# Jordan University of Science and Technology

## Faculty of Engineering

## Industrial Engineering Department

| IE461 Mechanics Of Machines - JNQF Level: 7 |
|---|
| First Semester 2023-2024 |

| Course Catalog |
|---|
| 3 Credit Hours. Kinematics fundamentals, mobility, linkage decomposition, kinematic analysis of mechanisms, graphical and analytical linkage synthesis, cam mechanism design, indexing and dwell mechanisms, computer-aided simulation of mechanisms. |

| Text Book | |
|---|---|
| **Title** | Machines and Mechanisms: Applied Kinematic Analysis |
| **Author(s)** | David H. Myszka |
| **Edition** | 4th Edition |
| **Short Name** | Textbook |
| **Other Information** | |

**Course References**

| Short name | Book name | Author(s) | Edition | Other Information |
|---|---|---|---|---|
| Reference 1 | Kinematics, Dynamics, and Design of Machinery | Waldron, K. J. and Kinzel, G. L | 4th Edition | |
| Reference 2 | Theory of Machines and Mechanisms | Shigley and Uicker | 6th Edition | |
| Reference 3 | Design of Machinery | Robert Norton | 5th Edition | |

| Instructor | |
|---|---|
| Name | **Dr. Abdallah Al-Dwairi** |
| Office Location | M5L3 |
| Office Hours | |

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|---|---|
| Email | dwairy@just.edu.jo |

| Class Schedule & Room |
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| Section 1:<br>Lecture Time: Sun, Tue, Thu : 13:30 - 14:30<br>Room: M5123 |

| Prerequisites | | |
|---|---|---|
| **Line Number** | **Course Name** | **Prerequisite Type** |
| 292180 | IE218 Dynamics And Vibrations | Prerequisite / Study |

| Tentative List of Topics Covered | | |
|---|---|---|
| **Weeks** | **Topic** | **References** |
| Weeks 1, 2 | Basic Concepts | **Ch. 1** From **Textbook** |
| Week 3 | Building mechanism models using Working Model | **Ch. 2** From **Textbook** |
| Weeks 4, 5 | Displacement Analysis | From **Textbook** |
| Weeks 6, 7, 8 | Mechanism Design | **Ch. 5** From **Textbook** |
| Weeks 9, 10 | Velocity and Acceleration Analysis | **Ch 6, 7 + Handouts** From **Textbook** |
| Weeks 11, 12, 13 | Cam Mechanism Design | **Ch. 9** From **Textbook** |
| Weeks 14, 15 | Gearing and Gear Trains, Planetary Gear Trains | **Ch. 10** From **Textbook** |

| Mapping of Course Outcomes to Program Outcomes and NQF Outcomes | Course Outcome Weight (Out of 100%) | Assessment method |
|---|---|---|
| Develop an ability to perform structural and mobility analysis of mechanisms involving lower and higher pairs. [1SO1] [1L7K1] | 25% | |
| Develop skills to perform kinematic analysis of linkage mechanisms using graphical and analytical methods. [1SO1] [1L7K1] | 25% | |
| Develop an ability to design a simple linkage or cam mechanism for given motion specifications while satisfying design quality criteria. [1SO2] [1L7S2] | 25% | |
| Develop the skill to build a physical prototype for a mechanism and simulate it using computer software. [1SO3, 1SO5] [1L7S1, 1L7C1] | 25% | |

| Relationship to Program Student Outcomes (Out of 100%) | | | | | | |
|---|---|---|---|---|---|---|
| SO1 | SO2 | SO3 | SO4 | SO5 | SO6 | SO7 |
| 50 | 25 | 12.5 | | 12.5 | | |

| Relationship to NQF Outcomes (Out of 100%) | | | |
|---|---|---|---|
| L7K1 | L7S1 | L7S2 | L7C1 |
| 50 | 12.5 | 25 | 12.5 |

| Evaluation | |
|---|---|
| **Assessment Tool** | **Weight** |
| Midterm Exam | 20% |
| Final Exam | 40% |
| 1st Quiz | 5% |
| Project | 15% |
| HW and Activity | 10% |
| 2nd Quiz | 5% |
| 3rd Quiz | 5% |

| Policy | |
|---|---|
| Midterm | Midterm Exam 30% |
| Project | 20% |
| Final Exam | 40% |
| HW and Activity | 10% |

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