Course specifications of

Systems Modelling – MDP 443

University: Ain Shams   Faculty: Engineering

Program on which the course is given: B. Sc. in Mechanical Engineering.
Major or minor element of program :   N.A.
Department offering the program :   Design and Production Engineering.
Department offering the course: Design and Production Engineering
Academic year/ Level: 4th , First semester
Date of specification approval:

A- Basic Information

Title:	**Systems Modelling**	**Code:**	MDP 443
Credit Hours:	**N.A.**	**Lecture:**	2
Tutorial :	2	**Practical:**	0
Total:	4		

B- Professional Information

1- Overall aims of course

By the end of this course, the student will be able to:

1- Identify the problem
2- Construct a model of the given problem.
3- Test the model to ensure that its behavior conforms to the behavior of the actual problem under real situation.
4- Identify and collect data (supply values for input parameters).
5- Run the simulation process.
6- Make a plan of experimental tests.
7- Analyze results.
8- Use simulation packages.

The student shall attain the above mentioned objectives efficiently under controlled guidance and supervision while gaining the experience through application and analysis of realistic case studies.

2- Intended learning outcomes of course (ILOs)
a. Knowledge and understanding

a1- Define a problem.

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a2- Define decision alternatives.

a3- Describe restrictions on decisions to be made.

a4- Define objective criterion for evaluating the alternatives.

a5- Explain the effect of model accuracy in representing the real system on the quality of the resulting solution.

a6- Know the meaning of optimization.

a7- Know the close relation between Queuing theory and Simulation.

b. Intellectual skills

b1- Assess the formulation of a real problem into a simulation model.

b2- Use Statistical distributions to represent input data.

b3- Use appropriate techniques for the verification and validation of the simulation model.

b4- Use statistical tools in the analysis of simulation results.

b5- Make manual simulation using Monte Carlo technique.

c. Professional and practical skills

c1- Identify data and structure of realistic problems.

c2- Construct the appropriate simulation model to deal with real case studies.

c3- Adapt the real data to suit the simulation model or vice versa.

C4- Deal with simulation packages.

d. General and transferable skills

d1- Search for real objectives and constraints.

d2- Write technical reports and conduct presentation about a real case study.

d2- Practice working in a team.

3- Contents

No	Course Content	Lecture	Tutorial	Total

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1	Overview and definitions	2	2	0
2	Queuing Models as the basis of simulation	6	2	4
3	Monte Carlo Simulation	4	2	2
4	Input data analysis using statistical distributions	12	4	8
5	Simulation Package (SLAM or ARENA)	18	10	8
6	Methods of Model validation and verification	6	4	2
7	Design of experiments	8	4	4
8	Case studies	4	2	2
	Total	60	30	30

4- Assessment schedule

Assessment method	No	Description	Week No	Weight (%)
Assessment	1	Assessment No. 1	2	1
Assessment	2	Assessment No. 2	4	1
Written exam	3	Quiz No. 1	5	3
Written exam	4	Mid term Examination	7	10
Assessment	5	Assessment No. 3	9	1
Written exam	6	Quiz No. 2	10	4.5
Case study	7	Case study No. 1	11	7.5
Assessment	8	Assessment No. 4	12	2
Written Exam	9	Final Term Examination	16	70
Total				100 %

5- List of reference

5.1 Course notes…………………………………………………………………………………

5.2- Essential books (text books)

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1- Averill, L. and Kelton, D.M.; Simulation Modelling and Analysis; McGraw Hill Co.; 1999.
2- Kelton, D.M., Sadowski, R.P. and Sadowski, D.A.; Simulation with Arena with CD Rom; McGraw Hill; 2001.

5.3- Recommended books……………………………………………………………………………

5.4- Periodicals, Web sites, … etc

1- www.ie.org

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6- Facilities required for teaching and learning

1- Appropriate teaching class accommodations including presentation board and data show.
2- Computer Lab for software use.

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