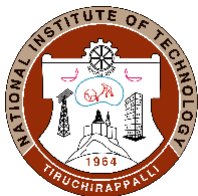




**NATIONAL INSTITUTE OF TECHNOLOGY,
TIRUCHIRAPPALLI**

DEPARTMENT OF METALLURGICAL AND MATERIALS ENGG

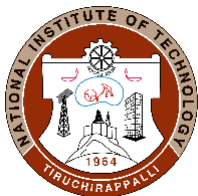
COURSE PLAN – PART I			
Name of the programme and specialization	BTech Metallurgical and Materials Engg.		
Course Title	Special Steels and Cast Irons		
Course Code	MTPE04	No. of Credits	03
Course Code of Pre-requisite subject(s)	MTPC15		
Session	January, 2024	Section (if, applicable)	Nil
Name of Faculty	Dr S KUMARAN	Department	MME
Official Email	kumara@nitt.edu	Telephone No.	9944434705
Name of Course Coordinator(s) (if, applicable)	Nil		
Official E-mail		Telephone No.	
Course Type (please tick appropriately)	<input type="checkbox"/> Core course <input checked="" type="checkbox"/> Elective course		
Syllabus (approved in BoS)			
<p>Definition of high strength steels, problems in developing high strength steels; discussion on fracture toughness; HSLA steels, principle of microalloying and thermomechanical processing; importance of fine grained steels</p> <p>Phase diagrams, composition, properties and applications of ferritic, austenitic, martensitic, duplex and precipitation hardenable stainless steels</p> <p>Dual phase steels, TRIP steels, TWIP steels, UHSS - maraging steels, metallurgical advantages, heat treatment, properties and applications</p> <p>Tool steels; classification, composition, and application, constitution diagram of high-speed steels, special problems in heat treatment of tool steels</p> <p>Types of cast irons - grey, SG, white, malleable; austempered ductile iron; alloy cast irons, Ni hard, high silicon cast irons, heat resistant cast irons- high chrome cast iron- structure, property and engineering applications</p>			
COURSE OBJECTIVES			
To become familiar with a wide array of ferrous alloys including carbon steels, special steels and Cast-iron			



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MAPPING OF COs with POs	
Course Outcomes	Programme Outcomes (PO)
1. Understand principles of microalloying and problem associated with developing high strength steels.	3M 1 & 2H
2. Know the properties, types and applications of stainless steels	3M 1 & 2H
3. Selection of advanced and ultra-high strength steels for specific engineering applications	4H 2 & 3H
4. Choose the suitable tool steel for specific applications based on the property requirements	1 & 4M 2 & 3H
5. Select proper alloying and heat treatment procedure to obtain required properties in cast iron.	1 & 2M 3 & 4H

COURSE PLAN – PART II			
COURSE OVERVIEW			
<ul style="list-style-type: none"> • Introduction to high strength steels and their development • HSLA steels, principle of microalloying and thermomechanical processing; importance of fine grained steels • Stainless steels : Introduction, classification, physical metallurgy, mechanical behaviour, applications • Dual phase steels, TRIP steels, TWIP steels, UHSS – • Maraging steels, metallurgical advantages, heat treatment, properties and applications • Tool steels; classification, composition, and application, constitution diagram of high-speed steels, special problems in heat treatment of tool steels • Types of cast irons - grey, SG, white, malleable; austempered ductile iron; alloy cast irons, Ni hard, high silicon cast irons, heat resistant cast irons- high chrome cast iron- structure, property and engineering applications 			
COURSE TEACHING AND LEARNING ACTIVITIES			(Add more rows)
S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	3 rd week, January to 2 nd week February	HSLA steels and its Metallurgy Dual Phase steels	Chalk and Board
2	3 rd week, February to 2 nd week March	Stainless steels (All types)	
3	3 rd week, March to 2 nd week April	Maraging steels and Tools Steels	
4	3 rd week, April to 1 st week May	Cast Irons	



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COURSE ASSESSMENT METHODS (shall range from 4 to 6)				
S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assignment - I	4 th week February	1 hr	10
2	Written Assessment	4 th Week March	1hr 30 Min	25
3	Quiz / Viva /Presentation	3rd /4th week April	1 hr	5
4	Mini Project & Presentation		1hr	10
CPA	Compensation Assessment	4 th week April	1hr 30 Min	25
5	Final Assessment	Nov. / Dec	3hrs	50
COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)				
Student's Feedback				
COURSE POLICY (including compensation assessment to be specified)				
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				
<u>ATTENDANCE POLICY</u> (A uniform attendance policy as specified below shall be followed)				
<ul style="list-style-type: none"> ➤ 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. 				
<u>ACADEMIC DISHONESTY & PLAGIARISM</u>				
<ul style="list-style-type: none"> ➤ 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 				



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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

Nil

FOR APPROVAL

Course Faculty

CC- Chairperson

HOD



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Guidelines

- a) The number of assessments for any theory course shall range from 4 to 6.
- b) Every theory course shall have a final assessment on the entire syllabus with at least 30% weightage.
- c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.
- d) The passing minimum shall be as per the regulations.

B.Tech. Admitted in				P.G.
2018	2017	2016	2015	
35% or (Class average/2) whichever is greater.		(Peak/3) or (Class Average/2) whichever is lower		40%

- e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.
- f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.
- g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.