Kingdom of Saudi Arabia
National Commission for
Academic Accreditation & Assessment

المملكــة العربيــة السعوديــة
الهيئـــة الوطنيـــة للتقويــم
والاعـتـمـــاد الأكـاديـمـــي

ATTACHMENT 2 (e)
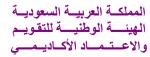
Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Course Specification

Operations Research
14023102-4

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Course Specification

Institution	**Umm Al Qura University**	Date of Report: **07-1437 / 04-2016**

College/Department
College of Computers and Information Systems
Information Systems Department

A. Course Identification and General Information

1. Course title and code:
Operations Research   **14023102-4**

2. Credit hours
4 credits

3. Program(s) in which the course is offered.
Information Systems, Bachelor of Science

4. Name of faculty member responsible for the course
Dr Skander Turki

5. Level/year at which this course is offered
3rd year after preparatory/ level 7

6. Pre-requisites for this course (if any)
4042301-3 Intro to Statistics & Probability

7. Co-requisites for this course (if any)

8. Location if not on main campus:

Delivered in the four locations where the Information Systems BSc is given:
- Al Abidiyya main campus boys section,
- Al Zahir main campus girls section,
- Al Qunfuda Boys section,
- Al Qunfuda Girls section.

9. Mode of Instruction (mark all that apply)

a. Traditional classroom	X	What percentage?	100%
b. Blended (traditional and online)		What percentage?	
c. e-learning		What percentage?	
d. Correspondence		What percentage?	
f. Other		What percentage?	

Comments:

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B Objectives

1. What is the main purpose for this course?
- Importance of operations research in decision support systems - Applications of operations research in IT and IT applications - Optimization issues - Techniques for optimization linear and non linear

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1 Topics to be Covered

List of Topics	No of Weeks	Contacthours per week
optimal policy in design and management: mathematical models.	1	4
Linear programming: The Simplex method,	3	12
two-phase Simplex method, duality, shadow prices.	3	12
Linear integer programming: Gomory's cutting plane methods for pure and mixed linear integer programming	3	12
Search methods; branch and bound algorithms.	2	8
Game theory: two person non-co-operative games.	2	8
Saddle points. Matrix games.	2	8

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2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	64					64
Credit	4					4

3. Additional private study/learning hours expected for students per week.	4

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

Course Learning Outcomes, Assessment Methods, and Teaching Strategy work together and are aligned. They are joined together as one, coherent, unity that collectively articulate a consistent agreement between student learning, assessment, and teaching.

The *National Qualification Framework* provides five learning domains. Course learning outcomes are required. Normally a course has should not exceed eight learning outcomes which align with one or more of the five learning domains. Some courses have one or more program learning outcomes integrated into the course learning outcomes to demonstrate program learning outcome alignment. The program learning outcome matrix map identifies which program learning outcomes are incorporated into specific courses.

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. **Fourth**, if any program learning outcomes are included in the course learning outcomes, place the @ symbol next to it.

Every course is not required to include learning outcomes from each domain.

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	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Understand the application domains of operations research methods.	Lectures based on examples Problem sets	Quizzes and/or Online Quizzes, Midterm, Final Exam
2.0	**Cognitive Skills**		
2.1	Be able to formulate problems using different operations research techniques	Lectures based on examples Problem sets	Quizzes and/or Online Quizzes, Midterm, Final Exam
2.2	Analyze and solve problems using different operations research techniques		
3.0	**Interpersonal Skills & Responsibility**		
3.1	N/A		
4.0	**Communication, Information Technology, Numerical**		
4.1	Apply mathematical and problem solving OR techniques	Lectures based on examples Problem sets	Quizzes and/or Online Quizzes Midterm, Final Exam
5.0	**Psychomotor**		
5.1	N/A		

Suggested Guidelines for Learning Outcome Verb, Assessment, and Teaching

NQF Learning Domains	Suggested Verbs
Knowledge	list, name, record, define, label, outline, state, describe, recall, memorize, reproduce, recognize, record, tell, write
Cognitive Skills	estimate, explain, summarize, write, compare, contrast, diagram, subdivide, differentiate, criticize, calculate, analyze, compose, develop, create, prepare, reconstruct, reorganize, summarize, explain, predict, justify, rate, evaluate, plan, design, measure, judge, justify, interpret, appraise
Interpersonal Skills & Responsibility	demonstrate, judge, choose, illustrate, modify, show, use, appraise, evaluate, justify, analyze, question, and write
Communication, Information Technology, Numerical	demonstrate, calculate, illustrate, interpret, research, question, operate, appraise, evaluate, assess, and criticize
	demonstrate, show, illustrate, perform, dramatize, employ, manipulate,

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Psychomotor	operate, prepare, produce, draw, diagram, examine, construct, assemble, experiment, and reconstruct

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Suggested *verbs not to use* when writing measurable and assessable learning outcomes are as follows:

Consider	Maximize	Continue	Review	Ensure	Enlarge	Understand
Maintain	Reflect	Examine	Strengthen	Explore	Encourage	Deepen

Some of these verbs can be used if tied to specific actions or quantification.
Suggested assessment methods and teaching strategies are:

According to research and best practices, multiple and continuous assessment methods are required to verify student learning. Current trends incorporate a wide range of rubric assessment tools; including web-based student performance systems that apply rubrics, benchmarks, KPIs, and analysis. Rubrics are especially helpful for qualitative evaluation. Differentiated assessment strategies include: exams, portfolios, long and short essays, log books, analytical reports, individual and group presentations, posters, journals, case studies, lab manuals, video analysis, group reports, lab reports, debates, speeches, learning logs, peer evaluations, self-evaluations, videos, graphs, dramatic performances, tables, demonstrations, graphic organizers, discussion forums, interviews, learning contracts, antidotal notes, artwork, KWL charts, and concept mapping.

Differentiated teaching strategies should be selected to align with the curriculum taught, the needs of students, and the intended learning outcomes. Teaching methods include: lecture, debate, small group work, whole group and small group discussion, research activities, lab demonstrations, projects, debates, role playing, case studies, guest speakers, memorization, humor, individual presentation, brainstorming, and a wide variety of hands-on student learning activities.

5. Schedule of Assessment Tasks for Students During the Semester			
Assessment	Assessment task (eg. essay, test, group project, examination etc.)	Week due	Proportion of Final Assessment
1	Midterm Exam	8	20%
2	Quizzes	Each 4 weeks	20%
3	Problem sets	Each three weeks	10%
5	Final Exam	Exams week	50%

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)
Office hours and meeting on projects

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E Learning Resources

1. Required Text(s) : slides and lab documentation
2. Essential References Operations Research: An Introduction, Hamdy Taha Other books that might be available on internet
3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List) Books and web sites reading Recommended web site for education resources on operations research http://filebox.vt.edu/users/wfan/resource.html
4-.Electronic Materials, Web Sites etc
5- Other learning material such as computer-based programs/CD, professional standards/regulations Most lab on computer systems

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Lecture rooms, laboratories, etc.) Lecture room
2. Computing resources
3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)

G   Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching End-of-term course/teacher evaluation for is to be completed by students at the end of the semester, evaluating the content of the course, its teaching, the learning, assessment methods.. The monitoring of these students feedback will allows the course quality improvement

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2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department
• Peer Evaluation Procedure • Instructor self-evaluation

3. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)
• Upon student request, his/her work might be remarked by another faculty member within the department.

4 Processes for Improvement of Teaching
• (Self , Peer) Review, Identify, Analyse, and Revise

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.
- Review and update course content - Update course references - Use students feedback

Faculty or Teaching Staff: _____

Signature: _____   **Date Report Completed:** _____

Received by: _____   **Dean/Department Head: Dr. Skander Turki**

Signature: _____   **Date: 07-1437 / 04-2016**