

## PGDBD-Elective course II

### IT 605 Genomics data analytics

#### **Introduction to Genomics, sequencing and recombinant DNA technology**

**Next Generation Sequencing Technologies:** Methods and applications

**Whole Genome Sequencing and Analysis:** Concept, methods, assembly methods (de novo and reference-based) and algorithms, genome annotation (structural and functional), comparative genomics

**High-throughput Transcriptome Profiling:** Concept, methods and applications; transcriptome construction (de novo and reference-based), differential gene expression

**Non-coding RNAs:** Small RNAs, miRNAs, long non-coding RNAs; sequencing and prediction methods; biological relevance

**Single nucleotide polymorphisms:** Genome resequencing; data processing and SNP prediction; applications in agriculture/human health

#### **Practicals:**

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1. Creating and benchmarking an NGS pipeline from scratch using tools such as Bowtie, Cufflinks, Samtools.
  2. Writing advanced R and Bioconductor powered genomics applications for specific case studies.
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