

## IE 4345: Decision Analysis in System Design (Section 001) - Spring 2018

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**Office Hours:** Tuesday 2-4pm (other times by appointment)

**Section Information:** This syllabus applies to IE 4345 Section 001.

**Time and Place of Class Meetings:** Tuesday & Thursday, 12:30-1:50pm, Science Hall (SH) 100

**Description of Course Content:** This course provides an introduction to fundamental concepts and methods related to decision analysis. Decision theory principles and tools will be applied to better understand and evaluate system alternatives while considering multiple attributes and requirements. Systems engineering trade study approaches are presented. Decision making under uncertainty and risk is addressed.

**Prerequisite:** Accepted into an engineering professional program at UTA.

### Student Learning Outcomes:

- Students will be able to explain key concepts related to decision analysis.
- Students will be able to describe and apply principles, methods, and tools related to decision analysis, where appropriate.
- Students will be able to demonstrate the use of trade studies to support the design of complex systems.
- Students will be able to demonstrate how to consider uncertainty and risk in decision analysis.

### Required Textbooks and Other Course Materials:

#### *Required Textbook:*

- Goodwin, P., & Wright, G. (2014). *Decision analysis for management judgement (5<sup>th</sup> ed.)*. Chichester, United Kingdom: John Wiley & Sons. ISBN-10: 1118740734, ISBN-13: 978-1118740736.

#### *Other Course Materials:*

- Other reference information will be: (1) received as handouts, (2) identified as UTA library reserve readings, or (3) UTA library lookup and/or Internet accessible documents. Access to slides from the lecture materials will be provided to students.

**Course Website:** Blackboard (elearn.uta.edu). Course presentations, syllabus, reading and homework assignments will be accessible via Blackboard. Presentations and other materials may be password protected. If so, the instructor will provide the password to open the documents in class.

### Descriptions of Major Assignments and Examinations:

**Assignments and Projects:** The course will include individual and team assignments. A final project will also be assigned. Team assignments and the final projects require that a presentation be provided during the class. Assignment and project presentations must be made within the specified time requirements or the assignment or project will be penalized. For team assignments, one assignment is handed in per team. The electronic version of the team presentation in Powerpoint format is due at least one day prior to the assignment/project deliverable due date and is to be emailed to the instructor and the teaching assistant. A hardcopy of the assignment or project must be provided to the instructor prior to the presentation in class. For team assignments, all team members are responsible for being familiar with the content of the presentation and the assignment. Teams who are to present will not be identified in advance of the class. If a team is selected and team members are not in class when called to present, the selected team will be penalized 10% of the assignment grade.

Team assignment and project grades are based on the content and question responses. Late assignments or projects will be penalized a minimum of 10%. If a team assignment or project is not handed in prior to

the class session that the assignment is due, no credit will be received for the assignment. All students are expected to present a portion of the final project presentation. For individual assignments see specific instructions. Individual assignments will typically not require a presentation.

The class requires students to participate on a team of their class peers for assignments unless specified otherwise (e.g., individual assignments). This will require that the teams be capable of conducting face-to-face and/or virtual meetings outside the classroom. The instructor will identify the teams and associated members at the beginning of the semester. Each team member will be expected to prepare and present a final review of the accomplishments of its individual team members using a peer evaluation form at the end of the semester. Team members should establish ground rules at the beginning of the semester. If an individual assignment or project is required, the individual student is required to work on their own. Copying, including from past students' assignments and projects as well as from other current students or teams, is not permitted and the university ethics policy will be followed if this occurs.

Quizzes may be performed in the class. If this is the case, an individual quiz or a set of quizzes may substitute for an assignment. Quizzes are closed book and closed notes. Students must work alone on quizzes. No sharing of any materials or communication with other students may occur during quizzes including writing instruments, etc. There is no makeup for quizzes. However, the instructor may elect to drop the lowest grade for one of the quizzes.

In addition to the instructor presentation and discussion, assignment and project presentations, and quizzes, students should expect in-class exercises during the lecture time. These in-class exercises are intended to provide students with practice related to concepts.

*Exams:* There will be two exams, a midterm and final. Each exam is closed book and closed notes. The instructor will notify students in advance of an exam if a scantron form is required. If an exam is missed, no makeup will be allowed without prior permission from the instructor or an excuse approved by the course instructor and with legitimate written documentation proving an illness or emergency. Additional information to verify the validity of your excuse may be requested. The student will receive a grade of zero for the exam without an approved excuse from the instructor. If an excuse is approved, the instructor will require the student to take a comprehensive exam at the end of the semester.

#### **Exam Policies:**

- **Before an exam: Students must bring their UTA ID card to all exams as the ID will be checked and matched to an exam.** There will be assigned seats for the exams. The instructor will provide a roster with seat locations and a seating chart for students. You must arrive by the time the class is scheduled to start. It is recommended that students be at the class 10 minutes before the exam starts to provide sufficient time to find your assigned seat and get settled. Each exam will be scheduled for the time identified by the instructor. You will not be given additional time if you are late to an exam.
- **During an exam:** All exams are closed book and closed notes unless noted otherwise by the instructor. Students are only allowed to use their pens, pencils, erasers, scantron form and any documentation provided by the instructor. Any attempt to use items on the exam not allowed by the instructor (e.g., cheating) will result in following the university ethics policy. Cellphones, computers, and other communication devices must be turned off and removed from the desk or table. All items not allowed for the exam should be placed on the floor. Students must work alone on exams. No sharing of any materials or communication with other students may occur during exams including writing instruments, etc. Please use the restroom prior to the exam. Any suspicious behavior during the exam will be noted by the proctor. In certain circumstances, students may be confronted by the proctor. Any problematic circumstances may require following the university ethics policy. Exams are to be opened, started, and stopped at the times announced by the proctor. Anyone attempting to view an exam early or stopping an exam late will be deducted a minimum of 10 points. Put down your writing instruments promptly when told that the time for the exam is at an end. If the exam proctor leaves the class without a student's exam at the end of the exam as indicated by the proctor, the student will receive a grade of zero on the exam.
- **After an exam:** Once graded, the exams will be handed out and reviewed in class. The exams must be turned in when requested. If the exam is not provided back to the instructor and the instructor leaves the room without the exam, the student will receive a grade of zero for the exam. Students who

wish to see their graded exams, after the review in class, must visit the instructor during office hours. Copies of the exams are not allowed or provided. The instructor highly encourages students who perform poorly on exams to come and discuss results with the instructor during office hours.

**Attendance:** At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator in student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance.

As the instructor of this class, I will not take regular attendance. However, you are responsible for informing the instructor prior to the class if you will be absent for a particular assignment, exam, or project. You are responsible for the material presented in class when you are absent.

However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Blackboard. This date is reported to the Department of Education for federal financial aid recipients.

**Other Requirements:** As identified in the syllabus section "descriptions of major assignments and examinations", the class requires students to participate on a team of their class peers to apply the systems engineering principles and knowledge learned in this class. This will require that the teams be capable of conducting face-to-face and/or virtual meetings outside the classroom.

**Class Courtesy:** The instructor insists on a quiet classroom and asks that noise be minimized to ensure a quality and positive classroom experience for all students. This includes silencing cell phones/other audible devices before class. Please go outside the class if you need to talk with others during the lecture. Students who come to class late and once class has already started should try to enter the classroom as discreetly as possible. Due to noise in the hallway and to reduce distractions from those entering late, the door may be shut 5 minutes after class begins. Students who do not come to class within the first 5 minutes of the start of class may not be able to attend class if the door is locked. Please be courteous to the instructor and your fellow classmates.

**Grading:** Grades will be based on two exams (30% each), assignments and quizzes (30%), and the project (10%). The team assignments and team project grades for an individual will be based, in part, on a peer evaluation that is performed at the end of the semester and reflects the student's contribution to the team effort over the semester. The peer evaluation may result in an adjustment of up to a letter grade for the student's team assignment and project grades. Students are expected to keep track of their performance throughout the semester and seek guidance from available sources (including the instructor) if their grade drops below satisfactory levels. See "Student Support Services" for additional assistance.

**Drop Policy:** Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance.** Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://wwwb.uta.edu/ao/fao/>).

**Disability Accommodations:** UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including *The Americans with Disabilities Act (ADA)*, *The Americans with Disabilities Amendments Act (ADAAA)*, and *Section 504 of the Rehabilitation Act*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with

disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of a **letter certified** by the Office for Students with Disabilities (OSD). Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting: **The Office for Students with Disabilities, (OSD)** [www.uta.edu/disability](http://www.uta.edu/disability) or calling 817-272-3364. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at [www.uta.edu/disability](http://www.uta.edu/disability).

Counseling and Psychological Services (CAPS) [www.uta.edu/caps/](http://www.uta.edu/caps/) or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

**Non-Discrimination Policy:** *The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit [uta.edu/eos](http://uta.edu/eos).*

**Title IX Policy:** The University of Texas at Arlington ("University") is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. *For information regarding Title IX, visit [www.uta.edu/titleIX](http://www.uta.edu/titleIX) or contact Ms. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or [jmhood@uta.edu](mailto:jmhood@uta.edu).*

**Academic Integrity:** Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

*I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*

*I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

UT Arlington faculty members may employ the Honor Code in their courses by having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University. Additional information is available at <https://www.uta.edu/conduct/>.

**Electronic Communication:** UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

**Campus Carry:** Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit <http://www.uta.edu/news/info/campus-carry/>

**Student Feedback Survey:** At the end of each term, students enrolled in face-to-face and online classes categorized as “lecture,” “seminar,” or “laboratory” are directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback via the SFS database is aggregated with that of other students enrolled in the course. Students’ anonymity will be protected to the extent that the law allows. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback is required by state law and aggregate results are posted online. Data from SFS is also used for faculty and program evaluations. For more information, visit <http://www.uta.edu/sfs>.

**Final Review Week:** For semester-long courses, a period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

**Emergency Exit Procedures:** Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

Students are encouraged to subscribe to the MavAlert system that will send information in case of an emergency to their cell phones or email accounts. Anyone can subscribe at <https://mavalert.uta.edu/> or <https://mavalert.uta.edu/register.php>

**Student Support Services:** UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include [tutoring](#), [major-based learning centers](#), developmental education, [advising and mentoring](#), personal counseling, and [federally funded programs](#). For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to [resources@uta.edu](mailto:resources@uta.edu), or view the information at <http://www.uta.edu/universitycollege/resources/index.php>.

**University Tutorial & Supplemental Instruction (Ransom Hall 205):** UTSI offers a variety of academic support services for undergraduate students, including: 60 minute one-on-one tutoring sessions, Start Strong Freshman tutoring program, and Supplemental Instruction. Office hours are Monday-Friday 8:00am-5:00pm. For more information visit [www.uta.edu/utsi](http://www.uta.edu/utsi) or call 817-272-2617. **The IDEAS Center** (2nd Floor of Central Library) offers FREE tutoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. Students can drop in, or check the schedule of available peer tutors at [www.uta.edu/IDEAS](http://www.uta.edu/IDEAS), or call (817) 272-6593.

**The English Writing Center (411LIBR):** The Writing Center offers FREE tutoring in 15-, 30-, 45-, and 60-minute face-to-face and online sessions to all UTA students on any phase of their UTA coursework. Register and make appointments online at <https://uta.mywconline.com>. Classroom visits, workshops, and specialized services for graduate students and faculty are also available. Please see [www.uta.edu/owl](http://www.uta.edu/owl) for detailed information on all our programs and services. The Library’s 2nd floor Academic Plaza offers students a central hub of support services, including IDEAS Center, University Advising Services, Transfer UTA and various college/school advising hours. Services are available during the library’s hours of operation. <http://library.uta.edu/academic-plaza>.

**Course Schedule:** *Note: As the instructor for this course, I reserve the right to adjust this schedule when required and in any way that serves the educational needs of the students enrolled in this course. Changes*

to the syllabus and associated schedule will be discussed in class and an updated syllabus will be posted in Blackboard. Students must comply with any changes to the syllabus once notified by the instructor.

Date	Lecture Topic
1/16	Course Introduction
1/18	Referencing, Systems Thinking
1/23	Systems Thinking
1/25	Complex Decision Concepts
1/30	Complex Decision Objectives, Attributes, Weights
2/1	Simple Multi-Attribute Rating Technique (SMART)
2/6	Simple Multi-Attribute Rating Technique (SMART)
2/8	Simple Multi-Attribute Rating Technique (SMART)
2/13	SMART Alternatives
2/15	SMART Alternatives
2/20	Decision Making Under Uncertainty
2/22	Decision Making Under Uncertainty
2/27	Decision Trees and Influence Diagrams
3/1	Decision Trees and Influence Diagrams
3/6	Review
3/8	Exam 1
3/13	Spring Vacation
3/15	Spring Vacation
3/20	Applying Simulation to Decision Problems
3/22	Applying Simulation to Decision Problems
3/27	Revising Judgements with New Information
3/29	Revising Judgements with New Information, <i>March 30 – last day to drop class</i>
4/3	Heuristics and Biases
4/5	Decisions Involving Groups
4/10	Resource Allocation and Negotiations
4/12	Resource Allocation and Negotiations
4/17	Decision Framing and Cognitive Inertia
4/19	Scenario Planning
4/24	Special Topics
4/26	Special Topics
5/1	Project Presentations
5/3	Project Presentations, Review
5/10 11am-1:30pm	Exam 2 (Please note that exam time is different than normal class time.)

**Inclement Weather Policy:** If the University is closed, this class will not meet. Any scheduled assignments or examinations will be rescheduled to the next class period that the class meets. You can get information about closures by checking the main website at [www.uta.edu](http://www.uta.edu).

**Emergency Phone Numbers:** In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911. Non-emergency number 817-272-3381.

**The course syllabus, assignment, presentation materials, and other course materials developed by the instructor(s) are copyrighted to the instructors developing them. Students are prohibited from copying, transferring ownership or selling any of the materials obtained and any notes taken during this course to any person or organization without the express written permission of the instructor developing this course. Students may print downloaded lecture materials for their own use only. Students are prohibited from being paid to take notes during this course for any person or organization.**