Indian Institute of Technology Guwahati
Proposal for a New Course / Revision of a Course

Course Number & Title: BT 617 & Proteomics: Methods & Applications	
L-T-P-C: 3-0-0-6	
Type of Letter Grading (Regular Letter Grades / PP or NP Letter Grades): Regular Letter Grades	
Kind of Proposal (New Course / Revision of Existing Course): Revision of Existing Course	
Offered as (Compulsory / Elective):Electives	
Offered to: B Tech/M Tech/PhD	
Offered in (Odd/ Even / Any):Any	
Offered by (Name of Department/ Center):BSBE	
Pre-Requisite: Nil.	
Preamble / Objectives (Optional): This course aims to provide the detailed guidelines and procedures to characterize protein in a complex biological sample. It involves basic information about protein and experiments to separate the complex biological mixture and then identify the protein of interest. The objective is to introduce the utility of proteomics and its potentials to understand complex biological phenomenon and problems in biotechnology industry.	
Course Content/ Syllabus Protein: Introduction, structure, functional diversity, modification, analytical tools to identify protein modifications; Protein Separation Techniques: Basic principle of chromatography, instrumentation, ion-exchange, size-exclusion and affinity chromatography techniques; Analysis of protein sample: Basic principle of electrophoresis, instrumentation, SDS-PAGE, Native PAGE, Preparative PAGE, different PAGE staining methods; Isoelectric focusing (IEF): Basic Principle of separation, Method of Isoelectric focusing of complex biological sample, 2-D gel electrophoresis and its different variants, Image analysis of 2-D gels; Mass Spectrometry: Basic principle, Instrumentation,Method of preparing sample for Mass spectrometry,LC-MS and its potential in proteomics. Strategies for protein identification: Discussion about different types of analytical tools, blotting techniques, protein sequencing, peptide mass fingerprinting, Proteome database etc.; Potentials of proteomics in biotechnology : Case studies related to Clinical and biomedical application of proteomics; cancer biology, cell biology, plant biotechnology, down-stream processing, immunology and drug discovery etc.	
Books (In case UG compulsory courses, please give it as “Text books” and “Reference books”. Otherwise give it as “References”.	
Text book and References: (Format: Authors, *Book Title in Italics font,* Volume/Series, Edition Number, Publisher, Year.)	
1.	R.M.Twyman, Principles of Proteomics, BIOS Scientific Publishers, 2004.
2.	P.Michael Conn, Handbook of Proteomic Method.Humana Press, Totowa, New Jersay, USA, 2003.
3.	Stryer, Biochemistry, W. H. Freeman and Co., New York, 2007.
4.	R. D. Appel and D.F. Hochstrasser, Proteome Research: New Frontiers in Functional Genomics,Springer, 1997
5.	C. Branden and J. Tooze, Introduction to protein structure, Garland Publishing, 1998.
6.	Selected review papers from different journals