Shiv Chhatrpati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)
Department of Biotechnology

स्थापना - १९७०

Structured Work Plan for Teaching

Academic Year 2019-20 (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) sequencingmethod, Pyrosequencing.	18-06-19 To 06-07-19	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.	18-07-19 To 07-08-19	02 01 02 01 01 02 01 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	07-08-19 To 05-09-19	03 04 02 03	Classroom Seminar Group Discussion	Assignment

		Unit IV 1. Vector Engineering and codon optimization, host engineering. 2. Strategies of gene delivery, in vitro translation, 3. expression inbacteria and yeast, expression in insects and insect cells, expressionin mammalian cells, 4. expression in plants. 5. Chromosome engineering, 6. Targeted gene replacement, gene editing, gene regulation & silencing.	05-09-19 To 10-10-19	03 02 02 01 01 03	Classroom Seminar Group Discussion	Assignment

Practicals

Sr. No.	Subject	Practicals	Date	No. of Practicals
1	Genetic Engineering	Isolation of nucleic acid	08-07-19 & 13-07-19	02
2		Endonuclease digestion of nucleic acid analysis of DNA fragments by agarose gel electrophoresis	15-07-19 & 20-07-19	02
3		Quantification of nucleic acid	22-07-19 & 27-07-19	02
4		Thermal melting of DNA	29-08-19 & 03-08-19	02
5		Isolation of plasmid DNA-i) minipreparation	05-08-19 & 10-08-19	02
6		In vitro DNA ligation, transformation of E. coli.	12-08-19 & 17-08-19	02
7		Separation of poly A+RNA on oligo-dT column.	20-08-19 & 24-08-19	02
8		Protein isolation techniques	26-08-19 & 31-08-19	02
9		Protein electrophoresis	06-09-19 & 09-09-19	02
10		Protein blotting technique	14-09-19 & 16-09-19	02

Course Teacher

Head

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Structured Work Plan for Teaching
Academic Year 2019-20 (Term-II)

स्थापना - १९७०

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	Computional 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	Unit 2 : What is bioinformatics and its relation with molecular biology Examples of related tools (FASTA, BLAST, RASMOL), Databases (GENBANK, Pumbed, PDB) and software (RASMOL) Data generation, Generation of large scale Molecular biology data (Through Genome sequencing) Protein sequencing, Gel electrophoresis, Applications of Bioinformatics. Unit 3: Introduction to data types and Source, Population and sample,	29 Nov 19 to 31 Dec 19	02 02 02 02	Guest Lecture Quiz Contest Class room Seminar	Unit Test- I 20.01.2020 Unit Test – II 22.03.2020

		Classification and Presentation of Data.				
		Quality of data, private and public data sources. General introduction of Biological Databases;		02		
		Nucleic acid databases (NCBI, DDBJ, and EMBL)		02		
		Protein databases (Primary, Composite, and Secondary)	01 Jan 20	05		
			to			
		Unit -4 : Introduction to Sequences, alignments, Local alignment and Global alignment (algorithm and example),	18 Jan 20	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 20	03		
			to			
		(Rasmol, SPDBv, Chime, Cn3D, PyMol).	05 Mar 20	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 Web (WWW): associated tools, services, resources		02		

		and various terminologies; Introduction to operating system; File System Concept- NTFS, FAT etc.	18 Feb 20 to 07 Mar 20	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	12/12/19 & 13/12/19	2
	2 Sequence homology as product of molecular evolution, sequence similarity searches	19/12/19 & 20/12/19	2
	3) sequence alignment- global, local, end free-space; measurement of sequence similarity, similarity and homology	26/12/19 & 27/12/19	2
	4) Multiple sequence alignment Phylogeny reconstruction, PHYLIP package	03/01/20 & 04/01/20	2
	5) Word processing Getting an amino acid sequence, nucleotide sequence by blasting.	09/01/20 & 10/01/20	2
	6) Multiple sequence alignment	16/01/20 & 17/01/20	2
	7) Homology modeling Protein identification & characterization with peptide mass fingerprinting data.	23/01/20 & 24/01/20	2
	8) Primary structure analysis of proteins	30/01/20 & 31/01/20	2
	9) Secondary structure analysis of proteins (helical content of peptide)	06/02/20 & 07/02/20	2
	10) Tertiary structure analysis of proteins (3D structure prediction)	13/02/20 & 14/02/20	2

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