

Benha University

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| Faculty of Engineering at Shoubra | Model No.12Course Specifications : Advanced Photogrammetry |   |
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| **University** : Benha university |

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| **Faculty** : Faculty of Engineering at Shoubra |

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| **Department offering the program :** Surveying Engineering Department |
| **Department offering the Course :** Surveying Engineering Department |
| **1- Course Data**  |
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| Course Code : SUR421 | Course Title : Advanced Photogrammetry | Study Year : Fourth Year |
| Specialization :  | Surveying Engineering Compulsory |
| Teaching Hours:  |
| Lecture : 3 | Tutorial : 1 | Practical : 2 |  |

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| **2-  Course Aims** For students undertaking this course, the aims are to: |
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| 2.1- Perceive the concepts and theories of digital photogrammetric processes.2.2- Apply the mathematical models related to automating photogrammetric processes.2.3- Be familiar with modern photogrammetric techniques.2.4- Realize photogrammetric software packages. |

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| **3- Intended Learning Outcomes of Course (ILOS)**  |
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| **a-  Knowledge and Understanding**  |
| On completing this course, students will be able to: |
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| a1Identify digital imagery and photogrammetric workstation.(a8) |
| a2Explain the principals and the theory of digital orientation and aerial triangulation.(a8) |
| a3Describe the principals of extraction and matching point and edge features.(a12) |
| a4 Recognize DEM generation and digital orthorectification.(a12) |
| a5 Know the different techniques of intensity-based matching.(a13) |

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| **b-  Intellectual Skills**  |  |
| At the end of this course, the students will be able to: |  |
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| b1 Determine the transformed coordinates measured on digital imagery.(b1) |
| b2Compute the best match by correlation and least-squares matching.(b1) |
| b3Calculate initial values of parameters needed for digital orientation and aerial triangulation.(b1) |
| b4Compute parameters needed for DEM generation and digital orthorectification.(b14) |
| b5 State the contrast between aerial photogrammetry and Lidar technology.(b14) |

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| **c-  Professional Skills** |  |
| On completing this course, the students are expected to be able to |  |
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| c1Apply the digital techniques of orientation and aerial triangulation.(c6) |
| c2 Apply the techniques of correlation and least-squares matching.(c6) |
| c3Implement the techniques of feature extraction and matching.(c16) |
| c4 Apply the procedure of DEM generation and digital orthorectification.(c18)c5 Use other efficient technologies of positioning.(c18)  |

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| **d-  General Skills**  |  |
| At the end of this course, the students will be able to: |  |
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| d1Use MATLAB software for processing digital images.(d4) |
| d2Use digital photogrammetric software for performing digital photogrammetric processes.(d6) |

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| **4- Course Contents**  |
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| **No.** | **Topics** |
| 1 | Review of photogrammetric mathematical models |
| 2 | Digital imagery |
| 3 | Digital photogrammetric workstation |
| 4 | Digital Image Orientation |
| 5 | Digital Aerial Triangulation |
| 6 | Correlation matching |
| 7 | Least-squares matching |
| 8 | Interest point detection |
| 9 | Edge detection and representation |
| 10 | DEM generation |
| 11 | Digital orthorectification |
| 12 | Lidar and GPS Photogrammetry |

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| **5- Teaching and Learning Methods**  |
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| 5.1- Lectures  |
| 5.2- Practical training / laboratory  |
| 5.3- Tutorial  |
| 5.4- Computer based work  |

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| **6- Teaching and Learning Methods of Disables** |
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| 6.1- N.A  |

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| **7- Student Assessment**  |
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| **a- Student Assessment Methods** |
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| 1 | Assignments   |
| 2 | Quizzes    |
| 3 | Project    |
| 4 | Mid-term exam   |
| 5 | Oral exam   |
| 6 | Final exam   |

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| **b- Assessment Schedule** |  |
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| **No.** | **Assessment** | **Week** |
| 1 | Assignments | 3,5,6,10,12 |
| 2 | Quizzes | 4,7 |
| 3 | Mid-term exam | 8 |
| 4 | Oral Exam | 14 |
| 5 | Final exam | 15  |

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| **c- Weighting of Assessments** |  |
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| **Assessment** | **Weight** |
| Mid-term Examination | 10 % |
| Final Examination | 60 % |
| Oral Examination | 20 % |
| Practical Examination | 10 % |
| Semester work | 10 % |
| Other types of assessment | 0 % |
| Total | 100 % |

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| **8- List of References**  |
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| **a- Course Notes** |
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| 1- Course notes prepared by instructor.  |

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| **b- Books** |
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| 1- Mikhail, E. M., Bethel, J. S. and McGlone, J. C.,2001. Introduction to modern photogrammetry. John Wiley & Sons, Inc., USA.  |
| 2- Wolf, P. R. and Dewitt, B. A., 2000. Elements of Photogrammetry: With Applications in GIS. McGraw-Hill Education (India) PvtLimited. |

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| **c- Recommended Books** |
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| 1- Schenk, T., 1999. Digital Photogrammetry. Terra Science LLC, USA.  |

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| **d- Web Sites** |
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| 1- www.isprs.org  |

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| **University** : Benha university |

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| **Faculty** : Faculty of Engineering at Shoubra |

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| **Department** : Surveying Engineering Department  |

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| **Matrix of Knowledge and Skills of the course**  |
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| **No.** | **Topics** | **week** | **Basic Knowledge** | **Intellectual Skills** | **Professional Skills** | **General Skills** |
| 1 | Review of photogrammetric mathematical models | 1 | a1 |  |  |  |
| 2 | Digital imagery | 2 |  | b1 |  |  |
| 3 | Digital photogrammetric workstation | 3 |  | b3 | c4 |  |
| 4 | Digital Image Orientation | 4 | a5 |  |  |  |
| 5 | Digital Aerial Triangulation | 5 | a2 |  | c2 | d1 |
| 6 | Correlation matching | 6 |  | b4 |  |  |
| 7 | Least-squares matching | 7 | a4 |  | c1 | d2 |
| 8 | Mid-term exam | 8 | - | - | - | - |
| 9 | Interest point detection | 9 |  |  | c5 | d1 |
| 10 | Edge detection and representation | 10 |  | b3 |  | d2 |
| 11 | DEM generation | 11 |  | b5 |  |  |
| 12 | Digital orthorectification | 12 | a5 |  | c1 |  |
| 13 | Lidar and GPS Photogrammetry | 13 |  | b4 |  | d1 |
| 14 | Oral exam | 14 | - | - | - | - |
| 15 | final exam | 15 | - | - | - | - |

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|  | **The Matrix of The Relation Between The Course’ Aims and The ILOS of The Course** |
| **No** | **Advanced Photogrammetry** | **a1** | **a2** | **a3** | **a4** | **a5** | **b1** | **b2** | **b3** | **b4** | **b5** | **c1** | **c2** | **c3** | **c4** | **c5** | **d1** | **d2** |
| 1 | Perceive the concepts and theories of digital photogrammetric processes. | √ | √ | √ | √ |  |  |  |  |  |  |  |  |  |  |  |  |   |
| 2 | Apply the mathematical models related to automating photogrammetric processes. |  |  |  |  |  | √ | √ | √ | √ |  | √ | √ | √ |  |  | √ |   |
| 3 | Be familiar with modern photogrammetric techniques. |  |  |  |  | √ |  |  |  |  | √ |  |  |  | √ | √ |  |  |
| 4 | Realize photogrammetric software packages. |  |  |  |  |  |  |  |  |  |  |  |  |  | √ | √ |  | √ |

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| **- Course Coordinator :    Mohamed Ibrahim MoustafaZahran** |

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| **- Head of Department :    Mohamed Ibrahim MoustafaZahranDate: 6 / 9 / 2015** |