



SECOND SEMESTER 2020-2021

Course Handout (Part-II)

Date: 16.01.2021

In addition to part-I (General Handout for all courses appended to the timetable) this portion gives further specific details regarding the course.

Course No. : BIOT F422

Course Title : Nanobiotechnology

Instructors : Suman Kapur

1. Course Description:

Introduction; Nanoscience in Nature; Fundamental science behind nanomaterials; Synthesis and properties of nanomaterials; Tools to study the properties, Size and Shape determinations, Application of nanomaterials in Science, Engineering and biomedical field; Future Trends.

2. Scope & Objectives:

This is a course for the science and engineering students to introduce the concept of Nanobiotechnology at a basic level. It shows that nanomaterials are there in nature in abundance. Proper appreciation and unfolding them can lead to various fruitful application in Sciences, as well as in Engineering and Biomedical fields. The various techniques (conventional and ultra-modern) to synthesize and study nanomaterials are covered. The course ends with the direction towards which the field of Nanobiotechnology is growing at the moment.

3. Text Book:

Nicolini, Claudio, Nanobiotechnology and nanobiosciences -- 2009, World Scientific Pub

4. Reference Books:

RB1. C. M. Niemeyer and Chad A. Mirkin, Nanobiotechnology: concepts, applications and perspectives applications and perspectives, 2004, Wiley India

RB 2. Balaji, Subbiah, Nanobiotechnology, 2010, MJ Publisher India

5. Lecture Plan:

Lect. No.	Learning Objectives	Topics to be covered	Chapter in the Text Book
1-3	Introduction	What is Nanoscience? Where and how does the size matter? Moore's Law, Nanoscience in nature	TB Ch 1
4-10	Some Basics of Solid State Physics & Quantum Mechanics	Lattice Structure, Band Diagram, Density of States at various dimensions	TB Ch 1 & 3
11-18	Fabrication of Nanoparticles Quantum wells wires and dots	Top-down and bottom up approach	TB Ch 1 & 2

19-28	Characterization and analysis	Scanning Tunneling microscopy, Scanning Probe Microscopy, X-ray & Neutron Scattering Techniques	TB Ch 2, 3 & 4
29-34	Properties of different nanomaterials	Thermo-mechanical, Optical, Electrical, Magnetic Properties	TB Ch 3 & 4
35-40	Application of nanoscience in various fields	Molecular Electronics, Nanostructured materials, Polymer nanocomposites, Nanobiology	Ch 4
40-42	Future Trends	Future Scope of Nanoscience and a step forward to a more powerful Nanotechnology	Research articles

6. Evaluation Scheme:

EC No.	Evaluation Component	Duration	Weightage	Date and Time	Nature of Component
1	Mid Sem Test	90 min.	30%	03/03 3.30 - 5.00PM	Open Book
2	Quiz	Variable	20% (4x5)	In class hours	Open Book
3	Assignments	Variable	15% (3x5)	In class hours	Open Book
4	Comprehensive Examination	2 Hours.	35%	08/05 FN	Open book

Chamber Consultation Hour: To be announced in the class.

Notices: Notices concerning the course will be put up on the notice board of Department of Biological Sciences

Make-up policy: Make-up decisions will be made on a case-by-case basis and only genuine cases as determined by the instructor and validated by Wardens and/or Medical Officer will be considered. No make-up for Quizzes/Presentations/Assignments.

Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor-in-charge
BIO F422

