**Course Specification**

(IS 342 Simulation Languages)

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

**1. Course Data**

|  |  |
| --- | --- |
| **Code:** | **IS 342**  |
| **Course title:** | Simulation Languages |
| **Level:** | 3 |
| **Specialization:** | Information systems |
| **Credit hours:** | 3 hours |
| **Number of learning units (hours):**  | (3) theoretical (2) tutorial |

**2. Course Objective**

Acquainting the students with knowledge about

* Basic concepts of modeling, specific and potential simulation instruments, and study of a simulation language.

**3. Intended Learning Outcomes:**

1. **Knowledge and Understanding**

A4. Identify Programming Principles.

1. **Intellectual Skills**

B3. Devise a solution for IT problems.

B7. Reconstruct results analysis.

B13. Perform problem analysis.

B19. Perform Analytical Thinking.

1. **Professional and Practical Skills**

C23. Use of Programming skills.

C24. Devise solutions to problems.

1. **General and Transferable Skills**

D3. Use different Problem Solving techniques.

D13. Use Designing skills to solve problems effectively.

**4. Course contents**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  Week no. | Topic | No. of hr(s) | Lecture | Tutorial/Practical |
|  Week 1 | Basic Simulation Modeling | 4 | 3 | 2 |
| Week 2 | Modeling Complex Systems | 4 | 3 | 2 |
| Week 3 | Simulation Software | 4 | 3 | 2 |
| Week 4 | Review of Basic Probability and Statistics | 4 | 3 | 2 |
| Week 5 | Building Valid, Credible, & Appropriately Detailed Simulation Models | 4 | 3 | 2 |
| Week 6 | Selecting Input Probability Distributions | 4 | 3 | 2 |
| Week 7 | Random-Number Generators | 4 | 3 | 2 |
| Week 8 | Mid Term Exam | 4 | 3 | 2 |
| Week 9 | Generating Random Varieties | 4 | 3 | 2 |
| Week 10 | Output Data Analysis for a Single System | 4 | 3 | 2 |
| Week 11 | Comparing Alternative System Configurations | 4 | 3 | 2 |
| Week 12 | Variance-Reduction Techniques | 4 | 3 | 2 |
| Week 13 | - Experimental Design, Sensitivity Analysis, and Optimization- Simulation of Manufacturing Systems | 4 | 3 | 2 |

**Mapping contents to ILOs**

|  |  |
| --- | --- |
| Topic | Intended Learning Outcomes (ILOs) |
| Knowledge and understanding | Knowledge and understanding | Knowledge and understanding | Knowledge and understanding |
| Basic Simulation Modeling | A4 | B7,B3 | C23 |  |
| Modeling Complex Systems | A4 | B19 | C24 |  |
| Simulation Software | **A4** | B13 | C24,C23 | D3 |
| Review of Basic Probability and Statistics | **A4** | B13,B7 | C24 | D13 |
| Building Valid, Credible, & Appropriately Detailed Simulation Models | A4 | B3 | C24 | D13 |
| Selecting Input Probability Distributions | **A4** | B13 | C23 |  |
| Random-Number Generators | A4 | B7 | C24 |  |
| Mid Term Exam | **A4** | B19 | C23 |  |
| Generating Random Varieties | **A4** |  |  | D13,D3 |
| Output Data Analysis for a Single System | **A4** |  |  |  |
| Comparing Alternative System Configurations | **A4** |  |  | D3 |
| Variance-Reduction Techniques | A4 |  | C23 |  |
| - Experimental Design, Sensitivity Analysis, and Optimization- Simulation of Manufacturing Systems | **A4** |  | C24 | D13 |

**5. Teaching and Learning Methods**

Teaching and Learning Methods

Lectures

Exercises

Case Studies

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

 Using data show

 e-learning management tools

**7. Students Evaluation**

**a) Used Methods**

 Written Exams to assess Concepts related to Modeling and Simulation

 Project to assess understanding Concepts related to Modeling and Simulation

**b) Time**

Assessment 1…………………. Week …………….

Assessment 2 ………………… week …………….

Assessment 3…………………. Week …………….

Assessment 4…………………. Week …………….

**c) Grades Distribution**

Mid-Term Examination 30%

Final-term Examination 50%

 Oral Examination. %

 Semester Work and Project 10%

 Other types of assessment 10%

 Total 100%

Any formative only assessments

**List of Books and References**

**a) Notes**

Course Notes

**b) Mandatory Books**

**Kelton, W. David and Averill M. Law .Simulation modeling and analysis.** Boston : McGraw-Hill, c2000.3rd ed.

**c) Suggested Books**

 law, Averill**.** [Simulation Modeling and Analysis with Expertfit Software](http://www.amazon.com/Simulation-Modeling-Analysis-Expertfit-Software/dp/0073294411/sr%3D1-2/qid%3D1158249771/ref%3Dsr_1_2/103-7807595-3353436?ie=UTF8&s=books)**(**Hardcover **-** Jul 21, 2006)

**d) Other publications**

http://scout.wisc.edu/Archives/SPT--BrowseResources.php?ParentId=12712 <http://isbn.nu/toc/0070592926>

**Course Coordinator:**  Dr. Mona Nasr

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