

Request for Graduate Course Addition

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. **The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.**

College: CITE _____

Dept/Division: Engineering _____

Alpha Designator/Number: ME/621 _____

 Graded CR/NC

Contact Person: Dr. Asad A. Salem _____

Phone: 304-696-3207 _____

NEW COURSE DATA:

New Course Title: Corrosion Engineering _____

Alpha Designator/Number:

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Title Abbreviation:

C	O	R	R	O	S	I	O	N		E	N	G	I	N	E	E	R	I	N	G				
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(Limit of 25 characters and spaces)

Course Catalog Description:
(Limit of 30 words)

Covers the causes and mechanisms of aqueous corrosion, electrochemistry and thermodynamics of corrosion. Materials selection, design for minimization of corrosion, and corrosion protection. Case studies are discussed.

Co-requisite(s): _____

First Term to be Offered: Spring 2016 _____

Prerequisite(s): Graduate status _____

Credit Hours: 3 _____

Course(s) being deleted in place of this addition (*must submit course deletion form*): _____

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

Dept. Chair/Division Head _____	Date _____
Registrar _____	Date _____
College Curriculum Chair _____	Date _____
Graduate Council Chair _____	Date _____

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College: CITE

Department/Division: Engineering

Alpha Designator/Number: ME/621

Provide complete information regarding the new course addition for each topic listed below. Before routing this form, a complete syllabus also must be attached addressing the items listed on the first page of this form.

1. FACULTY: Identify by name the faculty in your department/division who may teach this course.

Dr. Iyad Hijazi

2. DUPLICATION: If a question of possible duplication occurs, attach a copy of the correspondence sent to the appropriate department(s) describing the proposal. Enter "**Not Applicable**" if not applicable.

Not Applicable

3. REQUIRED COURSE: If this course will be required by another department(s), identify it/them by name. Enter "**Not Applicable**" if not applicable.

Not Applicable

4. AGREEMENTS: If there are any agreements required to provide clinical experiences, attach the details and the signed agreement. Enter "**Not Applicable**" if not applicable.

Not Applicable

5. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials to teach this course, attach an estimate of the time and money required to secure these items. (Note: Approval of this form does not imply approval for additional resources.) Enter "**Not Applicable**" if not applicable.

Not Applicable

6. COURSE OBJECTIVES: (May be submitted as a separate document)

Please refer to the attached syllabus

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7. COURSE OUTLINE (May be submitted as a separate document)

Please refer to the attached syllabus

8. SAMPLE TEXT(S) WITH AUTHOR(S) AND PUBLICATION DATES (May be submitted as a separate document)

R. Winston Revie and Herbert H. Uhlig, Corrosion and Corrosion Control, An introduction to Corrosion Science and Engineering, 4th Edition, Wiley publication, 2008. ISBN 978-0-471-73279-2

9. EXAMPLE OF INSTRUCTIONAL METHODS (Lecture, lab, internship)

Lecture

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10. EXAMPLE EVALUATION METHODS (CHAPTER, MIDTERM, FINAL, PROJECTS, ETC.)

homework, quizzes, project, exams

11. ADDITIONAL GRADUATE REQUIREMENTS IF LISTED AS AN UNDERGRADUATE/GRADUATE COURSE

None

12. PROVIDE COMPLETE BIBLIOGRAPHY (May be submitted as a separate document)

- R. Winston Revie and Herbert H. Uhlig, Corrosion and Corrosion Control, An introduction to Corrosion Science and Engineering, 4th Edition, Wiley publication, 2008. ISBN 978-0-471-73279-2
- Pierre Roberge, Corrosion Engineering: Principles and Practice, McGraw-Hill Professional; 1 edition, 2008. ISBN-10: 0071482431.
- Callister, W. D., Jr., Materials Science and Engineering: An Introduction, Sixth Edition. New York, New York: John Wiley and Sons, Inc., 2003. ISBN: 0-471-13576-3.

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Please insert in the text box below your course summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings):

Department:

Course Number and Title:

Catalog Description:

Prerequisites:

First Term Offered:

Credit Hours:

Department: Weisberg Division of Engineering

Course Number and Title: ME 621 Engineering Corrosion

Catalog Description: Covers the causes and mechanisms of aqueous corrosion, electrochemistry and thermodynamics of corrosion. Materials selection, design for minimization of corrosion, and corrosion protection. Case studies are discussed.

Prerequisites: Graduate Status

First Term Offered: Spring 2016

Credit Hours: 3

ME 621 – Corrosion Engineering

College of Information Technology & Engineering
Weisberg Division of Engineering and Computer Science

Course Title/Number	Corrosion Engineering-ME 621
Semester/Year	
Days/Time	
Location	
Instructor	
Office	
Phone	
E-Mail	
Office/Hours	
University Policies	By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to www.marshall.edu/academic-affairs and clicking on “Marshall University Policies.” Or, you can access the policies directly by going to http://www.marshall.edu/academic-affairs/?page_id=802 Academic Dishonesty/ Excused Absence Policy for Undergraduates/ Computing Services Acceptable Use/ Inclement Weather/ Dead Week/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities of Students/ Affirmative Action/ Sexual Harassment

Course Description: From Catalog

Covers the causes and mechanisms of aqueous corrosion, electrochemistry and thermodynamics of corrosion. Materials selection, design for minimization of corrosion, and corrosion protection. Case studies are discussed.

Required Text:

- R. Winston Revie and Herbert H. Uhlig, *Corrosion and Corrosion Control, An introduction to Corrosion Science and Engineering*, 4th Edition, Wiley publication, 2008. ISBN 978-0-471-73279-2
- Pierre Roberge, *Corrosion Engineering: Principles and Practice*, McGraw-Hill Professional; 1 edition, 2008. ISBN-10: 0071482431.
- Callister, W. D., Jr., *Materials Science and Engineering: An Introduction*, Sixth Edition. New York, New York: John Wiley and Sons, Inc., 2003. ISBN: 0-471-13576-3.

Course Objectives:

- Develop skills for materials selection and protection to minimize impacts of corrosion.
- Describe the mechanisms and causes of corrosion.
- Build critical thinking and problem solving abilities as it extends the student's knowledge gained in prior courses.
- Build teamwork skills and enhances written and oral communication skills utilizing a design project.
- Acquire technology competencies through literature review for the design project which involve use of the Internet.

Grade Policy:

Attendance and Participation	5%
Homework	10%
Quizzes	10%
Project	15%
Exam	60%

Attendance Policy

Students are expected to attend all classes. Attendance will be taken and will influence the overall grade in the course (see below). The MU policy on absences will be followed; students should read and understand this policy.

Learning Outcomes:

Course Student Learning Outcomes	How students will practice each outcome in this Course	How student achievement of each outcome will be assessed in this Course	ABET Outcome (letter) & Level (number)
Describe the mechanisms and causes of corrosion.	<ul style="list-style-type: none">• Lectures• In-class examples• Homework assignments	<ul style="list-style-type: none">• Homework Assignments• Exam• Quiz	a2,c2,e2
Develop skills for materials selection and protection to minimize impacts of corrosion.	<ul style="list-style-type: none">• Lectures• In-class examples• Homework assignments	<ul style="list-style-type: none">• Homework Assignments• Exam• Quiz	a2,c2,e2
Identify common types of corrosion.	<ul style="list-style-type: none">• Lectures• In-class examples• Homework assignments	<ul style="list-style-type: none">• Homework Assignments• Exam	a2,c2,e2

		<ul style="list-style-type: none"> • Quiz 	
Explain the electrochemical basis for corrosion and use Pourbaix diagrams to give qualitative predictions of corrosion behaviour.	<ul style="list-style-type: none"> • Lectures • In-class examples • Homework assignments 	<ul style="list-style-type: none"> • Homework Assignments • Exam • Quiz 	a2,c2,e2
Describe the relationship between the cathodic reaction and iron and steel corrosion rates and the effect of the environment.	<ul style="list-style-type: none"> • Lectures • In-class examples • Homework assignments 	<ul style="list-style-type: none"> • Homework Assignments • Exam • Quiz 	a2,c2,e2
Describe the cathodic protection approach to corrosion control.	<ul style="list-style-type: none"> • Lectures • In-class examples • Homework assignments 	<ul style="list-style-type: none"> • Homework Assignments • Project • Exam • Quiz 	a2,c2,e2
Identify metallic, inorganic, and organic coatings; their methods of application and their advantages and disadvantages.	<ul style="list-style-type: none"> • Lectures • In-class examples • Homework assignments 	<ul style="list-style-type: none"> • Homework Assignments • Exam • Quiz 	a2,c2,e2
Describe the classes of inhibitors and their effect on corrosion rate.	<ul style="list-style-type: none"> • Lectures • In-class examples • Homework assignments 	<ul style="list-style-type: none"> • Homework Assignments • Exam • Quiz 	a2,c2,e2

Course Schedule

No of Weeks	Topic	Chapter
1	Definition and importance of corrosion	1
1.5	Electrochemical mechanisms	2
1.5	Thermodynamics: corrosion tendency and electrode potential	3
1	Thermodynamics: Pourbaix diagrams	4
2	Kinetics: polarization and corrosion rates	5
2	Passivity	6
1	Iron and steel	7
2	Cathodic protection	13
1	Inhibitors and passivators	17
2	Coatings	14 & 15

Prepared by Dr. Iyad Hijazi