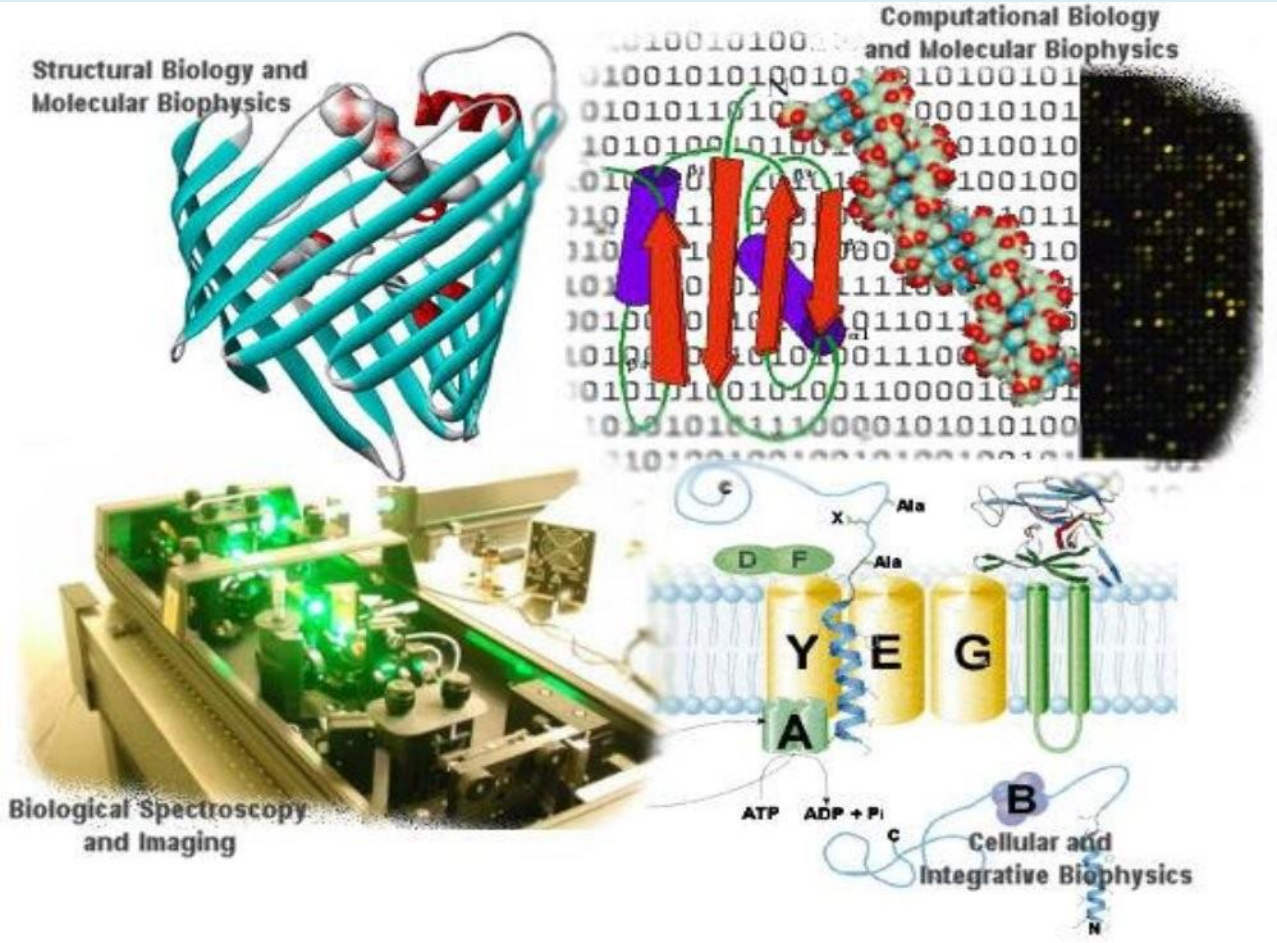
S.Y.B.Sc. Biotechnology 2019 - 2020

Tools and techniques in Biotechnology



SEMESTER - IV

BIO-IV.E-6

Ms. Madhavi M. Motankar

FSAB, Assistant Professor
Department of Biotechnology
Parvatibai Chowgule College Autonomous
Email: mmm009@chowgules.ac.in

COURSE SCHEDULE

THEORY

Monday: 12:30–1:30pm in B302; Tuesday: 11:30–12:30pm in B302 and Wednesday: 09:30-10:30pm in B305

Lecture no.s	Lecture Topics
L 1	Units of measurement and calculation and measurement of pH
L 2	Weak electrolytes - biochemical importance of weak electrolytes
L 3	Ionization of weak acids and bases; ionization of a weak electrolyte
L 4	Buffer solutions; buffer capacity and buffer action
L 5	**Activity 1 (In-class and Out-class in Group)**
L 6	Principle of centrifugation; centrifugal force and sedimentation rate;
L 7	Preparative centrifugation – Differential and Density gradient
L 8	Analytical ultracentrifuges
L 9	**Activity – 2 (Group discussion)**
L 10	Principle and technique of Ultraviolet-Visible Spectroscopy
L 11	Fluorescence spectroscopy
L 12	Infrared Spectroscopy
L 13	Raman spectroscopy
L 14	Atomic Absorption Spectroscopy
L 15	**Activity – 3 (Tabular sheets in groups)**
L 16	Principle and technique of paper chromatography
L 17	**Continuous Assessment - I**
L 18	**Review of CA-I**
L 19	Thin Layer Chromatography
L 20	Gel filtration chromatography
L 21	Ion exchange chromatography
L 22	Affinity chromatography
L 23	High Performance Liquid Chromatography
L 24	Gas Liquid Chromatography
L 25	**Activity – 4 (Tabular sheet in groups)**
L 26	Agarose Gel electrophoresis
L 27	Native and SDS-PAGE
L 28	Isoelectric focusing and 2D PAGE Diffusion

L 29	**Activity – 5 (MCQs in groups)**
L 30	Introduction to hybridization probes
L 31	Radioactive and non-radioactive probes
L 32	Fluorescent In Situ Hybridization
L 33	Southern blotting
L 34	Northern blotting
L 35	Western blotting and hybridization
L 36	**Activity – 6 (PBT in Groups)**
L 37	Radiation – Sources and types
L 38	Applications of isotopes
L 39	Radioactive decay of alpha and beta,
L 40	Radioactive decay of gamma and X-rays
L 41	**Geiger Muller Counter**
L 42	Scintillation counter
L 43	**Continuous Assessment - II**
L 44	**Review of CA-II**
L 45	**Revision**
L 46	**Revision**

REFERENCES

1. MAHESH, S. (2003) Biotechnology - 3 Including Molecular Biology and Biophysics, New Age International Private Limited, Publishers New Delhi.
2. ARORA, M.P. (2006) Biophysics, Himalaya Publishing House, New Delhi.
3. BAJPAI, P. K. (2010) Biological Instrumentation and Methodology, Second Revised Edition. S. Chand and Company Limited.
4. UPADHYAY, UPADHYAY & NATH (2010) Biophysical Chemistry Principles and Techniques, Fourth Revised Edition, Himalaya Publishing House, New Delhi.

PRACTICAL SCHEDULE

Saturday (Batch-I & II): 08:30am – 10:30am in Biotech Laboratory

Sr. no	Experiments
1.	Isolation of plant chloroplasts by density gradient centrifugation
2.	Preparation of TLC plates for separation of plant pigments
3.	Separation of plant pigments using Thin Layer Chromatography (TLC)
4.	Separation of proteins using Gel Permeation Chromatography
5.	Study of HPLC and its applications
6.	Study of the AAS technique and its applications
7.	Dialysis technique for protein separation and purification
8.	Separation of proteins by SDS-PAGE - Demonstration
9.	Southern blotting technique - Demonstration
10.	Comparison of absorption curves of any two coloured compounds

*** MANDATORY ITEMS TO BE CARRIED FOR PRACTICALS;**

1) Laboratory record note book.

2) Stationery kit. (Coloured pens, ruler, eraser, 2 finely sharpened HB pencils & sharpener).

REFERENCES

1. SIVASANKAR, B. (2009) Bio-separations Principles and Techniques, PHI Learning Private Limited, New Delhi.
2. PLUMMER, D.T. (1993) An Introduction to Practical Biochemistry, Sixth Reprint. Tata McGraw-Hill Publishing Company Limited, New Delhi.
3. JAYARAMAN, J. (2011) Laboratory Manual for Biotechnology, Second Edition. New Age International Private Limited, Publishers New Delhi.
4. VERMA, A.S., DAS, S. & SINGH, A. (2014) Laboratory Manual for Biotechnology, First Edition, S. Chand and Company Private Limited.

x ----- x