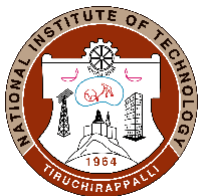




DEPARTMENT OF METALLURGICAL AND MATERIALS  
ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	B.Tech – Metallurgical and Materials Engineering		
Course Title	CORROSION ENGINEERING		
Course Code	MTPC 28	No. of Credits	3
Course Code of Pre-requisite subject(s)	Not required		
Session	July / August 2020	Section (if, applicable)	Nil
Name of Faculty	Dr.S.Natarajan	Department	MME
Official Email	<a href="mailto:sn@nitt.edu">sn@nitt.edu</a>	Telephone No.	9843164261
Name of Course Coordinator(s) (if, applicable)	Nil		
Official E-mail		Telephone No.	
Course Type (please tick appropriately)	<input checked="" type="checkbox"/> Core course <input type="checkbox"/> Elective course		
<b>Syllabus (approved in BoS)</b>			
<p>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</p> <p>Exchange current density, polarization - concentration, activation and resistance, Tafel equation; passivity, electrochemical behaviour of active/passive metals, Flade potential, theories of passivity</p> <p>Atmospheric, pitting, dealloying, stress corrosion cracking, intergranular corrosion, corrosion fatigue, fretting corrosion and high temperature oxidation; causes and remedial measures</p> <p>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</p> <p>Corrosion prevention by design improvements, anodic and cathodic protection, metallic, non-metallic and inorganic coatings, mechanical and chemical methods and various corrosion inhibitors</p>			



<b>COURSE OBJECTIVES</b>	
To provide a practical knowledge about corrosion and its application in engineering field.	
<b>MAPPING OF COs with Pos</b>	
<b>Course Outcomes</b>	<b>Programme Outcomes (PO) (Enter Numbers only)</b>
1. Exploring possibilities to choose a metal in any galvanic couple for a desired applications based of emf and galvanic series.	1,2,11
2. Determine the corrosion rate by weightloss method, electrical resistance method, potention static polarization experiment and atmospheric corrosion using colour indicator method.	1,2,4,10,11
3. Analyze galvanic corrosion, pitting corrosion and stress corrosion cracking.	1,2,11
4. Estimate the corrosion resistance by IGC susceptibility test, salt spray test and coating thickness	1,2,10,11

<b>COURSE PLAN – PART II</b>			
<b>COURSE OVERVIEW</b>			
This course will provide knowledge in areas of corosion thermodynamics, pourbaix diagrams, forms of corrosion, testing and laboratory invstigation. The prevention of corrosion by design, cathodic and anodic protection with role of inhibitors and coating are also studied.			
<b>COURSE TEACHING AND LEARNING ACTIVITIES</b>			( Add more rows)
<b>S.No.</b>	<b>Week/Contact Hours</b>	<b>Topic</b>	<b>Mode of Delivery</b>
1	1 <sup>st</sup> week	Electrochemical and thermodynamic principles, Nernst equation	PPT through Online
2	2 <sup>nd</sup> week	Electrode potentials of metals, EMF and galvanic series, merits and demerits	PPT through Online
3	3 <sup>rd</sup> week	origin of Pourbaix diagram and its importance to iron	PPT through Online
4	4 <sup>th</sup> week	Pourbaix diagram and its importance to aluminium and magnesium metals.	PPT through Online



5	5 <sup>th</sup> week	Exchange current density, polarization - concentration, activation and resistance	PPT through Online
6	6 <sup>th</sup> week	Tafel equation; passivity	PPT through Online
7	7 <sup>th</sup> week	electrochemical behaviour of active/passive metals, Flade potential	PPT through Online
8	8 <sup>th</sup> week	theories of passivity, Atmospheric corrosion	PPT through Online
9	9 <sup>th</sup> week	pitting, dealloying, stress corrosion cracking	PPT through Online
10	10 <sup>th</sup> week	intergranular corrosion, corrosion fatigue, fretting causes and remedies	PPT through Online
11	11 <sup>th</sup> week	Purpose of testing, laboratory, semi-plant and field tests, susceptibility tests for IGC	PPT through Online
12	12 <sup>th</sup> week	stress corrosion cracking and pitting, sequential procedure for laboratory and on-site corrosion investigations, corrosion auditing and corrosion map of India	PPT through Online
13	13 <sup>th</sup> week	Corrosion prevention by design improvements, anodic and cathodic protection, metallic, non-metallic and inorganic coatings	PPT through Online
14	14 <sup>th</sup> week	mechanical and chemical methods and various corrosion inhibitors	PPT through Online



<b>COURSE ASSESSMENT METHODS</b> (shall range from 4 to 6)				
<b>S.No.</b>	<b>Mode of Assessment</b>	<b>Week/Date</b>	<b>Duration</b>	<b>% Weightage</b>
1	Assessment-I (Cycle test)	7 <sup>th</sup> week	1 hr	20%
2	Assignment-I	12 <sup>th</sup> week		25%
3	Assginment-II	15 <sup>th</sup> week		25%
4	Compesation Assessment	It may be conducted after Cycle test		
5	Final Assessment	14 <sup>th</sup> week	2 hr	30%
<b>*mandatory; refer to guidelines on page 4</b>				
<b>COURSE EXIT SURVEY</b> (mention the ways in which the feedback about the course shall be assessed)				
An exit survey will be taken from the student at the end of the semester through a questionnaire on coverage of syllabus, usefulness of course-plan, teaching efficiency, etc.				
<b>COURSE POLICY</b> (including compensation assessment to be specified)				
<b><u>1. Examination:</u></b> a) In general, all students are advised to appear for cycle test. However due to genuine reason, if any student is absent, retest will be conducted in the portions announced for the cycle test.  b) Students should submit two assignments on selective topics related to this course. Weightage for the assignment would be 50% (25% for each assignment).  c) The pass mark and grading will be assigned as per the Institute norms.				
<b><u>2. Attendance:</u></b>  a) As per the norms of Institute.				
<b><u>ATTENDANCE POLICY</u></b> (A uniform attendance policy as specified below shall be followed)  ➤ 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.				
<b><u>ACADEMIC DISHONESTY &amp; PLAGIARISM</u></b>				



## NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

- 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.
- The above policy against academic dishonesty shall be applicable for all the programmes.

### ADDITIONAL INFORMATION, IF ANY

### FOR APPROVAL

**Course Faculty**  
**Prof. S. Natarajan**

**CC- Chairperson**  
**Dr K Sivaprasad**

05.11.2020

**HOD** \_\_\_\_\_



**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.