

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Structured Work Plan for Teaching

(June – 2020 to October 2020)

1. Details of Classes to be taught

Sr. No.	Class	Name of Asstt. Prof.	Subject	Paper
1	M.Sc. II	Dr. Sachin S. Kulkarni	Biotechnology	Course Title: Genetic Engineering Course Code : P-GEE-334 Course Title: Lab Course IX Course Code: P-LAC-338

2.

2. Summary of Lesson Plan

Name of Teacher: Dr. Sachin S. Kulkarni

Class : M.Sc. BT. II (Third Semester)

Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date

1	Genetic Engineering	<p>Unit I</p> <ol style="list-style-type: none"> 1. Isolation of DNA and RNA. 2. Quantification of nucleic acids. 3. Radiolabelling of nucleic acids: End labelling, nick translation, labelling by primer extension, 4. DNA sequencing: Maxam-Gilbert(Chemical) and Sanger- Nicolson (dideoxy/ enzymatic) sequencingmethod, Pyrosequencing. 	<p>18-06-20 To 06-07-20</p>	<p>03 01 03 03</p>	<p>Classroom Seminar Group Discussion</p>	<p>Assignment</p>
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		<p>Unit II</p> <ol style="list-style-type: none"> 1. Types of restriction endonucleases, classification and uses. 2. Restriction mapping. 3. DNA modifying enzymes: Nucleases, Polymerases, Phosphatases and DNA ligases. 4. Prokaryotic host. Plasmid vectors, 5. Bacteriophage, other vectors, expression vectors, 6. Construction of genomic and c-DNA libraries, 7. Joining of DNA Fragments to vectors, 8. Homo polymer tailing, cohesive and blunt end ligation, adaptors, linkers. 	<p>18-07-20 To 07-08-20</p>	<p>02 01 02 01 01 02 01 01 01</p>	<p>Classroom Seminar Group Discussion</p>	<p>Assignment</p>
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		<p>Unit III</p> <ol style="list-style-type: none"> 1. Selection, screening and analysis of recombinants. 2. Principle of hybridization. Northern blotting, Southern blotting, Western-blotting. 3. Polymerase chain reaction, 4. Restriction fragments length polymorphism, RAPD, AFLP, MAP 	<p>07-08-20 To 05-09-20</p>	<p>03 04 02 03</p>	<p>Classroom Seminar</p> <p>Group Discussion</p>	<p>Assignment</p>
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		<p>Unit IV</p> <ol style="list-style-type: none"> 1. Vector Engineering and codon optimization, host engineering. 2. Strategies of gene delivery, in vitro translation, 3. expression in bacteria and yeast, expression in insects and insect cells, expression in mammalian cells, 4. expression in plants. 5. Chromosome engineering, 6. Targeted gene replacement, gene editing, gene regulation & silencing. 	<p>05-09-20 To 10-10-20</p>	<p>03 02 02 01 01 03</p>	<p>Classroom Seminar Group Discussion</p>	<p>Assignment</p>
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Practicals

Sr. No.	Subject	Practicals	Date	No. of Practical
1		Isolation of nucleic acid	08-07-2020 & 13-07-2020	02

2	Genetic Engineering	Endonuclease digestion of nucleic acid analysis of DNA fragments by agarose gel electrophoresis	15-07-2020 & 20-07-2020	02
3		Quantification of nucleic acid	22-07-2020 & 27-07-2020	02
4		Thermal melting of DNA	29-08-2020 & 03-08-2320	02
5		Isolation of plasmid DNA-i) minipreparation	05-08-2020 & 10-08-2020	02
6		In vitro DNA ligation, transformation of E. coli.	12-08-2020 & 17-08-2020	02
7		Separation of poly A+RNA on oligo-dT column.	20-08-2020 & 24-08-2020	02
8		Protein isolation techniques	26-08-2020 & 31-08-2020	02
9		Protein electrophoresis	06-09-2020 & 09-09-2020	02
10		Protein blotting technique	14-09-2020 & 16-09-2020	02

Rajarshi Shahu Mahavidyalaya, Latur (Autonomous College)

B.Sc. Biotechnology (Semester Pattern) VI Semester

Course Title: Computational Biology

Course Code: U-COB-705

Teaching plan for 20-21(summer)

Name of Teacher: Dr. Sachin S. Kulkarni

Sr. No.	Subject Computational Biology	Unit/Chapter	Dates	No. of lectures	activities	test
1	Unit I	Introduction to bioinformatics and data generation What is bioinformatics and its relation with molecular biology. Examples of related tools (FASTA, BLAST, RASMOL), databases (GENBANK, Pubmed, PDB) and software (RASMOL) Data generation; Generation of large scale molecular biology data (Through Genome sequencing, Protein sequencing, Gel electrophoresis, Applications of Bioinformatics.	10-02-2021 To 26-03-2021	01 01 02 04 01 01	Classroom Group Discussion	Unit – I 12/2/2021 Unit – II 16/03/2021 Unit –III 26/04/21
	Unit II	Biological Database and its Types Introduction to data types and Source. Population and sample, Classification and Presentation of Data. Quality of data, private and public data sources. General Introduction of Biological Databases; Nucleic acid databases (NCBI, DDBJ, and EMBL). Protein databases (Primary, Composite, and Secondary).	27-3-2021 To 15-04-2021	03 02 02 03 02	Classroom Group Discussion	

	Unit III	Sequence Alignments and Visualization Introduction to Sequences, alignments, Local alignment and Global alignment (algorithm and example), Pairwise alignment (BLAST and FASTA Algorithm) and multiple sequence alignment (Clustal W algorithm). Methods for presenting large quantities of biological data: sequence viewers, 3D structure viewers (Rasmol, SPDBv, Chime, Cn3D, PyMol).	16-04-2021 To 30-04-2021	02 02 04 04	Classroom Group Discussion	
	Unit IV	General introduction to Gene expression in prokaryotes and eukaryote, transcription factors binding sites. SNP, EST, STS. General introduction to protein structure, prediction of secondary structure of protein, computational protein modelling	31-04-2021 To 20-05-2021	02 02 03 02	Classroom Group Discussion	

Practicals

Sr. No.	Subject	Practicals	Date	No. of Practical
1	Computational Biology	A guided tour of NCBI/EBI : Data access – standard search engines : data retrievals tools – Entrez, DBGET and SRS (sequence retrieval systems); software for data building. submission of new revised data	11/2/2021 to 24/04/2021	04
2		Sequence homology as product of molecular evolution, sequence similarity searches, sequence alignment-global, local, end free-space; measurement of sequence similarity, similarity and homology.		04
3		Multiple sequence alignment		04

4		Phylogeny reconstruction, PHYLIP package	Batch A,B,C,D	04
5		Getting an amino acid sequence, nucleotide sequence by blasting		04
6		Multiple sequence alignment		04
7		Homology modeling		04
8		Protein identification & characterization with peptide mass fingerprinting data.		04
9		Primary structure analysis of proteins.		04