



Faculty of Eng. & Natural Sci.

BIO635-202301

Nanotoxicology

Instructor(s)

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Course Content

The number of materials and devices produced using nano technology is rapidly growing. With recent advances in the field, nano materials and nano particles start to be widely used in all fields of life. In order to avoid eventual health problems, documentation of the effects of nano particles and materials on organisms and cells is of utmost importance. During the nanotoxicology course, the effects of nano particles and materials on human health and, stress, disease and death responses of the organisms and cells to nano particles and materials will be analyzed and discussed from a molecular biology perspective. Nano particles/materials in industry and in the environment, methods to study nanotoxicology, organismal responses to nanomaterials, entry-uptake, fate of nano particles in cells and cellular and molecular stress and death responses against them will be covered during the course.

Assessment Methods and Criteria

	Percentage(%)	Number of assessment methods
Midterm	60	2
Quiz		0
Term-Paper	40	1

Course Outline

Week Subject

1-2 Introduction to Nanotechnology and Nanomedicine
Nanodevices and Nanomaterials

Major problem in treatment of many diseases

Advantages of Nano-delivery Systems

3 Designing Nanoparticles for Therapeutics

Types of Therapeutic Nanoparticles

Type of Nanostructured Nanoparticles

Nanocrystalline Particles in Nanomedicine

4 Nanotoxicity and human health

Fate of nanomaterials in the body: short term and long term effects

5 Determination of Toxicity

In vitro and in vivo study of the effect of nanoparticles on mammalian cells and tissues

6 Characterization Methods of Nanoparticles

DLS, TEM, SEM etc.

7-14 Current Application of Nanoparticles in Clinics

Nanoparticles for Cancer Therapy

Nanoparticles for Infectious Disease Therapy

Nanoparticles for Autoimmune Disease Therapy

Nanoparticles for Cardiovascular Disease Therapy

Nanoparticles for Neurodegenerative Disease Therapy

Nanoparticles for Ocular Disease Therapy

Nanoparticles for Pulmonary Disease Therapy

Nanoparticles for Regenerative Therapy