



## Course Specification

**Course Name:** [Quantitative Models in Management and Economics ]

**Course Code:** DS422

### I. Basic Course Information

Major or minor element of program: [Major]

Department offering the course: Operations Research and Decision Support Department

Academic level: 400 Level

Semester in which course is offered: [First (fall) Semester]

Course pre-requisite(s): [Decision Support Tools & Techniques [DS331] ]

Credit Hours: 3

Contact Hours Through:

Lecture	Tutorial*	Practical*	Total
2.5	0.0	1.5	4.0

\* 1.5 hours for **either** Tutorial or Practical

Approval date of course specification: September 2014

### II. Overall Aims of Course

[A Decision Support Student Equipped with Scientific Background, Competences and Practical Knowledge and application in developing and implementing Quantitative Models for the planning and control of management and economic systems. ]

### III. Program ILOs covered by course

Program Intended Learning Outcomes (By Code)			
Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
[K14,K16,K20,K21 ]	[I11,I12,I13,I14 ]	[P12,P15,P16 ]	[G1,G5,G9 ]



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**IV. Intended Learning Outcomes of Course (ILOs)**

**a. Knowledge and Understanding**

On completing the course, students should be able to:

- K1. Recognize the role of Computer mathematical Models in Problem Solving, Strategic Planning and Decision Making Processes.
- K2. List the advantages and limitation of Applying quantitative Computer Models to system evaluation and testing.
- K3. Recognize and Understand the Application of Quantitative Models to analyze and solve Managerial and Economic Problems.
- K4. Using Quantitative models to plan and test alternative managerial and economic policies and decisions.

**b. Intellectual/Cognitive Skills**

On completing the course, students should be able to:

- I1. Design and Develop Computer-based mathematical Models to solve alternative systems and problems.
- I2. Test and Analyze the efficiency and effectiveness of managerial and economic systems based on Quantitative Models.
- I3. Plan for and Design real world experiment using quantitative models.
- I4. Assess and evaluate alternative modeling methods and techniques.
- I5. Compare different computer languages to implement quantitative models.

**c. Practical/Professional Skills**

On completing the course, students should be able to:

- P1. Plan, Develop and Apply Computer-based Models.
- P2. Plan, Develop and Implement Computer Modeling Tools to address Real world Managerial and Economic Problems.
- P3. Learn about the utilization of Modeling Languages to Implement, Run and Carry out Experiments.

**d. General and Transferable Skills**

On completing the course, students should be able to:

- G1. Learn the ability of system description, design and analysis Skills.
- G2. Carry out policy formulation and test using computer-based quantitative models.
- G3. Understand the scope and applications of quantitative models to analyze real world situation.

**V. Course Matrix Contents**

	Main Topics / Chapters	Duration (Weeks)	Course ILOs Covered by Topic (By ILO Code)			
			K & U	I.S.	P.S.	G.S.
1-	[An Introduction to the main features, structure, types and techniques of quantitative models (Optimization Versus simulation). ]	[ 1 ]	[K1 ]	]	[ ]	[G1 ]
2-	[An Overview of using computer-based Quantitative models to study Managerial and economic Systems. ]	[ 2 ]	[K1,K2 ]	[ ]	[ ]	[G2 ]



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3-	[An introduction to databases and Accounting framework of management and economic systems ]	[2 ]	[K3 ]	[I1,I2 ]	[ ]	[ ]
4-	[Illustrative Computer-based Optimization Models and Solvers in Management and Economics. ]	[2 ]	[ ]	[ ]	[P1 ]	[ ]
5-	[Illustrative Computer-based Simulation Models and techniques in Management and Economics. ]	[2 ]	[ ]	[I3 ]	[P2 ]	[G2 ]
6-	Introduction to the General algebraic Modelling system (GAMS).	2		I4	P3	G3
7-	Using general algebraic Modelling System (GAMS) to implement and analyse managerial and economic problems.	2	K4	I5		
	<b>Net Teaching Weeks</b>	<b>13</b>				

VI. Course Weekly Detailed Topics / hours / ILOs

Week No.	Sub-Topics	Total Hours	Contact Hours	
			Theoretical Hours	Practical Hours*
1	[An Introduction to the main features, structure, types and techniques of quantitative models (Optimization Versus simulation). ]	[2.5 ]	[2.5 ]	
2	[An Overview of using computer-based Quantitative models to study Managerial and economic Systems. ]	[4 ]	[2.5 ]	[1.5 ]
3	[An Overview of using computer-based Quantitative models to study Managerial and economic Systems. ]	[4 ]	[2.5 ]	[1.5 ]
4	[An introduction to databases and Accounting framework of management and economic systems ]	[4 ]	[2.5 ]	[1.5 ]
5	[An introduction to databases and Accounting framework of management and economic systems ]	[4 ]	[2.5 ]	[1.5 ]
6	[Illustrative Computer-based Optimization Models and Solvers in Management and Economics. ]	[4 ]	[2.5 ]	[1.5 ]
7	<b>Midterm Exam</b>			
8	[Illustrative Computer-based Optimization Models and Solvers in Management and Economics. ]	[4 ]	[2.5 ]	[1.5 ]



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9	[Illustrative Computer-based Simulation Models and techniques in Management and Economics. ]	[4 ]	[2.5 ]	[1.5 ]
10	[Illustrative Computer-based Simulation Models and techniques in Management and Economics. ]	[4 ]	[2.5 ]	[1.5 ]
11	[Introduction to the General algebraic Modeling system (GAMS). ]	[4 ]	[2.5 ]	[1.5 ]
12	[Introduction to the General algebraic Modeling system (GAMS). ]	[4 ]	[2.5 ]	[1.5 ]
13	[Using general algebraic Modeling System (GAMS) to implement and analyze managerial and economic problems. ]	[4 ]	[2.5 ]	[1.5 ]
14	[Using general algebraic Modeling System (GAMS) to implement and analyze managerial and economic problems. ]	[4 ]	[2.5 ]	[1.5 ]
15	<b>Final Exam</b>			
<b>Total Teaching Hours</b>		<b>51</b>	<b>33</b>	<b>18</b>

\* No Practical/Tutorial during the first week of the semester

**VII. Teaching and Learning Methods**

Teaching/Learning Method	Selected Method	Course ILOs Covered by Method (By ILO Code)			
		K & U	Intellectual Skills	Professional Skills	General Skills
Lectures & Seminars	*	[All ]	[All ]	[All ]	[All ]
Tutorials		[ ]	[ ]	[ ]	[ ]
Computer lab Sessions	*	[K1,K2,K3 ]	[ ]	[ ]	[G1,G2 ]
Practical lab Work	*	[K4 ]	[I1,I2,I3,I4 ]	[P1,P2,P3 ]	[ ]
Reading Materials		[ ]	[ ]	[ ]	[ ]
Web-site Searches	*	[ ]	[I1,I2,I3,I4,I5 ]	[P1,P2 ]	[G3 ]
Research & Reporting		[ ]	[ ]	[ ]	[ ]
Problem Solving / Problem-based Learning		[ ]	[ ]	[ ]	[ ]
Projects		[ ]	[ ]	[ ]	[ ]
Independent Work		[ ]	[ ]	[ ]	[ ]
Group Work	*	[ ]	[I1,I2,I3 ]	[All ]	[G1,G2 ]
Case Studies		[ ]	[ ]	[ ]	[ ]
Presentations		[ ]	[ ]	[ ]	[ ]
Simulation Analysis		[ ]	[ ]	[ ]	[ ]
Others (Specify):		[ ]	[ ]	[ ]	[ ]



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VIII. Assessment Methods, Schedule and Grade Distribution

Assessment Method	Selected Method	Course ILOs Covered by Method (By ILO Code)				Assessment Weight / Percentage	Week No.
		K & U	I.S.	P.S.	G.S.		
Midterm Exam							
Final Exam	*	All	All	All	All	60%	14
Quizzes	*	All	All	All	All	10%	4,10
Course Work							
Report Writing							
Case Study Analysis	*	All	All	All	All	10%	5,11
Oral Presentations							
Practical							
Group Project	*	All	All	All	All	20%	12
Individual Project							
Others (Specify):							

IX. List of References

<b>Essential Text Books</b>	<ul style="list-style-type: none"> <li>GAMS Development Corporation (2007) "GAMS - A User's Guide", Washington DC, USA.</li> <li>Pidd, M. (1998) "Computer Simulation in Management Science" John Wiley &amp; Sons.</li> <li>Law, E. et al (2000) "Computer Simulation Modeling and Analysis" Third Edition, McGraw-Hill International Series.</li> <li>Hamdi Taha (2005) "Introduction to Operations Research" Printice Hall, USA.</li> </ul>
<b>Course notes</b>	Hand outs to the students (Hard Copy and Electronic on Web)
<b>Recommended books</b>	None
<b>Periodicals, Web sites, etc ...</b>	None

X. Facilities required for teaching and learning

<ul style="list-style-type: none"> <li>Teaching Accommodation</li> <li>Data Show Facility</li> <li>Computers</li> <li>Computer Labs</li> </ul>
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**Course coordinator:** Prof. Motaz Khorshid

**Head of Department:** Prof. Mohamed Mostafa Saleh

**Date:** September 2014