Name of Faculty	:	Faculty of Science
Name of Program	:	Master of Science
Course Code	:	2MSB05
Course	:	Practical -1 RDNA Technology and Virology
Type of Course	:	Professional Core
Year of Introduction	:	2023-24

Prerequisite	:	Basic knowledge of virus and genetics.
Course Objective	:	This course conceptualize properties and applications of versatile DNA modifying enzymes, cloning strategies, vector types, host genotype specificities for selection and screening of recombinants and/or recombinant clones. This course will serve to illustrate creative use of modern tools and techniques for manipulation and analysis of genomic sequences and to expose students to use recombinant DNA technology in biotechnological research. Applying the methods used in research and diagnosis of viral diseases.
Course Outcomes	:	At the end of this course, students will be able to:
	CO1	Develop hands-on training experience on methods and techniques used in virology.
	CO2	Acquire hands-on training experience on virus identification and diagnostics and virus isolation methods
	CO3	Observe and determine pathological changes occur during virus infection and replication (cytopathic effects).
	CO4	A sound knowledge on methodological repertoire allows students to innovatively apply these in basic and applied fields of biological research.
	CO5	Conceptualize PCR technique in medical and forensic science.
	CO6	Outline the fundamental steps in a genetic engineering procedure

Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			**Credits**	**Examination Marks**				
				Theory Marks		**Practical Marks**		**Total marks**
L	**T**	**P**	**C**	**SEE**	**CIA**	**SEE**	**CIA**	
0	0	8	4	0	0	70	30	100

Legends: ***L****-Lecture;* ***T****–Tutorial/Teacher Guided Theory Practice;* ***P*** *– Practical,* ***C*** *– Credit,* ***SEE*** *– Semester End Examination,* ***CIA*** *- Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.*

Suggested List of Experiments

Sr. No	Name of Experiment	Teaching Hours	Mapping with COs
1.	Isolation and of DNA from E.coli	02	CO6
2.	Isolation of DNA from Plant cell	02	CO6
3.	Quantification and purification of DNA	02	CO6
4	Isolation of Plasmid DNA	02	CO6
5	Restriction digestion of plasmid (demo)	02	CO4
6	Agarose Gel Electrophoresis	02	CO4
7	Polyacrylamide Gel Electrophoresis	02	CO4
8	SDS Page	02	CO4
9	Electrophoretic separation of Serum Protein	02	CO4
10	Estimation of DNA by DPA	02	CO4
11	Estimation of RNA by DPA	02	CO4
12	Southern Blotting	02	CO4
13	Northern Blotting	02	CO4
13	Western Blotting	02	CO4
14	PCR	02	CO5
15	Study of the structure of plant viruses	02	CO1
16	Study of structure of animal viruses	02	CO1
17	Isolation of Bacteriophages from sewage sample	02	CO2
18	One step growth curve for determination of virus titre	02	CO2
19	Phage typing of E.coli Bacteriophages	02	CO2
20	Direct methods of detection of Viral inclusion bodies using light microscopy	02	CO3
21	Infectivity assay of bacterial viruses	02	CO1
22	Determination of TCID 50	02	CO1
23	Determination of LD 50	02	CO1
24	Virus-induced cytopathic effect	02	CO3

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	**30**	**30**	**40**	**0**	**0**	**0**

NOTE: This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Major Equipment / Instruments

Sr. No.	Name of Major Equipment/ Instruments and Software
1	Analytical Balance
2	Autoclave
3	Micropipettes
4	Stains
5	Light Microscope
6	Anaerobic jar
7	UV Chamber
8	Hot Air Oven
9	Centrifuge
10	Electrophoresis
11	SDS PAGE
12	PCR
13	Deep Freezer
14	Autoradiography
15	Colorimeter
16	UV Vis Spectrophotometer
Software	Software: Bio4C Tm Processpad software

Suggested Learning Websites

Sr. No.	Name of Website
1	https://www.genome.gov/genetics-glossary/Recombinant-DNA-Technology
2	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3327398/

Reference Books

Sr. No.	Name of Reference Books
1	BIMM 101 Recombinant DNA Techniques Lab Manual Winter 2021 Authors: Lisa McDonnell, William McGinnis, Mandy Butler, Stephanie Mel, Emily Grossman, Adam Kirby, Thomas Kuret, Christopher Day, Keefe Reuther
2	Gene Cloning and DNA analysis by T.A.Brown
3	Principles of Gene cloning and Genomics by B. Primrose (Author), Richard Twym