

Course Name: Practical OMICs

Course Number: BY509

Credit: 0.5-0.5-2-3

Prerequisites: Any MS/MSc/PhD students/BTech students with IC 136 course (Understanding Biotechnology & its Applications) or Consent of Faculty member.

Students intended for: B. Tech. 3rd and 4th year, MS/M.Sc/M.Tech., Ph.D.

Elective or Compulsory: Elective

Semester: Odd/Even

Course Objective:

Genome sequences are now available that enables us to determine the biological components that make up a cell or an organism. These biological components are studied under the fields of OMICS. The recently developed discipline of systems biology examines how these components interact and form networks and how the networks generate whole cell functions corresponding to observable phenotypes. The objective of this course is to first introduce the practical aspects of one or more of the different OMICS methods including Genomics, Transcriptomics, Metagenomics, and others based on the available resources.

Module 1 (10 hours)

Theory and Tutorials:

The theoretical aspects of different OMICS methods will be covered. This will include introduction to best experimental practices of experiment designing, sample selection, metadata selection, sample and library preparation for respective OMICS analysis. This will be followed by downstream analysis of OMICS data obtained including read preprocessing, and the respective analysis of OMICS data.

Module 2 (32 hours)

Practicals:

Mini projects will be assigned to the student involving one or more OMICS experiments. Experimental protocols will be taught and performed utilising the knowledge gained in Module 1 above on assigned case studies. This will be followed by analysis of the data obtained including hands-on exposure of the state-of-the-art software for respective OMICS data analysis, various available resources, and statistical data analysis for the same.