

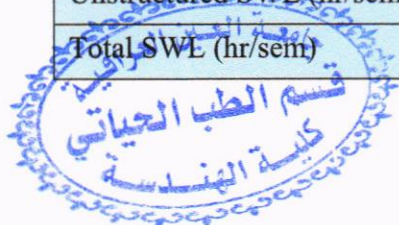
# MODULE DESCRIPTION FORM

| MODULE INFORMATION                 |                                 |                               |                                                                                                                                                                                                                                                     |
|------------------------------------|---------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module Title                       | <b>Engineering Materials II</b> |                               | Module Delivery                                                                                                                                                                                                                                     |
| Module Type                        | Basic                           |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input checked="" type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | MDER321                         |                               |                                                                                                                                                                                                                                                     |
| ECTS Credits                       | 5                               |                               |                                                                                                                                                                                                                                                     |
| SWL (hr/sem)                       | 125                             |                               |                                                                                                                                                                                                                                                     |
| Module Level                       | 3                               | Semester of Delivery          | 2 (six)                                                                                                                                                                                                                                             |
| Administering Department           | Biomedical Eng.                 | College                       | College of Engineering                                                                                                                                                                                                                              |
| Module Leader                      | Duaa Mohammed Abd al omur       | e-mail                        | <a href="mailto:Duaamohammed001@gmail.com">Duaamohammed001@gmail.com</a>                                                                                                                                                                            |
| Module Leader's Acad. Title        | Assistant lecture.              | Module Leader's Qualification | Ms.c                                                                                                                                                                                                                                                |
| Module Tutor                       |                                 | e-mail                        |                                                                                                                                                                                                                                                     |
| Peer Reviewer Name                 |                                 | e-mail                        |                                                                                                                                                                                                                                                     |
| Scientific Committee Approval Date | 2026-02-28                      | Version Number                | 1.0                                                                                                                                                                                                                                                 |

| RELATION WITH OTHER MODULES |         |            |
|-----------------------------|---------|------------|
| Prerequisite module         | MDER210 | Semester 3 |
| Co-requisites module        | None    | Semester   |

| Module Aims, Learning Outcomes and Indicative Contents |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MODULE OBJECTIVES</b>                               | <ol style="list-style-type: none"> <li>1. Problem-solving with basic principles of engineering, science, and mathematics.</li> <li>2. Engineering standards and simple measurement methods used for materials that regulate the use of engineering materials.</li> <li>3. The main types of materials in engineering and their basic physical and mechanical properties.</li> <li>4. The basic analysis skills to solve practical problems for slope and deflection of beams, shafts, and combined members.</li> <li>5. Theoretical knowledge to the wide range of materials used in engineering and their fundamental, physical properties .</li> </ol> |

|                                  |                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |  |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|--|
| MODULE<br>LEARNING<br>OUTCOMES   | KNOWLEDGE                                                                                                                                                                                                       | A2-1 Define the basic concepts of stress and strain, and the stress-strain relationships for homogenous, isotropic.<br><br>A2-2 Explain the relationships between loads, member forces and deformations and material stresses and strains in structural members under axial loading, torsion, flexural loadings, shear, and thin-walled pressure vessels.<br><br>A2-2 Express the behavior of materials under combined loading conditions and identify possible modes of failure.<br><br>A2-3 Apply the above understanding to the designs and analysis of structural members based on strength and deformation criteria.<br><br>A2-3 Sketch shear force and bending moment diagrams, and the internal stress distributions in beams and shafts.<br><br>A2-4 Calculate Slope and Deflection of Beams ,Shearing Stresses and Beams and Torsion of Circular Shafts.<br><br>A2-5 Design simple structural components based on strength and deformation criteria, ensuring safety and efficiency in engineering practice. |     |  |
|                                  | SKILLS                                                                                                                                                                                                          | B.1.1 Function efficiently as an individual<br><br>B.1.2 Function as a member of multidisciplinary and multicultural teams.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |  |
|                                  | ETHICS                                                                                                                                                                                                          | C.2.1 Plan engineering projects, taking into consideration other trades requirements.<br><br>C.2.2 Supervise and monitor engineering projects, taking into consideration other trades requirements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |  |
| INDICATIVE<br>CONTENTS           | <ul style="list-style-type: none"><li>• Indicative content includes the following.</li><li>• Slope and Deflection of Beams</li><li>• Shearing Stresses and Beams</li><li>• Torsion of Circular Shafts</li></ul> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |  |
| LEARNING AND TEACHING STRATEGIES |                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |  |
| STRATEGIES                       | <ul style="list-style-type: none"><li>• Tutorial and graphics</li><li>• Problem solving</li><li>• Brainstorming</li><li>• Research and reporting</li></ul>                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |  |
| Student Workload (SWL)           |                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |  |
| Structured SWL (hr/sem)          | 78                                                                                                                                                                                                              | Structured SWL (hr/w)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 5.2 |  |
| Unstructured SWL (hr/sem)        | 47                                                                                                                                                                                                              | Unstructured SWL (hr/w)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 3.1 |  |
| Total SWL (hr/sem)               | 125                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |  |



### DELIVERY PLAN (WEEKLY SYLLABUS)

المنهاج الاسبوعي النظري

|         | MATERIAL COVERED                       | LOs           |
|---------|----------------------------------------|---------------|
| Week 1  | Slope and Deflection of Beams          | A2-1          |
| Week 2  | Slope and Deflection of Beams          | A2-2,A2-3     |
| Week 3  | Slope and Deflection of Beams          | A2-1          |
| Week 4  | Shearing Stresses and Beams            | A2-2,A2-3     |
| Week 5  | Shearing Stresses and Beams            | A2-1          |
| Week 6  | Shearing Stresses and Beams            | A2-2,A2-3     |
| Week 7  | Shearing Stresses and Beams            | A2-1          |
| Week 8  | MID-TERM EXAM                          | -----         |
| Week 9  | Torsion of Circular Shafts             | A2-1          |
| Week 10 | Torsion of Circular Shafts             | A2-2,A2-3     |
| Week 11 | Torsion of Circular Shafts             | A2-2,A2-3     |
| Week 12 | Torsion of Circular Shafts             | A2-2,A2-3     |
| Week 13 | Thin Cylinders and Shells              | A2-1A2-2,A2-3 |
| Week 14 | Thin Cylinders and Shells              | A2-1A2-2,A2-3 |
| Week 15 | Preparatory week before the final Exam | -----         |
| Week 16 | The Final Exam                         | -----         |

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

|        | Material Covered             |
|--------|------------------------------|
| Week 1 | Lab 1: Simple Tension        |
| Week 2 | Lab 2: Simple Compression    |
| Week 3 | Lab 3: Shear Test            |
| Week 4 | Lab 4: Hardness and Impact   |
| Week 5 | Lab 5: Deflection of Beams   |
| Week 6 | Lab 6: Curve Beams           |
| Week 7 | Lab 7: Unsymmetrical Bending |



| LEARNING AND TEACHING RESOURCES (مصادر التعلم والتدريس) |                                                                                        |                           |
|---------------------------------------------------------|----------------------------------------------------------------------------------------|---------------------------|
|                                                         | Text                                                                                   | Available in the Library? |
| Required Texts                                          | Mechanics of Materials, Hearn, 2nd edition, Perjamon press, 1985                       | Yes                       |
| Recommended Texts                                       | Khurmi, R.S. and Gupta, J.K., 2005. A textbook of machine design. S. Chand publishing. | Online                    |
| Websites                                                |                                                                                        |                           |

| MODULE EVALUATION (تقييم المادة العلمية) |                    |                 |                   |                         |                           |
|------------------------------------------|--------------------|-----------------|-------------------|-------------------------|---------------------------|
|                                          |                    | Time/<br>Number | Weight<br>(Marks) | Week Due                | Relevant Learning Outcome |
| Formative assessment                     | Quizzes            | 6               | 10% (10)          | During the Semester     | A2-1 ,A2-2 ,A2-3          |
|                                          | Assignments        | 10              | 10% (10)          | During the Semester     | A2-2 ,A2-3                |
|                                          | Student Attendance | 10              | 10% (10)          | During the Semester     | B1-1,B1-2                 |
|                                          | Projects / Lab.    | 10              | 10% (10)          | During the Semester     | A2-3                      |
|                                          | Report             | 1               | 10% (10)          | During Weeks # 12,13,14 | A2-1 ,A2-2 ,A2-3          |
| Summative assessment                     | Midterm Exam       | 2hr             | 10% (10)          | Week #9                 | -----                     |
|                                          | Final Exam         | 3hr             | 50% (50)          | Week #17                | -----                     |
| Total assessment                         |                    |                 | 100% (100)        |                         |                           |

| GRADING SCHEME (مخطط الدرجات) |                  |                     |           |                                       |
|-------------------------------|------------------|---------------------|-----------|---------------------------------------|
| Group                         | Grade            | التقدير             | Marks (%) | Definition                            |
| Success Group<br>(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<br>(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  |

