Course Code	21BTB102T	Course Name	Introduction to Computational Biology		Course Category	B		Basic Sciences		L	T	P	C
										2	0	0	2

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Biotechnology		Data Book / Codes/Standards	Nil	

Course Learning Rationale (CLR): The purpose of learning this course is to.

- CLR-1 : Explain the cell structure and function from its organization
- CLR-2 : Define the molecular and biochemical basis of an organism
- CLR-3 : Acquire knowledge of computational tools used for the human genome project
- CLR-4 : Discuss protein structure and its prediction
- CLR-5 : Acquire knowledge of neurons and workings of the brain
- CLR-6 : Impart the knowledge of immune system and prediction of vaccines

Course Outcomes (CO): At the end of this course, learners will be able to

- CO-1 : Describe the cell growth, reproduction, and differentiation
- CO-2 : Explain the concepts and principles of biochemistry
- CO-3 : Relate biological applications of protein sequence analysis and genomics
- CO-4 : Infer the computing techniques in biological structure prediction
- CO-5 : Evaluate neuronal mechanisms and computer applications that replicate its workings
- CO-6 : Integrate the immune system and its workings to predict vaccine candidates

Learning Blooms Level	Program Outcomes (PO) (1-Low 2-Medium or 3- High)												Program Specific outcome		
	1 Engineering Knowledge	2 Problem Analysis	3 Design & Development	4 Analysis, Design, Research	5 Modern Tool Usage	6 Society & Culture	7 Environment & Sustainability	8 Ethics	9 Individual & Team Work	10 Communication	11 Project Mgt. & Finance	12 Life Long Learning	PSO - 1	PSO - 2	PSO - 3
1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
3	2	-	-	2	-	-	-	-	-	-	-	-	-	-	-
3	2	3	-	1	3	-	-	-	-	-	-	-	-	-	-
4	3	2	2	1	3	-	-	-	-	-	-	-	-	-	-
5	3	-	2	2	3	-	-	-	-	-	-	-	-	-	-
6	3	-	2	1	3	-	-	-	-	-	-	-	-	-	-

Unit-1 - CELL AND EVOLUTION 6 Hours

Cell theory, Whitaker's kingdom classification, cell organelles, and their functions, homeostasis, Replication and cell Division, tissue differentiation, stem cells and their applications, genetic algorithms

Unit-2 BASICS IN BIOCHEMISTRY 6 Hours

Structure and functions of carbohydrates, lipids, proteins, enzymes, DNA, RNA, and hormones. The human genome project, genomics, Sequence databases, BLAST tool.

Unit-3 - STRUCTURE BIOLOGY 6 Hours

Protein synthesis, Secondary structure of the protein, Structure and function, Structural databases, protein visualizing tools, Secondary structure prediction algorithms

Unit-4 - NEUROBIOLOGY 6 Hours

Basic of Neurons, glial cells, Brain and its parts, Artificial neural networks, concepts, and differences with biological neural networks. – uses of ANN, machine learning, and data mining in biology

Unit-5 - IMMUNOBIOLOGY 6 Hours

Elements of the immune system, Types of the immune response, Active and passive immunity, Immunoinformatics, epitope prediction tools

Learning Resources	1. Thyagarajan S. N. Selvamurugan, R.A.Nazeeret al., Biology for engineers McGraw Hill Education. 2012 2. Parish, and Twyman, Instant notes. Bioinformatics, Westhead (1st edition), Bios Scientific Publishers Ltd., 2003	3. Norman Lewis, Gabi Nindl Waite, Lee R. Waite et.al., Applied Cell and Molecular Biology for Engineers. McGraw-Hill Education, 2007 4. Teresa K. Attwood, David Parry-Smith, Introduction to Bioinformatics, Pearson Education,2001 5. Zvelebil, Marketa J., and Jeremy O. Baum. Understanding Bioinformatics. Garland Science, 2007

Continuous Assessment