

Course Title	Nanomedicine				
Course Code	MD280				
Course Type	Elective				
Level	1 st Cycle (MD)				
Year / Semester	2 nd Year / 3 rd Semester				
Teacher's Name	TBA				
ECTS	3	Lectures / week	1 hr/ 14 weeks	Laboratories / week	0 hr/ 14 weeks
Course Purpose and Objectives	<p>Nanomedicine involves the development and application of materials and devices to study biological processes and to treat disease at the level of single molecules and atoms. Through the study and treatment of disease at the molecular cell level, this exciting new field of nanotechnology and medicine is offering unique capabilities in disease diagnosis and management. This course offers a survey of timely concepts in the rapidly emerging nanomedicine. We will introduce basic principles underlying nanomedicine and review how nanomedicine is redefining clinical research in areas such as diagnostic imaging agents, nanomaterial-based drug delivery, and nanoscale proteomics. Specific attention will be directed to disease processes including: cancer, kidney, and neurodegenerative diseases. Students will be expected to gain a broad understanding of concepts and applications of nanomedicine, as well as to apply concepts in nanomedicine to a focused clinical area of their choice.</p>				
Learning Outcomes	<p>Upon successful completion of this course students should be able to:</p> <ul style="list-style-type: none"> • introduce participants to the emerging field of nanomedicine and to give an overview of present and future applications of nanotechnologies and nanomaterials in medicine and healthcare and their limitations • provide an understanding of the scientific and regulatory obstacles to implementation of nanomedicines • provide an environment in which participants from a range of backgrounds can learn from eminent scientists in the field and can share their ideas in discussions with subject specialists • enable participants to make informed decisions about applications of nanotechnologies in their own field of work 				
Prerequisites	None	Co-requisites	None		
Course Content	1.Introduction to nanomedicine: challenges and opportunities				

	<p>Introduction to nanotechnologies for medicine and healthcare – challenges and opportunities Nanoparticles in medicine Recent developments in the safety of nanomaterials Practical session Day 2: Nanotechnologies for regenerative medicine and tissue engineering</p> <p>2. Nanotechnologies for regenerative medicine and tissue engineering – overview Nanomaterials for regeneration of bone and cartilage Scaffolds and nanocomposites for tissue engineering Using stem cells in tissue engineering Electrospinning in tissue engineering Day 3: Nano-Diagnostics</p> <p>3. Introduction to nano-diagnostics Extracellular vesicles in health and disease Engineered nanoparticles for cancer diagnostics and therapy Nanoparticles for medical imaging Company case studies Day 4: Nano-Biosensors</p> <p>4. Requirements of biosensing systems Electrochemical sensing methodologies Optical sensing methodologies Nano-biosensors (devices) – examples from research and industry Day 5: Nano-Pharmaceuticals</p> <p>5. Nanotechnologies and nanoparticles for drug delivery and therapy Approaches to nanoparticle targeting Nano–Radiopharmaceuticals Polymer-based nanoparticles for drug delivery and therapeutics Company case study</p>
Teaching Methodology	Face-to-Face
Bibliography	<p>Introduction to Nanomedicine and Nanobioengineering; by Paras N Prasad.</p> <p>Nanomedicine, Technologies and Applications, 1st Edition; by Thomas Webster.</p> <p>The Handbook of Nanomedicine; by Kewal K Jain.</p>

Assessment	Examinations: 70% Assignment/Lab 20% Class Participation: 10%
Language	English