

The University of Texas at El Paso
Operations Research I – IE 3390
Fall 2022 – Course Syllabus

Professor: Dr. Ana C. Cram

Office: Engineering Building Room A-241

e-mail: accram@utep.edu

Class meets: Liberal Arts Building, 103, Mondays and Wednesdays 9:00 am – 10:20 am

Office hours: Mondays and Wednesdays 1:00 pm to 2:00 pm or by appointment

Course web page: <https://blackboard.utep.edu/>

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

Course Objective:

- 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 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:

- Textbook: “Operations Research: An Introduction”, by Taha, Hamdy A. 10th Edition, Prentice Hall.

Other References

- “Introduction to Operations Research,” by Hillier, Lieberman., 8th edition, McGraw-Hill.
- “Operations Research: Applications and Algorithms”, by Winston, Wayne L. 4th edition,

ABET Outcomes

Contribution to Industrial Engineering Program Outcomes:		
1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	x
6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	x

Summary of Course Structure

Content is provided in 4 modules. Each module will have instructions to identify lectures and individual and group activities (Homework) to be completed on Blackboard's course shell.

#	Module Name
1	Introduction to Optimization and Linear programming
2	Simplex method & Sensitivity Analysis
3	Combinatorial optimization & Transportation

General Course map

Module	Week	Date	Topic
Module 01	Week 1	Monday, August 22, 2022	Introduction
		Wednesday, August 24, 2022	Optimization
	Week 2	Monday, August 29, 2022	Modeling
		Wednesday, August 31, 2022	Modeling II
	Week 3	Monday, September 5, 2022	Modeling exercises
		Wednesday, September 7, 2022	Graphical method
	Week 4	Monday, September 12, 2022	Graphical method II
		Wednesday, September 14, 2022	Exam 01
Module 02	Week 5	Monday, September 19, 2022	Simplex Method
		Wednesday, September 21, 2022	Simplex Method exercises
	Week 6	Monday, September 26, 2022	simple Method Special cases
		Wednesday, September 28, 2022	BIG M method
	Week 7	Monday, October 3, 2022	Big m method exercises
		Wednesday, October 5, 2022	Two-phase method
	Week 8	Monday, October 10, 2022	Exercises
		Wednesday, October 12, 2022	Sensitivity analysis
	Week 9	Monday, October 17, 2022	Sensitivity analysis II
		Wednesday, October 19, 2022	Exercises
Week 10	Monday, October 24, 2022	Solvers	
	Wednesday, October 26, 2022	Exam 02	
Module 03	Week 11	Monday, October 31, 2022	Python 01
		Wednesday, November 2, 2022	Python 02
	Week 12	Monday, November 7, 2022	Python 03
		Wednesday, November 9, 2022	Combinatorial Optimization
	Week 13	Monday, November 14, 2022	GA Code Example
		Wednesday, November 16, 2022	Transportation I
	Week 14	Monday, November 21, 2022	Transportation II
		Wednesday, November 23, 2022	Networks
Week 15	Monday, November 28, 2022	Presentation	
	Wednesday, November 30, 2022	Exam 03	

Points Distribution

Assignment	Points
Homework Assignments & Quizzes	20
Exams (3 exams – 20 points each)	60
Final Project	20
Total Points	100

Grading Criteria

The following scale is used for assigning letter grades.

A	90 and above
B	80 < 90
C	70 < 80
D	60 < 70
F	0 < 60

- **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.
- No late Homework will be accepted. No excuses!!
- Excuses for positive Covid-19 cases will be accepted if proper positive results are provided. Such results should include your full name. No at-home Covid-19 tests will be accepted. UTEP offers free Covid-19 testing on campus for students attending face-to-face and/or remote classes. For more information on the testing locations, please visit: <https://www.utep.edu/ehs/covid/>

Student participation

The course is designed to be an enjoyable learning experience for everyone, with support for every participant. This course will immerse students into a community of practice so that students can develop skills and knowledge that facilitate their professional development. Students are expected to complete all weekly content. Furthermore, students should finish quizzes and deliver complete quality assignments and projects on time.

The following policies will be enforced:

1. Students must complete all homework assignments through blackboard each week to receive a grade.
2. Students who miss two exams or miss more than 40 points of the total grade will be dropped from the course.
3. Students with many absences and little or no activity in the course will be dropped.

Assignments

This course uses several different methods to assess student learning. A description of each method follows:

- **Homework:** At the end of each week, a set of problems related to the topics covered in the module will be assigned.
- **Exams:** Students will be tested through an exam at the end of each module.
- **Class Participation:** In almost every class, students will have the opportunity to participate in solving problem exercises and explaining the procedure used to the rest of

the class. This activity will potentially give you extra-credit points for the exam in the corresponding module.

Academic Dishonesty

Academic dishonesty is prohibited and is considered a violation of the *UTEP Handbook of Operating Procedures*. It includes, but is not limited to cheating, plagiarism, collusion, and fabrication.

1. Cheating can involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports.
2. Plagiarism occurs when someone intentionally or knowingly represents another person's words or ideas as his or her own.
3. Collusion involves unauthorized collaboration with another person or group to commit any academically dishonest act.
4. Fabrication occurs when false information is included on a works-cited page.
5. During exams and quizzes, you are **not allowed to use any wi-fi-enabled electronic device**, including cell phones or other electronic communication devices or methods (calculators, wrist watches, earbuds, etc.). No wristwatch or other electronic device may be worn.
6. During exams and quizzes, you are allowed to use only instructor-approved calculators.
7. No electronic version of the book, loose paper print-outs of the book, or extra sheets of paper of any kind is 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; 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

Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. Violations will be taken seriously and will be referred to the Office of Student Conduct and Conflict Resolution for possible disciplinary action. Students may be suspended or expelled from UTEP for such actions. You can find more information in the *UTEP Handbook of Operating Procedures*.

UTEP Handbook of Operating Procedures @ <https://www.utep.edu/hoop/>

Software requirements

You will need the following computer software to work efficiently in this course. In some cases, your computer may already have some of these programs installed.

1. Adobe Acrobat Reader. You can get the program by going to <http://www.adobe.com/>
2. Adobe Flash Player. You can get the player by going to <http://www.adobe.com/> and then clicking on 'Get Adobe Flash Player?'. Follow instructions to install the player.
3. Microsoft Office.
4. Email tool with file attachment capability. Please use your UTEP email account.

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 that 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.

Cell phone policy- Cell phones are to be off during class. You should not take phone calls during class, except for emergencies.

Glossary

Cyber-Harassment, or the use of a computer to cause a person harm such as anxiety, distress or psychological harm, including abusive, threatening or hateful emails and messages and the posting of derogatory information online.

Cyberbullying, or intimidating messages sent directly to the victim via email or other Internet communication mediums, and/or the use of technological means to interfere with a victim's use of the Internet such as hacking or denial of services attacks. This can also include spreading rumors about the victim in internet forums or discussion boards; subscribing the victim to unwanted online services or sending messages to others in the victim's name.

Cyberstalking, or threatening behavior or unwanted advances directed at another using the Internet and other forms of online and computer communications. With personal information becoming readily available to an increasing number of people through the Internet and other advanced technology, state legislators are addressing the problem of stalkers who harass and threaten their victims over the World Wide Web.

Flaming, or hostile and insulting interaction between internet users. It is frequently the result of the discussion of heated real-world issues such as politics, religion, and philosophy, or of issues that polarize subpopulations, but can also be provoked by seemingly trivial differences.

Deliberate flaming, as opposed to flaming as a result of emotional discussions, is carried out by individuals who are specifically motivated to incite flaming. Usually, are subtler than their counterparts, or trolls, who also post inflammatory messages in an online community. Their primary intent is to provoke readers into an emotional response and disrupt normal, on-topic, discussion.

Plagiarism, or the presentation of another person's work as your own, whether you mean to or not (i.e., copying parts of or whole papers off the Internet).

Collusion, or lending work to another person to submit as his or her own.

Fabrication, or deliberately creating false information on a works cited page.

COVID-19 PRECAUTIONS

Please stay home if you: (1) have been diagnosed with COVID-19 (2) are experiencing COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, and alternative instructions will be provided. The Student Health Center is equipped to provide COVID 19 testing.

The Center for Disease Control and Prevention recommends that people in areas of substantial or high COVID-19 transmission wear face masks when indoors in groups of people. The best way that Miners can take care of Miners is to get the vaccine. If you still need the vaccine, it is widely available in the El Paso area and will be available at no charge on campus during the first week of classes. For more information about the current rates, testing, and vaccinations, please visit epstrong.org