



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

**COURSE PLAN – PART I**

Name of the programme and specialization	B.TECH. METALLURGICAL AND MATERIALS ENGINEERING		
Course Title	Corrosion Engineering		
Course Code	MTPC24	No. of Credits	3
Course Code of Pre-requisite subject(s)	Nil		
Session	Jan 2023	Section (if, applicable)	NA
Name of Faculty	Dr. Illa Mani Pujitha	Department	MME
Email	pujitha@nitt.edu	Telephone No.	9985506825
Name of Course Coordinator(s) (if, applicable)	NA		
E-mail	NA	Telephone No.	NA
Course Type	PC		

**Syllabus (approved in BoS)**

Electrochemical and thermodynamic principles, Nernst equation and electrode potentials of metals, EMF and galvanic series, merits and demerits; origin of Pourbaix diagram and its importance to iron, aluminium and magnesium metals

Exchange current density, polarization- concentration, activation and resistance, Tafel equation; passivity, electrochemical behaviour of active/passive metals, Flade potential, theories of passivity

Atmospheric, pitting, dealloying, stress corrosion cracking, intergranular corrosion, corrosion fatigue, fretting corrosion and high temperature oxidation; causes and remedial measures

Purpose of testing, laboratory, semi-plant and field tests, susceptibility tests for IGC, stress corrosion, cracking and pitting, sequential procedure for laboratory and on-site corrosion investigations, corrosion auditing and corrosion map of India

Corrosion prevention by design improvements, anodic and cathodic protection, metallic, non-metallic and inorganic coatings, mechanical and chemical methods and various corrosion inhibitors

**References Books:**

1. Raj Naryan, " An Introudction to Metallic Corrosion and its Prevention". 1st Edition, Oxford and IBH, 1983.
2. Fontana M.G, Greene N.D, " Corrosion Engineering", @nd Edition MCGrawHill, 1983.
3. Denny Jones, " Principles and Prevention of Corrosion, Prentice Hall of Indi, 1996

**COURSE OBJECTIVES**

To acquire knowledge on principles, various forms, testing, monitoring and prevention of corrosion phenomenon.

**COURSE OUTCOMES (CO)**

Course Outcomes	Aligned Programme Outcomes (PO)
At the end of the course student will be able to:	
1. basic principles related to thermodynamic feasibility of corrosion phenomenon in metals and alloys	1,2
2. basics of kinetics of electrochemical corrosion, relevant theories and equations	1,2
3. manifestations of corrosion phenomenon through their origin, mechanisms and remedies.	1,2
4. origin and causes of high temperature oxidation through their kinetics, governing equations and remedies.	1,2
5. Different methods of corrosion testing, susceptibility tests, corrosion auditing and map of India.	1,2,4,7
6. Various corrosion preventive methods through design, coatings, inhibitors, cathodic and anodic protection Industrial examples to highlight the above phenomena.	3,4,5,6,12

**COURSE PLAN – PART II****COURSE OVERVIEW**

The course discuss in detail about the corrosion interms of metallurgical and thermodynamic aspects, corrosion testing and preventive methodologies, material selection for suitable environment.

**COURSE TEACHING AND LEARNING ACTIVITIES**

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	I-III	Introduction to Corrosion, Thermodynamics and Kinetics	Chalk and talk, PPT + animated/real videos
2	IV-VI	Polarization and Passivity	
3	VII-IX	Different Forms of Corrosion	
4	X-XI	Corrosion testing, Numericals	
5	XII-XIII	Corrosion Prevention Techniques	

**COURSE ASSESSMENT METHODS (shall range from 4 to 6)**

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Cyclic test-1	6 <sup>th</sup> March 2023	90	25
2	Cyclic test-2	15 <sup>th</sup> April 2023	90	20
3	Assignment	18-21 April 2023	--	15
CPA	Compensation Assessment	2 <sup>nd</sup> May 2023	60	20 / 25
4	Final Assessment	9 <sup>th</sup> May 2023	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(pujitha@nitt.edu) / Mobile/Whatsapp (9985506825)/In-person (MME/112C)

**COMPENSATION ASSESSMENT POLICY**

It will be given on 2<sup>nd</sup> May 2023 for those who are absent on genuine grounds for mid semester exam or quiz.

**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 her at any time through whatsapp or phone call or by mail.

**FOR APPROVAL**

*I. Mani Pujitha*  
Course Faculty  
Dr. Illa Mani Pujitha

*[Signature]*  
CC-Chairperson  
Dr. V. Karthik

*[Signature]*  
HOD  
Prof. S. Muthukumaran