

# Nanobiotechnology - Web course

## COURSE OUTLINE

The objective of the course is to familiarize the learner with the underlying principles that governs the structure and function of biomolecules and to harness these unique properties of biomolecules for novel applications. The topics that are to be covered are:

- Self assembly in biological systems
- Organic & Inorganic Templates in Biological Systems
- Biogenic nanoparticles
- Stealth nanoparticles
- Smart Nanosystems
- Targeted nano delivery systems – The Trojan horse concept
- Stem cells & Nanotechnology – Stimulating tissue regeneration
- Nanobiosensors for diagnostics

## COURSE DETAIL

Sl. No.	Topic	No. of Hours
1	Self assembly of proteins.	3
2	Self assembly of oligonucleotides.	4
3	Self assembly of amphipathic lipids.	2
4	Organic & Inorganic Templates in Biological Systems (Bone mineralization, silicate deposits).	4
5	Biogenic nanoparticles.	2
6	Stealth nanoparticles.	2
7	Virosomes and virus-like nanoparticles for gene delivery.	3
8	Stimuli responsive 'smart' nanosystems.	6
9	Targeted nano delivery systems – The Trojan horse concept (Passive targeting, Active targeting, External triggers, Internal triggers)	4
10	Stem cells & Nanotechnology – Stimulating tissue regeneration (Importance of nanogeometry,	6



NP-TEL

# NPTEL

<http://nptel.iitm.ac.in>

## Nanotechnology

### Pre-requisites:

- Basic knowledge (under graduate level) in biotechnology / biochemistry / physics / chemistry.

### Additional Reading:

- Encyclopaedia of Nanoscience & Technology, Edited by H.S. Nalwa, American Scientific Publishers (2005).
- Bionanotechnology: Lessons from Nature, David Goodsell, John Wiley & Sons (2004)

### Coordinators:

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	nanochemistry & nanomechanics)	
11	Capture-based, Cell-based & Tissue based sensors.	2
12	Nanoparticles for imaging.	2
	<b>Total</b>	40

**References:**

- Nanobiotechnology: Concepts, applications and perspectives, Christof M. Niemeyer, Chad A. Mirkin , Wiley Interscience (2004).