**Theory of Structures I**

**Course Description Form**

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| 1. Course Name: | | | | | | | | |
| Theory of Structures I | | | | | | | | |
| 1. Course Code: | | | | | | | | |
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| 1. Semester / Year: | | | | | | | | |
| First semester / Third year | | | | | | | | |
| 1. Description Preparation Date: | | | | | | | | |
| 1/10/2024 | | | | | | | | |
| 1. Available Attendance Forms: | | | | | | | | |
| In class | | | | | | | | |
| 1. Number of Credit Hours (Total) / Number of Units (Total) | | | | | | | | |
| The. 2 hr Pract. 2 hr Tut.1 hr / 3 Units | | | | | | | | |
| 1. Course administrator's name (mention all, if more than one name) | | | | | | | | |
| Name: Dr. Maloof mahmood  Email: maloof.mahmood@muc.edu.iq | | | | | | | | |
| 1. Course Objectives | | | | | | | | |
| **Course Objectives** | | | | 1. An ability to identify, formulate, and solve complex engineering  problems by applying principles of engineering, science, and  mathematics.  2. An ability to communicate effectively with a range of audiences.  3. An ability to function effectively on a team whose members together  provide leadership, create a collaborative and inclusive environment,  establish goals, plan tasks, and meet objectives. | | | | |
| 1. Teaching and Learning Strategies | | | | | | | | |
| **Strategy** | | 1. Using the whiteboard to explain the theoretical material and solve the examples and applications gradually and in logical sequential steps that are concluded and discussed by the students, leaving a period for listening to the students’ questions and answering them.  2. Using data show and display screen to explain and clarify some graphics and videos related to the subject during the lectures.  3. Using critical thinking and brainstorming to reach the main ideas related to the subject.  4. Recording some important lectures electronically to benefit from them and reviewing the material when needed by students. | | | | | | |
| 1. Course Structure | | | | | | | | |
| **Week** | **Hours** | | **Required Learning Outcomes** | | **Unit or subject name** | | **Learning method** | **Evaluation method** |
|  | 4 | | Explain the fundamental concepts of the theory of structures, including stability and determinacy of beams, trusses, and frames. | | Introduction to Theory of Structures | | Theoretical | Several Ways (Assignments) |
|  | 4 | | Stability and Determinacy of Beams, Trusses and Frames | | Several  (Assignments) |
|  | 4 | | Analyze statically determinate beams and draw accurate Shear Force Diagrams (S.F.D.), Bending Moment Diagrams (B.M.D.), and Axial Force Diagrams (A.F.D.) for various structural elements. | | Statically Determinate Beams | |
|  | 4 | | Drawings of Shear Force Diagram and Bending Moment Diagram of Beams | | Several Ways (Assignments) |
|  | 4 | | Illustrate structural diagrams for rigid frames, including those with sloped legs. | | Drawings of S.F.D. , B.M.D. and A.F.D. of Rigid Frames | | Several (Assignments) |
|  | 4 | | Drawings of diagrams for frames with sloped leg | | Several Ways (Assignments) |
|  | 4 | | Determine maximum values of internal forces using Influence Line (I.L.) methods. | | Determinations of max. values of I.L. | | Several Ways (Assignments) |
|  | 4 | | Drawings of I.L. for reactions of beams, shear force and bending moment | | Several (Assignments) |
|  | 4 | | Construct Influence Lines for reactions, shear forces, and bending moments in beams under uniform distributed loads (u.d.L.) and wheel loads. | | I.L. for beams with u.d.L passing over beams | | Several Ways (Exams + Assignments) |
|  | 4 | | I.L. for wheel loads passing over beams | | Monthly Exam |
|  | 4 | | Apply the Influence Line method to calculate maximum reactions, shear forces, and bending moments. | | Max. values for reactions ,shear force and bending moment by I.L. method. | | Several Ways (Assignments) |
|  | 4 | | Elastic Deformation of Beams by Strain Energy Method | | Several Ways (Assignments) |
|  | 4 | | Compute elastic deformations of beams using Strain Energy Method, Unit Load Method, and Conjugate Beam Method. | | Deflection by Unit Load Method | | Several Ways (Assignments) |
|  | 4 | | Conjugate Beam Method for Deflection | | Monthly Exam |
|  | 4 | | Develop problem-solving skills for structural analysis and design through regular assessments and practical applications. | | Monthly Exam | | Several (Assignments) |
| 1. Course Evaluation | | | | | | | | |
| 1. Final Exam: 60% 2. Monthly Exams: 15% 3. Reports and Assignments: 10% 4. Attendance and Daily Participation: 10% 5. Oral Evaluation: 5% | | | | | | | | |
| 1. Learning and Teaching Resources | | | | | | | | |
| Required textbooks (curricular books, if any) | | | | | | Hibbeler, Russell Charles, and Kiang-Hwee Tan. 2006. Structural Analysis. Pearson Prentice Hall Upper Saddle River. | | |
| Main references (sources) | | | | | |  | | |
| Recommended books and references (scientific journals, reports...) | | | | | | Nielson, Bryant G. 2022. Structural Analysis: Understanding Behavior. John Wiley & Sons. | | |
| Electronic References, Websites | | | | | |  | | |