



A. Basic Information

Course Title: Operations Research	Code: EMM 406	Units: 2	
Lecture: 2 Hours	Tutorial: -	Practical: -	Total: 2 Hours
Program on which the course is given:	M. Sc. in Engineering Mathematics		
Major or Minor element of program:	Major		
Department offering the program:	Engineering Mathematics and Physics		
Department offering the course:	Engineering Mathematics and Physics		
Academic year / Level:	Academic year 2012 / 2013- Second Semester		
Date of specification approval:			

B. Professional Information

1. Overall aims of course

- To provide the students fundamentals of operations research and its applications in engineering.
- To teach the students methods for solving linear programming problems.
- To apply mathematical techniques for modeling, solving and analyzing real problems.

2. Intended Learning outcomes of Course (ILOs)

a. Knowledge and Understanding:

- 2.1.1 Identify theories, fundamentals and specialized knowledge in operations research.
- 2.1.2 Describe the two way impact of the relation between professional practice and its effect on the engineering applications.

b- Intellectual Skills

- 2.2.3 Link different knowledge sources to prove theorems and solve problems.
- 2.2.7 Make professional decisions in various professional contexts.

**c- Professional and Practical Skills**

2.3.2 Write and evaluate professional reports via mathematical logic.

d- General and Transferable Skills

2.4.1 Communicate effectively using different means.

2.4.3 Assess him/her self and identify his/her own personal learning needs.

3. Contents

No	Topic	No. of hours	ILOs	Teaching / learning methods and strategies	Assessment method
1	Introduction	2	2.1.1, 2.1.2	Lectures	Assignments
2	Mathematical formulation of linear programming problems	2	2.1.1, 2.1.2	Lectures	Assignments, Written exam
3	Classification of mathematical programming problems	2	2.1.1, 2.1.2, 2.2.3, 2.2.7, 2.3.2	Lectures	Assignments, Written exam
4	Methods for solving linear programming problems	2	2.1.1, 2.1.2, 2.2.3, 2.2.7, 2.3.2	Lectures, Tutorial	Written exam
5	Simplex method	2	2.1.1, 2.1.2, 2.2.3, 2.2.7, 2.3.2	Lectures, Tutorial	Written exam
6	Dual Simplex method	2	2.1.1, 2.1.2, 2.2.3, 2.2.7, 2.3.2	Lectures, Tutorial	Written exam
7	Two phase method	2	2.1.1, 2.1.2, 2.2.3, 2.2.7, 2.3.2	Lectures, Tutorial	Written exam
8	Mid-Term Exam	2	--	--	Mid-Term exam



9	Dual problems	2	2.1.1, 2.1.2, 2.2.3, 2.2.7, 2.3.2	Lectures, Tutorial	Written exam
10	Large scale problems	2	2.1.1, 2.1.2, 2.2.3, 2.2.7, 2.3.2	Lectures, Tutorial	Written exam
11	Transportation problem	2	2.2.3, 2.2.7, 2.3.2, 2.4.1, 2.4.3	Lectures, Tutorial	Written exam
12	Assignment problem	2	2.2.3, 2.2.7, 2.3.2, 2.4.1, 2.4.3	Lectures, Tutorial	Written exam
13	Sensitivity analysis	2	2.2.3, 2.2.7, 2.3.2, 2.4.1, 2.4.3	Lectures, Class activity	Assignments
14	Sensitivity analysis	2	2.2.3, 2.2.7, 2.3.2, 2.4.1, 2.4.3	Lectures, Class activity	Assignments
Final exam					

4. Teaching and Learning Methods

Lectures, Seminar / workshop, Class activity, Research / Report, Assignments / homework

5. Student Assessment Methods

Assignments to assess 2.1.1, 2.1.2, 2.2.3, 2.2.7, 2.3.2, 2.4.1, 2.4.3

Mid-Term exam to assess 2.1.1, 2.1.2, 2.2.3, 2.2.7, 2.3.2

Quizzes to assess 2.2.3, 2.2.7, 2.3.2, 2.4.1, 2.4.3

Final exam to assess 2.1.1, 2.1.2, 2.2.3, 2.2.7, 2.3.2

6. Assessment schedule

Assessment 1 on weeks 2, 4, 6, 10, 12.

Assessment 2 Quizzes on weeks 5, 11.

Assessment 3 Mid-year exam on week 8

Assessment 5 Final exam on week 15



7. Weighting of Assessments

Semester Work	16 %
Mid- Year Examination	17 %
Final Examination	67 %
Total	100 %

8. List of References

8.1 **Course Notes:** Lecture material and training sheets.

8.2 **Essential Books (Text Books):** 'Operations Research: An Introduction', H.A.Taha, Macmillan Pub. Co., New York, 2007.

8.3 **Recommended Books:** 'Global Optimization Algorithms', Thomas Weise, New York, 2008.

8.4 **Periodicals Web sites, etc:** <http://www.gap-system.org> <http://www.intmath.com> <http://www.thomsonrights.com>

9. Facilities Required for Teaching and learning

Data show, Overhead Projector, White board

**Course Aims and ILOs**

Course Aims	ILOs						
To provide the students fundamentals of operations research and its applications in engineering	2.1.1	2.1.2	2.2.3	2.2.7	2.3.2		
To teach the students methods for solving linear programming problems	2.1.1	2.1.2	2.2.3	2.2.7	2.3.2		
To apply mathematical techniques for modeling, solving and analyzing real problems			2.2.3	2.2.7	2.3.2	2.4.1	2.4.3

Course Contents and ILOs

Course Contents	ILOs						
Mathematical formulation of linear programming problems	2.1.1	2.1.2					
Methods for solving linear programming problems: Simplex method, Dual Simplex method, Two phase method	2.1.1	2.1.2	2.2.3	2.2.7	2.3.2		
Dual problems	2.1.1	2.1.2	2.2.3	2.2.7	2.3.2		
Large scale problems	2.1.1	2.1.2	2.2.3	2.2.7	2.3.2		
Transportation problem			2.2.3	2.2.7	2.3.2	2.4.1	2.4.3
Assignment problem			2.2.3	2.2.7	2.3.2	2.4.1	2.4.3
Sensitivity analysis			2.2.3	2.2.7	2.3.2	2.4.1	2.4.3

Course coordinator: Dr. Mohamed Husien Eid

Course instructor: Dr. Mohamed Husien Eid

Head of department: Associate. Prof. Dr. Ahmed Mohamed Abdullah

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