



DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Name of the programme and specialization	B.TECH. METALLURGICAL AND MATERIALS ENGINEERING		
Course Title	Alloy Development		
Course Code	MTPE19	No. of Credits	3
Course Code of Pre-requisite subject(s)	Nil		
Session	July 2023	Section (if, applicable)	NA
Name of Faculty	Dr. Vinothkumar.G	Department	MME
Email	vinothkumar@nitt.edu	Telephone No.	9345622864
Name of Course Coordinator(s) (if, applicable)	NA		
E-mail	NA	Telephone No.	NA
Course Type	Programme Elective course		
Syllabus (approved in BoS)			
Refer https://www.nitt.edu/home/academics/curriculum/B.Tech-MME-2020.pdf Page no. 85			
COURSE OBJECTIVES			
To study the fundamentals, classification, properties of applications of various ferrous and nonferrous systems			
COURSE OUTCOMES (CO)			
Course Outcomes			Aligned Programme Outcomes (PO)
At the end of the course student will be able to:			
1. Understand the strategies of alloying, effects of alloying and thermodynamics of alloying			1
2. Describe the carbon steels, cast iron and their grading, role of alloying elements and heat treatment			1,2
3. Choose a suitable alloying elements to develop a highly alloyed steels with specific properties			1,2
4. Develop a non-ferrous alloy systems with specific properties by adjusting the alloying elements			1,2
5. Understand the principle of formation of high entropy alloys and bulk metallic glasses			1
COURSE PLAN – PART II			
COURSE OVERVIEW			
The course discuss in detail about the alloy delvelopment strategies for ferrous and non-ferrous system with examples of the industrially important ferrous and non-ferrous alloys			

COURSE TEACHING AND LEARNING ACTIVITIES				
S.No.	Week/Contact Hours	Topic	Mode of Delivery	
1	1 st and 2 nd week	Metals vs Alloys; superiority of alloys over pure elemental metals; strategies for alloying; concepts such as strengthening mechanisms.	Chalk and talk, PPT + animated/real videos	
2	3 rd and 4 th week	Thermodynamics aspects of alloying; relation between alloy composition, structure and properties. ICME approach to alloy design and development		
3	5 th week to 7 th week	Ferrous systems – Effect of specific alloying elements; alloy grades of cast irons, carbon steels; role of heat treatment		
4	8 th and 10 th week	Ferrous systems – Highly alloyed steels; specific examples; Effect of alloying elements on phase transformations; development of novel grades of steels such as maraging steels, IF steels, AHS steels, PH steels, DP steels and Duplex stainless steels, role of heat treatment		
5	11 th week to 13 th week	Non-Ferrous systems based on Aluminium, Titanium and Copper; Typical alloying elements and their effects; relevant phase diagrams; Input on heat treatment		
6	14 th week	Use of alloying elements for grain refinement; Inclusion engineering; concept of ODS alloys		
7	15 th week and 16 th week	special cases such as High Entropy Alloys and Bulk metallic glasses		
COURSE ASSESSMENT METHODS (shall range from 4 to 6)				
S.No.	Mode of Assessment	Date	Duration (minutes)	% Weightage
1	Assignment	27 th Sep 2023	--	10
2	Mid semester exam	4 th Oct 2023	90	20
3	Seminar/Video podcast	23 rd Oct 2023	5	10
4	Mini Project	30 th Oct 2023	--	20
CPA	Compensation Assessment	6 th Nov 2023	90	20
5	Final Assessment	28 th Nov– 1 st Dec	180	40

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

The exit survey will be assessed based on the questionnaire prepared by the class teacher and expected attainment is 75% on 1-5 scale basis

COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)

MODE OF CORRESPONDENCE (email/ phone etc)

Email(vinothkumar@nitt.edu) / Mobile(9345622864)/Whatsapp (8870126325)/In-person (MME 112F)

COMPENSATION ASSESSMENT POLICY

It will be given on 6th Nov 2023 for those who are absent on genuine grounds for mid semester exam.

ATTENDANCE POLICY

- 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.

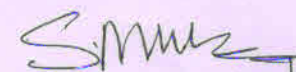
ADDITIONAL INFORMATION

The Course faculty is available for consultation at any time. Students can also contact him at any time through whatsapp or phone call or by mail.

FOR APPROVAL


Course Faculty
Dr. Vinothkumar.G


CC-Chairperson
Prof. B. Ravisankar


HOD
Prof. S. Muthukumaran