

**UNIVERSITY OF MUMBAI**

No. UG/152 of 2018-19

**CIRCULAR:-**

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Science & Technology are hereby informed that the recommendations made by the I/c Dean, Faculty of Science & Technology have been accepted by the Academic Council at its meeting held on 8<sup>th</sup> September, 2018 vide item No. 4.13 relating to the syllabus as per the (CBCS) of Bridge course for S.Y.B.Sc. in Biotechnology, has been brought into force with effect from the academic year 2018-19, accordingly. (The same is available on the University's website [www.mu.ac.in](http://www.mu.ac.in)).

MUMBAI – 400 032

14<sup>th</sup> March, 2019

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Science & Technology Faculty. (Circular No. UG/334 of 2017-18 dated 9<sup>th</sup> January, 2018. )

**A.C./4.13/08/09/2018**

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No. UG/152 -A of 2018

MUMBAI-400 032

14<sup>th</sup> March, 2019

Copy forwarded with Compliments for information to:-

- 1) The I/c Dean, Faculty of Science & Technology,
- 2) The Director, Board of Examinations and Evaluation,
- 3) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
- 4) The Director, Board of Students Development,
- 5) The Co-ordinator, University Computerization Centre,

(Dr. Ajay Deshmukh)  
REGISTRAR



Academic Council \_\_\_\_\_

Item No: \_\_\_\_\_

# UNIVERSITY OF MUMBAI



## SYLLABUS OF BRIDGE COURSE IN BIOTECHNOLOGY

**Program: leading to S.Y.B.Sc. In Biotechnology.**

**With effect from**

**Academic Year 2018-2019**

**Bridge Course for Biotechnology Syllabus Credit Based Semester and Grading System  
leading to S.Y.B.Sc (Biotechnology) To be implemented from the Academic year 2018-  
2019**

Course	TOPICS	Credits	L / Week
USBTBC101	Paper I	03	03
USBTBC102	Paper II	03	03
USBTBCP101	Practical : USBTBC101 + USBTBC102	02	03

Course: USBTBC101	TOPICS (Credits : 03 Lectures/Week:03) Paper-I	No of Lectures
<b>UNIT1</b>	DNA Replication in Prokaryotes and Eukaryotes- Semi-conservative DNA replication, DNA Polymerases and its role, <i>E.coli</i> Chromosome Replication, Bidirectional Replication of Circular DNA molecules. Rolling Circle Replication, DNA Replication in Eukaryotes DNA Recombination – Holliday Model for Recombination Transformation	15
<b>UNIT 2</b>	Experimental evidences for DNA and RNA as Genetic Material. Genetic Engineering in <i>Ecoli</i> and other Prokaryotes, Yeast, Fungi and Mammalian Cells Cloning Vectors-Plasmids ( pBR 322, pUC) Vectors for Plant and Animal Cells, Shuttle Vectors, YAC Vectors, Expression Vectors Enzymes- DNA Polymerases, Restriction Endonucleases, Ligases, Reverse Transcriptases, Nucleases, Terminal Transferases, Phosphatases Isolation and Purification of DNA (Genomic, Plasmid) and RNA,, Identification of Recombinant Clones	15
<b>UNIT 3</b>	<b>Basics of Animal Tissue Culture</b> Introduction Cell Culture Techniques, Equipment and Sterilization Methodology. Introduction to Animal Cell Cultures: Nutritional and Physiological: Growth Factors and Growth Parameters. General Metabolism and Growth Kinetics Primary Cell Cultures : Establishment and Maintenance of Primary Cell Cultures of Adherent and Non-Adherent Cell Lines with examples. Application of Cell Cultures	15
<b>References</b>	1. iGenetics by Peter Russell 2. Biotechnology: Fundamentals and Applications by S.S.Purohit 3. Culture of Animal Cells by R. Ian Freshney	

<b>Course: USBTBC102</b>	<b>TOPICS (Credits : 03 Lectures/Week:03) Paper-II</b>	<b>No of lectures</b>
<b>UNIT 1</b>	Definition, Classification, Nomenclature, Chemical Nature, Properties of Enzymes, Mechanism of Enzyme Action, Active Sites, Enzyme Specificity, Effect of pH, Temperature, Substrate Concentration on Enzyme Activity, Enzyme Kinetics, Michelis-Menten Equation, Types of Enzyme Inhibitions-Competitive, Uncompetitive, Non-Competitive Allosteric Modulators Co-Factors, Zymogens,	15
<b>UNIT 2</b>	Overview of the immune system, Cells and Organs involved, T and B cells. Innate Immunity, Acquired Immunity, Local and Herd Immunity, Humoral and Cellular Immunity - Factors Influencing and Mechanisms of each. Antigens and Antibodies: Types of Antigens, General Properties of Antigens, Haptens and Superantigens Discovery and Structure of Antibodies (Framework region) Classes of Immunoglobulins, Antigenic Determinants. Antigen-Antibody Interactions Monoclonal Antibodies, Vaccines (Live, Killed) and Toxoid. Problems with Traditional Vaccines, Impact of Biotechnology on Vaccine Development.	15
<b>UNIT 3</b>	Defination&Importance of Statistics in Biology Types of Data, Normal and Frequency Distribution Representation of Data and Graphs (Bar Diagrams, Pie Charts and Histogram, Polygon and Curve) Types of Population Sampling Measures of Central Tendency (For Raw, Ungroup& Group Data) Mean Median Mode Measures of Dispersion Range, Variance, Coefficient of Variance. Standard Derivation. Standard Error.	15
<b>References</b>	1. Biochemistry by Satyanarayan 2. Immunology by kuby 3. Biostatistics by Arora	

## Practicals

1. Isolation and purification of DNA (genomic, plasmid)
2. Restriction Digestion
3. Agarose Gel Electrophoresis of the genomic and plasmid DNA
4. Media Preparation and Sterilization (ATC)
5. Trypsinization of Tissue and Viability Count
6. Qualitative Assay of Enzyme Amylase, Lipase, Protease, Urease, Catalase and Dehydrogenase
7. Enzyme Kinetics : Study of the effect of  $pH$ , Temperature on activity of Enzyme
8. Study of Effect of Substrate Concentration on enzyme activity and determination of  $V_{max}$  and  $K_m$
9. Study of antigen antibody interaction by Ouchterlony method
10. Biometric Analysis for Mean, Median, Mode and Standard Deviation and Data representation using frequency Polygon, Histogram and Pie Diagram

## Evaluation Scheme

### I. Internal Exam-25 Marks

#### (i) Test– 20 Marks

20 marks Test – Duration 40 minutes

(ii) **5 Marks** - Active participation in routine class instructional deliveries Overall conduct as a responsible student, manners, skill in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.

### II. External Examination- 75 Marks

(i) Duration - 2.5 Hours.

(ii) Theory question paper pattern:-

All questions are compulsory.

Q.1 Unit I: 20 Marks

Q.2 Unit II: 20 Marks

Q.3 Unit III: 20 Marks

Q.4 Unit I, II and III: 15 Marks

### III. Practical Examination – 50 marks

50 Marks: 40 marks + 05 marks (journal) + 05marks (viva)

***\*\*Theory and Practical Examination to be conducted at college level***

***\*\*Certified Journal is compulsory for appearing at the time of Practical Exam***

