LS 501A Molecular Genetics and Genetic Engineering 2 Credits Name of the Faculty: Prof. P.C. Rath, Prof. K. Natarajan*		
Sr.No.	**Topic**	**Faculty Name/ Contact Hours**
1	Path from Genetics to Molecular Genetics and Genetic Engineering to Genomics	PCR/1
2	Transcriptional Control Regions of Prokaryotic and Eukaryotic Genes	PCR/4
4	DNA Modifying Enzymes, DNA Cloning and Manipulating Cloned DNA	PCR/3
5	RNA isolation, cDNA Synthesis, cDNA Library Construction and its Applications	PCR/1
6	Genomic DNA Library Construction and its Applications	PCR/3
7	Identification and analysis of recombinant DNA clones	PCR/2
8	RNA Interference, Gene Silencing, Epigenetics	KN/1
9	Milestones in Genome Sequencing and Maxam-Gilbert Sequencing; DNA labelling chemistries	KN/1
10	Sanger Sequencing- dideoxy cycle seq and automated DNA seq; Templates for sequencing	KN/1
11	Genome sequencing techniques- classical	KN/2
12	Methods to study Gene Expression and its Applications	KN/1
13	Polymerase Chain Reaction and its Applications	KN/2
14	RNA-Seq chemistry and applications for transcriptomics	KN/1
15	Protein-Protein Interactions and its Applications	KN/1
16	Fundamentals of Mass Spectrometry for proteomics	KN/1
17	Site-directed Mutagenesis, Genome Editing (Crispr-Cas, Zfn, Talen etc.) and their Applications	PCR/3
18	Gene Knock-out and Knock-down Methods and their Applications	PCR/1
19	Transgenic Systems and their Applications	PCR/1

Further Reading:

1. Principles of gene manipulation and Genomics. 7th Edn. Primrose and Twyman (2006)
2. Molecular Biology of the Gene. Watson et al. 6th Edn (2009)
3. Genes IX. Lewin (2008)
4. Molecular Cloning- A laboratory Manual. Sambrook and Russell (2001)