

## Construction & Building Engineering Courses (CB)

Construction Management Courses Group

### CB 312 – Systems Analysis for Construction Engineers

#### COURSE INFORMATION

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Course Title: Systems Analysis for Construction Engineers

Code: CB 312

Hours: Lecture – 2 Hrs.                      Tutorial – 2 Hrs.                      Credit –3.

Prerequisite: BA 329

#### GRADING

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Class Performance/Attendance: 10%

Midterm # 1/Assignments – (7<sup>th</sup> Week): 30%

Midterm # 2/Assignments – (12<sup>th</sup> Week): 20%

Final Exam: 40%

#### COURSE DESCRIPTION

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Introduction to the mathematical models. The formulation of linear programming models. Solving of linear programming models using the graphical solution method. The simplex method. The transportation and assignment problems. Decision making under uncertainty, risk aversion, utility function. Economic considerations for resource allocation, minimum cost model. Sensitivity analysis, changes in unit costs, changes in resource constraints.

#### TEXT BOOK

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An Introduction To Management Science: Quantitative Approaches by ANDERSON, DAVID. Publisher: Cengage, Cheriton house, North Way A Dover Canada. 2009.

#### REFERENCE BOOKS

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Quantitative Techniques for Decision Making in Construction by Tang, S. L., Ahmad, I. U., Ahmed, S. M., and Ming, L. Publisher: Hong Kong University Press, 2004.

Introduction to Operations Research by Ecker, J.G., Kupferschmid, M. Publisher: Krieger Publishing Co., Malabar, FL, USA, 1991.

## APPENDIX A-84

### COURSE AIM

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The course aims at introducing the student to the fundamentals of systems analysis and its application in construction engineering.

### SPECIFIC OUTCOMES OF INSTRUCTION

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The student should know the basics of the systems analysis approach and scientific tools required for the selection of the optimum system design and construction scenario.

### COURSE OUTLINE

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- Week Number 1:* Introduction to the mathematical models.
- Week Number 2:* Formulation of the linear programming models.
- Week Number 3:* Solving LP models using the graphical solution.
- Week Number 4:* Solving LP models using the simplex method.
- Week Number 5:* The transportation problems.
- Week Number 6:* The assignment problems.
- Week Number 7:* Utility function and risk aversion - economic aspects.
- Week Number 8:* Utility estimation and decision making based on utility optimization. Economic aspects.
- Week Number 9:* Resource allowance, minimum cost models, maximum output models.
- Week Number 10:* The optimization of resource utilization, and formulation and solving of minimum cost and maximum output models.
- Week Number 11:* Resource allowance, minimum cost models, maximum output models (continued).
- Week Number 12:* Introduction to feasibility studies: Definitions and importance of feasibility analysis.
- Week Number 13:* The optimization of resource utilization, and formulation and solving of minimum cost and maximum output models.
- Week Number 14:* Resource allowance, minimum cost models, maximum output models (continued).
- Week Number 15:* The optimization of resource utilization, and formulation and solving of minimum cost and maximum output models.
- Week Number 16:* Final Exam.

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COURSE COORDINATOR AND DEMAND

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*Course Coordinator:* Dr. Mohamed Emam.

*Course Demand:* *Required*