

CORROSION SCIENCE AND ENGINEERING - CERTIFICATE

The Certificate in Corrosion Science and Engineering was designed in response to industry demand and the national need in strategic sectors, such as infrastructure renewal, energy (extraction, conversion, and transportation), utilities (in particular water), transportation, production, and manufacturing.

The curriculum incorporates:

- cross-disciplinary components on materials science and engineering, thermodynamics, kinetics, and electrochemistry;
- interdisciplinary, integrative courses on the forms of corrosion, the electrochemical and degradation processes in extreme environments, and the control and mitigation strategies to prevent these processes in specific environments; and
- elective courses related to different engineering disciplines and applications as well as professional internships in industry and national laboratories.

The goals of the corrosion science and engineering certificate program are to train the next generation of scientists and engineers:

1. who will serve as a trained, advanced workforce for industry, academia, and government agencies with a basic understanding of environmental degradation assets required to optimize asset life cycle, production efficiency, and worker safety;
2. are familiar with the technological and computational tools and methods for corrosion and material degradation evaluation, inspection, detection, and prevention;
3. have interdisciplinary collaborative experience in materials preservation and degradation, with individuals from different science and engineering disciplines;
4. contribute to interdisciplinary efforts while developing a comprehensive understanding of the potentials and limitations of corrosion science and engineering; and
5. acquire skills necessary to thrive in their chosen career path.

Program Requirements

| Code | Title | Semester Credit Hours |
|------------------------------|---|-----------------------|
| MSEN 601 | Fundamental Materials Science and Engineering | 3 |
| MSEN 643 | Materials Electrochemistry and Corrosion | 3 |
| MSEN 644 | Corrosion and Electrochemistry Lab | 3 |
| MSEN 646 | Corrosion Prevention and Control Methods | 3 |
| Select one of the following: | | 3 |
| BMEN 635 | Biomaterials Compatibility | |
| CHEM 623 | Surface Chemistry | |
| CHEN 655/ SENG 655 | Process Safety Engineering | |
| MEEN 660 | Corrosion Engineering | |

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| MEMA 611 | Fundamentals of Engineering Fracture Mechanics | |
| MSEN 602 | Physics of Materials | |
| MSEN 603 | Fundamentals of Soft and Biomaterials | |
| MSEN 616/ MEEN 616 | Surface Science | |
| MSEN 620 | Kinetic Processes in Materials Science | |
| MSEN 625 | Mechanical Behavior of Materials | |
| MSEN 640 | Thermodynamics in Materials Science | |
| NUEN 662 | Nuclear Materials Under Extreme Conditions | |
| PETE 643 | Oil Field Chemistry | |
| Total Semester Credit Hours | | 15 |