

Risk Assessment for Radiation Systems

ENU 4145

Class Periods and Locations: Tuesday, Period 7, 1:55 – 2:45 p.m.; WEIM 1092
Thursday, Periods 6 and 7, 12:50 – 2:45 p.m.; MAT 0015

Academic Term: Spring 2020

Instructor:

Dr. Donald Wall

Donald.wall@ufl.edu

Phone: 273-2662

Office Hours: Monday 2:00 p.m. – 4:00 p.m.

Wednesday, 2:00 p.m. – 4:00 p.m.

Additional times are available by appointment.

Room 311, Materials Engineering Building (MAE)

Teaching Assistants:

- none

Course Description

Three one hour lectures discussing the study of radiation management systems, including reliability and risk assessment.

Course Pre-Requisites

ENU 4144 and STA 3032

Course Objectives

The course objectives include comprehension and proficiency in the following topics:

- risk analysis
- analysis of systems reliability and failure modes

The course objectives will be addressed by means of:

- textbook study
- lecture material that will compliment and clarify the textbook material
- provide examples of applications, including some in-class problem solving exercises
- homework problems, with emphasis on problems that have applications in the field

Materials and Supply Fees

none

Professional Component (ABET):

3 credits of engineering topics.

Relation to Program Outcomes (ABET):

Outcome	Coverage*
1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	High
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	medium
3. an ability to communicate effectively with a range of audiences.	n/a
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	Medium
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	n/a
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	n/a
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies	High

*Coverage is given as high, medium, low or not applicable.

Required Textbook

- Reliability Engineering and Risk Analysis: A Practical Guide
- Mohammad Modarres
- 2016, 3rd Edition
- ISBN 978-1498745871

Recommended Materials

Electronic versions of documents or sources of electronic versions will be provided as necessary.

Course Schedule

The class meeting times are:

Tuesday, Period 7, 1:55 – 2:45 p.m.

Thursday, Periods 6 and 7, 12:50 – 2:45 p.m.

Location:

Weimer Hall (WEIM), Room 1092 for Tuesday classes

Matherly Hall (MAT), Room 0015 for Thursday classes

Final exam:

April 30, 2020

12:30 p.m. – 2:30 p.m.

WEIM 1092 (unless otherwise listed on the official UF final exam schedule)

Course Outline

There are seven major topics for the course, with 8 HW and 3 exams, which are as follows:

1. Introduction to Reliability and Risk Analysis
2. Probability in Reliability Evaluation
3. Probability Distributions
4. Fault Trees
5. Event Trees
6. Failure Data
7. System and Network Reliability

The day-to-day outline of lecture coverage is a draft form and may be subject to change. The HW deadlines will not be moved forward, but may be moved back. Exam dates will not change unless required by UF schedule.

Dates	Subject	Reading	Due
Week of Jan. 6	Syllabus and course policies. Introduction to Reliability and Risk Analysis	RE, Ch. 2	
Week of Jan. 13	Introduction to Reliability and Risk Analysis	10 CFR 20	
Week of Jan. 20	Introduction to Reliability and Risk Analysis Probability in Reliability Evaluation		HW 1
Week of Jan. 27	Probability in Reliability Evaluation		
Week of Feb. 3	Probability Distributions	RE, Ch. 3	HW 2
Week of Feb. 10	Probability Distributions		HW 3
Week of Feb. 17	Probability Distributions		
	Exam 1 (Feb. 20)		
Week of Feb. 24	Fault Trees	RE, Ch. 4	
Week of Mar. 2	Spring Break -- No Classes		
Week of Mar. 9	Fault Trees		HW 4
Week of Mar. 16	Event Trees		HW 5
Week of Mar. 23	Failure Data		
Week of Mar. 30	Failure Data		HW 6
Week of Apr. 6	System and Network Reliability	RE, Ch. 8	
	Exam 2 (Apr. 9)		
Week of Apr. 13	System and Network Reliability		HW 7
Week of Apr. 20	Course Review and Reading Days		HW 8
April 30	Final Exam		

Note: RE refers to the required text, Reliability Engineering and Risk Analysis: a Practical Guide. Additional reading from RE will be announced in class and on Canvas. Other reading material will be made available as .pdf documents.

Attendance Policy, Class Expectations, and Make-Up Policy

Attendance is not used to determine grades. Changes of exam or HW due dates as a result of absence will be in accordance with UF policy.

Excused absences must be consistent with University policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation.

Makeup Exam Policy. Students who need to miss an exam due to extenuating circumstances and who wish to take a makeup exam will be required to provide prior notice and to provide evidence that it is necessary to miss the exam. Missing an exam without prior notice will only be excused under documented and compelling circumstances. Makeup exams will not be permitted if the instructor is not notified of the circumstances within 48 hours after the exam has been given. Makeup exams will only be given under the direct supervision of the instructor and *will not* be the same as the original exam. A makeup exam shall be scheduled within 72 hours of the original exam time, unless there are documented and compelling circumstances and in accordance with University policy.

Electronic devices. Use of electronic devices for any reason other than immediate course-related purposes is prohibited. This includes cell-phone use, texting, checking email, internet use and similar activities. Laptops may be used to take notes or for specific course-related purposes as authorized by the instructor. Laptops may not be used for other purposes such as checking email or internet use. A person who commits an infraction will be required to leave the classroom for the remainder of the day.

Late homework. Homework that is late will receive a penalty of 10% per day for the first two days. Homework will not be accepted any later than 48 hours following the due time and date. Homework *must* be submitted either directly to the instructor or according to specific instructions. *Do not leave homework or other assignments in the instructor's mailbox, at any other place or with any other person unless specifically told to do so.* Note that the MAE building is locked late in the day and will be inaccessible after hours.

Legibility. Assignments or portions of assignments, (i.e. homework *and* exams) that are illegible will receive zero credit. It is true that some people have poor handwriting. If that is the case, write slower, find a way to improve legibility and consult with the instructor for possible solutions. Please provide a sample of your writing to get an opinion if you are not sure whether or not it is legible. As a guideline, difficult to read (or messy) = illegible. *Assignments that are illegible will receive zero credit.*

Evaluation of Grades

Assignment	Total Points
Homework Sets	200
Exam 1	150
Exam 2	150
Final Exam	150
Total	650

Grading Policy

Percent	Grade
90 - 100	A
86 - 90	A-
83 - 85	B+
80 - 82	B
77 - 79	B-
73 - 76	C+
67 - 72	C
60 - 66	D
< 60	E

Grades posted on Canvas are for your reference, but are not official grades.

More information on UF grading policy may be found at:
<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. <https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.