MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

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| **Module Information**  **معلومات المادة الدراسية** | | | | | | | |
| **Module Title** | Ground Penetration Radar (GPR) | | | | **Module Delivery** | | |
| **Module Type** |  | | | | * **☒ Theory** * **☒ Lecture** * **☒ Lab** * **☐ Tutorial** * **☐ Practical** * **☐ Seminar** | | |
| **Module Code** | GEO42134 | | | |
| **ECTS Credits** | 7 | | | |
| **SWL (hr/sem)** | 175 | | | |
| **Module Level** | | 4th | **Semester of Delivery** | | | | 7th |
| **Administering Department** | | Geophysics | **College** | Remote sensing & Geophysics | | | |
| **Module Leader** | Mohammed Khudheir Hummadi | | **e-mail** | mohammed.hummadi@gmail.com | | | |
| **Module Leader’s Acad. Title** | | Lecturer | **Module Leader’s Qualification** | | | | Ph.D |
| **Module Tutor** |  | | **e-mail** |  | | | |
| **Peer Reviewer Name** | |  | **e-mail** |  | | | |
| **Scientific Committee Approval Date** | | 15/5/2023 | **Version Number** | | |  | |

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| **Relation with other Modules**  **العلاقة مع المواد الدراسية الأخرى** | | | |
| **Prerequisite module** | none | **Semester** |  |
| **Co-requisites module** | none | **Semester** |  |

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| **Module Aims, Learning Outcomes and Indicative Contents**  **أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية** | |
| **Module Aims**  **أهداف المادة الدراسية** | 1. Learn what the Ground Penetration Radar (GPR) is. 2. Learn the geophysical method used in geological survey by GPR. 3. Learn the electromagnetic radiation method principles. 4. Learn the shallow survey principles by GPR. 5. Learn the antenna types of GPR. |
| **Module Learning Outcomes**  **مخرجات التعلم للمادة الدراسية** | 1. Learn the principles of GPR survey. |
| **Indicative Contents**  **المحتويات الإرشادية** |  |

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| **Learning and Teaching Strategies**  **استراتيجيات التعلم والتعليم** | |
| **Strategies** | The primary approach employed in the delivery of this module will focus on fostering active student engagement in exercises, alongside the enhancement and broadening of their critical thinking abilities. Achieving this objective will involve a combination of classroom sessions, interactive tutorials, as well as the inclusion of various straightforward experiments, such as engaging sampling activities, designed to captivate the students' interest. |

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| **Student Workload (SWL)**  **الحمل الدراسي للطالب** | | | |
| **Structured SWL (h/sem)**  **الحمل الدراسي المنتظم للطالب خلال الفصل** | 128 |  |  |
| **Unstructured SWL (h/sem)**  **الحمل الدراسي غير المنتظم للطالب خلال الفصل** | 47 |  |  |
| **Total SWL (h/sem)**  **الحمل الدراسي الكلي للطالب خلال الفصل** | 175 | | |

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| **Module Evaluation**  **تقييم المادة الدراسية** | | | | | |
| **As** | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) |  |  |
| **Assignments** | 2 | 10% (10) |  |  |
| **Projects / Lab.** | 1 | 10% (10) |  |  |
| **Report** | 1 | 10% (10) |  |  |
| **Summative assessment** | **Midterm Exam** | 2 hr | 10% (10) |  |  |
| **Final Exam** | 2hr | 50% (50) |  |  |
| **Total assessment** | | | 100% (100 Marks) |  |  |

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| **Delivery Plan (Weekly Syllabus)**  **المنهاج الاسبوعي النظري** | |
| **Week** | **Material Covered** |
| **Week 1** | Definition of GPR |
| **Week 2** | principles of GPR in geophysics |
| **Week 3** | The electromagnetic radiation principles |
| **Week 4** | Electrical properties of subsurface |
| **Week 5** | The relation between velocity of radar wave and conductivity of the soil |
| **Week 6** | Antenna types and the frequencies used in GPR |
| **Week 7** | Types of GPR survey |
| **Week 8** | How to survey by using GPR |
| **Week 9** | Common mid-point method |
| **Week 10** | Fixed offset profiling |
| **Week 11** | Data Processing of GPR |
| **Week 12** | The profile section of GPR and radargram |
| **Week 13** | What is the anomalies of subsurface by using GPR |
| **Week 14** | The applications of GPR survey |
| **Week 15** | Examples of GPR survey |
| **Week 16** | **Preparatory week before the final Exam** |

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| **Delivery Plan (Weekly Lab. Syllabus)**  **المنهاج الاسبوعي للمختبر** | |
| **Week** | **Material Covered** |
| **Week 1** | Calculate the wavelength and frequency of electromagnetic waves |
| **Week 2** | Calculate the speed of GPR waves in some subsurface |
| **Week 3** | The relation between electrical properties and speed of waves of GPR |
| **Week 4** | Study the types of antenna and the differences between them |
| **Week 5** | Study the radargram and compare between some examples |
| **Week 6** | Distinguish the anomalies of radargram and calculate the depth of object |
| **Week 7** | Calculate and compare between shallow and deep survey |

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| **Learning and Teaching Resources**  **مصادر التعلم والتدريس** | | |
|  | **Text** | **Available in the Library?** |
| **Required Texts** | INTRODUCTION TO GROUND PENETRATING RADAR  Inverse Scattering and Data Processing  Raffaele Persico  John Wiley & Sons, Inc. 2014 |  |
| **Recommended Texts** | Field Geophysics  3rd Edition  John Milsom  University College London 2003 |  |
| **Websites** | [Ground Penetrating Radar — GPG 0.0.1 documentation (geosci.xyz)](https://gpg.geosci.xyz/content/GPR/index.html) | |

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| **Grading Scheme**  **مخطط الدرجات** | | | | |
| **Group** | **Grade** | التقدير | **Marks (%)** | **Definition** |
| **Success Group**  **(50 - 100)** | **A -** Excellent | **امتياز** | 90 - 100 | Outstanding Performance |
| **B -** Very Good | **جيد جدا** | 80 - 89 | Above average with some errors |
| **C -** Good | **جيد** | 70 - 79 | Sound work with notable errors |
| **D -** Satisfactory | **متوسط** | 60 - 69 | Fair but with major shortcomings |
| **E -** Sufficient | **مقبول** | 50 - 59 | Work meets minimum criteria |
| **Fail Group**  **(0 – 49)** | **FX –** Fail | **راسب (قيد المعالجة)** | (45-49) | More work required but credit awarded |
| **F –** Fail | **راسب** | (0-44) | Considerable amount of work required |
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| **Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. | | | | |