NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE OUTLINE			
Course Title	**MATERIALS SCIENCE AND TECHNOLOGY**		
Course Code	CLOE20	**No. of Credits**	3
Department	Chemical Engineering	**Faculty**	IYESWARIA.K. B
Pre-requisites Course Code	NIL		
Course Coordinator(s) (if, applicable)	**NIL**		
Other Course Teacher(s)/Tutor(s) E-mail	**NIL**	**Telephone No.**	9003106011
Course Type	**Elective course**		

COURSE OVERVIEW

This course deals with various aspects of materials starting from its atomic structure, alignment, bonding, strength, imperfections and various physical, chemical, and mechanical properties of various materials.

COURSE OBJECTIVES

1. To impart the basic concept of material science.
2. To understand the various properties, corrosion and heat treatment of engineering materials.
3. To understand the engineering requirement and selections of materials based on the properties for various applications.

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
1. understand the basics knowledge such as internal structure, crystal geometry, crystal imperfection of the engineering materials	PO1, PO4, PO5, PO10.
2. understand the various properties and corrosion behavior of the selected materials in chemical industries	PO4, PO9, PO10, PO11.
3. provide experience in the metallic and nonmetallic material selection and handling material in chemical engineering in the areas of equipment design	PO1, PO4, PO5, PO8, PO10, PO11.

COURSE TEACHING AND LEARNING ACTIVITIES			
S. No.	**Week**	**Topic**	**Mode of Delivery**
1	Week - 1	Introduction about Course, Why do Atoms Bond? Various types of bonding and its difference	Chalk & Talk – (Black Board) BB, PPT
2	Week – 2	Various Classes of Engineering materials and various physical and chemical properties	Chalk & Talk – (Black Board) BB, PPT
3	Week – 3	Mechanical Properties of materials like modulus, Yield strength, toughness, hardness etc., and its importance in selecting materials for particular task	Chalk & Talk – (Black Board) BB, PPT
4	Week – 4	Problems on mechanical properties and short introduction to unit cell	Chalk & Talk – (Black Board) BB, PPT
5	Week – 5	Unit cell and various crystal structures like BCC FCC etc., and its properties	Chalk & Talk – (Black Board) BB, PPT
6	Week – 6	Imperfection in crystals, crystal geometry, Self diffusion Fick's law and applications	Chalk & Talk – (Black Board) BB, PPT
7	Week – 7	Properties of corrosion and why it occurs? Types of corrosion	Chalk & Talk – (Black Board) BB, PPT
8	Week – 8	Electrical and magnetic properties of materials, Deformation of materials	Chalk & Talk – (Black Board) BB, PPT
9	Week – 9	Theories of corrosion, prevention and control of corrosion, Heat Treatment techniques	Chalk & Talk – (Black Board) BB, PPT
10	Week – 10	Metals – Application of Iron and their alloys, Steel Iron Carbon equilibrium diagram.	Chalk & Talk – (Black Board) BB, PPT
11	Week – 11	Nonferrous materials and alloys, Aluminium, Copper, Zinc, lead and nickel alloys with special reference to the application in chemical industries.	Chalk & Talk – (Black Board) BB, PPT
12	Week – 12	Inorganic materials – Ceramics Glasses and refractories and its application in chemical industries.	Chalk & Talk – (Black Board) BB, PPT
13	Week – 13	organic materials: wood, plastics, and rubber and wood and its application in chemical industries.	Chalk & Talk – (Black Board) BB, PPT

14	Week – 14	Advanced materials (Biomaterials, nanomaterials and composites) with special reference to the applications in chemical Industries.	Chalk & Talk – (Black Board) BB, PPT

COURSE ASSESSMENT METHODS

S. No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Cycle Test - I	Week 7	1 hour	20%
2	Cycle Test - II	Week 13	1 hour	20%
3	Retest	Week 17	1 hour	20%
4	Assignments	---	----	10%
5	End Semester Exam	Week 19	3 hours	50% (Total = 100%)

ESSENTIAL READINGS : Class notes and Callister (Materials Science book) is essential

REFERENCE BOOKS

1	Lawrence H. Van Vlack, "Elements of Material Science and Engineering", 1971.
2	S. K. Hajra Choudhury, "Material Science and processes", 1st Edn. , 1977. Indian Book Distribution Co., Calcutta.
3	William D. Callister, "Materials Science and Engineering",7th edn, John Wiley & Sons, Inc
4	V. Raghavan, Materials Science and Engineering, Prentice Hall

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)	
1	Feedback from students during class committee meeting.
2	Anonymous feedback through questionnaire.
COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)	
1	Cycle Test – I and Cycle Test - II will be conducted in regular class.
2	Portions for Cycle Test - I are Unit – I and Unit – II (1st and 2nd paragraph of the syllabus.)

3	Portions for Cycle Test - II are Unit – III and Unit – IV (3rd and 4th paragraph of the syllabus.)
4	Student who have missed the first or second or both the cycle test (s) can register with the concerned faculty for the RE – TEST Exam which shall be conducted soon after the second cycle test, but before the End semester examination. The weight age for Retest is 20 % and time duration is 1 hour. The portions for Retest include both cycle test(s) portions.
5	75% Attendance is compulsory for writing the End Semester Examination.
7	Students who have less than 50 % of attendance have to redo subject.
8	Students who have failed in the semester examination with F grade, those completed mandatory classes and those have missed the end semester examination shall take reassessment (supplementary examination).
9	The passing minimum should be 50 % of the first mark and grading is done in accordance with first mark. If the difference between first and second highest mark is huge (say 10) then the average of first two marks is taken into consideration for setting the criteria.

ADDITIONAL COURSE INFORMATION

Faculty is available for discussion after the class hours in the Department of Chemical Engineering at Room No. 101 and can also be contacted through cell no. 9003106011. Queries may also be asked through the mail id iyes@nitt.edu

FOR SENATE'S CONSIDERATION

Course Faculty _____ **CC-Chairperson** _____ 29/8/17 **HOD** _____ 22/8/2017