# Jordan University of Science and Technology

## Faculty of Engineering

## Civil Engineering Department

CE748 Applications Of Advanced Technologies In Transportation Engineering - JNQF Level: 9

First Semester 2024-2025

| Course Catalog |
|---|
| 3 Credit Hours. Introduction to photogrammetric systems and cameras; Review of linear algebra concepts; advances in analytical and digital photogrammetry; Adjustment of observations and least-squares adjustment to redundant data; Advance technology applications in transportation engineering; Geographical Information System (GIS) and Remote Sensing; Artificial Intelligence (AI); Knowledge-based and expert systems; Vision systems technology; Image processing; and practical applications in new trends in transportation engineering. |
| **Teaching Method:** On Campus |

| Text Book | |
|---|---|
| **Title** | Photogrammetric potential of non-metric cameras |
| **Author(s)** | Y. Abdel-Aziz and H. Karara |
| **Edition** | 10th Edition |
| **Short Name** | Ref #1 |
| **Other Information** | |

**Course References**

| Short name | Book name | Author(s) | Edition | Other Information |
|---|---|---|---|---|
| Ref #2 | Video metrology for documentation of engineering construction | M. T. Obaidat | 1st Edition | |
| Ref #3 | Knowledge-based systems in engineering | Clive Dym and Raymond Levitt | 4th Edition | |
| Ref #4 | Robot vision | Berthold Horn | 3rd Edition | |
| Ref #5 | ASCE journals (Surveying, photogrammetry, GIS, and transportation divisions) | ASCE | 1st Edition | Journal |

| | | | | |
|---|---|---|---|---|
| Ref #6 | Expert systems in construction and structural eng. | H. Adeli | 1st Edition | |

| Instructor | |
|---|---|
| Name | **Prof. Mohammed Obaidat** |
| Office Location | C2 L2 |
| Office Hours | Mon : 10:00 - 11:30<br>Tue : 14:30 - 16:00<br>Wed : 10:00 - 11:30<br>Thu : 14:30 - 16:00 |
| Email | mobaidat@just.edu.jo |

| Class Schedule & Room |
|---|
| Section 1:<br>Lecture Time: Mon, Wed : 13:00 - 14:30<br>Room: U |

| Tentative List of Topics Covered | | |
|---|---|---|
| **Weeks** | **Topic** | **References** |
| Weeks 1, 2, 3 | Geographical Information System (GIS) and Remote Sensing | From **Ref #1** |
| Week 4 | Advance technology applications in transportation engineering | From **Ref #2**, From **Ref #5** |
| Weeks 5, 6 | Artificial Intelligence (AI); Knowledge-based and expert systems | From **Ref #2**, From **Ref #4**, From **Ref #5** |
| Weeks 7, 8 | Vision systems technology; and Image processing | From **Ref #2**, From **Ref #4**, From **Ref #5** |
| Weeks 9, 10, 11 | Digital Photogrammetry, linear algebra, and regression analysis principles | From **Ref #1**, From **Ref #4**, From **Ref #5** |

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|---|---|---|
| Week 12 | ITS | From **Ref #2**, From **Ref #5** |
| Week 13 | Expert Systems | From **Ref #3**, From **Ref #5**, From **Ref #6** |
| Weeks 14, 15, 16 | Computer vision, ITS, Expert Systems, NNW, AI, Digital mapping and Image Processing Applications and Integrations | From **Ref #1**, From **Ref #2**, From **Ref #3**, From **Ref #4**, From **Ref #5**, From **Ref #6** |

| **Mapping of Course Outcomes to Program Outcomes and NQF Outcomes** | **Course Outcome Weight (Out of 100%)** | **Assessment method** |
|---|---|---|
| Demonstrate new trends of technology in Transportation Engineering [1PI-1a] [1L9S1] | 25% | MidTerm EXAM |
| Apply and practice new technologies in Transportation Engineering and Geomatics. [1PI-4a] [1L9K3] | 25% | Research Work |
| Propose and formulate research work using new technologies in Transportation Engineering [1PI-6a] [1L9C6] | 25% | FINAL and research article |
| Design and Practice new technologies software in GIS, AI, Expert Systems, Computer Vision, Image Processing, ITS, and Stereo Vision. [1PI-7a] [1L9C2] | 25% | FINAL and research article |

| **Relationship to Program Student Outcomes (Out of 100%)** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PI-1a | PI-2a | PI-2b | PI-2c | PI-2d | PI-3a | PI-4a | PI-4b | PI-5a | PI-6a | PI-6b | PI-7a |
| 25 | | | | | | 25 | | | 25 | | 25 |

| **Relationship to NQF Outcomes (Out of 100%)** | | | |
|---|---|---|---|
| L9K3 | L9S1 | L9C2 | L9C6 |
| 25 | 25 | 25 | 25 |

| Evaluation | |
|---|---|
| **Assessment Tool** | **Weight** |
| MidTerm EXAM | 20% |
| Research Work | 30% |
| FINAL and research article | 50% |

| Policy | |
|---|---|
| Research | Students must write a research article at least |
| Presentation | All students must present their research work in front of each others. |
| Problem Solving | Students must be exposed to problem solving issues. |
| Technical Writing | Students have to practice technical writing through their research problems. |
| Methodologies | Students must be exposed to all types of research methodologies including: computer programming, data collection, field work, laboratory work,<br>software development, etc |

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