

## QMT123: OPERATIONS RESEARCH APPLICATIONS

### COURSE SYLLABUS

Course Catalog: QMT123  
Course Title: Operations Research Applications  
Department: Department of Quantitative Methods and Information Technology  
School: John Gokongwei School of Management  
School Year: SY 2012-213, 2<sup>nd</sup> Semester  
Credit: 3 Units [Major Subject]

#### A. Course Descriptions

This course introduces students to specific OR methodologies and their application to real-life problems. Emphasis will be on the use of OR approaches to support decision making in different functional areas (finance, marketing, strategic management)

#### B. Course Objective

By the end of this course, the student should be able to understand and appreciate the basic elements of OR practice in organizational decision making, and learn the use of specific OR methodologies and software applications.

#### C. Course Outline

<b>Schedule</b>	<b>Topic and Deadlines</b>
Module 1 Nov 6,8,13,14,20	<b>Genetic Algorithm</b> (Aly Yap)  <i>Genetic Algorithms uses a search heuristic that mimics the process of natural evolution. This heuristic is routinely used to generate useful solutions to optimization and search problems. Genetic algorithms belong to the larger class of evolutionary algorithms (EA), which generate solutions to optimization problems using techniques inspired by natural evolution, such as inheritance, mutation, selection, and crossover.</i>
Module 2 (Nov 22, 27,29, Dec 4,6)	<b>Pro Model Simulation Software</b> (John C. Clerigo)  <i>Pro Model is a program used for discrete simulation . It uses a graphic user interface which minimizes the need for actual code programming, except for more advanced simulation models. This lesson will:</i> <ol style="list-style-type: none"><li>1) Review the students regarding the basic concepts in simulation.</li><li>2) Introduce the students to the interface and shortcuts of Pro Model.</li><li>3) Create a simple simulation model using the program.</li></ol>
Module 3 (Dec 11,13, 18, Jan 8,10))	<b>Decision Analysis</b> (ARTanchoco)  <i>Decision Analysis involves the use of tools and techniques for the visualization, mathematical representation, and analysis of complex decisions, especially those requiring multiple objectives or criteria. The module will cover mind-mapping techniques and the use of the Analytical Hierarchy Process (AHP) for problem structuring and evaluation and alternatives.</i>
Module 4 (Jan 15, 17, 22, 24, 29))	<b>Network Analysis</b> (Mari-Jo Ruiz)  <i>Network applications based on Graph Theory including Voronoi Diagrams for wireless communications and marketing networks; Social Network Analysis for assessing terrorist networks, power structures in organizations, and win-ability of sports teams; Ant Colony Optimization for telecommunications networks.</i>

Module 5  
(Jan 31, Feb 5,7,12,14)

**Optimization Software (VReventar)**

*This module will review software packages for optimization modeling, including:*

- *Optimization in the Cloud: NEOS*  
<http://www.neos-server.org/neos/>
- *XpressMP:*  
<http://www.fico.com/en/Products/DMTools/Pages/FICO-Xpress-Optimization-Suite.aspx>
- *ILOG/Cplex:*  
<http://www-01.ibm.com/software/integration/optimization/cplex-optimizer/>

*Sample problems and applications in supply chain modeling, portfolio allocation, and asset liability modeling will be discussed to demonstrate software use and interpretation of results.*

**E. Course Requirements**

Each module will require either a (small group) project or a short paper on the application of the tools and techniques covered in the course. (20% each x 5 modules)

**G. Classroom Policies**

1. **Attendance:** Students are expected to attend all scheduled classes. Though it is a privilege to have a certain amount of cuts, this privilege comes with a certain amount of responsibility. It is up to the student to make up for all missed lectures and class work due to his absence. Attendance will be monitored. Since this is a 3-unit course, students are allowed a maximum of 6 absences. Punctuality is likewise expected. Tardiness of more than 20 minutes after the 2<sup>nd</sup> bell will be considered an absence.
2. **Dress Code:** Students are expected to abide by the Dress Code set by the School of Management and dress in a manner appropriate to the nature of an academic institution.
3. **Class participation:** Students are highly encouraged to participate during class discussions. Class participation will have a significant effect in the computation of the final grade.