# Course Syllabus

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| **1** | **Course title** | Business Modeling and Simulation | |
| **2** | **Course number** | (1605339) | |
| **3** | **Credit hours** | 3 Credit hours | 3 Credit hours |
| | **Contact hours (theory, practical)** | 3 hours | |
| **4** | **Prerequisites/corequisites** | None | |
| **5** | **Program title** | Management Information Systems | |
| **6** | **Program code** | 05 | |
| **7** | **Awarding institution** | The University of Jordan | |
| **8** | **School** | School of Business | |
| **9** | **Department** | Management Information Systems | |
| **10** | **Course level** | 3 | |
| **11** | **Year of study and semester (s)** | 2022/2023 First Semester | |
| **12** | **Other department (s) involved in teaching the course** | None | |
| **13** | **Main teaching language** | English | |
| **14** | **Delivery method** | ☐Face to face learning ☒Blended ☐Fully online | |
| **15** | **Online platforms(s)** | ☒Moodle ☒Microsoft Teams ☐Skype ☐Zoom ☐Others…… | |
| **16** | **Issuing/Revision Date** | Oct 9,2022 | |

**17 Course Coordinator:**


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|---|---|
| Name: Ashraf Bany Mohammed | Contact hours: Sun, Tue and Thus 8:30- 9:30 |
| Office number: Building 4 - 102 | Phone number: - |
| Email: a.bany@ju.edu.jo | |

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**18 Other instructors:**

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|---|
| Name:<br>Office number:<br>Phone number:<br>Email:<br>Contact hours:<br>Name:<br>Office number:<br>Phone number:<br>Email:<br>Contact hours: |

**19 Course Description:**

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| As stated in the approved study plan.<br><br>The purpose of the course is to have students understand the general principles of Business simulation model design and concepts of computer simulation. The course introduces students to simulation types, mathematical model types and simulation software and languages. The course covers in details simulation of discrete system (Discrete Event Simulation and simulation by different equations) and simulation of continuous system using differential equations with practical examples in management, banking, manufacturing and computer networks. Arena software is intended to be used throughout the course. |

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**20 Course aims and outcomes:**

A- Aims:

1. to have students understand the general principles of Business simulation model design and concepts of computer simulation
2. to teach students how to analyze and make strategical and operational decisions in the environment of a computer processed management simulation.
3. to interject the use of the computer simulation in business decision making process
4. to give the student a practical experience on how to develop models and later a computer simulation for them .

B- Students Learning Outcomes (SLOs):

Upon successful completion of this course, students will be able to:

| SLOs / SLOs of the course | SLO (1) Knowledge and Understanding | SLO (2) Intellectual Analytical and Cognitive Skills | SLO (3) Subject- Specific Skills | SLO (4) Transferable Key Skills |
|---|---|---|---|---|
| 1 | To understand the principles of systems simulation | To Design a model for a system. | To Implement a simulation for a real system | To Display an integrated approach to the deployment of business molding skills |
| 2 | To develop mathematical tools for system modeling | To Design and schedule events in a simulation | To Solve some problems using simulation | To Design and Modeling a system using Arena Software |
| 3 | To familiarize student with the structure and behavior of complex systems | To Verify and validate designed models | To Use random number generators | To Demonstrate significantly enhanced group working abilities |
| 4 | To Understand what it takes to move from a description of your process to a simulation of your process | To Be able to formulate a simulation study | To Write simulations using proper language, model and parameters | To Enhance ability to approach problems systematically |
| 5 | To Have knowledge of the important random numbers and frequency distributions in simulation model | To Be able to develop a simulation model within the simulation language such as Arena | To Analyze output results of simulation experiments | To Develop interpersonal skills planning and managing personal time and work |

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| 6 | To Have hands-on experience with Arena and be able to use it in your simulation project to examine the performance of a system | To Be capable of analyzing the result from simulation models | | |

## 21. Topic Outline and Schedule:

| Week | Lecture | Topic | Intended Learning Outcome | Learning Methods (Face to Face/Blended/ Fully Online) | Platform | Synchronous / Asynchronous Lecturing | Evaluation Methods | Resources |
|---|---|---|---|---|---|---|---|---|
| 1 | 1.1 | What is Simulation ? | | Blended | MS TEAMS | Synchronous | Homework | Reference book and Manual + YouTube classes |
| | 1.2 | What is Simulation ? | | Blended | MS TEAMS | Synchronous | Homework | Reference book and Manual + |

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| | | | | | | | | YouTube classes |
| | 1.3 | What is Simulation ? | | Blended | MS TEAMS | Synchronous | Homework | Reference book and Manual + YouTube classes |
| 2 | 2.1 | Fundamental Simulation Concepts | | Blended | MS TEAMS | Synchronous | Homework | Reference book and Manual + YouTube classes |
| | 2.2 | Fundamental Simulation Concepts | | Blended | MS TEAMS | Synchronous | Homework | Reference book and Manual + YouTube classes |
| | 2.3 | Fundamental Simulation Concepts | | Blended | MS TEAMS | Synchronous | Homework | Reference book and Manual + YouTube classes |
| 3 | 3.1 | Process Modeling | | Blended | MS TEAMS | Synchronous | Homework | Reference book and Manual + YouTube classes |
| | 3.2 | Process Modeling | | Blended | MS TEAMS | Synchronous | Homework | Reference book and |

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| | | | | | | | | Manual + YouTube classes |
| | 3.3 | Process Modeling | | Blended | MS TEAMS | Synchronous | Homework | Reference book and Manual + YouTube classes |
| 4 | 4.1 | Simulation by Hand | | Blended | MS TEAMS | Synchronous | Homework | Reference book and Manual + YouTube classes |
| | 4.2 | Simulation by Hand | | Blended | MS TEAMS | Synchronous | Homework | Reference book and Manual + YouTube classes |
| | 4.3 | Simulation by Hand | | Blended | MS TEAMS | Synchronous | Homework | Reference book and Manual + YouTube classes |
| 5 | 5.1 | Simulation by Hand | | Blended | MS TEAMS | Synchronous | Exam | Reference book and Manual + YouTube classes |

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| | 5.2 | Simulation by Hand | | Blended | MS TEAMS | Synchronous | Exam | Reference book and Manual + YouTube classes |
| | 5.3 | Simulation by Hand | | Blended | MS TEAMS | Synchronous | Exam | Reference book and Manual + YouTube classes |
| 6 | 6.1 | A Guided Tour Through Arena. | | Blended | MS TEAMS | Synchronous | pre-lab quiz | Reference book and Manual + YouTube classes |
| | 6.2 | A Guided Tour Through Arena. | | Blended | MS TEAMS | Synchronous | pre-lab quiz | Reference book and Manual + YouTube classes |
| | 6.3 | A Guided Tour Through Arena. | | Blended | MS TEAMS | Synchronous | pre-lab quiz | Reference book and Manual + YouTube classes |
| 7 | 7.1 | Simulation With Arena | | Blended | MS TEAMS | Synchronous | pre-lab quiz | Reference book and Manual + |

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| | | | | | | | | YouTube classes |
| | 7.2 | Simulation With Arena | | Blended | MS TEAMS | Synchronous | pre-lab quiz | Reference book and Manual + YouTube classes |
| | 7.3 | Simulation With Arena | | Blended | MS TEAMS | Synchronous | pre-lab quiz | Reference book and Manual + YouTube classes |
| 8 | 8.1 | Simulation With Arena | | Blended | MS TEAMS | Synchronous | pre-lab quiz | Reference book and Manual + YouTube classes |
| | 8.2 | Simulation With Arena | | Blended | MS TEAMS | Synchronous | pre-lab quiz | Reference book and Manual + YouTube classes |
| | 8.3 | Simulation With Arena | | Blended | MS TEAMS | Synchronous | pre-lab quiz | Reference book and Manual + YouTube classes |
| 9 | 9.1 | Simulation With Arena | | Blended | MS TEAMS | Synchronous | pre-lab quiz | Reference book and |

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| | | | | | | | | Manual + YouTube classes |
| | 9.2 | Simulation With Arena | | Blended | MS TEAMS | Synchronous | pre-lab quiz | Reference book and Manual + YouTube classes |
| | 9.3 | Simulation With Arena | | Blended | MS TEAMS | Synchronous | pre-lab quiz | Reference book and Manual + YouTube classes |
| 10 | 10.1 | Simulation With Arena | | Blended | MS TEAMS | Synchronous | pre-lab quiz | Reference book and Manual + YouTube classes |
| | 10.2 | Simulation With Arena | | Blended | MS TEAMS | Synchronous | pre-lab quiz | Reference book and Manual + YouTube classes |
| | 10.3 | Simulation With Arena | | Blended | MS TEAMS | Synchronous | pre-lab quiz | Reference book and Manual + YouTube classes |

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| 11 | 11.1 | Probability Models | | Blended | MS TEAMS | Synchronous | Exam | Reference book and Manual + YouTube classes |
| | 11.2 | Probability Models | | Blended | MS TEAMS | Synchronous | Exam | Reference book and Manual + YouTube classes |
| | 11.3 | Probability Models | | Blended | MS TEAMS | Synchronous | Exam | Reference book and Manual + YouTube classes |
| 12 | 12.1 | Scheduling and Binary Search | | Blended | MS TEAMS | Synchronous | Lab Project | Reference book and Manual + YouTube classes |
| | 12.2 | Scheduling and Binary Search | | Blended | MS TEAMS | Synchronous | Lab Project | Reference book and Manual + YouTube classes |
| | 12.3 | Scheduling and Binary Search | | Blended | MS TEAMS | Synchronous | Lab Project | Reference book and Manual + |

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| | | | | | | | | YouTube classes |
| 13 | 13.1 | Building Valid, Credible, and Appropriately Detailed Simulation Models | | Blended | MS TEAMS | Synchronous | Lab Project | Reference book and Manual + YouTube classes |
| | 13.2 | Building Valid, Credible, and Appropriately Detailed Simulation Models | | Blended | MS TEAMS | Synchronous | Lab Project | Reference book and Manual + YouTube classes |
| | 13.3 | Building Valid, Credible, and Appropriately Detailed Simulation Models | | Blended | MS TEAMS | Synchronous | Lab Project | Reference book and Manual + YouTube classes |
| 14 | 14.1 | Practical exercises on Business Process Modeling | | Blended | MS TEAMS | Synchronous | Lab Project | Reference book and Manual + YouTube classes |
| | 14.2 | Practical exercises on Business | | Blended | MS TEAMS | Synchronous | Lab Project | Reference book and Manual + |

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| | | Process Modeling | | | | | | YouTube classes |
| | 14.3 | Practical exercises on Business Process Modeling | | Blended | MS TEAMS | Synchronous | Lab Project | Reference book and Manual + YouTube classes |
| 15 | 15.1 | Project Presentations | | Blended | MS TEAMS | Synchronous | Homework | Reference book and Manual + YouTube classes |
| | 15.2 | Project Presentations | | Blended | MS TEAMS | Synchronous | Homework | Reference book and Manual + YouTube classes |
| | 15.3 | Project Presentations | | Blended | MS TEAMS | Synchronous | Homework | Reference book and Manual + YouTube classes |

**22 Evaluation Methods:**

Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:

| Evaluation Activity | Mark | Topic(s) | SLOs | Period (Week) | Platform |
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| Midterms | 25 | Topics 1-4 | | Week 6 | Face to face |
| Quiz (Second Practical Exam) | 20 | All practical material | | Week 12 | MS teams and Moodle |
| Projects presentation and Assignments | 5 | All practical material | | Week 15 | MS teams and Moodle |
| Final | 50 | All material | | Final Week | Face to face |
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## 23 Course Requirements

**(e.g: students should have a computer, internet connection, webcam, account on a specific software/platform…etc):**

The courses require students to have a computer or smartphone, internet connection and Arena Simulation software

## 24 Course Policies:

A- Attendance policies: Based on University Bylaws

B- Absences from exams and submitting assignments on time: Based on University Bylaws

C- Health and safety procedures: Based on University Bylaws

D- Honesty policy regarding cheating, plagiarism, misbehavior: Based on University Bylaws

E- Grading policy: Based on University Bylaws

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F- Available university services that support achievement in the course: NA

**25 References:**

A- Required book(s), assigned reading and audio-visuals:


1. A.M. Law , “Simulation Modeling and Analysis” (fourth edition) , McGraw Hill , 2007
2. Simulation with Arena, 5/e, W. David Kelton, Randall P. Sadowski, Nancy B. Swets. McGraw Hill , 2010.
3. Jerry Banks et al., "Discrete-Event System Simulation", 5 edition, Prentice-Hall.
4. S Leemis, Lawrence and Park , Stephen,” Discrete Event Simulation-A first Course” , Prentice Hall, 2006.


B- Recommended books, materials and media:


1. The art of computer systems performance analysis: techniques for experimental design, measurement, simulation, and modeling. Raj Jain, John Wiley & Sons, INC. 1991.
2. A course in simulation, Sheldon M. Ross, Macmillan publishing Company New York, 1990.


**26 Additional information:**

NA

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| Name of Course Coordinator: Ashraf Bany Mohammed Signature: ---------- Date: Oct 8,2022 |
| Head of Curriculum Committee/Department: ---------- Signature: ---------- |
| Head of Department: ---------- Signature: ---------- |
| Head of Curriculum Committee/Faculty: ---------- Signature: ---------- |
| Dean: ---------- Signature: ---------- |