



Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)
Department of Biotechnology
Structured Work Plan for Teaching
Academic Year 2018-19 (Term-I)

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. 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	Unit I 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) sequencing method, Pyrosequencing.	18-06-18 To 06-07-18	03 01 03 03	Classroom Seminar Group Discussion	Assignment


		Unit II 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.	18-07-18 To 07-08-18	02 01 02 01 01 02 01 01	Classroom Seminar Group Discussion	Assignment
		Unit III 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	07-08-18 To 05-09-18	03 04 02 03	Classroom Seminar Group Discussion	Assignment

		Unit IV				
		1. Vector Engineering and codon optimization, host engineering.	05-09-18	03	Classroom Seminar	Assignment
		2. Strategies of gene delivery, in vitro translation,	To	02		
		3. expression in bacteria and yeast, expression in insects and insect cells, expression in mammalian cells,	10-10-18	02	Group Discussion	
		4. expression in plants.		01		
		5. Chromosome engineering,		01		
		6. Targeted gene replacement, gene editing, gene regulation & silencing.		03		

Practicals

Sr. No.	Subject	Practicals	Date	No. of Practicals
1	Genetic Engineering	Isolation of nucleic acid	08-07-18 & 13-07-18	02
2		Endonuclease digestion of nucleic acid analysis of DNA fragments by agarose gel electrophoresis	15-07-18 & 20-07-18	02
3		Quantification of nucleic acid	22-07-18 & 27-07-18	02
4		Thermal melting of DNA	29-08-18 & 03-08-18	02
5		Isolation of plasmid DNA-i) minipreparation	05-08-18 & 10-08-18	02
6		In vitro DNA ligation, transformation of E. coli.	12-08-18 & 17-08-18	02
7		Separation of poly A+RNA on oligo-dT column.	20-08-18 & 24-08-18	02
8		Protein isolation techniques	26-08-18 & 31-08-18	02
9		Protein electrophoresis	06-09-18 & 09-09-18	02
10		Protein blotting technique	14-09-18 & 16-09-18	02


Course Teacher


Head
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**Shiv Chhatrapati Shikshan Sanstha's
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**Department of Biotechnology
Structured Work Plan for Teaching
Academic Year 2018-19 (Term-II)**

1. Detilas of Classes to be taught

Sr. No	Class	Name of Asstt. Prof	Subject	Paper
1	B.Sc. BT TY	Dr. S.S. Kulkarni	Biotechnology	Computational Biology

2. Summary of Lesson Plan

Name of Teacher : Dr. S.S. Kulkarni

Class: B.Sc. BT TY (Six Semester)

Sr. No	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activites to be organized	No. of Test/ Assignment with topic and date
1.	Computational Biology	<p>Unit 2 : What is bioinformatics and its relation with molecular biology</p> <p>Examples of related tools (FASTA, BLAST, RASMOL), Databases (GENBANK, Pumbed, PDB) and software (RASMOL) Data generation,</p> <p>Generation of large scale Molecular biology data (Through Genome sequencing)</p> <p>Protein sequencing, Gel electrophoresis, Applications of Bioinformatics.</p> <p>Unit 3: Introduction to data types and Source,</p>	<p>29 Nov 18 to 31 Dec 18</p>	<p>02</p> <p>02</p> <p>02</p>	<p>Guest Lecture</p> <p>Quiz Contest</p> <p>Class room Seminar</p>	<p>Unit Test- I 20.01.2019</p> <p>Unit Test - II</p>


	Population and sample, Classification and Presentation of Data.		02		
	Quality of data, private and public data sources. General introduction of Biological Databases;		02		
	Nucleic acid databases (NCBI, DDBJ, and EMBL)				
	Protein databases (Primary, Composite, and Secondary)	01 Jan 19 to 18 Jan 19	05		
	Unit -4 : Introduction to Sequences, alignments, Local alignment and Global alignment (algorithm and example),		03		
	Pairwise alignment (BLAST and FASTA Algorithm) and multiple sequence alignment (Clustal Walgorithm).		04		
	Methods for presenting large quantities of biological data: sequence viewers, 3D structure viewers	25 Feb 19 to 05 Mar 19	03		
	(Rasmol, SPDBv, Chime, Cn3D, PyMol).		04		
	Unit 1. Introduction Overview and functions of a computer system, storage, devices, memory, etc.		03		
	The Minicomputer, Mainframe Computers, Parallel Processing Computer, The Super Computer, etc.		03		
	The Internet and its Resources, World Wide	18 Feb 19	02		

		<p>Web (WWW): associated tools, services, resources and various terminologies;</p> <p>Introduction to operating system; File System Concept- NTFS, FAT etc.</p>	to 07 Mar 19	02		
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Sr. No	Practical to be covered	Date	No. of Practicals
Computational Biology	1) A guided tour of NCBI/ EBI : Data access – standard search engines: data retrievalstools – Entrez, DBGET and SRS (sequence retrieval systems); software for data building submission of new revised data	12/12/18 & 13/12/18	2
	2 Sequence homology as product of molecular evolution, sequence similarity searches	19/12/18 & 20/12/18	2
	3) sequence alignment- global, local, end free-space; measurement of sequence similarity, similarity and homology	26/12/18 & 27/12/18	2
	4) Multiple sequence alignment Phylogeny reconstruction, PHYLIP package	03/01/19 & 04/01/19	2
	5) Word processing Getting an amino acid sequence, nucleotide sequence by blasting.	09/01/19 & 10/01/19	2
	6) Multiple sequence alignment	16/01/19 & 17/01/19	2
	7) Homology modeling Protein identification & characterization with peptide mass fingerprinting data.	23/01/19 & 24/01/19	2
	8) Primary structure analysis of proteins	30/01/19 & 31/01/19	2
	9) Secondary structure analysis of proteins (helical content of peptide)	06/02/19 & 07/02/19	2
	10) Tertiary structure analysis of proteins (3D structure prediction)	13/02/19 & 14/02/19	2


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