CENTRAL UNIVERSITY OF KERALA
DEPARTMENT OF COMPUTER SCIENCE
M.Sc. COMPUTER SCIENCE

ELECTIVES					
COURSE CODE	COURSE TITLE	CONTACT HRS/WEEK			CREDITS
		LEC	LAB	TUT	
CSC5013	Bioinformatics	2	2	1	4

Lec = Lecture, Tut = Tutorial, Lab = Practical

This is a participatory, experimental, problem solving and **employability based skill development course**.

Course Objective:
The objective of the course is to provide theoretical and practical aspects of bioinformatics.

By completing this course, students will obtain the following course/learning outcomes:
1. Knowledge gained:
   (i) Theoretical concepts for developing methods and algorithms for bioinformatics
2. Skill gained:
   (ii) Critical analyzing and logic **skills in developing methods and algorithms for bioinformatics**
3. Competency gained:
   (iii) Modelling and development of bioinformatics based applications.

Prerequisites: Basic knowledge of programming

Grading:

Lab implementation	– 15%
Participatory based group Project	– 10%
Assignment/Quiz/presentation	– 5%
Class Test	– 10%
Final Exam	– 60%

CSC5013 – Bioinformatics

Module 1
Introduction to Bioinformatics and molecular biology, Biological databases, Genome viewer, Applications of Bioinformatics, Processing biological sequences with MATLAB.

Module 2
Information retrieval from biological databases: Sequence homology, protein alignments, multiple sequence alignment, alignment tools, bio linguistic methods

Module 3
Biological sequence analysis: Sequence models, subsequence pattern models, gene models.

Module 4
Phylogenetics and system biology: phylogenetic reconstruction, distance based methods, character based methods, probabilistic methods, microarrays.

Text Books:
1. *Bioinformatics: Sequence & Genome Analysis, by David W. Mount, Cold spring Harbor press, 2004.*
2. *Introduction to Bioinformatics, by T K Attwood & D J Parry-Smith Addison Wesley Longman, 1999*
3. *Fundamentals of bioinformatics and computational biology, by Gautam B. Singh, Springer, 2015*

Reference:
4. *Bioinformatics- A Beginner's Guide, Jean-Michel Claverie, Cerdric Notredame, WILEY Dreamtech India Pvt. Ltd, 2006*
5. *Bioinformatics- Basics, Algorithms and Applications, Ruchi Singh, Richa Sharma, University Press, 2010*
6. *Bioinformatics- Databases, Tools, and Algorithms, Orpita Bosu, S K Thukral, Oxford University Press, 2007*
7. *Fundamentals of Bioinformatics and Computational Biology - Methods and Exercises in MATLAB, Gautam B. Singh, Springer International Publishing Switzerland 2015*