Jordan University of Science and Technology

Faculty of Engineering

Mechanical Engineering Department

ME773 Modelling And Simulation Of Dynamic Systems
Second Semester 2023-2024

Course Catalog
3 Credit Hours. Introduction to multi-domain systems. Mechanical, thermal, fluid, electrical, electronic, electromechanical system dynamics, emphasis on modeling and simulation of hybrid systems using modern computer-aided tools.
Teaching Method: Blended

Text Book	
Title	Modeling and Analysis of Dynamic Systems
Author(s)	C. M. Close, D. K. Frederick and J. C. Mewell
Edition	3rd Edition
Short Name	Text Book
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref 1	Modeling and Simulation of Dynamic Systems	Woods R. and Lawrence K	1st Edition	
Ref 2	Any good textbook in the subject	NA	1st Edition	
Ref 3	Lecture Notes	Instructor	1st Edition	

Instructor	
Name	**Prof. Mohamed Al-Fandi**
Office Location	M5 L2

Office Hours	Sun : 10:30 - 12:30 Mon : 09:00 - 10:30 Tue : 10:00 - 11:30 Wed : 10:30 - 11:30
Email	mohamed_alfandi@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Tue : 11:30 - 13:30 Room: LAB

Tentative List of Topics Covered

Weeks	Topic	References
Week 1	1. Introduction to Mathematical Modeling & Simulation	From **Text Book**, From **Ref 3**
Week 2	2. Laplace Transform	From **Text Book**, From **Ref 1**, From **Ref 2**, From **Ref 3**
Weeks 3, 4, 5	3. Modeling of Various Mechanical Systems	From **Text Book**, From **Ref 1**, From **Ref 2**, From **Ref 3**
Weeks 6, 7	4. Transfer Functions and Block Diagram Models	From **Text Book**, From **Ref 1**, From **Ref 2**, From **Ref 3**
Weeks 8, 9	5. Computer Simulation with MATLAB/Simulink/Simscape	
Weeks 10, 11	6. State-variable Models and Simulations	From **Text Book**, From **Ref 1**, From **Ref 2**, From **Ref 3**
Week 12	7. Modeling of Electrical Systems	From **Text Book**, From **Ref 3**

Weeks 13, 14, 15, 16	8. Case studies in Modeling and Simulations of Multi-domain Dynamic Systems: Electromechanical, Fluid, Thermal	From **Text Book**, From **Ref 1**, From **Ref 2**, From **Ref 3**

Mapping of Course Outcomes to Program Outcomes	**Course Outcome Weight (Out of 100%)**	**Assessment method**
Students will be able to develop mathematical models of dynamic systems based on their physical principles	30%	
Students will be able to represent dynamic systems using state-space models, transfer functions, and block diagrams.	20%	
Students will be skilled in using simulation software tools to analyze and visualize dynamic system behavior.	30%	
Students will be able to apply modeling and simulation techniques to solve real-world engineering problems in various domains	20%	

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7

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