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| | Ministry of Higher Education and Scientific Research - Iraq<br><br>University of Warith Al-Anbiyaa<br>College of Engineering<br>Civil Engineering Department | |

# MODULE DESCRIPTION FORM

| Module Information | | | |
|---|---|---|---|
| **Module Title** | STRENGTH OF MATERIALS II | **Module Delivery** | |
| **Module Type** | CORE | | ☒ **Theory** |
| **Module Code** | CIV043 | | ☒ **Lecture** |
| **ECTS Credits** | 5 | | ☐ **Lab** |
| **SWL (hr/sem)** | 125 | | ☒ **Tutorial** |
| **Module Level** | 2 | **Semester of Delivery** | 2 |
| **Administering Department** | Civil engineering | **College** | Engineering |
| **Module Leader** | Wail Asim Mohammad | **e-mail** | wael.essam@uowa.edu.iq |
| **Module Leader's Acad. Title** | Assist.prof.doctor | **Module Leader's Qualification** | Ph.D. |
| **Module Tutor** | | **e-mail** | |
| **Peer Reviewer Name** | | **e-mail** | |
| **Scientific Committee Approval Date** | 20/10/2024 | **Version Number** | 1.0 |

| Relation with other Modules | | | |
|---|---|---|---|
| **Prerequisite module** | Strength of Materials I | **Semester** | 1 |
| **Co-requisites module** | None | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents | |
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| **Module Aims** | 1. To develop problem solving skills and understanding of materials theory through the application of techniques.<br>2. To understand the relation between the forces and the stresses.<br>3. This course deals with the basic concept of stresses and strains.<br>4. This is the basic subject for all types of determinate structures.<br>5. To understand the methods of solving stresses, strains, and deflections problems. |
| **Module Learning Outcomes** | 1. Recognize how determinate structures works under various types of loading.<br>2. List the various loading associated with determinate structures.<br>3. Summarize what is meant by a stresses and strains.<br>4. Describe the stress, the strains and the deflection.<br>5. Define Hook's law.<br>6. Identify the basic structural elements and their applications.<br>7. Discuss the operations of sinusoid and phasors in an electric circuit.<br>8. Discuss the various properties of beams, columns. |
| **Indicative Contents** | Indicative content includes the following.<br>**Strains**: -<br>Definition, Hook's Low, Poisson's ratio, Thermal strain, Stress-strain diagram, Linear relation between E,G and V.<br>**Transformation of stress and strain**: -<br>Equation for the transportation of plane stress, Principal stress, Mohr' s Circle of stress, Equations for transportation of plane strain Mohr's Circle of stress.<br>**Deflection of Beams**: -<br>Governing differential equation for deflection of elastic beam, Double Integration method, Moment area method.<br>**Columns:** -<br>Natural of the beam column problem, Euler buckling load |

| Learning and Teaching Strategies | |
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| **Strategies** | The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials that are interesting to the students. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 62 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 4 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 62 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 132 | | |

| Module Evaluation | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5, 10 | LO #1, 2, 10 and 11 |
| | **Assignments** | 2 | 10% (10) | 2, 12 | LO # 3, 4, 6 and 7 |
| | **Projects / Lab.** | - | - | - | - |
| | **Report** | 1 | 10% (10) | 13 | LO # 5, 8 and 10 |
| **Summative assessment** | **Midterm Exam** | 2 hr | 10% (10) | 7 | LO # 1-7 |
| | **Final Exam** | 2hr | 60% (60) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

| | Material Covered |
|---|---|
| **Week 1** | **Strain**: - Definition, Hook's Low, Poisson ' s ratio. |
| **Week 2** | **Strain**: - Thermal strain. |
| **Week 3** | **Strain**: - Stress-strain diagram. |
| **Week 4** | **Strain**: - Linear relation between E,G and V |
| **Week 5** | **Transformation of stress and strain**: -Equation for the transportation of plane stress. |
| **Week 6** | **Transformation of stress and strain**: -Principal stress, Mohr' s Circle of stress. |
| **Week 7** | **Transformation of stress and strain**: -Equations for transportation of plane strain Mohr ' s Circle of stress |
| **Week 8** | **Transformation of stress and strain**: -Equations for transportation of plane strain Mohr ' s Circle of stress |
| **Week 9** | **Deflection of beams**: - Governing differential equation for deflection of elastic beam. |
| **Week 10** | **Deflection of beams**: - Double Integration method, Multiple Equation Methods. |
| **Week 11** | **Deflection of beams**: - Double Integration method, General Equation Method. |
| **Week 12** | **Deflection of beams**: - Moment area method |
| **Week 13** | **Columns:** -Natural of the beam column problem, Euler buckling load |
| **Week 14** | **Columns:** -Natural of the beam column problem, Euler buckling load |
| **Week 15** | **Columns:** -Natural of the beam column problem, Euler buckling load |
| **Week 16** | **Preparatory week before the final Exam** |

## Delivery Plan (Weekly Lab. Syllabus)

| | Material Covered |
|---|---|
| **Week 1** | |
| **Week 2** | |
| **Week 3** | |
| **Week 4** | |
| **Week 5** | |
| **Week 6** | |

| | |
|---|---|
| **Week 7** | |

| Learning and Teaching Resources | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Strength of Materials, by: Singer. | Yes |
| **Recommended Texts** | Introduction to Mechanics of Solid, by: E. Popov.<br>Elements of Strength of Materials, by: Timoshenko<br>Mechanics of Materials by: Russell C. Hibbeler.<br>Mechanics of materials by: Ferdinand Beer et al.<br>Mechanics of Materials by: Manua Gere.<br>Strength of Materials, J. P. Den Hartog | yes |
| **Websites** | | |

## Appendix :

| Grading Scheme<br>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 works 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 |
| | | | | |

**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.