Syllabus template

Semester: III	
Course : Microbiology	
Paper Title: Advanced Laboratory techniques	
Paper code: S2MB230311P	**Credits:**
Hours/week : 4	
Category: Core/MDC/SEC/VAC: Skill	
Theory / Practical / Composite: Practical	
No of Modules: No Modules	

Course Overview: This practical course focuses on the development of technical skills related to certain experimental procedures crucial for working/research in fields pertaining to Biochemistry, Molecular Biology and Recombinant DNA Technology.

Course Outcome:

1. **To separate proteins by using different techniques based on charge, mass**
2. **To separate amino acid and other biomolecules depending on physico-chemical characters**
3. **Identification and characterisation of different DNAs (genomic/plasmid) with different techniques**
4. **To know Recombinant DNA technologies with different techniques.**
5. **To learn basic biochemical techniques**

Prerequisites: ***Basic knowledge about any prior course***

SYLLABUS

UNIT/Module	CONTENT	HOURS or NUMBER OF CLASSES	CO Mapping	COGNITIVE LEVEL
1.	Measurement of pH (buffer) by pH meter	4	CO5	K1,K2,K3,K5
2.	Qualitative tests for amino acid, carbohydrate, lipids	4	CO2	K1,K2,K3,K5
3.	UV-Vis Spectrophotometry-quantification of protein, assay of enzyme, determination purity of sample	4	CO5	K1,K2,K3,K5
4.	Study of enzyme kinetics (Km and V max determination)	4	CO5	K1,K2,K3,K4,K5
5.	Thin layer chromatography-Separation of amino acids, lipids and natural substances like catechin from mixtures	4	CO2	K1,K2,K3,K5
6.	Separation of protein mixtures by column chromatography	4	CO1	K1,K2,K3,K5
7.	Separation of protein mixtures by Polyacrylamide Gel Electrophoresis	4	CO1	K1,K2,K3,K4,K5
8.	Western Blot technique-to identify the separated protein	4	CO1	K1,K2,K3,K4,K5

9.	**Agarose gel electrophoresis-separation and visualization of DNA**	**4**	**CO3**	**K1,K2,K3,K4,K5**
10.	**Gene Induction**	**4**	**CO4**	**K1,K2,K3,K4,K5**
11.	**Restriction digestion**	**4**	**CO4**	**K1,K2,K3,K4,K5**
12.	**DNA ligation**	**4**	**CO4**	**K1,K2,K3,K5**
13.	**Transformation (Blue White screening)**	**4**	**CO4**	**K1,K2,K3,K4,K5**
14.	**Genomic DNA isolation**	**4**	**CO3**	**K1,K2,K3,K5**
15.	**Plasmid DNA isolation**	**4**	**CO3**	**K1,K2,K3,K5**

Text Books

1. **Wilson K and Walker J. (2010) Principles and Techniques of Biochemistry and Molecular Biology; 7 th Edition, Cambridge university Press.**
2. **Voet D and Voet JG, 2013. Fundamentals of Biochemistry. 4 th John Wiley and Sons**
3. **Nelson DL and Cox MM (2008) Lehninger Principles of Biochemistry, 5 th edition, W. H.Freeman and Company 4. Campbell, MK (2012) Biochemistry, 7 th ed., Published by Cengage Learning**

Suggested readings

Same as above

Web Resources: Nil

Evaluation:
CA:40
End sem:7
Attendance:3

Paper Structure for Theory Semester Exam Module : NA

Course outcomes (COs) and Cognitive Level Mapping

COs	CO Description	Cognitive levels
CO1	**To separate proteins by using different techniques based on charge, mass**	**K1,K2,K3,K4,K5**
CO2	**To separate amino acid and other biomolecules depending on physico-chemical characters**	**K1,K2,K3,K5**
CO3	**Identification and characterisation of different DNAs (genomic/plasmid) with different techniques**	**K1,K2,K3,K4,K5**
CO4	**To know Recombinant DNA technologies with different techniques**	**K1,K2,K3,K4,K5**
CO5	**To learn basic biochemical techniques**	**K1,K2,K3,K4,K5**