COURSE SYLLABUS

Catalogue No.: Ma 195J.14  
Course Title: Seminar on Topics in Operations Research  
Department: Mathematics  
School: Science and Engineering  
Semester: First  
School Year: 2015-2016  
Credit: 3 units  
Prerequisites: Ma 22, Ma 122, Ma 151  
Instructor: Jesus Lemuel L. Martin, Jr.

A. Course Description

Operations Research (OR) consists of the application of mathematical methods to the optimization of decision-making in organizations. This course will cover several areas of OR and the algorithms and solution procedures for problems in these areas, together with their mathematical justification and appropriate software.

B. Course Learning Outcomes

At the end of the course, the student should be able to:

1. Demonstrate an understanding and appreciation of the Operations Research framework and the standard optimization models for mathematical programming.
2. Identify and formulate linear, integer, goal and dynamic programming problems.
3. Identify and formulate simulation problems.
4. Solve problems based on the above topics using the appropriate algorithms and computer programs.

C. Course Outline and Timeframe

<table>
<thead>
<tr>
<th>Topics</th>
<th>Tentative Exam Date</th>
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</thead>
<tbody>
<tr>
<td><strong>Brief Introduction to Operations Research</strong></td>
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<tr>
<td>History</td>
<td>March 1</td>
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<tr>
<td>Methodology</td>
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<tr>
<td>Standard Models</td>
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<tr>
<td>Impact on Business and Industry</td>
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<tr>
<td><strong>Linear Programming</strong></td>
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<tr>
<td>Formulation</td>
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<tr>
<td>Graphical Method</td>
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<tr>
<td>The Simplex Method</td>
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<tr>
<td>Underlying Theorems</td>
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<tr>
<td>The Simplex Algorithm</td>
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<tr>
<td>Degeneracy</td>
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<tr>
<td>Sensitivity Analysis</td>
<td></td>
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<tr>
<td>Duality</td>
<td></td>
</tr>
<tr>
<td>Computer Solution</td>
<td></td>
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<tr>
<td><strong>Integer Programming</strong></td>
<td>March 31</td>
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<tr>
<td>Dual Simplex Method</td>
<td></td>
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<tr>
<td>Cutting Plane Algorithm</td>
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<td>Branch and Bound Algorithm</td>
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<td>Formulation</td>
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<tr>
<td>Mixed Integer Linear Programming</td>
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<td>Computer Solution</td>
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<td><strong>Goal Programming</strong></td>
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<td>Formulation</td>
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Second Semester AY 2015-2016

| Graphical Method
| Simplex Method
| Computer Solution

### Dynamic Programming
- Deterministic Models
  - Discrete Variables
  - Continuous Variables
- Probabilistic Models

### Simulation
- Sampling from discrete distributions
- Sampling from continuous distributions
- Sampling from the normal distributions

**Important Dates/Holidays:**
- January 18 [Monday] (Start of 1st semester classes)
- January 22 [Friday] (Faculty Day #1)
- February 1 [Monday] (President’s Day)
- February 2 [Tuesday] (Faculty Day #2)
- February 8 [Monday] (Chinese New Year)
- February 25 [Thursday] (EDSA People Power Anniversary)
- March 21 [Monday] (Advisory grades deadline)
- March 24-26 [Thursday-Saturday] (Holy Week)
- March 29 [Tuesday] (Easter Mass)
- April 9 [Saturday] (Araw ng Kagitingan)
- May 9 [Monday] (National Elections)
- May 16-21 [Monday-Saturday] (Final Exams for the 2nd Semester)

**D. References:**

*Primary Reference:*
Lecture notes to be distributed during the course of the class.

*Additional References:*
Second Semester AY 2015-2016


E. Course Requirements and Grading System:

Grades will be based on the long tests and a report.

<table>
<thead>
<tr>
<th>Final Grade</th>
<th>Equivalent letter grade</th>
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<tbody>
<tr>
<td>92% - 100%</td>
<td>A</td>
</tr>
<tr>
<td>86% - 91%</td>
<td>B+</td>
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<tr>
<td>77% - 85%</td>
<td>B</td>
</tr>
<tr>
<td>69% - 76%</td>
<td>C+</td>
</tr>
<tr>
<td>60% - 68%</td>
<td>C</td>
</tr>
<tr>
<td>50% - 59%</td>
<td>D</td>
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<tr>
<td>49% and below</td>
<td>F</td>
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</table>

F. Classroom Policies

1. Attendance will be checked. Absence in a TTh class meeting is considered 1 ½ cuts; in an MWF meeting, 1 cut. A tardy (arriving more than 15/10 minutes after the second bell for TTh/MWF) is considered a half-cut. The allowed number of cuts will be implemented based on the university's official policy.
2. **No using of cellular phones during class, especially for taking pictures of notes.** Cellular phones must be in silent mode. If you wish to take notes, write them down.
3. The teacher reserves the right to send anyone out on the grounds of discourtesy to the teacher or to a fellow student, misbehavior in the classroom, & other reasons provided in the student handbook.
4. **Only A4 bond papers are to be used in exams, assignments, reports and quizzes. Answers are to be written only in the front page of each sheet. If both sides are used, the lower score from one side will be used as score for that sheet or may be disregarded altogether. Red, violet or purple ball pens are not allowed in exams.**
6. A make-up test for a missed long test may be given for the following valid reasons only: prolonged illness (e.g. dengue), contagious diseases (e.g. sore eyes), accidents (e.g. vehicular), and death in the family. The decision on whether to allow a student to take a make-up exam is subject to the approval of the Department Chair and/or written endorsement of the Associate Dean for Academic Affairs. **(Make-up exams are more difficult than those given as scheduled.)**
7. You have up until one week after any test is returned to report any mistakes in checking.
8. No extra work will be given so as to improve the student's grade.

G. Contact Details and Consultation Hours

FB group: [https://www.facebook.com/groups/admunimathOR/](https://www.facebook.com/groups/admunimathOR/)
Email address: jlmartin@ateneo.edu
0800-1000, Tuesdays and Thursdays, by appointment (SEC-A 321)