

Module (Course Syllabus) Catalogue 2023-2024

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| College/ Institute | College of Engineering | | |
| Department | Highway Engineering Department | | |
| Module Name | STEEL STRUCTURES (STEEL DESIGN) | | |
| Module Code | HE408 | | |
| Semester | Semester Eight | | |
| Credits | 4 | | |
| Module type | Prerequisite | Core | Assist. |
| Weekly hours | 4 hours/week | | |
| Weekly hours (Theory) | (4) hrs. In Class | (162) hrs. Workload | |
| Weekly hours (Practical) | 0 | | |
| Lecturer (Theory) | Bakhtyar Nassih Najar | | |
| E-Mail & Mobile NO. | bakhtyar.najar@epu.edu.iq (0750-430-1936) | | |
| Lecturer (Practical) | 0 | | |
| E-Mail & Mobile NO. | | | |

Course Book

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| Course Description | <p>This course presents the basics of design of steel building structures, and is based on the unified specification, ANSI/AISC. This class will study the general material applicable to all steel structures. It will be followed to present member design, then the connection design. The principles of limit state design such as Allowable Stress Design (ASD) and Load and Resistance Factor Design (LRFD) approaches will be introduced to the students. LRFD will be considered used throughout the class. Tension members, compression members, flexural members, and finally members subject to combined bending and axial load will be studied. In addition, simple and eccentric steel connections will be discussed.</p> |
| Course objectives | <p>The main purpose for taking this Module:</p> <ol style="list-style-type: none">1. Introduce the student to material behavior and Load and Resistance Factor Design methodology.2. Introduce the student to AISC construction manual with its content and use.3. Familiarize the student with the design of steel members and connections. |
| Student's obligation | <ol style="list-style-type: none">1. Class starts on time. Late are not allowed.2. Quiz is expectable every week.3. Mobile telephone is not allowable in the study hall.4. Food and drinks are not allowable in the study hall |
| Required Learning Materials | <p>Concept of designing with steel. Using AISC code is the essential in this class for the students. The class is structured to learn member design. The topics included: Tension, Compression, Flexure, Shear, Beam Column, connection and more.</p> |
| Assessment scheme | <p>Individual, small group, and full class discussion; homework problems; examinations; and small group problem-solving sessions may be used to assess outcomes.</p> <p>Lecture, homework, and in-class group activities will be coordinated. Specific evaluation procedures will be defined during the first week of class. In general, grading will depend on weekly tests, homework, class participation, and a comprehensive final exam.</p> |

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| <p>Specific learning outcome:</p> | <p>Upon completion of the course student should be able to:</p> <p>Upon successful completion of this course, the students will be able to:</p> <p>a) The basics of structural loadings, load combinations.</p> <p>b) How to design structural steel members, and how to use the current design specification.</p> <p>c) The course will also introduce the student to design aids that are commonly used by practicing structural engineers. (Skills)</p> <p>i. Design and analysis of Tension members.</p> <p>ii. Design and analysis of compression members.</p> <p>iii. Design of base plate.</p> <p>iv. Design of beam-column.</p> <p>1. v. Design of bolts and welds.</p> |
| <p>Course References:</p> | <p>1. Manual of Steel Construction, 14th Edition, American Institute of Steel Construction, 2011 (Must have it with you during the lecture).</p> <p>1- 2. STEEL DESIGN, William T. Segui, Cengage Learning, 5th Edition, 2013</p> |

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| <p>100% Engineering Science Weekly plan:</p> | |
| <p>This course will cover all of following subjects:</p> <p>1) Introduction, Material Properties, Design Process.</p> <p>2) Tension Members: Strength, Effective Area, Staggered Bolts, Block Shear.</p> <p>3) Tension Members: Design, Misc. Topics Compression Members: Introduction, Column Theory.</p> <p>4) Compression Members: Strength, Local Stability, Effective Length.</p> <p>5) Compression Members: Design, Buckling Modes, Misc.</p> <p>Topics</p> | |

- 6) Beams: Introduction, Elastic and Plastic Moments, Strength of Compact.
- 7) Beams: Shear Strength, Deflections, Design.
- 8) Beam-Columns: Introduction, Interaction, Moment Amplification.
- 9) Beam-Columns: Members in Unbraced Frames, Design
- 10) Simple Connections: Bolts, Bolted Connections, Design.
- 11) Simple Connections: Weld, Welded Connections, Design
Eccentric Connections: Introduction.
- 12) Eccentric Connections: Eccentric Bolted Connections, Eccentric Welded Connections.