

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE OUTLINE TEMPLATE			
Course Title	Electrical, Electronic, and Magnetic Materials		
Course Code	MTPC13	No. of Credits	03
Department	MME	Faculty	Dr. N.Ramesh Babu
Pre-requisites Course Code	Nil		
Course Coordinator(s) (if, applicable)	NA		
Other Course Teacher(s)/Tutor(s) E-mail	NA	Telephone No. Email	3464 nrb@nitt.edu
Course Type	Core course		
COURSE OVERVIEW			
COURSE OBJECTIVES			
To understand the basic principles and physical origins of electronic, magnetic & optical properties of materials and to study the various materials which exhibit these functional properties			
COURSE OUTCOMES (CO)			
Course Outcomes	Aligned Programme Outcomes (PO) (Enter Numbers only)		
Upon completion of this course, the student will be able to:			
Understand various electrical phenomenon such as bandgap theory, ferroelectricity, piezoelectricity and pyroelectricity along with dielectric behaviour of materials	[1,3,5]		
To study various kinds of magnetism principles, various types of materials exhibiting magnetism, and their day to day applications in the industry with recent advancements	[1,3,5]		
To study the theory of superconductivity phenomenon and superconducting materials and their applications along with recent advancements	[1,2,3]		
Understand the fundamentals of semiconducting materials and operational principles of solid-state devices made of these semiconducting materials. To	[1,2,3]		

learn various methods of producing semiconductors and their processing methods used in the semiconducting materials industry.	
To learn about the photoconduction phenomenon, optical materials and various optical devices and their performances.	[1,3,5]

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Topic	Mode of Delivery
1.	I-IV	Basics of electrical conductivity, conductors, semiconductors, dielectric materials	Online classes, VC Mode PPTs
2.	V-VII	Effect of composition, structure and temperature on electrical properties of materials, Working principle of some devices.	
3.	VIII-X	Origin of Magnetism, Dia, Para, Ferro and Ferri magnetism in different materials; Hard and Soft magnets; Application Superconductivity in Materials	
4.	XI-XIII	Semiconductor materials purification, doping and processing	
5.	XIV-XV	Optical properties of materials	

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assignment -I	VI	1 hour	20
2	Mid test	VIII week	2 hours	30
3	Assignment -II	XI/XII week	1 hour	20
	Retest	XIII week	1.5 hour	30 If any student misses the mid-test for medical reasons
4	End semester exam	After XV week	2 hours	30

ESSENTIAL READINGS : Textbooks, Reference books, Website addresses, Journals, etc
1. Electronic, Magnetic, and Optical Materials, Pradeep Fulay , Jung-Kun Lee, CRC press, 2016
2. Kittel C., 'Introduction to Solid State Physics', 7 th Edition, Wiley Eastern, New International Publishers, 2004
4. Ed. Kasap and Capper, handbook of electronic and photonic materials, 2006, NY.
5. Dekker. A.J, Solid state Physics, Mac Millan India, 1995
6. Van Vlack L.H, Elements of Materials Science and Engineering, 6 th edition, Addison Wiley, 1989
7. Raghavan V, Materials Science and Engineering – A First Course, Prentice Hall India, 2004.

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

The student's feedback will be assessed based on the questionnaire prepared by the Institute and the expected attainment to be greater 80%. The feedback collected from the students by the Institute is to be informed to the teacher to improve the course content and delivery.

COURSE POLICY

(Including plagiarism, academic honesty, attendance, grading, etc.)

1. No grade will be awarded for attendance and there is no specific % attendance requirement for writing the semester examination. The students are advised to attend all the classes except for medical reasons. Students are advised to meet the institute requirements for % attendance.
2. The relative grading policy will be followed and the passing minimum marks will be fixed based on Institute guidelines.

ADDITIONAL COURSE INFORMATION

Students can contact the Course Coordinator at any time through email/phone.

The Course Coordinator is available for consultation by appointment through email/phone. The Course Coordinator email id/phone number are available in this course plan.

For senate consideration



Course Faculty



Class Committee Chairman



HOD/MME