



## Course Description/ School of Engineering

### Department of Surveying Engineering

#### (Bachelor)

#### 1. معلومات مدرس المساق (Instructor)

|                                                                    |                                                                                    |                                             |
|--------------------------------------------------------------------|------------------------------------------------------------------------------------|---------------------------------------------|
| Instructor's / Coordinator's Name:                                 | Eng.alia almashaqbeh                                                               | اسم ( مدرس / منسق ) المساق :                |
| Office Hours:                                                      | 8:30-09:30 Mon. Wed.                                                               | الساعات المكتبية :                          |
| Office and Phone:                                                  | Eng. Building 1 <sup>st</sup> Floor, 5221                                          | رقم المكتب والرقم الفرعي :                  |
| Email:                                                             | <a href="mailto:eng.alia.mashaqbeh@aabu.edu.jo">eng.alia.mashaqbeh@aabu.edu.jo</a> | البريد الالكتروني :                         |
| Research and Teaching Assistant / Supervisor / Technical (if any): | -----                                                                              | مساعد البحث والتدريس/المشرف/الفني (إن وجد): |

#### 2. وصف المساق (Course Description)

مقدمة في أساسيات المساحة التصويرية الرقمية، نقاط التحكم الرية، طرق إسقاط الصورة: الإسقاط المتناظر، الإسقاط المنحرف، الإسقاط الماكفي في الشك والزوايا، دراسة وإيجاد معاملات المتجات الخارجية والداخلية للصورة والكاميرا، معايير الكاميرا، وإيجاد المعاملات المطلقة للصورة والنسبية بين صورتين، طرق التقاطع والإسقاط، والتصحيح للصورة تكوين النموذج المكاني الثلاثي البعد، نموذج السطح المشترك بين صورتين، ونقطة نموذج الشعاع، الصور الرقمية والرؤية المجسمة، ومعالجة الزيغان، تطوير حلول للطر المذكورة، باستخدام البرمجة، تطبيقات حاسوبية والتدري علم معالجة مجموعة من الصور باستخدام طريقة التثليث الجوي ونقاط الحكام والتصحيح بطريقة الحزم، إنتاج صور عمودية الإسقاط، إنتاج نماذج منتظمة ثلثية البعد لالارض دراسة جمع الصور (الموزايك). مقدمة الى المساحة التصويرية الرقمية , Preview for the principals of digital photogrammetry, Ground control in photogrammetry Aerotriangulation methods , Stereo triangulation with multiprocessor instruments , Stereo triangulation with universal instruments , Semi-analytical aerotriangulation , Standard , procedure of block adjustment by independent models , Collinearity condition equations Coplanarity condition equations , The central projection equations , Elements of exterior orientation , Single photo resection and orientation (SPRO) case I , Single photo resection

, and orientation (SPRO) case II , Single photo resection and orientation (SPRO) case III  
Single photo resection and orientation (SPRO) case IV , Two photo intersection (bundle  
method) ,Two photo intersection (special case)] , produce ortho-images, produce 3D  
models for land, Photo Mosaic. Introduction to Digital Photogrammetry

### 3. بيانات المساق (Course Information)

|                                                                                                                                                                                                                                                  |                                                                                               |                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Level:المساق:<br>Bachelor, 3 <sup>rd</sup> Year                                                                                                                                                                                                  | Course Title:اسم المساق:<br>digital and Analytical Photogrammetry                             | Course No.:رقم المساق:<br>4070545                                                  |
| Class Time:وقت المحاضرة:<br>Mon. Wed. (10:00-11:30)                                                                                                                                                                                              | المتطلب السابق / المتزامن :<br>(السابق: 0705343 و 0705353)                                    | طبيعة المساق: <u>نظري</u> / عملي<br>Course Type:<br><u>Theoretical</u> / Practical |
| Study hours:عدد الساعات الدراسية:<br>3                                                                                                                                                                                                           | Semester:الفصل الدراسي:<br>First                                                              | العام الجامعي: 2025 / 2024<br>Academic Year 2024 / 2025                            |
| المستوى السابع<br>seven Level                                                                                                                                                                                                                    | مستوى التسكين في الإطار الوطني الأردني للمؤهلات<br>(Jordan National Qualifications Framework) |                                                                                    |
| تاريخ التعديل: 2024.10.01                                                                                                                                                                                                                        | تاريخ الإعداد: 2023.09.01                                                                     |                                                                                    |
| نوع التعلم: Type of Teaching:                                                                                                                                                                                                                    |                                                                                               |                                                                                    |
| <div>تعليم وجاهي Face to Face <input checked="" type="checkbox"/></div> <div>تعليم مدمج (1:2) <input type="checkbox"/> 1:1 <input type="checkbox"/> 2:1 Blended <input type="checkbox"/></div> <div>Online عن بعد <input type="checkbox"/></div> |                                                                                               |                                                                                    |

#### 4. الكتاب المقرر (Text Book)

| Main Reference   | Geodesy | المراجع الرئيس           |
|------------------|---------|--------------------------|
| Author           |         | المؤلف                   |
| Publisher        |         | الناشر                   |
| Year             |         | السنة                    |
| Edition          |         | الطبعة                   |
| Textbook Website |         | الموقع الالكتروني للمرجع |

#### 5. المراجع (وتشمل الكتب والبحوث المنشورة في الدوريات او المواقع الالكترونية المحكمة)

##### References (books, research published in periodicals or websites)

|    |                                                                                                                                                                                                                                                                                                                     |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1- | <ul style="list-style-type: none"> <li>• Wolf, P. R., Dewitt, B. A., &amp; Wilkinson, B. E. (2014). Elements of Photogrammetry with Applications in GIS (4th Edition). McGraw-Hill.</li> <li>• Mikhail, E. M., Bethel, J. S., &amp; McGlone, J. C. (2001). Introduction to Modern Photogrammetry. Wiley.</li> </ul> |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

#### 1. مخرجات المساق ( Course Intended Learning Outcomes (CILO's) )

| الوزن<br>Weight | PLO's<br>مخرجات<br>البرنامج | Descriptors<br>الوصفات | مخرجات المساق CLO's                                                                                                                                                                                                     |   |
|-----------------|-----------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|                 |                             | K1                     | Explain the principals of digital photogrammetry, Ground control in photogrammetry , Aerotriangulation methods , Stereo triangulation with multiprocessor instruments , Stereo triangulation with universal instruments | 1 |
|                 | PILO1                       | K2                     | Illustrate theStandard procedure of block adjustment by independent models , Collinearity condition equations , Coplanarity condition equations , The central projection equations , Elements of exterior orientation   | 1 |
|                 | PILO2                       |                        |                                                                                                                                                                                                                         |   |
|                 | PILO3                       | S                      | Analyze the performance of fuel cell systems through data interpretation and comparison with theoretical models.                                                                                                        | 5 |
|                 |                             | K3                     | Explain the single photo resection and orientation SPRO case I , SPRO case II , SPRO case III , SPRO case IV ,                                                                                                          | 6 |
|                 |                             | K4                     | explain the Two photo intersection methods, how to produce ortho-images, 3D models for land, and Photo Mosaic.                                                                                                          | 6 |

#### 6. محتوى المساق (Curriculum Design Outline Syllabus)

| Week | Topic                                                    |
|------|----------------------------------------------------------|
| 1    | Introduction to photogrammetry and image geometry        |
| 2    | Measurement of image coordinates and film distortions    |
| 3    | Camera tilt and principal point displacement corrections |
| 4    | Perspective and lens distortion corrections              |

|    |                                                          |
|----|----------------------------------------------------------|
| 5  | Internal and external orientation elements determination |
| 6  | Camera calibration methods                               |
| 7  | Relative orientation of stereo pairs                     |
| 8  | Absolute orientation and 3D model creation               |
| 9  | Intersection and resection techniques                    |
| 10 | Orthophoto and rectification methods                     |
| 11 | Digital stereoscopic vision and image matching           |
| 12 | Aerial triangulation and bundle adjustment               |
| 13 | Generation of orthophotos and mosaics                    |
| 14 | Digital terrain model (DTM) extraction                   |
| 15 | Practical applications and final review                  |

7. استراتيجيات التعليم والتعلم وطرق التقويم  
(Teaching and learning Strategies and Evaluation Methods)

| نوع التقويم/القياس<br>Evaluation /Measurement |                           |                     |                      |                            | أنشطة التعلم<br>Learning Activities                                              | استراتيجيات التدريس<br>Teaching Strategies                     | مخرجات التعلم<br>Program Intended Learning Outcomes PILOs                                                                                                                                                                                                   | ت<br>No. |
|-----------------------------------------------|---------------------------|---------------------|----------------------|----------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| امتحان<br>Exam                                | اختبارات قصيرة<br>Quizzes | واجبات<br>Home work | مناقشة<br>Discussion | عروض صفية<br>Presentations |                                                                                  |                                                                |                                                                                                                                                                                                                                                             |          |
| -                                             | -                         | -                   | -                    | -                          | Presentations/<br>prepared &<br>introduced by<br>students<br>Class<br>discussion | Presentations<br>Videos<br>Link with<br>real world<br>problems | An ability to identify<br>formulate and solve<br>complex Engineering<br>problems by applying<br>principles of /<br>engineering, Science,<br>and mathematics.                                                                                                | 1        |
| -                                             | -                         | -                   | -                    | -                          | Presentations/<br>prepared &<br>introduced by<br>students<br>Class<br>discussion | Presentations<br>Videos<br>Link with<br>real world<br>problems | An ability to apply<br>Engineering design<br>to produce solutions<br>that meet specified<br>needs with<br>considerations of<br>public health, safety,<br>and welfare, as well<br>as global, cultural,<br>social,<br>environmental, and<br>economic factors. | 2        |
| -                                             | -                         | -                   | -                    | -                          | Presentations/<br>prepared &<br>introduced by<br>students                        | Presentations<br>Videos                                        | An ability to<br>communicate<br>effectively with<br>arrange of audiences.                                                                                                                                                                                   | 3        |

|   |   |   |   |   |                                                                         |                                                       |                                                                                                                                                                                                                                            |   |
|---|---|---|---|---|-------------------------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|   |   |   |   |   | Class discussion                                                        | Link with real world problems                         |                                                                                                                                                                                                                                            |   |
| - | - | - | - | - | Presentations/<br>prepared & introduced by students<br>Class discussion | Presentations Videos<br>Link with real world problems | An ability to recognize ethical and professional responsibilities in Engineering situations and make informed judgments, which must consider the impact of Engineering solution in global, economic, environmental, and societal contexts. | 4 |
| - | - | - | - | - | Presentations/<br>prepared & introduced by students<br>Class discussion | Presentations Videos<br>Link with real world problems | An ability to function effectively on a team whose members together provide leadership, create a collaborated and inclusive environment, establish goals, plan task, and made objectives.                                                  | 5 |
| ✓ | ✓ | ✓ | ✓ | ✓ | Presentations/<br>prepared & introduced by students<br>Class discussion | Presentations Videos<br>Link with real world problems | An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use Engineering judgment to draw conclusions.                                                                                               | 6 |
| ✓ | ✓ | ✓ | ✓ | ✓ | Presentations/<br>prepared & introduced by students<br>Class discussion | Presentations Videos<br>Link real world problems      | An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.                                                                                                                                            | 7 |

#### 8. تقييم الطلبة (Assessment)

| توزيع الدرجات لكل أسلوب<br>Distribution of grades | توقيت التقييم<br>Assessment Time                  | الأساليب المستخدمة<br>Methods Used |
|---------------------------------------------------|---------------------------------------------------|------------------------------------|
| 20                                                | During Semester                                   | أعمال الفصل Semester Work          |
| 30                                                | Midterm Examination Period<br>(Academic Calendar) | امتحان منتصف الفصل Mid Exam        |

|    |                                                 |            |                  |
|----|-------------------------------------------------|------------|------------------|
| 50 | Final Examination Period<br>(Academic Calendar) | Final Exam | الامتحان النهائي |
|----|-------------------------------------------------|------------|------------------|

9. علاقة التقييم بنتائج التعلم Assessment Relationship to learning Outcomes

| المجموع<br>Total | CILO |    |    |    |    |    | الدرجات<br>Marks | التقييم<br>Assessment                    | N<br>o. |
|------------------|------|----|----|----|----|----|------------------|------------------------------------------|---------|
|                  | 6    | 5  | 4  | 3  | 2  | 1  |                  |                                          |         |
| 5                |      | -  | -  | 5  | -  | -  | 5                | Quiz (1)<br>امتحان قصير (1)              | 1       |
| 5                |      | -  | -  | -  | 3  | 2  | 5                | Presentation<br>عرض تقديمي               | 2       |
| 5                |      | -  | -  | 3  | 2  | -  | 5                | Home work<br>(1) واجب (1)                | 3       |
| 5                |      | -  | 5  | -  | -  | -  | 5                | Home work<br>(2) واجب (2)                | 4       |
| 30               |      | -  | 10 | 5  | 5  | 10 | 30               | Midterm<br>Exam<br>امتحان منتصف<br>الفصل | 5       |
| 50               | 5    | 10 | 15 | 10 | 5  | 5  | 50               | Final Exam<br>الامتحان النهائي           | 6       |
| 100              | 5    | 10 | 30 | 23 | 15 | 17 | 100              | المجموع                                  |         |

**1. مخرجات تعلم البرنامج (PILO's) Program Intended Learning Outcomes**  
(To be added by the School)

|                                                                                                                                                                                                                                            |   |              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------|
| An ability to identify formulate and solve complex Engineering problems by applying principles of / engineering, Science, and mathematics.                                                                                                 | K | <b>PILO1</b> |
| An ability to apply Engineering design to produce solutions that meet specified needs with considerations of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.                 | C | <b>PILO2</b> |
| An ability to communicate effectively with arrange of audiences.                                                                                                                                                                           | S | <b>PILO3</b> |
| An ability to recognize ethical and professional responsibilities in Engineering situations and make informed judgments, which must consider the impact of Engineering solution in global, economic, environmental, and societal contexts. | C | <b>PILO4</b> |
| An ability to function effectively on a team whose members together provide leadership, create a collaborated and inclusive environment, establish goals, plan task, and made objectives.                                                  | S | <b>PILO5</b> |
| An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use Engineering judgment to draw conclusions.                                                                                               | S | <b>PILO6</b> |
| An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.                                                                                                                                            | K | <b>PILO7</b> |

**2. مخرجات تعلم البرنامج (PEO's) Program Educational Objectives**  
(To be added by the School)

|                                                                                                                                                                                  |             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Have the basic math and science knowledge and technical skills of the Surveying and Geomatics Engineering appropriate to enter careers in the geospatial industry and community. | <b>PEO1</b> |
| Have appropriate understanding of standards and specifications of the Surveying and Geomatics Engineering's practices.                                                           | <b>PEO2</b> |
| Have an understanding of the professional, ethical, and social issues with commitment to quality and dependability.                                                              | <b>PEO3</b> |
| Acquire the ability to obtain professional licensure and/or certifications in the Surveying and Geomatics Engineering.                                                           | <b>PEO4</b> |

**3. سياسات المساق Course Policies**

Should be explained to students at the first meeting:

يجب أن يوضح التالي للطلاب في اللقاء الأول معهم:

**12.1Class Attendance:**

- Students must attend all classes of this course.

- b. Any student with absence of **12.5%** of the classes of any course, will be illegible to sit for the final exam and will be given the university zero (**F**) in this course, and the teacher writes the word (deprived, and if a student submits an official sick report authenticated by university clinic or an accepted excuse by the Dean of his/her faculty, the student will be considered as withdrawn from the course.
- c. Students are not allowed to come late to classes. Any student coming late will not be allowed to attend the class and he/she will be marked absent.

### 12.1 المواظبة

- أ. يجب على الطلاب حضور جميع محاضرات المساق.
- ب. أي طالب يتغيب عن 12.5% من محاضرات المساق يُحرم من التقدم للامتحان النهائي وسيمنح صفراً جامعياً (هـ) في هذا المساق، ويدون مدرس المادة كلمة (محروم)، أما إذا قدم الطالب تقريراً مرضياً رسمياً مصدقاً من عيادة جامعية أو عذراً مقبولاً من قبل عميد كليته، فسيتم اعتبار الطالب منسحباً من المساق.
- د. لا يُسمح للطلاب بالحضور متأخراً إلى المحاضرات الدراسية، ولن يُسمح لأي طالب قد قدم متأخراً بحضور المحاضرة وسيتم تمييزه بالغياب.

**1.2 Exams:** Failure in attending the final exam will result in zero mark unless the student presents an official acceptable excuse to the Dean of his/her faculty who approves an incomplete exam, normally scheduled to be conducted during the first two weeks of the successive semester.

**12.2 الامتحانات:** يؤدي عدم حضور الامتحان النهائي إلى علامة الصفر ما لم يقدم الطالب عذراً رسمياً مقبولاً لعميد كليته / لها الذي يوافق على امتحان غير مكتمل، ومن المقرر إجراؤه عادةً خلال أول اسبوعين من الفصل الدراسي التالي.

**12.3 Assignments & Projects:** Assignments and projects should be submitted to the instructor on the due date. Zero mark will be given for late submissions unless the student has an acceptable excuse approved by the instructor of the course.

**12.3 الواجبات والمشاريع:** يجب تقديم الواجبات والمشاريع إلى المدرس في تاريخ الاستحقاق. سيتم منح علامة الصفر للتقديم المتأخر ما لم يكن لدى الطالب عذر مقبول معتمد من مدرس المساق.

### 12.4 Exam Attendance/Punctuality:

- a. A student who is late more than 10 minutes will not be permitted to sit the exam (first, second or mid exams).
- b. A student who is late more than 30 minutes will not be permitted to sit to final exam, and no student will be permitted to leave the exam center before the elapse of 30 minutes.

### 12.4 حضور الامتحان / الالتزام بالمواعيد

- أ. لن يسمح للطلاب الذي تأخر أكثر من 10 دقائق عن الامتحان بالدخول عليه لأدائه (الأول، الثاني، منتصف الامتحان).
- ب. لن يُسمح للطلاب الذي تأخر أكثر من 30 دقيقة عن الاختبار النهائي بالدخول عليه، ولن يُسمح لأي طالب بمغادرة قاعة الامتحان قبل مرور 30 دقيقة.

**12.5 Cheating:** Cheating is an attempt to gain marks dishonestly, If the student is caught cheating while taking the exam in one of the courses, or it is proven as a result of the investigation that he attempted to cheat, participated in or attempted to cheat, the following penalties shall be imposed on him collectively:

- a. It is considered a failure in that Course.

- b. Cancel his registration in the residual of the course registered to him in that semester.
- c. Dismissal from the university for one semester following the semester in which he was caught.

**12.5 الغش:** الغش هو محاولة للحصول على علامات بطريقة غير شرعية وإذا ضبط الطالب في أثناء تأدية الامتحان في إحدى المسابقات متلبساً بالغش أو تثبت نتيجة التحقيق انه حاول الغش أو اشترك أو شرع فيه توقع عليه العقوبات التالية مجتمعة: -

- أ. اعتباره راسباً في تلك المادة.
- ب. إلغاء تسجيله في بقية المواد المسجلة له في ذلك الفصل.
- ت. فصله من الجامعة لمدة فصل دراسي واحد يلي الفصل الذي ضبط فيه.

**12.6 Mobiles:** Mobile phones should be kept turned off or silent while in class. Usage of mobile phones is not allowed in classes in any form (talking and/or texting).

**12.6 الهواتف المحمولة:** يجب إبقاء الهواتف المحمولة مغلقة أو صامتة أثناء التواجد في الفصل. لا يُسمح باستخدام الهواتف المحمولة في الفصول بأي شكل (التحدث و / أو الرسائل النصية).