

**CS-401**

**(Major – Core)**

**COURSE DESCRIPTION**

<b>Course code number</b>	<b>CS-401</b>	<b>Course Title</b>	<b>Operations Research</b>
<b>Semester hours</b>	4 hours	<b>No. of Credit Units</b>	3
		<b>Course Coordinator</b>	

**Course Description**

First part of the course covers introduction to Linear Programming, Solving Linear Programming Problems: The Simplex Method, Duality Theory and Sensitivity Analysis, Other Algorithms for Linear Programming.  
Second part of the course covers Components of Inventory Models, Deterministic Continuous-Review Models, A Deterministic Periodic-review Model, A Stochastic Continuous-Review Model

**Course Outcomes**

Students who complete the course will be able to

1. Obtain an overview of the kinds of problems linear programming has been used to solve.
2. Learn how to develop linear programming models for simple problems.
3. Be able to identify the special features of a model that make it a linear programming model.
4. Learn how to solve two variable linear programming models by the graphical solution procedure.
5. Be able to interpret the computer solution of a linear programming problem.
6. Understand the inventory models and the advantages and limitations of inventory theory.

**Assessment Plan for the Course**

<b>Class Attendance and Participation</b>	-	10%
Quizzes	-	10%
Assignment	-	10%
Test	-	10%
Final Exam	-	60%

### **Class Attendance and Participation Policy:**

- **Attendance**

Class attendance is **mandatory**. Most of the material you will learn will be covered in the lectures, so it is important that you not miss any of them. You are expected to show up **on time** for class, and **stay for the whole lecture**. Students are expected to attend each class, to complete any required preparatory work (including assigned reading) and to participate actively in lectures, discussions and exercises.

- Mobile phones **must** be silenced and put away for the entire lecture unless use is specified by the instructor. You may not make or receive calls on your cell phone, or send or receive text messages during lectures.
- You are responsible for all material sent as email. Ignorance of such material is no excuse. You are responsible for all materials presented in the lectures.
- Your conduct in class should be conducive towards a positive learning environment for your class mates as well as yourself.

- **Quizzes, assignments, tests and Exam**

Your performance in this class will be evaluated using your scores for attendance, quizzes, homework assignments, two tests and one final examination. There are no planned extra credit projects or assignments to improve your grade.

We will take a short quiz for every lecture.

There will be 13 homework assignments, roughly one per week. Please show all your work and write or type your assignments neatly. Credit cannot be given for answers without work (except on true-false, always-sometimes-never, or other multiple choice questions).

Test will start after two or three chapters finished and the coordinator will announce the date for the test.

Any assignment or quiz or test is simply missed, regardless of the reason why (e.g. illness, work, traffic, car trouble, computer problems, death, etc.), and **earns a grade of zero**. You are strongly encouraged to complete all assignments and attend all quizzes so that you can check that you understand the material and can throw out bad grades, or grades for which you had to miss an assignment or quiz for a valid reason. **Late submissions will not be accepted for any graded activity for any reason.**

- **There are no extra credit opportunities.**

Students may not do additional work nor resubmit any graded activity to raise a final grade.

- **Exam**

The exam will be conducted on-campus, in a classroom. The dates/times/locations will be posted on Board as soon as possible.

For this course, the following additional requirements are specified:

All work submitted for a grade must have been prepared by the individual student. Students are expressly prohibited from sharing any work that has been or will be submitted for a grade, in progress or completed, for this course in any manner with a person other than the instructor and teaching assistant(s) assigned to this course). Specifically, students may not do the following, including but not limited to:

- Discuss questions, example problems, or example work with another person that leads to a similar solution to work submitted for a grade.
- Give to, show, or receive from another person (intentionally, or accidentally because the work was not protected) a partial, completed, or graded solution.
- Ask another person about the completion or correctness of an assignment.
- Post questions or a partial, completed, or graded solution electronically (e.g. a Web site).
- All work must be newly created by the individual student for this course. Any usage of work developed for another course, or for this course in a prior semester, is strictly prohibited without prior approval from the instructor.
- Posting or sharing course content (e.g. instructor provided lecture notes, assignment directions, assignment questions, or anything not created solely by the student), using any non-electronic or electronic medium (e.g. web site, FTP site, any location where it is accessible to someone other than the individual student, instructor and/or teaching assistant(s)) constitutes copyright infringement and is strictly prohibited without prior approval from the instructor.

**Tentative Lesson**

No	Topics	Week	Remark
<b>I</b>	<b>Chapter 3 Introduction to Linear Programming</b>		
1	3.1 Prototype Example,	Week 1	Assignment 1
2	3.2 The Linear Programming Model	Week 2	Assignment 2
3	3.3 Assumptions of Linear Programming	Week 3	
	3.4 Additional Examples		Assignment 3
4	3.5 Some Case Studies	Week 4	
5	3.6 Displaying and Solving Linear Programming Models on a Spreetsheet		Assignment 4
<b>II</b>	<b>Chapter 4 Solving Linear Programming Problems: The Simplex Method</b>		
6	4.1 The Essence of The Simplex Method	Week 5	Assignment 5
7	4.2 Setting Up The Simplex Method	Week 6	
8	4.3 The Algebra of The Simplex Method		Assignment 6
9	4.4 The Simplex Method In Tabular Form	Week 7	Assignment 7
10	4.5 Tie Breaking In The Simplex	Week 8	
11	4.6 Adapting To Other Model Forms		
	<b>Test I</b>		
<b>III</b>	<b>Chapter 6 Duality Theory and Sensitivity Analysis</b>		
12	6.1 The Essence of Duality Theory	Week 9	Assignment 8
13	6.2 Economic Interpretation of Duality		
14	6.3 Primal-Dual Relationships	Week 10	
15	6.4 Adapting To Other PrimalForms		Assignment 9
<b>IV</b>	<b>Chapter 7 Other Algorithms for Linear Programming</b>		
16	7.1 The Dual Simplex Method	Week 11	Assignment 10
<b>V</b>	<b>Chapter 19 Inventory Theory</b>		
17	19.1 Examples	Week 12	

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18	19.2 Components of Inventory Models		Assignment 11
19	19.3 Deterministic Continuous-Review Models	Week 13	Assignment 12
20	19.4 A Dterministic Periodic-review Model	Week 14	Assignment 13
21	19.5 A Stochastic Continuous-Review Model	Week 15	
	<b>Test II</b>		
	<b>Revision</b>		