



**Jordan University of Science and Technology**  
**Faculty of Computer & Information Technology**  
**Computer Engineering Department**

CPE716 Modeling And Performance Evaluation

Second Semester 2024-2025

**Course Catalog**

3 Credit Hours. This course provides the fundamental techniques of modeling and performance evaluation of computer systems. The course covers Markov chain theory, queuing theory, simulation models, analytical modeling, workload characterization, and performance evaluation problems.

**Teaching Method:** On Campus

**Text Book**

<b>Title</b>	Performance Modeling and Design of Computer Systems: Queueing Theory in Action
<b>Author(s)</b>	Mor Harchol-Balter
<b>Edition</b>	1st Edition
<b>Short Name</b>	Ref# 1
<b>Other Information</b>	<a href="https://www.cambridge.org/core/books/performance-modeling-and-design-of-computer-systems/743BEBB137B781EDBAFD807D8F7965DF">https://www.cambridge.org/core/books/performance-modeling-and-design-of-computer-systems/743BEBB137B781EDBAFD807D8F7965DF</a>

**Instructor**

<b>Name</b>	<b>Dr. Mazen AlWadi</b>
<b>Office Location</b>	M2 L2
<b>Office Hours</b>	
<b>Email</b>	mgalwadi@just.edu.jo

**Class Schedule & Room**

Section 1:  
Lecture Time: Tue : 13:00 - 16:00  
Room: C2009

**Tentative List of Topics Covered**

<b>Weeks</b>	<b>Topic</b>	<b>References</b>
Weeks 1, 2	Introduction and review of probability and stochastic processes	<b>Chapter 3</b> From <b>Ref# 1</b>
Week 3	Generating Random Variables for Simulation	<b>Chapter 4</b> From <b>Ref# 1</b>
Week 4	Little's Law and Other Operational Laws	<b>Chapter 6</b> From <b>Ref# 1</b>
Week 5	Discrete-Time Markov Chains, ergodicity, and Steady State Analysis	<b>Chapter 8</b> From <b>Ref# 1</b>
Week 6	The Arrival Process: Exponential Distribution and the Poisson Process	<b>Chapter 11</b> From <b>Ref# 1</b>
Week 7	M/M/1 Queue Systems and PASTA	<b>Chapter 13</b> From <b>Ref# 1</b>
Weeks 8, 9	The M/M/k/k Loss System	<b>Chapter 14</b> From <b>Ref# 1</b>
Weeks 10, 11	Finite-State Continuous Time Markov Chains, Time-Reversibility and Burke's Theorem	<b>Chapter 16</b> From <b>Ref# 1</b>
Weeks 12, 13	The M/G/1 Queue	<b>Chapter 23</b> From <b>Ref# 1</b>
Weeks 14, 15	Power Optimization Application	<b>Chapter 27</b> From <b>Ref# 1</b>
Weeks 15, 16	Performance Metrics, Scheduling: FCFS, LCFS, and RANDOM	<b>Chapters 28 &amp; 29</b> From <b>Ref# 1</b>

<b>Evaluation</b>	
<b>Assessment Tool</b>	<b>Weight</b>
Midterm	20%
Final Exam	40%
Project	40%

<b>Policy</b>	
Makeups	Makeup exams are not given unless there is a valid excuse accepted by the department chair.
Drop date	Check the Records and Registration office.
Cheating	Standard JUST policy will be applied.
Attendance	Excellent attendance is expected. Attendance will be recorded each lecture. If you miss a class, it is your responsibility to find out about any announcements or projects you may have missed.
Workload	Student should expect to spend more than 8 hours/week on the course.
Exams	The course will have a midterm and final exams that will be announced later. All exams are closed book exams and will be paper based.
Project	Each student is expected to work on a course project towards developing a research paper, which contributes to 40% of your grade.

Teaching	Recording of the course material will be uploaded to the E-learning on weekly basis. Each student is expected to watch the videos as they will cover the material. During the lecture time, we will briefly discuss the recorded lecture then move towards discussing research papers. Each student is expected to select a research paper to present during the lecture, which contributes to his research project.
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