Corrosion and Degradation of Materials in Nuclear Energy Applications
UEA – 711&711G/KU – ME590

Prerequisite: Chemistry I, Calculus II, and a fundamental materials course. KU Courses that meet requirements – Chem 159 or 184, Calc 122, ME 306.

Instructors

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Course Description

With the resurgence of the nuclear power industry and the growth of the nuclear Navy, there is a need for engineers trained in the materials needs of the nuclear industry. This course covers corrosion and degradation of materials in the nuclear and non-nuclear portions of nuclear power facilities. This course is available for either undergraduate or graduate credit.

Recommended Text

Recommended but not required: ***Corrosion Science and Technology***, Second Edition,
David E. J. Talbot, James D. R. Talbot, CRC Press, 2007, ISBN: 0-8493-9248-9

Lecture Schedule

All lectures will be broadcast live and recorded using Adobe Connect. Students are not required to attend this period in the classroom but may attend remotely, and if this is not possible, they may attend by listening to the recorded sessions.

Recorded lectures and review/discussion sessions will be available at any time to all students. Technical requirements for remote attendance include a computer with high-speed Internet connection, a microphone, and speakers. The use of a headphone with boom microphone is strongly recommended to minimize audio feedback. The use of a simple webcam will allow students and the instructor to see each other in real time. Students taking the course for graduate credit will be required to do a significant research paper and give a 15-20 minute live PowerPoint presentation on their selected topic in class.

Class Schedule:

A detailed class schedule will be available and will be posted on Blackboard. **Blackboard will be used to post critical course information – please use Blackboard!**
Blackboard website: http://courseware.ku.edu/ Solutions to homework problems will be posted on Blackboard approximately three working days after the due date.

Adobe Connect Information: All lectures for this course will be pre-recorded and available to students on demand. The URL all semester for remotely logging onto the live review/discussion. Each recorded lecture will have its own unique URL, which will be posted after class. Each can be viewed by students at any time all semester. Requirements for remote login are headphone, microphone, high speed Internet. Connect Add-ins, and Connect "Getting Started" system check, both available at http://technology.ku.edu/desktopconnect/. A webcam is optional.

Course Objectives: The primary course objectives are to enable students to acquire an understanding of the materials environment, requirements, and selection in nuclear energy applications, including future generation reactors.

Course Policies and Procedures:

1) Homework
We expect that many students taking this course will be "remote" and not attending class in the classroom. Therefore, completed assignments for all students should be turned in electronically by the beginning of class on the due date. Submission by email or to Blackboard is acceptable. The homework is important- please do it.

2) Homework format
Homework can be submitted in MS Word, MS Excel, or the equivalents. Please include your name, the problem number, and date on the work.
If appropriate, to present the problem solution, start with restating (preferably in your own words) what was given in the problem, what you are to find, and then provide your solution as such:
Given:
Find:
Solution:
The final answer to the problem (if numerical) should be encompassed by a line box. Some problems (such as short answer essay questions) will not require this format.

3) Late Homework
Homework is considered late if turned in after the ***beginning*** of the class period on the day due. Late homework will be accepted, but penalties will also be imposed as follows:
24 hours late: 50% deduction from total score.
48 hours late: 75% deduction from total score.
72 or more hours late: 100% deduction (no credit).
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In case of sickness or other valid causes, provision will be made for late submission with no penalty. Special exceptions to the late homework policy will be announced in lecture in the case of homework due the class period before an examination.

4) Posted Solutions
Homework problem set solutions will be posted on Blackboard *approximately* 3 days after the due date. Special exceptions will be made immediately before examinations.

5) Tests
There will be two midterm exams and a final exam. The point distribution for these exams is given on a later page. The exam methodology will be established once the composition and distribution of the student body is clear.

6) Missed tests

If you miss a midterm test without a sufficient and certified medical excuse or prior instructor approval, you will not be allowed to take a makeup test. The percent score on the final exam will be used for your midterm score. Only one midterm exam can be missed. If both midterms are missed, you cannot pass the course. If you miss the final exam without a valid excuse, a zero will be averaged into your grade. Special exceptions may be made on a case-by-case basis. ***For your benefit, it is strongly recommended that you do not utilize this policy.***

7) Review sessions

Your instructor plans to hold extra review sessions for your benefit, available via Adobe Connect Pro. Attendance at these review sessions is optional. In these review sessions, your instructor will answer questions, illustrate additional example problems, and answer questions regarding previous homework solutions. Your instructor will NOT work out homework problems that have not been turned in.

8) Calculation of Course Grade

KU Grading System (adapted from the University Senate Rules and Regulations "Article II, Section 2: The Grading System", http://www.ku.edu/~unigov/usrr.html#art2sect2)

The letters A, B, C, D shall be used to indicate passing work.

- *The grade of A will be reported for outstanding quality.*
- *The grade of B will be reported for high quality.*
- *The grade of C will be reported for acceptable quality.*
- *The grade of D will be reported for minimally passing, but less than acceptable quality.*

The letter F shall indicate that the quality of work was such that, to obtain credit, the student must repeat the regular work of the course, or that the student's work was not of passing quality at the time of disenrollment from the course.

***In general*, reported earned grades will follow these guidelines:**

Outstanding quality	A, 90 – 100% of the total available points.
High quality	B, 80 – 90% of the total available points.
Acceptable quality	C, 70 – 80% of the total available points.
Minimally passing quality	D, 60 – 70% of the total available points.
Not passing quality	F, less than 60% of the total available points.

We do not curve grades in this course. *It is theoretically possible for everyone in the class to get an A (or an F). Your performance depends only on how you do, not on how everyone else in the class does. It is therefore in your best interest to help your classmates in every legal and ethical way possible.*

9) Research paper for students taking ME590/NE711 for graduate credit

Students taking the course for graduate credit will be required to do a research report on a topic chosen from a list (provided at the beginning of the course) or on another topic, requiring instructor approval. These papers will be at least ten single-spaced pages in length exclusive of drawings, graphics, tables of content, reference listings and will be in 12-font Times New Roman type. Each student will give a live, 15-20 minute PowerPoint presentation during the review/discussion periods just before Thanksgiving break. These presentations will be recorded.

Breakdown of total points available: ME 590 (3 credit hours)

Credit Basis	**Undergraduate**	**Graduate**
Midterm Exam I	125 points (26%)	125 points (20.8%)
Midterm Exam II	125 points (26%)	125 points (20.8%)
Final Exam	150 points (28%)	150 points (25%)
Homework	100 points (20%)	100 points (16.7%)
Research Paper		100 points (16.7%)
Total	500 points	600 points

10) Gray areas between guaranteed letter grades

A “gray area” of several points below the specified numerical cutoff grades will be used. Using this system, two people getting the same weighted average grade (say, 89%) might therefore get different course grades (A or B). If you are in one of these gray areas, whether you get the higher or lower grade depends on whether your test performance has been improving or declining, or your performance in turning in homework.

We strongly encourage you to discuss academic or personal questions about this course with your course instructor during office hours or by email. Office hours are set for you -- we welcome questions and interaction with you during these times.

Instructor Self-Expectations:

- Provide a positive environment to facilitate the students’ learning.
- Use a variety of learning techniques to facilitate students’ optimal learning.
- Convey my experience and enthusiasm about the field of materials to students.
- Always be fair and consistent in grading and dealing with student issues.
- Treat students as customers.

Instructor Expectations of Students:

- Be professional in the classroom setting and outside of class.
- Do your assignments and study.
- Prepare for your team meetings and participate professionally in your team work.
- Ask your instructor questions if you don’t understand after you have tried to learn on your own.
- If you have a problem with something that I do, come to me to help resolve the problem.

Academic Dishonesty

Academic dishonesty (cheating) will not be tolerated in the School of Engineering. In this course, cheating will be defined as sharing information during Examinations or Quizzes, direct copying of homework assignments, allowing others to do the majority of the work for your homework, and plagiarism on the homework assignments. In this course it is okay to ask each other questions on the homework assignments. This implies that each student has individual active input on every problem or assignment. Tag teams efforts on homework assignments are not allowed and submission of identical homework is not permitted. Use of homework solution manuals obtained by unethical or illegal methods is prohibited. ***Cheating in class is inconsistent with professional engineering ethics and is a serious violation.*** If any student is found cheating, he/she will be dealt with in a forthright and no nonsense manner. The instance will be reported with documentation to the Associate Dean and appropriate penalties will be invoked.

Disability Services

On the University of Kansas campus, the staff of Services for Students with Disabilities (SSD), 135 Strong, 785-864-2620 (v/tty), coordinates accommodations and services for KU courses. If you have a disability for which you may request accommodation in KU classes and have not contacted them, please do as soon as possible. Please also see me privately in regard to this course. For students at other campuses, other policies may apply. Please check with the coordinator at your university.