Birla Institute of Technology & Science, Pilani
Hyderabad Campus

**SECOND SEMESTER 2021-2022**

Course Handout Part II

Date: 15-01-2022

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

***Course No.*** **: BIOT F346**
***Course Title*** **: Genomics**
***Instructor-in-Charge*** **: GIREESHA T.M.**

**1. Scope and Objective of the Course:**

The objective of the course is to introduce the students to the concepts of Genomics. It is the study of an organism's entire genome and major topics include, investigation of single genes, their biological functions/roles and their importance in the context of today's medical and biological research. The subtopics under Genomics include functional genomics, structural genomics, comparative genomics, epigenomics, pharmacogenomics. A primary approach is to determine the entire sequence and structure of an organism's DNA (genome) and then to determine how that DNA is arranged into genes and how to study its functions.

**2. Textbooks:**

1. Genomes, TA Brown, 3rd Edition, Garland Science Publishing (this book is available from Amazon to buy)
2. Introduction to Genomics, Arthur M. Lesk, 2nd Edition. Oxford University Press.

**3. Reference books**

1. Microbial Genome Methods, Kenneth W Adolph, CRC Press.
2. Genome Analysis, A Laboratory Manual, Vol. 4, Mapping Genomes, Bruce Birren, Cold Spring Harbor Laboratory Press.

**4. Course Plan:**

| Lecture No. | Learning objectives | Topics to be covered | Chapter in the Text Book |
|---|---|---|---|
| 1-8 | **Studying Genomes** | Genomes, Transcriptomes and Proteomes, Studying DNA, Mapping Genomes, Sequencing Genomes, Understanding a Genome Sequence, Understanding How a Genome Functions | T1: Ch. 1-6 |
| 9-14 | **Genome Anatomies** | Eukaryotic Nuclear Genomes, Genomes of Prokaryotes and Eukaryotic Organelles, Virus Genomes and Mobile Genetic Elements | T1: Ch. 7-9 |

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|---|---|---|---|
| 15-16 | **Genome Variation** | Types of variation between human genomes, pathogenic DNA variants, Detection and analysis of genome variations | Class notes |
| 17-29 | **How Genomes Function** | Accessing the Genome, Assembly of the Transcription Initiation Complex. Synthesis and Processing of RNA, Synthesis and Processing of the Proteome, Regulation of Genome Activity | T1: Ch. 10-14 |
| 30-36 | **How Genomes Replicate and Evolve** | Genome Replication, Mutations and DNA Repair, Recombination, How Genomes Evolve, Molecular Phylogenetics | T1: Ch. 15-19 |
| 37-40 | **Systems biology** | Applications of genomics | T2: Ch. 11 |

**5. Evaluation Scheme:**

| Component | Duration | Weightage (%) | Date & Time | Nature of Component |
|---|---|---|---|---|
| Quizzes | | 10% | Variable | Closed Book |
| Midsemester | 90 mins | 30% | 10/03 11.00am to12.30pm | Closed Book |
| 2 Assignments | | 20% | Variable | Open Book |
| Comprehensive examination | 120 mins | 40 % | 06/05 AN | Closed Book |

**6. Chamber Consultation Hour:** The specific timings and logistics of consultation will be finalized after discussion with the class.

**7. Notices:** Notices will be displayed on the course pages of CMS or through email.

**8. Make-up Policy:** Prior Permission has to be obtained from the Instructor-in-Charge for make-ups. No makeup for assignments.

**9. Academic Honesty and Integrity Policy**: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

**Instructor-in-Charge**