The University of Texas at Tyler
College of Engineering

CENG 5350 (MSEL 5320: Engineering Decision Making when

Considering Uncertainty and Risk)

Course Syllabus (Spring 2025)

Date: December 30. 2024. This version supersedes all earlier versions.

Time & Venue	Class Times: On-Line
Instructor	Dr. J. Torey Nalbone Office: RBS 2003 Email: tnalbone@uttyler.edu Phone: (903) 565-5520 Office hours: Standing ZOOM Office Hours 0800 to 0930 Tuesday/Thursday or by appointment
Teaching Assistant	TBD
Course Website	See UT Tyler's Canvas website. Canvas will be used to manage the course material for the semester. There you will find announcements, homework assignments, solutions, handouts, lesson videos, and other material pertaining to the class. **Please check there Daily at least regularly.**
Catalog Description	Welcome to MSEL 5320 (Engineering Decision Making – Uncertainty and Risk) During the semester students will find our study of Engineering Design using a Decision-Based context will open up the world of better and more effective, efficient and economical engineered products. Engineering design as a decision-making process; multi-criteria decision making in design under uncertainty; Group decision making in design processes; Sequential decision making; Model-based and data-driven decision making; Heuristics and biases in design decision making. Applications to engineering design including estimation of customer preferences, simulation-based determination, and sustainable resilient design.

Course Outcomes	In this course, you will learn: 1. Engineering design and systems engineering through the lens of decision making. 2. Framing a decision situation and making decisions with certainty 3. Considering uncertainty and the measurement of risk 4. Use spreadsheets and math solving algorithms as a specific tool to perform the mathematical operations required in analysis and design. 5. Perform engineering tasks in a team environment and communicate effectively to others Topics Covered a) Probability Theory: An Overview b) Single Attribute Utility Theory c) Multi-attribute Utility Theory with examples in engineering design and manufacturing d) Information Theory & the Value of Information e) Sequential Decision Making f) Group Decision Making **g) Rationality** **h) Cumulative Prospect Theory** **i) Decision Field Theory** **j) Preferences over Time & Estimating Customer Preferences**
Exams	There will be 3 total exams for this course provided during a scheduled class time on campus (In-person attendance required). The exams are **TENTATIVELY** scheduled for: • Exam 1: February 28st • Exam 2: April 11th • Final Exam: TBD Based on University Schedule Exams dates may be moved up or pushed back depending on the progress of the lectures. You can use a calculator and instructor-approved reference material. Solutions to exams will **NOT** be posted. No make-up exams will be given except for medical or other similar hardships where advanced arrangements are made with the instructor; or in case of non-selective medical emergencies with appropriate physician's note or documentation. Other than circumstances described above, failure to take the exam at the scheduled time will constitute a grade of zero on the exam.

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<tr><td>General Exam Rules & Cheat Sheet</td><td>All exams are closed book. Topics to be tested will be announced in class and on Canvas one week prior to the exam. Based on need an equation sheet will be provided.

The instructor will set questions from material taught in class. The meaning of “taught in class” includes verbal instructions or written notes on the white board and Canvas, briefing/ presentation during field trips, observation during field work/ experiments. They do not necessary appear in the textbook, distributed class notes, or homework. It is very important that you attend the class activities and take additional notes.

To discourage students from focusing narrowly on only a few questions, no practice exam will be given. There are enough self-practice problems in the textbook at the end of each chapter.</td></tr>
<tr><td>Grading</td><td>This course is graded on the standard grade framework of Graduate work at UT Tyler as described in the University catalog.

Grade Matrix
<table>
<tr><td>Course Grade</td><td>Grade assigned</td><td>Course Points</td></tr>
<tr><td>A</td><td>100%-to 87%</td><td>1500-1305</td></tr>
<tr><td>B</td><td>86.9% to 76%</td><td>1303-1140</td></tr>
<tr><td>C</td><td>75.9% to 66%</td><td>1138-990</td></tr>
<tr><td>F</td><td>< 65.9%</td><td>988 and below</td></tr>
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All midterms’ exams are equally weighted in the final grade consideration for the course. The Final exam represents a major component of your term grade as well as Professional Practice that is defined by these four components:
a. Participatory in both virtual and scheduled message board activities to provide both input and analysis of topics posted
b. Prepared for discussions and work that is submitted for grade considerations.
c. Punctual in your submission of deliverables as described in the assignment prompt.
d. Present, in that your responses and deliverables are not only timely but include original and cogent applications to solutions provided. You will be specifically instructed when an assignment is or will be considered for “group” work.</td></tr>
<tr><td>Decision Project</td><td>The decision project will be used to identify the process and decision making as part of a team/group and individual managerial processes in engineering design. This will be a written team submission which shall include attribution and review.</td></tr>
<tr><td>Homework</td><td>Expectations in assignments are mostly reflective answers and exploring question at the ends of the chapters assigned for individual work.</td></tr>
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