**Course Specification**

(IS 241 Modeling and Simulation**)**

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| --- | --- |
| **University:** | Helwan University |
| **Faculty:** | Faculty of Computers & Information |
| **Department:** | Information systems |

**1. Course Data**

|  |  |
| --- | --- |
| **Code:** | **IS 241** |
| **Course title:** | Modeling and Simulation |
| **Level:** | 2 |
| **Specialization:** | General |
| **Credit hours:** | 3 hours |
| **Number of learning units (hours):**  | (3) theoretical (2) tutorial |

**2. Course Objective**

Fundamentals of computer simulation as a modeling technique are presented. Simulation will be versus mathematical modeling. The value of simulation as an experimental tool to support solving the problem and decision making process. Time management in simulation models (concepts of timing routine). Stochastic versus deterministic models. Discrete versus continuous simulation. Deterministic fixed time advance simulation. Stochastic discrete event simulation (event, activity and process-based models). Random sampling on computers. An overview of statistical methods in simulation experiments. Introduction to software tools for simulation purposes. The development of simulation models using procedural and simulation programming languages is stressed throughout the course.

**3. Intended Learning Outcomes:**

**Knowledge and Understanding**

1. A15. Describe tools for developing applications.
2. A30. Outline the principles of Information Systems.
3. **Intellectual Skills**

B1. Differentiate IT problems.

B2. Design IT solutions.

B6. Summarize IT Solutions.

B18. Perform Creative Thinking.

1. **Professional and Practical Skills**

C21. Choose appropriate Data Modeling.

C23. Use of Programming skills.

C24. Devise solutions to problems.

1. **General and Transferable Skills**

D6. Show Modeling capability.

D13. Use Designing skills to solve problems effectively.

D14. Support Engineering skills.

**4. Course contents**

|  |  |  |  |
| --- | --- | --- | --- |
| **Topic** | **No. of hours** | **Lecture** | **Tutorial/ Practical** |
| Forecasting | 3 | 1 | 1 |
| Inventory Management: Independent Methods | 6 | 2 | 2 |
| Inventory Management: Dependent Methods | 6 | 2 | 2 |
| Waiting Lines Models | 6 | 2 | 2 |
| Computer Simulation | 6 | 2 | 2 |
| Networks | 3 | 1 | 1 |
| Markov Analysis | 6 | 2 | 2 |
| Computer Systems in Modeling & Simulation | 3 | 1 | 1 |
| Game Theory  | 3 | 1 | 1 |

**Mapping contents to ILOs**

|  |  |
| --- | --- |
| Topic | Intended Learning Outcomes (ILOs) |
| Knowledge and understanding | Intellectual Skills | Professional and practical skills | General and Transferable skills |
| Forecasting | A5 | B1 |  |  |
| Inventory Management: Independent Methods | A30 | B2 | C23 |  |
| Inventory Management: Dependent Methods | A30 | B6 | C21 |  |
| Waiting Lines Models | A30 | B18 |  |  |
| Computer Simulation | A30,A15 | B1,B18 | C21 |  |
| Networks | A30 |  |  | D6 |
| Markov Analysis | A30, |  |  | D14 |
| Computer Systems in Modeling & Simulation |  |  | C23,C21 |  |
| Game Theory  |  |  | C21 | D13,D6 |

**5. Teaching and Learning Methods**

 Class Lectures

 Use of S/W packages and system for numerical methods and simulation.

**6. Teaching and Learning Methods for students with limited capability**

 Using data show

 e-learning management tools

**7. Students Evaluation**

**a) Used Methods**

Problem-solving assignments

**b) Time**

Assessment 1: Test 1 Week 4

Assessment 2: Test 2 Week 7

Assessment 3: Midterm Exam Week 10

Assessment 4: final written exam Week 14

**c) Grades Distribution**

Mid-Term Examination 20%

Final-term Examination 60%

Other types of assessment 20 %

 Total 100%

Any formative only assessments

**List of Books and References**

**a) Notes**

Course Notes

Handouts

**b) Mandatory Books**

 **Title:** Quantitative Methods for Business

 **Author(s):** [David R. Anderson](http://www.bestwebbuys.com/David_R_Anderson-author.html?isrc=b-compare-author), [Dennis J. Sweeney](http://www.bestwebbuys.com/Dennis_J_Sweeney-author.html?isrc=b-compare-author), [Thomas A. Williams](http://www.bestwebbuys.com/Thomas_A_Williams-author.html?isrc=b-compare-author)

 **Publisher:** South-Western Pub, 2004

 **ISBN:** 9780324312652

**c) Suggested Books**

 **Title:** Introduction to Management Science, 2nd edition

 **Author(s):** [William J. Stevenson](http://www.amazon.com/exec/obidos/search-handle-url/102-7726513-4739342?_encoding=UTF8&search-type=ss&index=books&field-author=William%20J.%20Stevenson)

 **Publisher:** Richard D Irwin, 2003

 **ISBN:** 978-0256088090

 **Title:** [Quantitative analysis for management](http://www.abebooks.com/servlet/BookDetailsPL?bi=848641532&searchurl=nsa%3D1%26isbn%3D0205126693)

 **Author(s):** Barry Render

 **Publisher:** Allyn and Bacon, 2002

 **ISBN:** [0205126693](http://www.abebooks.com/servlet/BookDetailsPL?bi=848641532&searchurl=nsa%3D1%26isbn%3D0205126693)

**d) Other publications**

http://www.cs.purdue.edu/homes/gopal/cs543/lectures/

**Course Coordinator:**  Prof. Dr. Turky Sultan

**Chairman of the Department:** Prof. Dr. Yehia Helmy