

Course Objectives:

The objectives of the course are:-

1. To enable the students to understand organization of Human genome.
2. To enable the students to analyze and predict protein models and genome database.
3. To train the students to run various databases necessary to predict the effect of certain mutations.

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

1. **Acquire** the basic knowledge of Human genome and its organization.
2. **Understand** the key features of various genome and protein databases.
3. **Solve** the problem by mutation detection through various databases.
4. **Analyze** the mutation through genome databases and predict its pathogenic effect.
5. **Evaluate** protein structure of protein through protein databases.
6. **Demonstrate** the protein structure through protein modeling.

Course Contents:

Molecular Biology of Proteins (types, structure, synthesis, translation), Posttranslational modifications (glycosylation, phosphorylation, methylation, etc.), Molecular mechanisms of cellular communication/signaling pathways, Bioinformatic tools (genomics, proteomics, metabonomics). Protein-Protein Interactions, receptor identification and characterization, Integral Membrane Proteins and Ion Channels, Peptide Models of Transmembrane, Domains, Membrane Fusion and Membrane Binding Proteins, Apolipoproteins. Advance techniques used in proteomics including, 2D Gel Electrophoresis, Mass Spectrometry, Maldi TOF, MS/MS, LC/MSMS, iTRAQ, Protein arrays etc.

Teaching-Learning Strategies

Teaching will be a combination of class lectures, class discussions, and group work. Short videos /films will be shown on occasion.

Assignments

The sessional work will be a combination of written assignments, class quizzes, presentation, and class participation/attendance.

Assessments and Examination

Sessional Work:	25 marks
Midterm Exam:	35 marks
Final term Exam:	40 marks

Text book

1. Principles of Proteomics by R. M. Twyman (2004). BIOS Scientific Publishers

Books Recommended:

2. Proteomics in Practice: A Guide to Successful Experimental Design (2008) 2nd Ed. by R. Westermeier, T. Naven, and Hans-Rudolf. J.Wiley and Sons
3. Molecular Biology of the Cell, (2008) 5th Edition .B. Alberts, A. Johnson, J. Lewis, M. Raff, K. Roberts and P. Walter 5th Ed. Garland Sciences, Taylor and Francis
4. Biochemistry (2007) 6th Ed. by J.M. Berg, J.L. Tymoczko and L. Stryer W.H. Freeman and Co.
5. Introduction to Proteomics: Tools for the New Biology(2001) by Daniel C. Liebler

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Course Contents:

Protein Isolation, Purification, Methods for the study of Proteins, Immunohistochemistry, ELISA, Western, 1D, 2D Electrophoresis.,

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