Course Description:
This course covers an introduction to deterministic optimization models. Topics include the concepts of operations research modeling, classical optimization, linear and integer programming, and network analysis. An introduction to combinatorial optimization is also presented. A project is an integral part of this course.

Class Objectives:
- To become familiar with the major concepts of operations research, such as linear programming, the simplex algorithm and its computer implementation, sensitivity analysis, transportation problems, integer programming, and combinatorial optimization.
- To develop skills for identifying; formulating, solving, and interpreting appropriate models.
- To understand how the mathematical concepts are applied in the real-world and to learn to effectively use computing software to solve more complicated problems such as they arise in the real world.
- To learn to more effectively communicate mathematical ideas to others and to become more comfortable and effective working in a team setting.
- To become a more independent learner and logical thinker.

Test Book

Other References

ABET Outcomes

<table>
<thead>
<tr>
<th>Contribution to Industrial Engineering Program Outcomes:</th>
<th></th>
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<tbody>
<tr>
<td>1 An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.</td>
<td>x</td>
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<tr>
<td>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.</td>
<td>x</td>
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### Grading

<table>
<thead>
<tr>
<th>Grade percentage</th>
<th>A</th>
<th>91-100</th>
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<tbody>
<tr>
<td>B</td>
<td>81-90</td>
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<tr>
<td>C</td>
<td>71-80</td>
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<tr>
<td>D</td>
<td>60-70</td>
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<tr>
<td>F</td>
<td>&lt;60</td>
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#### Students with disabilities:
Students with disabilities or who suspect they have a disability may wish to self-identify for purposes of modifications. You can do so by providing documentation to the Office of Disabled Student Services located in the UTEP Union. If you have a condition which may affect your ability to exit safely from the premises in an emergency or which may cause an emergency during class, you are encouraged to discuss this in confidence with the instructor and/or director of the Disabled Student Services. For general information about the American with Disabilities Act (ADA), please call 747-5184.

#### Academic Honesty
During exams and quizzes, you are **NOT ALLOWED TO USE ANY FORM OF WI-FI ENABLED ELECTRONIC DEVICE**, including **cell phones** or other electronic communication devices or methods (calculators, wristwatches, earbuds, etc.). No wristwatch or other electronic device may be worn.

During exams and quizzes, you are allowed to use only instructor approved calculators.

**NO CELLPHONES** or any other Communication device is permitted during the exam that means the student can’t have a communication device **with them** during the exam even if the **device is OFF**

No electronic version of the book, loose paper print-outs of the book or extra sheets of paper of any kind are allowed unless **explicitly mentioned in writing by the instructor**. As a part of the **zero-tolerance policy**, if you have a cellphone or other electronic device capable of communication on your person; or if any proctor sees or hears any electronic device during the exam or if you share your work with someone else, you will be reported to the proper authorities and you may receive a zero on the exam and an F in the class. Other actions including suspension may also be perused.

If there is an evidence that the integrity of the exam is compromised the instructor has the right to repeat the exam or cancel the exam.

If you have a disability that requires the use of an electronic device during exams you must have a letter of accommodation from the Center for Accommodations and Support Services (CASS). This accommodation must be coordinated in advance with the instructor.

During exams, you **will not be allowed to leave the examination room until you complete the exam.** This includes restroom breaks. Students with disabilities must have a letter of accommodation and coordinate this in advance with the instructor.

**Instructors and/or proctors may record and/or use their personal cell phones to document activity during the exam.** Recording devices may also be located at various locations in the room and may be out of sight of the students. These recordings will be managed according to the UTEP approved regulations for such media.

If you are suspected of scholastic dishonesty you may not be directly confronted about your conduct by the instructor or proctor. You will however, be reported to the Office of Student Conduct and Conflict Resolution (OSCCR) and your exam will not be admissible. Your grade in the class may not be available until OSCR makes a final ruling, this may adversely impact your ability to enroll in other classes or graduation.
If you arrive more than 15 minutes late to an exam, you will not be allowed to enter the examination room.

There will be no makeup exams administered. If you have a university approved excuse, your instructor will have a process for determining how to handle the missing grade outlined in the syllabus. However, no makeup exams will be given.

If you miss more than one exam, the instructor may choose to administratively drop you from the class. This may adversely impact a visa and financial aid.

No food or drinks will be allowed in the examination room.

Departmental policy allows for the use of assigned seats. All students must present their UTEP issued ID prior to and during every exam and may be required to sign in. Not having a UTEP issued ID when asked will result in forfeiture of the exam.

Scholastic dishonesty on homework, lab assignments and all other class assignments will be held to the same standards and requirements of academic honesty as quizzes and exams.

Class Attendance Policy
Attendance is mandatory. Anyone with 5 or more absences will be dropped from the class. A drop for not attending will count toward the State Allowed Six Drop Limit. If you are failing the class at the time of the drop you may also be given a WF designation. Be advised that a drop could adversely impact visa status, financial aid and other programs.
As per UTEP rules, you may be asked to show a UTEP ID at any time during class.

Harassment Policy
The department has a zero-tolerance policy for harassment. Engagement in any behavior considered harassment will be reported to the proper authorities. In addition to generally understood forms of harassment, the department also treats the following behavior as harassment:

- Repeated emails and/or calls regarding subjects that have already been addressed. Once a decision has been made or a question answered, a student who continues to ask the same question will be given a warning by the recipient of the email/call. If the student continues, the behavior will be reported. Questions that seek understanding of course material are not harassment; but repeated questions about a grade or an administrative decision are.
- Grades are NOT negotiable, ever. If you believe a grading mistake has be made, you must follow the process described in the UTEP catalog. Any request for a grade elevation that is NOT based on a mistake is considered harassment and will be reported immediately.
- Remaining in an office after the occupant requests you leave is considered harassment and potentially threatening. You will be reported immediately without warning and depending on the severity, may be reported to law enforcement.
- Similar behavior towards department staff, and student advisors will also be treated as harassment, including persistent phone calls, emails, and badgering. Department staff and student advisors are there to help students, and should be treated with due respect.

Topics to be covered:
1. Modeling with linear programming
2. Linear programming
3. Integer programming
4. Network optimization
5. Transportation methods
6. Introduction to Artificial Intelligence
7. Metaheuristic optimization
8. Programming with Matlab