NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE OUTLINE TEMPLATE			
Course Title	Polymers and Composites		
Course Code	MT 654	No. of Credits	3
Department	MME	Faculty	Dr.V.Surianarayanan
Pre-requisites Course Code	Not required		
Course Coordinator(s) (if applicable)	Not applicable		
Tutor(s) E-mail	nivas@nitt.edu	Contact No.	8903486557
Course Type	☐ Core course	■ Elective course	

COURSE OVERVIEW

This course covers the fundamentals of polymers and composites. It gives the basic technical knowledge required to process polymers and composites. It introduces the designing and processing techniques involved.

COURSE OBJECTIVES

To understand the basics of polymers and composites- classifications and their properties and applications.

COURSE OUTCOMES (CO)

Course Outcomes	**Aligned Programme Outcomes (PO)**
At the end of this course, the students would be able to:	
1. Classify different types of polymers and composites and their structure – property relationships	[1]
2. Understanding the properties of different types of polymers and composites	[1,2,5]
3. Designing and processing new types of polymers and composites.	[4,8]

COURSE TEACHING AND LEARNING ACTIVITIES			
Sl.No	**Week**	**Topic**	**Mode of Delivery**
1	1st & 2nd Week	Structure of polymers, characterization and applications of polymers: mechanical behavior of polymers, strengthening of polymers.	Chalk and Talk
2	3rd & 4th Week	crystallization and glass transition phenomenon and types of polymers. Design and selection of plastics, structure property correlation, mechanical properties, degradation, wear and friction,	Chalk and Talk
3	5th Week	thermal, electrical and optical properties, flammability of plastics and processing of plastics and FRP	Chalk and Talk
4	6th & 7th Week	Composites: Particle reinforced composites, fiber reinforced composites – influence of fiber length, orientation and concentration. Fiber phase, matrix phase, metal matrix composites, polymer matrix composites,	Chalk and Talk
5	8th & 9th Week	ceramic matrix composites, carbon – carbon composites, hybrid composites and structural composites. Processing of composites: Processing of MMC, liquid metal infiltration, squeeze casting, stir casting, compo casting,	Chalk and Talk

6	10th & 11th week	solid state route and diffusion bonding, powder metallurgy route slip casting.	Chalk and Talk
7	12th & 13th Week	In-situ composites, eutectic alloy composites and directional solidification, constitutional super cooling and deviation from eutectic with variation in volume fraction of hard face, co extrusion of Cu-Nb composites and manufacturing of superconductors, self propagating high temperature synthesis, melt oxidation, precipitation reactions.	Chalk and Talk
8	14th Week	Assessment – 3	
9	15th / 16th Week	Final Assessment	

COURSE ASSESSMENT METHODS

Sl.No	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assessment 1 (Written test)	5th Week	1 hour	20 %
2	Assessment 2 (Written test)	10th Week	1 hour	20 %
3	Assessment 3 (Retest)	13th Week	1 hour	20 %
4	Assignments	2 assignments		10 %
5	Final Assessment (Written test)	15th / 16th Week	3 hours	50 %

ESSENTIAL READINGS : Textbooks, reference books etc.,

1. W.D Callister. Jr, Materials Science and Engineering, Wiley India Pvt. Ltd, 2007
2. R.J. Crawford, plastics engineering, Pergamon Presss, II edition, 1987
3. K.K.Chawala, Cermic Matrix composite Materials, Kluwer Academic Publishers, 2002
4. R.J.Young, Introduction to Polymers, Chapman and Hall,,London, 1981
5. F.W.Billmeyer, Text book of polymer scicncc, John Wiley &Sons, Newyork,1984

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)
The exit survey will be assessed based on the questionnaire prepared by the Institute/class teacher and the expected attainment to be greater 75%. The feedback collected from students by the Institute is to be informed to the teacher to improve the course in future semesters.
COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)
1. The students are expected to attend all the classes except for medical reasons. Minimum attendance of 50% (including the concession for on-duty and medical reasons) is required for writing the semester examination. 2. The relative grading policy will be followed and the passing minimum marks will be fixed based on Institute guidelines.
ADDITIONAL COURSE INFORMATION
The Retest (Assessment – 3) is only for those who missed either Assessment 1 or 2 due to medical reasons).
FOR SENATE'S CONSIDERATION

Course faulty (Dr.V.Surianarayanan)	**CC-Chairperson (Dr.N.Ramesh Babu)**	**HOD (Dr.S.P.Kumaresh Babu)**