

## IT-778 : Performa for course plan

- Course Name: **Agriculture Bioinformatics**
- Course Code: 778
- Credit: 3
- Course offered to: M.Sc. and PhD

### **Course description:**

The use of bioinformatics in agriculture has huge potential for speeding crop improvement. Through this course, students will be introduced with key challenges in agriculture and how advances in omic technologies and bioinformatics are helping to resolve them. The advances made so far by applying omics technologies in plant research and the key challenges ahead will be discussed. The detailed syllabus is as follows:

1. Introduction to agricultural bioinformatics
  2. Sequencing of Plant genomes: Status and Challenges
  3. Comparative genomics in major crop plants and prospects
  4. Omics technologies for gene discovery and pathway analysis in plants
  5. Concept and applications of phylogenomics in selecting targets for crop improvement
  6. Overview of Plant microRNAs and analysis
  7. Web tools and databases available for plant research
- Pre-requisite (Mandatory): must have credited course on "Fundamentals of Biological Sciences" OR should have knowledge about basic concepts of molecular and computational biology.
  - Pre-requisite (Desirable): Knowledge and hands-on experience with concept and tools in plant biotechnology and next generation sequencing technologies will be very helpful.

### **Course Outcome (CO):**

1. Understand the impact of bioinformatics and next generation technologies in agriculture
2. Role of Comparative genomic and phylogenomics in candidate selection for crop improvement
3. Get acquainted with tools and resources available for plant research

### **Tentative plan:**

Week number	Lecture topic	COs met
Wk 1	Introduction to agricultural bioinformatics	Cos 1
Wk2-3	Sequencing of Plant genomes: Status and	Cos2

	Challenges	
Wk4-5	Comparative genomics in major crop plants and	Cos2
Wk6-9	Contribution of omics technologies in gene	Cos2
Wk10-11	Concept and applications of phylogenomics in	Cos2
Wk12-13	Overview of Plant microRNAs and analysis	Cos2
Wk14-16	Web tools and databases available for plant	Cos3

**Resource Material:**

1. Review and Research Articles in National and International Journals
2. Web-based databases and tools
3. Agricultural Bioinformatics Edited by Kishor, P.B. Kavi, Bandopadhyay, Rain). Suravajhala. Prashanth
4. Phylogenomics: An Introduction by Christoph Bleidom
5. The role of bioinformatics in agriculture by Santosh Kumar
6. Plant Bioinformatics: Methods and Protocols; edited by David Edwards