

# NOC: Mass spectrometry based proteomics - Video course

## COURSE OUTLINE

Mass spectrometry is an advanced analytical technique for accurate mass measurement. It does so by producing charged molecular species in vacuum followed by its separation in the magnetic and electric fields on the basis of their mass to charge ( $m/z$ ) ratio. MALDI and ESI- coupled with mass analyzers are commonly used mass spectrometer configuration in proteomics. The human proteome draft was decoded by using high-resolution liquid chromatography coupled with mass spectrometry.

In this module, we will discuss the basics of mass spectrometry, sample preparations, liquid chromatography, hybrid mass spectrometers and quantitative proteomics techniques such as iTRAQ, SILAC and TMT using mass spectrometry. The course will also provide the basic knowledge about sample preparation, mass spectrometry workflow, different chromatography technologies and quantitative proteomics.

## COURSE DETAIL

Week No.	Topics
1.	<b>Proteomics introduction and sample preparation</b> Lec 1: Introduction to proteomics Lec 2: Why proteomics and sample preparation Lec 3: Protein extraction Lec 4: In-gel & in-solution digestion Lec 5: Fundamentals of mass spectrometry
2.	<b>Basics of mass spectrometry</b> Lec 6: Chromatography technologies Lec 7: Liquid chromatography Lec 8: Mass spectrometry: Ionization sources Lec 9: Mass spectrometry: Mass analyzers Lec 10: MALDI sample preparation and analysis



NP-TEL

NPTEL

<http://nptel.ac.in>

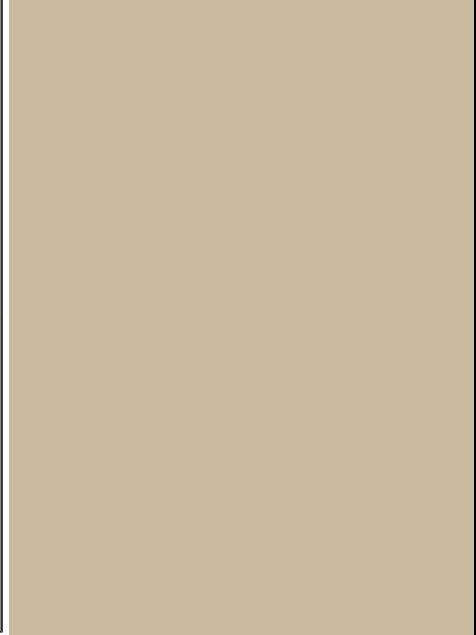
Biotechnology

### Pre-requisites:

The target audiences of this course are required to have a basic biology and biochemistry background

### Coordinators:

**Prof. Sanjeeva Srivastava**  
 School of Biosciences and  
 Bioengineering IIT Bombay

3.	<b>Quantitative proteomics</b> Lec 11: Introduction to quantitative proteomics Lec 12: Hybrid mass spectrometry configurations Lec 13: SILAC: In vivo labeling Lec 14: iTRAQ: In vitro labeling Lec 15: TMT: In vitro labeling	
4.	<b>Proteomics and systems biology</b> Lec 16: Quantitative proteomics data analysis Lec 17: Proteomics and systems biology-I Lec 18: Proteomics and systems biology-II Lec 19: Proteomics applications Lec 20: Challenges in proteomics	