| 2 | Eric R. Kandel, James H. Schwartz, Thomas M. Jessell, "Principles of Neural Science," McGraw-Hill, 5th Edition |
|---|---|
| 3 | Robert Ader, "Psychoneuroimmunology," Academic Press; 4th edition |
| 4 | Memory Mechanisms in Health and Disease |

## Bioinformatic Approaches in Complex disorders

**Details of course: -**

| Course Title | Course Structure | | | Pre-Requisite |
|---|---|---|---|---|
| | **L** | **T** | **P** | |
| **Bioinformatic Approaches in Complex disorders (BT330)** | 3 | 1 | 0 | Nil |

**Course Objective:**
This course focuses on analyses, chemistry, processing, bioavailability, and health benefits of bioactive food components. Objective of the course is to understand fundamental concepts and knowledge related to functional food and to reveal to students the importance of food in the promotion of our health.

**Course Outcome:**

1. Gain proficiency in using bioinformatics tools and software to analyze complex genetic data.
2. Develop the ability to interpret genetic variations and their associations with complex disorders.
3. Learn how to integrate multi-omics data (e.g., genomics, transcriptomics, proteomics) for comprehensive disorder analysis.
4. Apply computational methods to identify biomarkers and potential therapeutic targets for complex disorders.
5. Enhance skills in critically analyzing and interpreting bioinformatic research studies related to complex disorders.

| S. No. | Content | Contact Hours |
|---|---|---|
| 1. | **Introduction:** Monogenic and complex disorders; Interplay of genetic and environmental Factors; Integration of clinical and molecular data; Understanding the factors influencing disease susceptibility | 9 |
| 2. | **Genome wide sequence extraction:** Genomic sequences; Genome analysis; Extraction of information related to length of the sequence, organism specificity, evolutionary origin, etc | 8 |

| 3. | **Database Creation:** Database system; Construction of database; Database interface; Data collection and retrieval; Database Management Systems; Importance of databases and database management systems | 8 |
|---|---|---|
| 4. | **Sequence based and Structure based analysis:** Sequence alignment and assembly; Profile comparison of sequences; Similarity search and conserved domains; Identification of intrinsic features of the sequence and its variations, Identification of molecular structure; Structure induced functional analysis; Exploring genetic diversity. | 8 |
| 5. | **Development of a Predicted Tool:** Features of predicte tools and why need them; Data utility; Statistical algorithms; Machine learning techniques; Types of predictive tools | 9 |
| | TOTAL | 42 |

Books: -

| S. No. | Name of Books/ Author/Publisher |
|---|---|
| 1 | Shui Qing Ye 2015: Big Data Analysis for Bioinformatics and Biomedical Discoveries by Chapman and Hall/CRC, 2015 |
| 2 | Eija Korpelainen, Jarno Tuimala, Panu Somervuo, Mikael Huss, Garry Wong 2014: RNA-seq Data Analysis: A Practical Approach by Chapman & Hall/CRC Mathematical and Computational Biology, 2014 |
| 3 | Robert Gentleman: 2008 R Programming for Bioinformatics by Chapman and Hall/ CRC, 2008 |
| 4 | Bentley DR, Balasubramanian S, Swerdlow HP, et al. Accurate whole human genome sequencing using reversible terminator chemistry. Nature. 2008; 456:53- 59, 2008 |

**Plant Bioinformatics**

**Details of course:-**

| Course Title | Course Structure | | | Pre-Requisite |
|---|---|---|---|---|
| | **L** | **T** | **P** | |
| **Plant Bioinformatics (BT332)** | 3 | 1 | 0 | NIL |