



NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF CHEMICAL ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	B.Tech, Chemical Engineering		
Course Title	Nano Technology		
Course Code	CLOE15	No. of Credits	3
Course Code of Pre-requisite subject(s)			
Session	July / January 2022	Section (If, applicable)	A / B
Name of Faculty	Mr.J.Kalidass Mr.Atthi Srinvas	Department	Chemical Engineering
Official Email	<u>402118052@nitt.edu</u> <u>402119001@nitt.edu</u>	Mobile No.	9578126909 9542755201
Name of Course Coordinator(s) (if, applicable)	Dr.Jyoti Sahu		
Official E-mail	<i>jyoti@nitt.edu</i>	Telephone No.	<i>8879439922</i>
Course Type (please tick appropriately)	<input type="checkbox"/> Core course	<input checked="" type="checkbox"/> Elective course	
Syllabus (approved in BoS)			
<ul style="list-style-type: none"> ✓ Overview of nanoscience: Nanorevolution, Properties at nanoscale. Theory, definitions and scaling. Supramolecular Chemistry, Definition and examples of the main intermolecular forces used in supramolecular chemistry. Self-assembly processes in organic systems. ✓ Nanomaterials: Metal and Semiconductor Nanomaterials, Quantum Dots, Wells and Wires, Molecule to bulk transitions, Bucky balls and Carbon Nanotubes. ✓ Methods of synthesis of Nanomaterials: Equipment and processes needed to fabricate nanodevices and structures such as biochips, power devices, and opto-electronic structures. Bottom-up (building from molecular level) and top-down (breakdown of microcrystalline materials) approaches. ✓ Instrumentation for Nanoscale Characterization: Instrumentation required for characterization of properties on the nanometer scale. The measurable properties and resolution limits of each technique, with an emphasis on measurements in the nanometer range. ✓ Applications: Solar energy conversion and catalysis, Molecular electronics and printed electronics Nanoelectronics, Polymers with a special architecture, Liquid crystalline systems, Linear and nonlinear optical and electroopticals. Advanced organic materials for data storage, Photonics, Plasmonics, Chemical and biosensors, Nanomedicine and Nanobiotechnology. 			
COURSE OBJECTIVES			
<ol style="list-style-type: none"> 1. To impart the basic concepts of nanomaterials and nanotechnology 2. To understand the synthesis and applications of nanomaterials. 			



MAPPING OF COs with POs	
Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
1. Understand the chemistry involved in the synthesis of nanomaterials.	1,2,3,5,8,9,10,12
2. Identify and understand the peculiar properties of materials at nanoscale.	1,2,3,5,8,9,10,12
3. Differentiate various synthesis techniques of nanomaterials for different applications	1,2,3,5,8,9,10,11,12
4. Analyze the properties and identify the instrumentation for characterization of nanomaterials	1,2,3,5,8,9,10,11,12
5. Find the importance of applications of nanomaterials in biological processes.	1,2,3,5,8,9,10,11,12

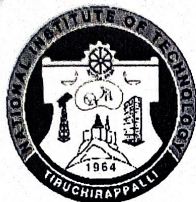
COURSE PLAN – PART II

COURSE OVERVIEW

The study of Nanotechnology involves the conceptual understanding of nanoscience which deals with the synthesis, characterization and utilization of various nanomaterials into advanced technology sectors like homeland security, medicine, transportation, information technology, food safety, environmental science, and energy etc.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	1	Introductory class	Chalk and Talk
2	6	Overview of nanoscience: Nanorevolution, Properties at nanoscale. Theory, definitions and scaling. Supramolecular Chemistry, Definition and examples of the main intermolecular forces used in supramolecular chemistry. Self-assembly processes in organic systems.	PPT, Chalk and Talk
3	6	Nanomaterials: Metal and Semiconductor Nanomaterials, Quantum Dots, Wells and Wires, Molecule to bulk transitions, Bucky balls and Carbon Nanotubes.	PPT, Chalk and Talk
4	7	Methods of synthesis of Nanomaterials: Equipment and processes needed to fabricate nanodevices and structures such as biochips, power devices, and opto-electronic structures. Bottom-up (building from molecular level) and top-	PPT, Chalk and Talk



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		down (breakdown of microcrystalline materials) approaches.	
5	7	Instrumentation for Nanoscale Characterization: Instrumentation required for characterization of properties on the nanometer scale. The measurable properties and resolution limits of each technique, with an emphasis on measurements in the nanometer range.	PPT, Chalk and Talk
6	8	Applications: Solar energy conversion and catalysis, Molecular electronics and printed electronics Nanoelectronics, Polymers with a special architecture, Liquid crystalline systems, Linear and nonlinear optical and electroopticals. Advanced organic materials for data storage, Photonics, Plasmonics, Chemical and biosensors, Nanomedicine and Nanobiotechnology.	PPT, Chalk and Talk

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assessment-I	After 13 th contact hour	1h	20
2	Assessment-II	After 27 th contact hour	1h	20
3	Assignment	After 17 th contact hour		10
CPA	Compensation Assessment*	After 35 th contact hour	1h	
4	Final Assessment *		3h	50

***mandatory; refer to guidelines on page 4**

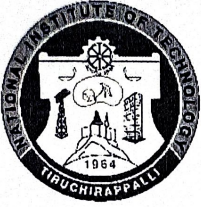
COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

Feedback will be taken two times. One after the first assessment and the other at the end of the semester.

COURSE POLICY (including compensation assessment to be specified)

Mode Of Correspondence:

Students may reach the faculties by given mail id and through Whatsapp.



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Compensation Assembly Policy:

Students who failed in Assessment-I or Assessment-II will be allowed to write the reassessment with prior information and with a valid reason.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)


- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.
- The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION, IF ANY

FOR APPROVAL

J. Kalidass 
Mr.J.Kalidass
Mr.Atti Srinivas
(Course Faculties)

Jyoti Sahu
30/08/2022
Dr.Jyoti Sahu
(CC-Chairperson)

P. Kalaichelvi
Dr.P.Kalaichelvi
(HOD)