Performa for course plan

- Course Name: Fundamentals of Biological Sciences
- Course Code: IT405
- Credit: 3 +1
- Course offered to: M.Sc.

- Course description:

This course is intended to start with introduction of fundamentals of biological sciences so that students coming from non-biology background can understand the basic concepts. After the mid-term, the course will be taken to advanced level where students will be acquainted with high-throughput methods in biology and their applications. The detailed structure of the course is as below:

1. Biomolecules & Cellular Organization
   a) Cell Structure and evolution
   b) Structure & function of biomolecules: Carbohydrates, Proteins, Lipids and Nucleic Acids
   c) Cell division & cell cycle
2. Fundamental Processes
   a) Replication, repair & recombination
   b) Transcription and RNA processing
   c) Protein synthesis and Processing
3. Genome Organization & Regulation
   a) Structure and organization of genome
   b) Concept of Gene
   c) Gene Regulation
4. Methods in Molecular Biology
   a) DNA sequencing and PCR
   b) Gene Expression Analysis
   c) Proteomics & Metabolite Analysis
   d) Recombinant DNA Technology
5. Applications of Omics sciences in Health & Agriculture

- Pre-requisite (Mandatory): none

- Pre-requisite (Desirable): none

- Course Outcome (CO): 1. Introduce the concept of cell, constituent biomolecules and fundamental processes underlying DNA replication, transcription and translation.
  2. Understand theorganization of genome, genes and gene regulation
  3. Introduce DNA sequencing and other high-throughput technologies available for omics-based analysis
  4. Elaborate on applications of the molecular technologies coupled with bioinformatics in agriculture and human health.

- Tentative plan:

Week number	Lecture topic	COs met
Wk 1-3	Biomolecules& Cellular Organization	Cos 1
Wk4-6	Fundamental Processes	Cos1
Wk 7-8	Genome Organization & Regulation	Cos2
Wk9-13	Methods in Molecular Biology	Cos3
Wk14-Wk16	Applications of Omics Sciences in Health & Agriculture	Cos4

- Resource Material:

1. Review and Research Articles in National and International Journals
2. Cell and Molecular Biology: Concepts and Experiments; by Gerald Kalp
3. Molecular Cell Biology; by Lodish
4. Introduction to Genetics: A Molecular Approach; by Terry Brown
5. Biochemistry; by Lubert Stryer, John L. Tymoczko And Jeremy Mark Berg
6. Concepts of Genetics; by Klug, Cummings, Spencer And Palladino
7. Genomes 3; by T.A. Brown
8. From Genes to Genomes: Concepts Applications of DNA Technology; by Dale, Schantz And Plant
9. Gene Cloning: Principles and Applications; by Julia Lodge, Pete Lund And Steve Minchin
10. Gene Cloning and DNA Analysis: An Introduction; by T.A. Brown
11. Genetics; by P.S. Verma and V.K. Agarwal
12. Cell and Molecular Biology; by P.K. Gupta
13. Molecular Biology and Genetic Engineering; by P.K. Gupta