

Benha University

|  |  |  |
| --- | --- | --- |
| Faculty of Engineering at Shoubra | Model No.12 Course Specifications : Advanced Photogrammetry |  |
|  | | |

|  |
| --- |
| **University** : Benha university |

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

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

|  |
| --- |
| **2-  Course Aims**  For students undertaking this course, the aims are to: |
|  |
| |  | | --- | | 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. | |

|  |
| --- |
| **3- Intended Learning Outcomes of Course (ILOS)** |
| |  | | --- | | **a-  Knowledge and Understanding** | | On completing this course, students will be able to: | | |  | | --- | | 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) | | |  | | | **b-  Intellectual Skills** |  | | At the end of this course, the students will be able to: |  | | |  | | --- | | 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) | |  | |  | | | **c-  Professional Skills** |  | | On completing this course, the students are expected to be able to |  | | |  | | --- | | 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) | |  | |  | | | **d-  General Skills** |  | | At the end of this course, the students will be able to: |  | | |  | | --- | | d1Use MATLAB software for processing digital images.(d4) | | d2Use digital photogrammetric software for performing digital photogrammetric processes.(d6) | |  | |  | | |

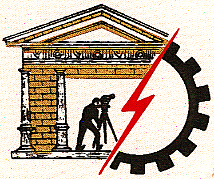
|  |
| --- |
| **4- Course Contents** |
| |  |  | | --- | --- | | **No.** | **Topics** | | 1 | Review of photogrammetric mathematical models | | 2 | Digital imagery | | 3 | Digital photogrammetric workstation | | 4 | Digital Image Orientation | | 5 | Digital Aerial Triangulation | | 6 | Correlation matching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

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

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

|  |
| --- |
| **7- Student Assessment** |
| |  | | --- | | **a- Student Assessment Methods** | | |  |  | | --- | --- | | 1 | Assignments | | 2 | Quizzes | | 3 | Project | | 4 | Mid-term exam | | 5 | Oral exam | | 6 | Final exam | | |  | | | **b- Assessment Schedule** |  | | |  |  |  | | --- | --- | --- | | **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 | |  | |  | | | **c- Weighting of Assessments** |  | | |  |  | | --- | --- | | **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 % | |  | |  | | |

|  |
| --- |
| **8- List of References** |
| |  | | --- | | **a- Course Notes** | | |  | | --- | | 1- Course notes prepared by instructor. | | | **b- Books** | | |  | | --- | | 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. | | | **c- Recommended Books** | | |  | | --- | | 1- Schenk, T., 1999. Digital Photogrammetry. Terra Science LLC, USA. | | | **d- Web Sites** | | |  | | --- | | 1- www.isprs.org | | |

|  |  |  |
| --- | --- | --- |
| Faculty of Engineering  at Shoubra | Model No.11A Course Specifications : Advanced Photogrammetry | Benha university |
|  | | |

|  |
| --- |
| **University** : Benha university |

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

|  |
| --- |
| **Department** : Surveying Engineering Department |

|  |
| --- |
| **Matrix of Knowledge and Skills of the course** |
| |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **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 | - | - | - | - | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **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. |  |  |  |  |  |  |  |  |  |  |  |  |  | √ | √ |  | √ |

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

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