

<b>COURSE PLAN – PART I</b>			
<b>Course Title</b>	<b>Nano materials and Applications</b>		
<b>Course Code</b>	MTOE48	<b>No. of Credits</b>	3
<b>Department</b>	MME	<b>Faculty</b>	Dr. P. VIVEKANANDHAN
<b>Pre-requisites Course Code</b>	---	<b>Section (if, applicable)</b>	--
<b>Course Coordinator(s) (if, applicable)</b>		<b>Department</b>	MME
<b>Other Course Teacher(s)/Tutor(s) E-mail</b>	--	<b>Telephone No.</b>	9865392902 Intercom : -
<b>Course Type</b>	<input type="checkbox"/> Core course <input checked="" type="checkbox"/> Elective course		
<b>Syllabus (approved in BoS)</b>			
<p>Introduction: Concept of nanomaterials – scale / dimensional aspects, nano and nature, effect of size reduction on various properties, advantages and limitations at the nano level.</p> <p>Methods to produce nanomaterials: Plasma arching, chemical vapour deposition, solgel process, electro deposition, ball milling, severe plastic deposition, etc.</p> <p>Characterization of nanomaterials and nanostructures: Salient features and working principles of SEM, TEM, STM, AFM, XRD, etc.</p> <p>Applications: Fullerenes, carbon nanotubes, nanocomposites, molecular machines, nanosensors, nanomedicines, etc.</p> <p>Health Issues: Understanding the toxicity of nanoparticles and fibers, exposure to quartz, asbestos, air pollution. Environmental issues: Effect on the environmental and other species. Societal implications: Implications of nanoscience and technology in society, government regulations, etc.</p>			
<b>COURSE OBJECTIVES</b>			
1. To know the fundamental concepts of nanomaterials, synthesizing methods, their properties at nanosclae and possible technological applications in various fields of science and engineering.			
<b>COURSE OUTCOMES (CO)</b>			
<b>Course Outcomes</b>			<b>Aligned Programme Outcomes (PO)</b>
<b>At the end of the course student will be able to:</b>			
1. Understand the concepts of nanomaterials and their properties			1
2. Learn different routes of synthesizing methods of nanomaterials			1, 5

3. Know the change in properties at the nanoscale level and their applications.	7,8
4. Understanding the risks on producing nanomaterials and safety precautions.	9

## COURSE PLAN – PART II

### COURSE OVERVIEW

Introduction: Concept of nanomaterials – scale / dimensional aspects, nano and nature, effect of size reduction on various properties, advantages and limitations at the nano level.

Methods to produce nanomaterials: Plasma arching, chemical vapour deposition, solgel process, electro deposition, ball milling, severe plastic deposition, etc.

Characterization of nanomaterials and nanostructures: Salient features and working principles of SEM, TEM, STM, AFM, XRD, etc.

Applications: Fullerenes, carbon nanotubes, nanocomposites, molecular machines, nanosensors, nanomedicines, etc.

Health Issues: Understanding the toxicity of nanoparticles and fibers, exposure to quartz, asbestos, air pollution. Environmental issues: Effect on the environmental and other species. Societal implications: Implications of nanoscience and technology in society, government regulations, etc.

### COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	1 <sup>st</sup> Week - 4 <sup>th</sup> Week August 2021	Concept of nano materials, nano and nature, effect of size reduction on various properties, advantages and limitations at the nano level.	Power point, Online Mode and through Course material
2	1 <sup>st</sup> Week - 3 <sup>rd</sup> Week Sep 2021	Methods to produce nanomaterials:	Power point, Online Mode and through Course material
3	4 <sup>th</sup> Week Sep 2021 to 3 <sup>rd</sup> week Oct 2021	Characterization of nanomaterials and nanostructures: Salient features and working principles of SEM, TEM, STM, AFM, XRD, etc.	Power point, Online Mode and through Course material
4	4 <sup>th</sup> Week Oct 2021 to 2 <sup>nd</sup> Week Nov 2021	Applications: Fullerenes, carbon nanotubes, nanocomposites, molecular machines, nanosensors, nanomedicines, etc.	Power point, Online Mode and through Course material

5	3 <sup>rd</sup> Week Nov 2021 to 1 <sup>st</sup> Week Dec 2021	Understanding the toxicity of nanoparticles and fibers, exposure to quartz, asbestos, air pollution. Environmental issues and Societal implications.	Power point, Online Mode through Course material
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**COURSE ASSESSMENT METHODS (shall range from 4 to 6)**

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Cycle Test – I	2 <sup>nd</sup> week Sep '21	1 hr	30
2	Assignment - 1	2 <sup>nd</sup> week Oct'21	-	20
3	Assignment – 2 / Case study report	4 <sup>th</sup> week Nov '21	-	20
CPA	Compensation Assessment (as Assignment)	1 <sup>st</sup> Week Dec '21	-	30 / 20
5	End semester exam	2 <sup>nd</sup> Week of Dec'21	2hrs	30

**COURSE EXIT SURVEY**

Student's Feedback

**COURSE POLICY (preferred mode of correspondence with students, policy on attendance, compensation assessment, , academic honesty and plagiarism etc.)**

**MODE OF CORRESPONDENCE (email/ phone etc) :** communication through class reps through mobile and E-mail.

**ATTENDANCE :** Minimum attendance 75%. If less than 75% attendance, He /She will be prevented from writing the end semester and re-do the course. Students secured F grade should re-appear the examination as per Institute norms

**COMPENSATION ASSESSMENT :** If any students miss the test in genuine ground (production of certificate or letter from the authorized personnel), She / he will be permitted for compensation assessment

**ACADEMIC HONESTY & PLAGIARISM :** If any students involve in malpractice in test or final examination, She /he will be prevented from writing the final assessment and awarded F grade and re-do the course (as per Instt. Regulations)

**ADDITIONAL INFORMATION**

Nil

**FOR APPROVAL**

  
(VIVEKANANDHAN P)

Course Faculty \_\_\_\_\_



CC-Chairperson \_\_\_\_\_



HOD \_\_\_\_\_