

BSE611A - Modern Instrumentation Methods

Instructor:	Dr. Arun K. Shukla
Contact:	Dr. Shukla - Lab No. 3, ground floor, BSBE department Phone: 4251 (Dr. Shukla's office), 4058 (Dr. Shukla's lab) For after class questions - Friday: 10AM-11AM (Dr. Shukla's office)
Course venue:	BSBE Seminar Room
Schedule:	Monday (12.00 PM-01.15 PM), Thursday (12.00 PM-01.15 PM)
Grading scheme:	10% for attendance, 10% for Quiz-I, 20% for mid-semester examination 10% for Quiz-II, 20% for end-semester examination, 30% for project/assignments/paper presentation

The grading scheme is tentative and can be altered at instructor's discretion. Any changes will be communicated to you in advance.

Final grade:	Final grades will be relative.
---------------------	--------------------------------

Recommended book: Primary reference book - Principles and Techniques of Biochemistry and Molecular Biology by Wilson and Walker; additional study material will be provided by the instructor.

Course content:

- i) Biochemical and molecular biology methods – Brief overview of protein expression, purification and characterization; Biomolecular interaction techniques (including Surface Plasmon Resonance, radioisotope assays); Chemical labeling approaches.
- ii) Structural biology methods - Basics principles of protein crystallization (conventional methods and recent developments); crystal identification, freezing, X-ray diffraction and an overview of structure determination process; structural visualization tools with hands-on module.
- iii) Additional biophysical methods - Electron Paramagnetic Resonance; Nuclear Magnetic Resonance; Hydrogen-Deuterium Exchange; Cryo-Electron Microscopy; Mass-spectrometry.
- iv) Immunochemical methods – Overview of antibody generation techniques (classical method and new approaches); Mapping antigen-antibody interaction; Basic concepts and design of Immunoassays; Antibody based biosensors with specific examples; Therapeutic potential of antibodies.
- v) Cell biology methods – Fundamentals and advance concepts in microscopy (fluorescence and confocal microscopy); Biomolecular interaction in cellular context (resonance energy transfer techniques); Immunofluorescence techniques.

Special note: Do not plagiarize

According to Merriam-Webster dictionary "plagiarism" means the act of stealing or passing off other person's ideas or words as one's own without crediting the source. Plagiarism is a very serious offence. For this course and in future as well, you must refrain from plagiarizing. If you are found plagiarizing your mid/end semester examination answers or any other assignment, you will get "zero" marks for the entire exam.

IF YOU ARE FOUND CHEATING IN ANY OF THE EXAMS OR ASSIGNMENTS, YOU WILL GET "F" GRADE AND THE CASE WILL BE REPORTED TO APPROPRIATE AUTHORITIES.