CORROSION ENGINEERING (CORE)

CORE 101 Tools for Corrosion Engineering (2 Units)
Corequisites: MATH 149 and CHEE 110. Introduction to corrosion engineering. Basic concepts of engineering practice. Introduction to professional level software needed for later studies. (Formerly 4250:101)

CORE 105 Corrosion Engineering Computations (2 Units)
Prerequisite: CHEE 101 or CORE 101. Corequisite: CHEM 153. Structure, processing and properties of metals, ceramics, and polymers. (Formerly 4250:105)

CORE 194 Design Project 1 (1 Unit)
Prerequisite: Permission. Individual design project in Corrosion Engineering that is supervised by a faculty member. (Formerly 4250:194)

CORE 200 Material and Energy Balances for Corrosion Engineers (4 Units)
Prerequisites: [CHEE 121 or CORE 105], CHEM 151 and MATH 221. Introduction to material and energy balance calculations applied to the solution of chemical processing and corrosion engineering problems. (Formerly 4250:200)

CORE 294 Design Project 2 (1-2 Units)
Prerequisite: Sophomore standing. Individual design project in Corrosion Engineering that is supervised by a faculty member. (Formerly 4250:294)

CORE 300 Introduction to Corrosion Science and Engineering (3 Units)
Prerequisites: [CHEE:305 and CHEE:220] or [MECE:380 and MECE:300] or [CIVE:380 and MECE:305] or [BMEN:300 and MECE:300] or [CHEE:305 and CHEM:313]. This course introduces the impact of corrosion to the society and the important forms of aqueous corrosion. Students are expected to learn the electrochemical reactions for corrosion, electrochemical phase diagrams, and corrosion kinetics and measurement techniques. (Formerly 4250:300)

CORE 301 Aqueous Corrosion Lab I (1 Unit)
Prerequisites: CHEM 154 and admission to an engineering major within the College of Engineering and Polymer Science. Corequisite: CORE 300. Laboratory exercises will reinforce the fundamentals of aqueous corrosion. (Formerly 4250:301)

CORE 305 Corrosion Prevention (3 Units)
Prerequisites: CORE 300 and admission to an engineering major within the College of Engineering and Polymer Science. This course covers the basic forms of corrosion including: Localized corrosion, Intergranular corrosion, Environmentally assisted cracking, Atmospheric corrosion and, Microbial induced corrosion. Course presents approaches to mitigating the forms of corrosion using engineering methodologies including: proper materials selection, organic coatings, chemical inhibitors, and cathodic protection. Topics in failure analysis are also discussed. (Formerly 4250:305)

CORE 306 Aqueous Corrosion Lab II (1 Unit)
Prerequisites: CORE 301 and admission to an engineering major within the College of Engineering and Polymer Science. Corequisite: CORE 305. Laboratory exercises will reinforce the fundamentals of aqueous corrosion. (Formerly 4250:306)

CORE 310 Fundamentals of Dry Corrosion (3 Units)
Prerequisites: CORE 300 and admission to an engineering major within the College of Engineering and Polymer Science. Corequisite: CORE 311. Fundamentals of dry/hot corrosion will cover corrosion tendencies, processes and rates at high temperature. An in-depth understanding of the high temperature corrosion mechanisms, materials performance, and the effects of stress will be covered. (Formerly 4250:310)

CORE 311 High Temperature Corrosion Lab (1 Unit)
Prerequisites: CORE 306 and admission to an engineering major within the College of Engineering and Polymer Science. Corequisite: CORE 310. Laboratory exercises will reinforce the fundamentals of high temperature corrosion. (Formerly 4250:311)

CORE 340 Corrosion Prevention (Dry) (3 Units)
Prerequisite: CORE 305. Corequisite: CORE 310, MECE 380. This course presents a functional approach to controlling and preventing dry corrosion based upon engineering methodologies to proper materials selection, inorganic coatings, and passivation. Applications in specific industries will be covered. (Formerly 4250:340)

CORE 394 Design Project 3 (1-3 Units)
Prerequisite: Junior standing. Individual design project in Corrosion Engineering that is supervised by a faculty member. (Formerly 4250:394)

CORE 440 Corrosion Engineering Design I (3 Units)
Prerequisites: CORE 305 and admission to an engineering major within the College of Engineering and Polymer Science. This course applies the lessons learned in corrosion prevention and laboratory courses to corrosion case studies. Solutions to existing corrosion problems will be developed based on the analysis of test data. (Formerly 4250:440)

CORE 441 Corrosion Engineering Design II (3 Units)
Prerequisites: CORE 440 and admission to an engineering major within the College of Engineering and Polymer Science. This course focuses on understanding the financial, political, social and health implications of corrosion, corrosion mitigation, and corrosion prevention. Solutions to existing corrosion problems will be developed based on economic, political, social, and health issues. The course will also cover methodologies for preserving assets and reducing operation costs. (Formerly 4250:441)
Gen Ed: Capstone

CORE 450 Engineering Principles of Corrosion (3 Units)
Prerequisite: Junior or greater standing or permission. Engineering principles for understanding corrosion and corrosion mitigation methods. Case studies of corrosion management to reliability and reduce corrosion. Multidisciplinary engineering enrollment encouraged. (Formerly 4250:450)

CORE 465 Corrosion Protection by Coatings (3 Units)
Prerequisites: Junior or greater standing and admission to an approved major in engineering, polymer science and polymer engineering, or chemistry. Principles of corrosion control by coatings. Fundamentals, coating curing mechanisms, coating types, surface preparation, coating application, coating analysis, coating function evaluation, and coating lifetime prediction.

CORE 494 Design Project 4 (1-3 Units)
Prerequisite: Senior Standing. Individual design project in Corrosion Engineering that is supervised by a faculty member. (Formerly 4250:494)

CORE 496 Special Topics in Corrosion Engineering (1-3 Units)
Prerequisite: Permission. (May be repeated for a total of six credits). Topics selected from new and developing areas of corrosion engineering. (Formerly 4250:496)

CORE 497 Honors Project (1-3 Units)
Prerequisites: Senior standing in Honors College or permission. Individual research or design project in Corrosion Engineering that is supervised by a faculty member. Conducted in accordance with the Honors College requirements. (Formerly 4250:497)