

Course code	Course Name	L-T-P-Credits	Year of Introduction
CH366	CORROSION ENGINEERING	3-0-0-3	2016
<b>Course Objectives</b>			
<ul style="list-style-type: none"> <li>This course is intended to impart knowledge on the importance of corrosion and its prevention and control in process industries.</li> </ul>			
<b>Syllabus</b>			
Importance and principles of corrosion, types of corrosion, testing and monitoring of corrosion, prevention of corrosion, corrosion control in different engineering materials, corrosion control in various industries			
<b>Expected Outcome</b>			
At the end of the course the student will be able to:			
<ol style="list-style-type: none"> <li>identify different types of corrosion</li> <li>demonstrate various corrosion testing techniques</li> <li>explain various corrosion prevention techniques</li> <li>select the appropriate corrosion control technique for different engineering materials</li> <li>know the corrosion control techniques used in various industries</li> </ol>			
<b>Text Books</b>			
<ol style="list-style-type: none"> <li>Fontana M. G., Corrosion Engineering, , Tata McGraw Hill, 3<sup>rd</sup> Edition, 2005.</li> <li>Jones D. A, Principles and Prevention of Corrosion,, Prentice-Hall, Inc., 2<sup>nd</sup> Edition, 1996.</li> </ol>			
<b>Reference Books</b>			
<ul style="list-style-type: none"> <li>Scully J. C, The Fundamentals of Corrosion,, 2<sup>nd</sup> Ed., Pergamon Press.</li> <li>Stansbury E. E. and Buchanan, R. A, Fundamentals of Electrochemical Corrosion, , ASM International.</li> <li>Uhlig H. H. and Revie R. W , Corrosion and Corrosion Control, 3<sup>rd</sup> Ed., John Wiley &amp; Sons.</li> </ul>			
<b>Course Plan</b>			
Module	Contents	Hours	Sem. exam marks
I	Definition and importance of corrosion, Principles of corrosion phenomenon: Corrosion rate expressions, Electrochemical aspects, Environmental effects, Metallurgical and other aspects.	7	15%
II	Different forms of corrosion: Galvanic or two metal corrosion, Crevice corrosion, Pitting, Intergranular corrosion, Selective leaching, Erosion corrosion, Stress corrosion, Hydrogen damage.	7	15%
<b>FIRST INTERNAL EXAMINATION</b>			
III	Corrosion testing and monitoring: Non-electrochemical and electrochemical methods: potentiostat, Tafel extrapolation, linear polarization, galvanostat,	7	15%

	impedance spectroscopy, thermogravimetric technique, salt spray test, weight change measurements.		
IV	Corrosion prevention: Design and coatings, inhibitors and surface engineering, cathodic protection and anodic protection.	7	15%
<b>SECOND INTERNAL EXAMINATION</b>			
V	Corrosion and its control in different engineering materials: concrete structures, duplex, super duplex stainless steels, ceramics, composites and polymers.	7	20%
VI	Corrosion and its control in industries: Power, Process, Petrochemical, ship building, marine and fertilizer industries. Corrosion auditing in industries, Corrosion map of India.	7	20%
<b>END SEMESTER EXAM</b>			

### Question Paper Pattern

**Maximum marks : 100**

**Exam. Duration 3 hours**

**Part A:** There shall be **Three questions** uniformly covering Modules 1 and 2, each carrying 15 marks, of which the student has to answer any **Two questions**. At the most 4 subdivisions can be there in one main question with a total of 15 marks for all the subdivisions put together. (2 x15= 30 Marks)

**Part B:** There shall be **Three questions** uniformly covering Modules 3 and 4, each carrying 15 marks, of which the student has to answer any **Two questions**. At the most 4 subdivisions can be there in one main question with a total of 15 marks for all the subdivisions put together. (2 x15= 30 Marks)

**Part C:** There shall be **Three questions** uniformly covering Modules 5 and 6, each carrying 20 marks, of which the student has to answer any **Two questions**. At the most 4 subdivisions can be there in one main question with a total of 20 marks for all the subdivisions put together. (2 x20= 40 Marks)