



**IE 312 Industrial Operations Research I, *Three semester hours***  
**Fall 2014,**  
TR 9:30-10:45 A.M./AG/IT 118A

**Instructor:**

E. Delbert Horton, Ph.D., P.E.  
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Department Engineering & Technology

**Contact Information:**

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***“Appointment Recommended”***

<b>COURSE INFORMATION</b>
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**COURSE TEXT**

OPERATIONS RESEARCH Applications and Algorithms, 4<sup>th</sup> edition, Wayne L. Winston, Duxbury Press, ISBN 0-534-38058-1 includes software package.

***COURSE REFERENCE TEXT/MATERIALS***

*Contemporary Linear Algebra*, Howard Anton and Robert C. Busby, John Wiley & Sons, Inc. ISBN 0-471-16362-7

*Operations Research, An Introduction, 8<sup>th</sup> Edition*, Hamdy A. Taha, Prentice Hall, ISBN 0-13-188923-0.

Instructor will provide handouts and use selected-Websites as references

## **COURSE REQUIREMENTS**

This course focuses on the application of linear programming techniques. Most of the mathematic models presented in the course are normal prescriptive or optimization applications. The models include the Diet, Work-Scheduling, Capital Budgeting, Short-Term Financial Planning, Blending, Multi-period Decision (Inventory model), Multi-period Financial Model, and Multi-period Work Scheduling. The course includes discussions of the simplex algorithm and other methods to derive solutions for the above models. The Excel Solver software is also used in the course to solve linear programming problems. Discussions (Sensitivity Analysis) are included as to how changes or variations in a linear programming's parameters affect the optimal solution. These techniques in the course are included to present the student, methods for deriving solutions of resource allocations, distributions, and business and industrial performance parameter index settings. Prerequisite: Math 335

## **ASSESSMENT OF STUDENT OUTCOMES**

Upon satisfactory completion of the course, the student as an operations research analyst will:

1. be able to define an organization problem including specifying the objectives and parts of the system that must be analyzed before the problem is solved.
2. be able to understand the basic building blocks of linear algebra, matrices, and vectors analysis.
3. be able to apply the knowledge of matrices and vectors to develop a systematic procedure(e.g. Gauss-Jordan method) to solve linear system of equations.
4. be able to collect data to estimate the values of parameters that affects the above problem.
5. be able to develop a mathematical model of the problem.
6. given the model, the student will be able to choose the alternative that best meets the objectives.
7. be able to understand the sensitivity analysis of an optimum solution.
8. be able to present the results and conclusions to an organization.

<b>COURSE REQUIREMENTS</b>
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## **COURSE EVALUATION**

The final grade will be based on the following factors.

Examinations: Three examinations plus the final examination

Class Participation: Students are expected to participate in class presentations and any problem sessions. Each student will be expected to prepare presentations of assigned topics and to solve problems related to topics of the course and turn these assignments in on time. Late submittals will be subject to a late grade penalty.

<u>Evaluation Factors:</u>	<u>Values</u>
Examinations:	50%
Final Examination (comprehensive):	30%
Class Participation:	20%

Class Assignments: The instructor will make regular class assignments during the daily class periods. It is expected that the student will do these assignments for the student's benefit. This Class Participation component of the course grade will be derived from the instructor's evaluation of reviewed assignments and class participation. These reviewed assignments will be assigned and evaluated by the instructor in the following manner and will account for 15% of the students course grade.

1. 5 percentage points of the course grade will be assessed as to the student's consistent and timely submittal of each assignment. (Check Mark on the Assignment)
2. 10 percentage points of the course grade will be assessed on the student's aggregate score of four (4) or five (5) of these assignments. The instructor selectively chooses these 4 or 5 assignments for scoring. (Check mark -(minus), Check mark only , Check mark +( plus))

Students are expected to participate in class presentations and any problem sessions. Each student will be expected to present if called on by the instructor their understanding of assigned topics and/or solutions to assigned problem to the class. Non participation in these exercises will be counted against the student's final 5% part of the Class Participation component of the course grade.

Grading Scale:

- A = 90-100%
- B = 80-89%
- C = 70-79%
- D = 60-69%
- Fail < 60%

Note

All handouts including syllabus examinations, and topic presentation materials are instructor's material. The instructor will keep all exam questions and presentation materials. The student will not be allowed to keep their examination submittals. If you desire to make a copy of your examination, please make it before submitting the examination for recording..

Examinations: Each of the four examinations including the final examination will

be given in class. The Final Exam is comprehensive. No make-up examinations will be given. If a student misses one of the first three examinations, then that missed examination will be assigned 85.0% of that student's Final Exam grade, regardless of the reason(s) for missing the examination. An examination grade equal to "0" because of a violation of the student expectations or academic dishonesty policy stated earlier counts as a missed examination, but the grade cannot be replaced. Upon missing the second of the first three examinations, students will be assigned a final grade of "F" for the course and will not be allowed to attend any more class meetings, regardless of the reason(s) for missing the examination. If a student misses the Final Exam, then that student will be assigned a final grade of "F" for the course, regardless of the reason(s) for missing the Final Exam. A Final Exam grade equal to "0" because of a violation of the student expectations or academic dishonesty policy stated earlier counts as a missed Final Exam. Students are required to use 8.5"×11" sheets of green engineering paper handwritten front and back. Any graphical requirements will be done on the green engineering paper. Students will need a scientific calculator for each test - unless the instructor states otherwise, it is the only computing or electronic storage device allowed during tests. If an examination is designated to be "open book" examination, the student will **NOT** be allowed to use an electronic book format during the exam period.

Assignments: Working and understanding all assignments is essential to succeeding in this course. Any information provided in or learned from working an assignment is fair game to be asked on an examination. If students are not entirely comfortable with a particular concept in an assignment, then they should work additional problems from the text or reference texts.

Assignment solutions (if available) are provided by the publisher of the course text. The instructor had nothing to do with their creation. Therefore, the instructor is not responsible for any errors in them. Additionally, when the instructor works a problem in class that is similar to a homework problem and the instructor's solution is more comprehensive than that provided in the homework solutions, then the instructor's solution is the one the students should follow and the one upon which the students will be graded.

<b>COURSE AND UNIVERSITY PROCEDURES/POLICIES</b>
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### **CONDUCT IN CLASSROOM**

All students enrolled at the university shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. Attendance will be kept and evaluated as part of class participation. The no sounding of cell phones and using a cell phone or text messaging is prohibited in class. No tobacco products, food and drinks are allowed in the classroom. Each student will be expected to follow the

### **STUDENT EXPECTATIONS:**

- Students are expected to attend all class periods. Students who do not attend class regularly may find this course to be more challenging than it should be. Students missing more than **four (4) class meetings** will be assigned a final grade of "F" for the course and will not be allowed to attend any more class meetings, regardless of the reason(s) for the absences. Students are considered absent from a class meeting if they miss any portion of class time. Class time begins when the instructor arrives, but no earlier than the scheduled start of class time. Class time ends when the instructor dismisses class, but no later than the scheduled end of class time.
- Students are expected to make a legitimate attempt to pass the course, as judged by the instructor. Students who do not make a legitimate attempt to pass the course will be assigned a final grade of "F" for the course and will not be allowed to attend any more class meetings.

Any violations of the following student expectations, as judged by the instructor, will result in letter grade reductions to course work grades and/or to the final course grade of the offending student.

- Students are expected to have complete knowledge of and to be fully compliant with the Code of Student Conduct in the current Student Guidebook at <http://www.tamuc.edu/studentlife/guidebook.htm>
- Students are expected to be fully prepared for each class before it meets.
- Students are expected to refrain from any disruptive behaviors during class. This includes (but is not limited to) not being in their seat at the scheduled start time of class; packing up and leaving class before it is dismissed by the instructor; talking or making other noises while the instructor is presenting material or a student is asking a question; sleeping; doing work for another course; reading newspapers, magazines, or other non-course materials; and using a computer at times and for purposes other than those designated by the instructor.
- Students are expected to have cell phones (**NO TEXTING**), music devices, and pagers turned off during class.

### **ACADEMIC DISHONESTY**

Efforts made by any student to achieve dishonestly will not be tolerated. Course work that students submit to the instructor is to be their own. Students may discuss course work and other course material with the instructor and/or fellow students (except during tests), but it is inappropriate to have another student do their course work (course assignment, examination, or presentation) or provide them with any portion of it. If the instructor determines a student has performed dishonestly on course work, then that student will be assigned a grade of "0" for that specific course work. If the instructor determines a student has committed a second act of academic dishonesty, then that student will be assigned a final grade of "F" for the course and will not be allowed to attend any more class meetings.

## UNIVERSITY SPECIFIC PROCEDURES:

### Students with Disabilities:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

**Office of Student Disability Resources and Services**  
**Texas A&M University-Commerce**  
**Gee Library**  
**Room 132**  
**Phone (903) 886-5150 or (903) 886-5835**  
**Fax (903) 468-8148**  
[StudentDisabilityServices@tamuc.edu](mailto:StudentDisabilityServices@tamuc.edu)

## COURSE OUTLINE / CALENDAR

### COURSE OUTLINE AND SCHEDULE

LECTURE 1: INTRODUCTION TO OPERATIONS RESEARCH  
LECTURE 2: CHAPTER 2.0, LINEAR ALGEBRA CONCEPTS  
LECTURE 3: CHAPTER 2.0, CONTINUE LINEAR ALGEBRA  
LECTURE 4: CHAPTER 3.1 WHAT IS LINEAR PROGRAMMING  
LECTURE 5: CHAPTER 3.2 GRAPHICAL SOLUTIONS  
LECTURE 6: CHAPTER 3.3 SPECIAL CASES  
LECTURE 7: CHAPTER 3.4 DIET PROBLEM  
LECTURE 8: CHAPTER 3.5 WORK SCHEDULING  
LECTURE 9: CHAPTER 3.6 CAPITAL BUDGETING PROBLEMS  
**EXAMINATION #1, CHAPTER 1 THRU 3.4**  
LECTURE 10: CHAPTER 3.6 CAPITAL BUDGETING PROBLEMS  
LECTURE 11: CHAPTER 3.7  
LECTURE 12: CHAPTER 3.8  
LECTURE 13: CHAPTER 3.8 AND 3.9  
LECTURE 14: CONTINUE CHAPTER 3.9  
LECTURE 15: CONTINUE CHAPTER 3.9  
LECTURE 16: CHAPTER 3.10  
LECTURE 17: CONTINUE CHAPTER 3.10  
**EXAMINATION #2, CHAPTER 3.5 THRU 3.10**  
LECTURE 18::CHAPTER 4.1, 4.2 AND 4.5  
LECTURE 19: CONTINUE CHAPTER 4.5  
LECTURE 20: CONTINUE CHAPTER 4.5 AND 4.6  
LECTURE 21: CHAPTER 4.17  
LECTURE 22: CHAPTER 4.17  
LECTURE 23: CHAPTER 5.1  
LECTURE 24: CHAPTER 5.1  
LECTURE 25: CHAPTER 5.2

LECTURE 26: CHAPTER 5.3  
LECTURE 27: OVERALL REVIEW OF COURSE

EXAMINATION SCHEDULE:

Exam #1, September 25, 2014, Chapters 1 thru 3.4

Exam #2, October 16, 2014, Chapters 3.5 thru 3.10

Exam #3, November 25, 2014, Chapters 4.1 thru 4.17

Final Exam, December 11, 2014, 8:00 AM -10:00 AM, Comprehensive plus Chapters 5.1, 5.2 and 5.3.

SYLLABUS CHANGES: The instructor has made every effort to provide the students with an accurate syllabus. However, situations may arise during the semester resulting in changes in the information provided in this syllabus. If this occurs, the changes will be announced in class. If students miss a class, it is their responsibility to find out if any changes have been made.

Owner, E. Delbert Horton of this syllabus, examinations and all lectures notes Students are prohibited from selling (or being paid for taking) notes and exams during this course to or by any person or commercial firm without the express written permission of the professor teaching this course.