Circular on University Website.

Copy to :-

- 1] The Director, Board of Examinations & Evaluation,
 - 2] **The Section Officer, [B.A. Unit] Examination Branch,**
 - 3] The Section Officer, [Eligibility Unit],
 - 4] **The Programmer [Computer Unit-1] Examinations,**
 - 5] **The Programmer [Computer Unit-2] Examinations,**
 - 6] The In-charge, [E-Suvidha Kendra],
 - 7] The Public Relation Officer,
 - 8] The Record Keeper,
- Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

-==*-

HF*280120/-

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

* COMPULSORY COURSE TO THE UNDER GRADUATE STUDENTS OF AFFILIATED
AND CONDUCTED COLLEGES OF UNIVERSITY

[Subject Code: IIC 001]

02 Credits

AN INTRODUCTION TO INDIAN CONSTITUTION

Unit I

1. Meaning and Concept of Indian Constitution
2. Nature of Constitution
3. Brief Idea of Indian Constitution
[Parts, Articles and Schedule]

Unit II

Silent Features of Indian Constitution

1. Written and Enacted Constitution; 2. The longest and most detailed Constitution of the World; 3. Rigidity and Flexible Constitution; 4. Parliamentary system of Government; 5. Federal system with unitary bias; 6. Adult Franchise; 7. Single Citizenship; 8. Sovereign, Democratic, Republic; 9. Secularism; 10. Directive Principles of State Policy; 11. Independent Judiciary; 12. Fundamental Rights; 13. Fundamental Duties.

Unit III

A. Fundamental Rights

1. Concept of State (Art. -12); 2. Right to Equality (Art. -14 to 18); 3. Right to Freedom (Art. -19 to 22); 4. Right against Exploitation (Art. -23 & 24); 5. Right to Religion (Art. -25 to 28); 6. Right of Minorities (Art. -29 & 30); 7. Constitutional Remedies (Art.-32).

B. Fundamental Duties (Art.-51 A)

Unit IV

Directive Principles of State Policy (DPSP's)

1. Meaning and Significance of Directive Principles.
2. Classification/ Principles of D.P.S.P.
3. Relationship between F.Rs. and D.P.S.P.

Unit V

Executives

A) Union Government

The President, Council of Ministers and Prime Minister.

B) State Government

The Governor, Council of Ministers and Chief Minister.

• **References**

1. Constitution of India, Bare Act. Govt. of India.
2. Subhash C Kashyap, Our Constitution (AN Introduction of Indian Constitution and Constitutional Law, National Book Trust, India 2001.
3. Avasthi & Maheshwari, Indian Constitution, Lakshmi Narain Agrawal Agra, 2017.
4. Basu D.D., Introduction to the Constitution of India, Lexis Nexis, 2013.
5. Sharma L.N. Indian Prime Minister, the Macmillan Company of India, 1976.
6. Jain H.M. Union Executive, Chaitanya Publishing House, 1969.
7. Dr. S.N. Busi, Dr. B.R. Ambedkar, Framing of Indian Constitution, 1st Edition, 2015.
8. M.P. Jain, Indian Constitution Law, 7th Edn., Nexis 2014.
9. M.P. Jain, Outlines of Indian Legal and Constitutional History, Lexis Nexis, 2014.
10. भारताचे संविधान.
11. प्रदिप गायकवाड, (संपादक) भारताचे संविधान शिल्पकार डॉ. बाबासाहेब आंबेडकर दिक्षाभूमी संदेश, नागपूर २००६.
12. ग्रॅनव्हिल ऑस्टिन, अनुवाद भारती केळकर भारताची राज्यघटना, राष्ट्राची कोणशिला, डायमंड पब्लिकेशन, पुणे २०१३.
13. डॉ. भा.ल. भोळे, भारताचे शासन आणि राजकारण, विद्या प्रकाशन, नागपूर.

Note: All latest volumes of above mentioned books must be preferred. The above list of books is not an exhaustive one.

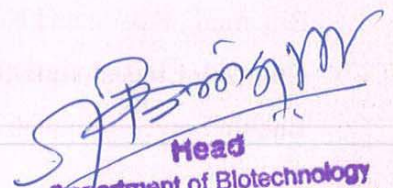
Internal Test (45 Minutes)
Home Assignment
Theory Paper (02 Hours)

10 Marks
10 Marks
30 Marks

[1]	Section – [A]	Ten MCQ Carrying One Mark each	10 Marks
[2]	Section – [B]	Two Short Questions Carrying 5 Marks each Out of Five Questions Students have to Attempt any two	10 Marks
[3]	Section – [C]	One Long Question, Out of Three Questions Students have to attempt any one	10 Marks

**Note: - This Course is bilingual (English & Marathi)
The Examination will also be bilingual.**

**M. Sc. Biotechnology
BTE –COM (IC 101)
CONSTITUTION OF INDIA**


Head
Department of Biotechnology
Dr. Babasaheb Ambedkar Marathwada
University, Sub-Centre Osmanabad

Department of Biotechnology
Dr. Babasaheb Ambedkar Marathwada
University, Sub-Centre Osmanabad

BTE 1001 – 4 credits
Biostatistics and Biomathematics

Unit I: Elements of mathematics-I

Derivatives: derivative of function, Derivatives of First Principles, Derivatives of inverse, exponential functions and trigonometric functions,

Integration: Methods of Integration: direct integration, integration by parts

Unit II: Elements of mathematics-II

Determinant: determinant of order 2 or 3, expansion of determinant, properties of determinant, Crammer rule

Matrix: Types of matrix, Algebra of matrices, Inverse matrix.

Logarithm : Fundamentals of logarithm, natural logarithm and logarithm to other bases, significance of logarithmic scales

Unit III: Sampling, Data Collection and Presentation:

Introduction to Biostatistics, Common Terms and Notations, Applications.

Sampling: Representative Sample, Sample Size, Sampling Bias and Sampling techniques.

Data Collection and Presentation: Type of Data, Method of Collection of Primary and Secondary Data, Methods of Data Presentation, Graphical Representation by Histogram, Polygon, Ogive Curve, Pie Diagram.

Unit IV: Central Tendency:

Measure of Central Tendency : Mean ,mode ,median

Measure of Variability : Standard Deviation, Standard Error Range ,Mean Deviation, Coefficient of Variation, Correlation Coefficient and Regression (Positive & Negative), Calculation of Correlation Coefficient & Regression Coefficient , Linear Regression and Regression Equation, ANOVA One and Two Way Classification.

Unit V: Test of Significance :& Computer based statistical techniques:

Test of Significance : F-test , Z-test .T-test and Chi-Square ,Probability Distribution : Binomial , Poison and Normal Distributions.

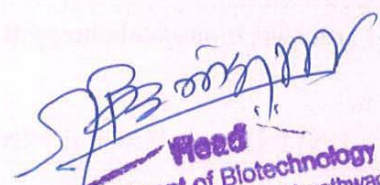
Computer based statistical techniques: Frequency Table of Single Discrete Variable , Bubble Sort , Computation of Mean , Variance and Standard Deviation, T-test , Correlation Coefficient

References :

1. B.K Mahajan method in Biostatistics Jaypee brother medical pulisher Ltd .india .
2. Richard ah Introduction to Biostatistics prentice hall of biostat


Head
Department of Biotechnology
Dr. Babasaheb Ambedkar Marathwada
University, Sub-Centre Osmanabad

3. Campbell R.C Statistics for biologist, Cambridge University Press,Cambridge
4. Wardlaw,A.C.(1985) Practical Statistics for experimental Biologists
5. Baily N.T.J. Statistical methods in Biology English University press
6. P.S.S. Sunderrao & J.Richard An Introduction to Biostatistics Prentice hall of India pvt.ltd. India
7. Khan, Fundementals of Biostatistics
8. B.K. Mahajan Methods in Biostatistics, Jaypee brothers medical publisher ltd,India
9. Robert sokal and James Rohlf Introduction to Biostatistics W.H. Freeman Press


Head
Department of Biotechnology
Dr.Babasaheb Ambedkar Marathwad
University, Sub-Centre Camanabari

M. Sc. Biotechnology
BTE 1002 – 4 credits
Biomolecules & Bioenergetics

UNIT I : Fundamentals

Structure of atoms, molecules and chemical bonds (bond strength, cleavage of C-C bond), Stabilizing interactions (Van der Waals, electrostatic, hydrogen bonding, hydrophobic interaction.).

Principles of biophysical chemistry (pH, pKa, titration curve, weak acids, bases) buffer, thermodynamics, (laws, concept of entropy, enthalpy, equilibrium constant, free energy change, free energy change for ATP hydrolysis), colligative properties.

Bioenergetics; oxidative phosphorylation (ETC) coupled reaction (redox reactions) group transfer, biological energy transducers-Substrate level Phosphorylation.

UNIT II : Carbohydrates

Classification, Composition, Structure, Function and Metabolism of Carbohydrates (Glycolysis, TCA cycle, HMP shunt pathway, Gluconeogenesis, Glycogen Synthesis, Biosynthesis of Starch, Lactose & Sucrose.) [Kinetics of each reaction].

Regulation of Carbohydrate metabolism (with reference to glucose), Metabolic Disorders. (Diabetes, Hypoglycemia, Diabetes as a factor for coronary disfunction, Lactose intolerance).

UNIT III : Proteins

General reactions of amino acids, amino acid Metabolism- Biosynthesis, Degradation, Regulation and Metabolic disorders – Phenylketonuria.

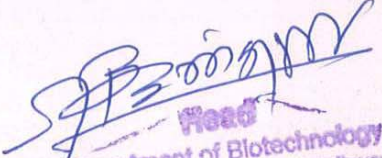
Classification, Composition, Structure {Conformation (Ramachandran Plot examples, Secondary, Tertiary, & Quaternary Structure, Domains, Motifs & Folds.)} and function of Proteins, Stability of Protein Structures, Sequencing of proteins.

UNIT IV : Nucleic Acids

Composition, Structure (including Conformation of nucleic acids (A-, B-, Z-, DNA), t-RNA, rRNA & Ribosomes, Micro-RNA; and Stability of nucleic acid structures) and functions of nucleic acids

Metabolism of nucleotides-. Biosynthesis and Regulation of Purines and Pyrimidines by *de novo* and Salvage pathways,

UNIT V : Lipids, Hormones and Vitamins:


Head
Department of Biotechnology
Dr. Babasaheb Ambedkar Marathwada
University, Sub-Centre Osmanabad

Lipids: Definition, Composition, Classification, Structure, Function, Storage lipids, Membrane lipids, Essential & Non-essential fatty acids, {Good & Bad lipids (Cholesterol)}.

Metabolism of lipids: General reactions, Functions, Biosynthesis and Degradation {fatty acids [oxidation of saturated (α & β) and unsaturated], Triglycerides, Phospholipids, Cholesterol, Prostaglandins}, Metabolic disorders (Triglyceridemia, Naiman-Sacks Disease)

Vitamins: Classification, Functions, Role in metabolism, Vitamins as co-factors.

Metabolic Disorders –A,B,C,D,K.

Hormones : Classification of hormones, Endocrine glands, basic mechanism of hormone action, neuroendocrine regulation [TSH, T_3 , T_4 ,] Pituitary gland secreted hormone

:Prolactin;Gonadotrophin releasing hormone:LH; role of hormones in reproduction

(Estrogen,Testosterone,hCG,FSH,LH), control of fertility(Prolactin,Progesterone,FSH,LH),

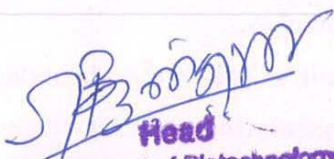
gametogenesis,human growth hormones , hormonal disorders{Thyroiditis(hypothyroidism,

hyperthyroidism),Polycystic Ovarian Syndrome/Polycystic Ovarian Disorder(PCOS/PCOD),

Insulin Dependent Diabetes,Phaeochromocytoma.}

References:

1. Cohn & Stump – Outline of Biochemistry Wiley Eastern Ltd.
2. Harpers Review of biochemistry – Prentice Hall
3. Cregnton – Protein Structure & Molecular Properties
- A. L. Lehninger, D. L. Nelson & M M Cox – Principles of Biochemistry.
4. Lubert Stryer – Biochemistry
5. David Meltzer – Biochemistry : The Chemical Reactions of living Cells –Academic Press, New York
6. Dixon & Webb –Enzymes
7. J. Jayaraman- Practical Biochemistry
8. Plummer. –Practical Biochemistry.
9. Horton; principles of biochemistry.
10. Hames; Instant Notes in Biochemistry.
11. Holme ; Analytical Biochemist
12. A.C.Deb Fundamentals of biochemistry
13. Ramakrishnan , Text book of Medical Biochemistry, Orient Longman
14. Zubay - Biochemistry 4th edition
15. Boyer- Concepts in Biochemistry
16. Cooper -The tools of Biochemistry


Head
Department of Biotechnology
Dr. Babasaheb Ambedkar Marathwada
University, Sub-Centre Cumanabgar

M. Sc. Biotechnology
BTE 1003 – 4 credits
Microbiology

Unit I: .Microscopic Techniques:

Fundamental microscopy

Differences between prokaryotic and eukaryotic cells

Stain & staining: Classification of stains, staining theories basic procedure,

Staining techniques: Negative, Monochrome and Differential Stainings (Gram, capsule, spore & acid fast staining).

Major Biochemical tests used in identification of bacteria

Unit II: The diversity of the microbial world:

Bacterial taxonomy: conventional, adensonian, and molecular approaches to bacterial taxonomy ,including ribotyping, rRNA sequencing, characteristics of primary domains (from five kingdom system of classification),introduction to diversity among Microorganisms, Survival mechanisms of extremophiles and their importance (thermophiles, psycrophils, methanogns, alkalophiles, acidophiles, halophiles,)

Unit III: Microbial growth and control

Definition of growth, ,Bacterial cell division , generation time , specific growth rate mathematical expression of growth Monoauxic, diauxic & synchronized growth curves, various methods to obtain synchronized cultures, Direct & indirect methods of microbial growth assessment,

Effect of environmental factors (solutes, temperature, pH, O₂,) on microbial growth;

Control of microorganisms by physical & chemical agents including antimicrobial chemotherapy.

Unit IV: Nutrition and pure culture technique:

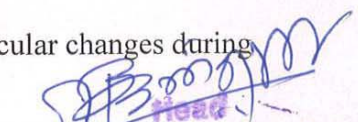
Pure culture techniques, principles of microbial nutrition, nutritional classification of microorganisms :autotrophic, heterotrophic ,saprophytic & parasitic microbes, construction of microbial culture media: purpose and type **simple medium** [mineral medium (MS) MS plus carbon, MS plus nitrogen, MS plus carbon plus nitrogen plus supplements] **Complex media** Selective, Enrichment, Differential

Techniques of culture collection: isolation, purification, cultivation & preservation of microbes.

Unit V: Microbial physiology;

Sporulating bacteria, stages of sporulation, cytological and macromolecular changes during sporulation. Spore germination

Microbial toxins: detection and molecular mechanism of action.


Department of Biotechnology
Dr. Babasaheb Ambedkar Marathwada
University, Sub-Centre Osmanabad

Microbial stress response, stress proteins and their role in normal cellular physiology.

Two component system

References:

1. Stenier R.Y et al ., General microbiology Mc Millan Press. Inc.
2. Pelczar ., Reid et al., Microbiology, TMH Publication.
3. Madigan M.T.,et al Brock biology of microorganisms J prentice hall Inc.
4. Johri B.N Extremeophiles. Springer Verlag, NY
5. Talaro; Foundations in Microbiology.
6. Ananthanarayan; Text book of microbiology. Orient Longman Delhi
7. Cappucinno; Microbiology – a laboratory manual. 4th ed.
8. Harrigan W.E. , Laboratory methods in Food Microbiology, Academic Press
9. Toratora, Funke & Care Microbiology : An Introduction
10. Salley A.J Fundamental Principles of Bacteriology
11. Atlas R.M. Principles of Microbiology
12. Methods in Microbiology series
13. Bergys Manual Vol 1-4


Head
Department of Biotechnology
Dr. Babasaheb Ambedkar Marathwada
University, Sub-Centre Osmanabad

M. Sc. Biotechnology
BTE 1004 – 4 credits
Inheritance Biology

UNIT-1: Gene Concept, Mendelism and Extension of Mendelian Principles

- A. **Concept of Gene:** Allele, Multiple Alleles, Pseudoallele, Complementation tests.
- B. **Mendelian Principles:** Dominance, Segregation, Independent Assortment, Deviation from Mendelian Inheritance.
- C. **Extensions of Mendelian Principles:** Codominance, Incomplete Dominance (Partial Dominance), Gene Interactions, Pleiotrophy, Genomic Imprinting, Penetrance and Expressivity, Phenocopy, Linkage and Crossing over, Sex determination, Sex Differentiation, Sex Linkage, Sex limited and Sex influenced characters.

UNIT 2: Mutation and Structural Alterations of Chromosome

- A. **Mutation:** Types, Causes and detection, Mutant types –lethal, Conditional, Biochemical, Loss of Function, Gain of Function, Germinal versus Somatic mutants, Insertional Mutagenesis (Transposon based –biological mutagens).
- B. **Structural and Numerical alterations of Chromosome:** Deletion, Duplication, Inversion, Translocation, Ploidy and their genetic implications.

UNIT 3: Microbial Genetics

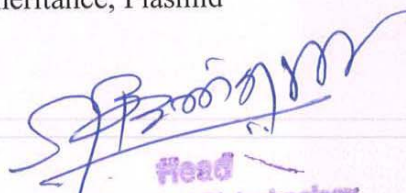
Methods of genetic transfers –Transformation, Conjugation, Transduction, Sex-duction, Mapping genes by interrupted mating, Fine structure analysis of genes –S Benzer's work.

UNIT 4: Gene Mapping Methods

Linkage maps, Tetrad analysis, Mapping with molecular markers, Mapping by using somatic cell hybrids, development of mapping population in plants.

UNIT 5: Extra Chromosomal Inheritance

Inheritance of mitochondrial and chloroplast genes, Maternal Inheritance, Plasmid inheritance.


Head
Department of Biotechnology
Dr. Babasaheb Ambedkar Marathwada
University, Sub-Centre Osmanabad

References:

1. **Principles of Genetics 8th edition, Eldon J. Gardner, Michael J. Simmons, and D. Peter Snustad**, Wiley India Edition (Indian edition).
2. **Molecular Genetics: An introductory Narrative (2nd Edition) Gunther S. Stent and Richard Calendar**, CBS Publishers and Distributors (Indian Edition) –Reprint 2004.
3. **Principles of Genetics, 7th Edition, Robert H Tamarin**, Tata McGraw Hill Edition (Indian Edition) –Reprint 2004
4. **Genetics 5th edition –Strickberger**, Pearsons publisher –Low Price Edition (Indian Edition).
5. **Modern Microbial Genetics –Editors Uldis N Streips and Ronald E. Yasbin**
Wiley –Liss publications, 1991.

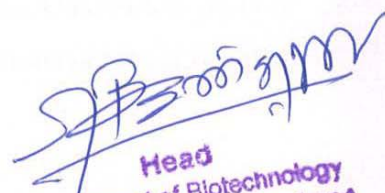

Head
Department of Biotechnology
Dr. Babasaheb Ambedkar Marathwada
University, Sub-Centre Osmanabad

BTP I -Practicals based on COURSE BTE 1001

-2 credits

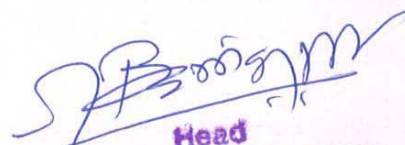
Practicals:

1. Representation of statistical data by histogram ogive curves and pie diagram.
2. Measure of Central tendencies : Arithmetic Mean , median and mode
3. Calculation of Measure of Dispersion : Mean deviation , Standard deviation and coefficient of variation , Quartile deviation .
4. Test of Significance : Chi-square test , t- test , Standard error


Head
Department of Biotechnology
Dr. Babasaheb Ambedkar Marathwada
University, Sub-Centre Osmanabad

Practicals

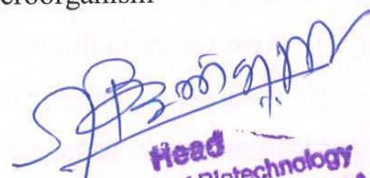
1. Preparation of buffers applying HH equation
2. Estimation of pKa values of amino acids
3. Qualitative methods for detection of carbohydrates
4. Estimation of carbohydrates by quantitative method (DNSA / GOD-POD method)
5. Estimation of proteins –(UV/Folin Lowry / Biurets method, Bradford [minimum two methods])
6. Determination of isoelectric pH of aminoacids
7. Isolation of proteins- casein from milk / pulses
8. Estimation of DNA and RNA
9. Acid values Iodine number& Saponification values of fats (commercial samples)
10. Isolation and purification of lipids from microbes and eukaryotes
11. Preparation / isolation of biomolecules from natural resource (Starch,)


Head
Department of Biotechnology
Dr. Babasaheb Ambedkar Marathwada
University, Sub-Centre Osmanabad

BTP III -Practicals based on COURSE BTE 1003 -2 credits

Practicals

1. Staining and Microscopic examination of microorganisms [for bacteria,- negative staining, monochrome staining, Gram staining] for fungi cotton blue wet mount]
2. Isolation of pure cultures of microorganisms by different plating techniques & serial dilution methods[from a suitable sample (preferably soil)]
3. Storage and preservation of microorganisms
4. Growth curve of microorganisms
5. Micrometry of microorganisms
6. Measurement of bacterial population by turbidometry, serial dilution ,methods
7. Effect of temperature, pH on microbial growth.
8. Biochemical characterization (IMViC) of selected microorganism


Head
Department of Biotechnology
Dr. Babasaheb Ambedkar Marathwada
University, Sub-Centre Osmanabad

BTP IV -Practicals based on COURSE BTE 1004

-2 credits

Practicals:

1. Study of one factor cross
2. Study of two factor cross
3. Study of three factor cross
4. Fluctuation test
5. Isolation of antibiotic resistance spontaneous mutant
6. UV induced mutagenesis
7. UV survival curve
8. Mutagenesis with a chemical mutagen (Ethidium bromide/ nitrous acid/ hydroxyl amine/ NTG or EMS) AND Survival curve with chemical mutagen.


Dean
Faculty of Science & Technology
Dr. Babasaheb Ambedkar Marathwada
University, Aurangabad


Head
Department of Biotechnology
Dr. Babasaheb Ambedkar Marathwada
University, Sub-Centre Osmanabad