

**Ministry of Higher Education and Scientific Research  
Scientific Supervision and Scientific Evaluation Apparatus  
Directorate of Quality Assurance and Academic Accreditation  
Accreditation Department**



# **Academic Program and Course Description Guide**

**2025–2026**

## Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills, so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide includes the description of the **Master's Program in Structural Engineering** in the Department of Civil Engineering, College of Engineering, Al-Muthanna University, for the academic year 2025–2026. It has been prepared in a manner consistent with the requirements of postgraduate studies in Iraqi universities and in a way that reflects the specialized nature of the program in terms of its objectives, study plan, courses, and intended learning outcomes. In addition, the approved academic program description template circulated under the Studies Department letter No. T M3/2906 dated 3/5/2023 has been adopted in order to unify the formulation of program and course descriptions and to provide an approved academic and administrative reference that benefits students, faculty members, scientific committees, and the bodies responsible for quality assurance and academic accreditation.

In this regard, it is important to emphasize the significance of preparing academic program and course descriptions as an effective tool for ensuring the proper functioning of the educational process, improving its efficiency, and strengthening its ability to respond to scientific, research, and societal requirements.

## Concepts and terminology:

- **Academic Program Description:** The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.
- **Course Description:** Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.
- **Program Vision:** An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.
- **Program Mission:** Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.
- **Program Objectives:** They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.
- **Curriculum Structure:** All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.
- **Learning Outcomes:** A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.
- **Teaching and learning strategies:** They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

## Academic Program Description Form

**University Name:** Al-Muthanna University

**Faculty/Institute:** College of Engineering

**Scientific Department:** Department of Civil Engineering

**Academic or Professional Program Name:** Master's Program in Structural Engineering

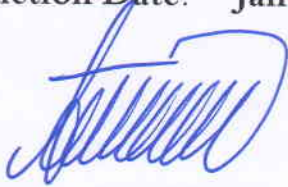
**Final Certificate Name:** Master of Science in Structural Engineering

**Academic System:** Semester System / Coursework and Thesis

**Description Preparation Date:** September/2025

**File Completion Date:** January/2026

**Signature:**



**Head of Department Name:**

Asst. Prof. Dr. Othman Hameed Zinkah

**Date:** January/2026

**Signature:**



**Scientific Associate Name:**

Asst. Prof. Dr. Furat Yasser Sharad

**Date:** January/2026

**The file is checked by:**

**Department of Quality Assurance and University Performance**

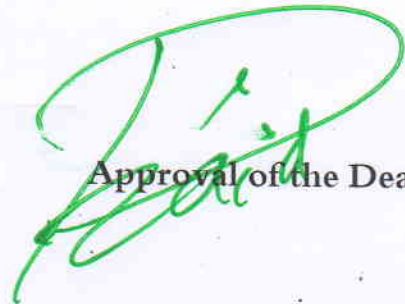
**Director of the Quality Assurance and University Performance Department:**

**Date:** January/2026

**Signature:**



**Approval of the Dean**



## **1. Program Vision**

The Program seeks academic and research excellence in the fields of structural engineering through preparing advanced scientific cadres who possess specialized knowledge and the ability to analyze, design, conduct research, and innovate, in a manner that contributes to the development of structural solutions, community service, support for sustainable development, and response to the requirements of scientific and professional advancement at the local and regional levels.

## **2. Program Mission**

The Program aims to prepare advanced academic and research cadres with solid specialized knowledge in the fields of structural analysis and design, capable of employing theoretical and numerical foundations as well as modern engineering software in addressing structural problems, conducting rigorous scientific research, and providing innovative and sustainable engineering solutions that contribute to community service and meet the needs of development and the labor market.

## **3. Program Objectives**

Our program is dedicated to preparing students to:

- Develop specialized academic cadres with advanced knowledge in the fields of structural engineering and the analysis and design of structures.
- Enhance research skills and analytical thinking in addressing structural problems using modern theoretical and numerical methods.
- Strengthen students' ability to use modern engineering software and tools in structural analysis, modeling, and design.
- Enable students to provide innovative and sustainable engineering solutions that respond to community needs and labor market requirements.

- Promote commitment to professional and ethical values and support continuous learning and academic development in the field of specializatio

#### 4. Program Accreditation

None

#### 5. Other external influences

None

#### 6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements				
College Requirements				
Department Requirements	12	22	62.86%	—
Summer Training	—	—	—	—
Thesis	1	11	31.43%	—
<b>Total</b>	13	33	100%	

\* This can include notes whether the course is basic or optional.

#### 7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
First Semester	MS-101	Technical English Language I	1	—

First Semester	MS-S101	Sustainable Engineering	2	—
First Semester	MS-S102	Advanced Reinforced Concrete	2	—
First Semester	MS-S103	Theory of Elasticity and Plasticity	2	—
First Semester	MS-S104	Advanced Structural Analysis	2	—
First Semester	MS-S105	Advanced Numerical Analysis	2	—
Second Semester	MS-201	Finite Element Analysis	2	—
Second Semester	MS-202	Research Methodology	2	—
Second Semester	MS-203	Technical English Language II	2	—
Second Semester	MS-S201	Structural Dynamics	2	—
Second Semester	MS-S202	Design of Precast and Prestressed Concrete	2	—
Second Semester	MS-S203	Plates and Shells	2	—

### 8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	Demonstrate advanced knowledge of concepts, theories, and scientific foundations in the fields of structural engineering.
Learning Outcomes 2	Understand the behavior of structures under different types of loads and comprehend advanced principles of structural analysis and design.
Learning Outcomes 3	Recognize the theoretical, numerical, and research-based foundations related to the analysis and interpretation of structural engineering problems.
Skills	
Learning Outcomes 1	Analyze structural engineering problems using appropriate scientific and mathematical methods.
Learning Outcomes 2	Employ specialized knowledge in evaluating structural systems and selecting appropriate solutions and alternatives.
Learning Outcomes 3	Apply scientific research skills in collecting, analyzing, and interpreting data in the field of structural engineering.
Learning Outcomes 4	Prepare academic and engineering research papers and reports in a well-organized scientific manner.
Learning Outcomes 5	Use modern software and methods in structural analysis, modeling, and design.

<b>Ethics</b>	
Learning Outcomes 1	Adhere to the ethics of scientific research and academic integrity in preparing studies and research.
Learning Outcomes 2	Assume professional responsibility in addressing structural issues in a manner that serves society and the public interest.
Learning Outcomes 3	Work in a spirit of cooperation and effective academic communication with instructors, researchers, and fellow students.
Learning Outcomes 4	Respect standards of quality, accuracy, and discipline in academic and professional performance.
Learning Outcomes 5	Adopt positive attitudes toward community service, sustainable development, and responsiveness to local needs.

<b>9. Teaching and Learning Strategies</b>
<ul style="list-style-type: none"> <li>▪ Specialized lectures.</li> <li>▪ In-class scientific discussions.</li> <li>▪ Research-based learning, including the preparation of reports and scientific presentations.</li> <li>▪ Analysis of engineering problems and study of practical cases.</li> <li>▪ Guided self-learning based on modern scientific sources.</li> <li>▪ Use of software and modern analytical methods.</li> <li>▪ Academic supervision in the preparation of research and the thesis.</li> </ul>

<b>10. Evaluation methods</b>
<ul style="list-style-type: none"> <li>▪ Written examinations.</li> <li>▪ Reports and assignments.</li> <li>▪ Presentations and seminars.</li> <li>▪ Class participation and scientific discussions.</li> <li>▪ Evaluation and defense of the thesis.</li> </ul>

<b>11. Faculty</b>
<b>Faculty Members</b>

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Prof. Dr. Issam Jawad Abdul Ali	Civil Engineering	Environmental Engineering			✓	
Prof. Dr. Hussein Yousif Aziz	Civil Engineering	Bridges and Tunnels			✓	
Prof. Dr. Basim Jabbar Abbas	Building and Construction Engineering	Geotechnical Engineering			✓	
Prof. Dr. Hussein Kareem Sultan	Civil Engineering	Structural Engineering			✓	
Assist. Prof. Dr. Othman Hameed Zinkah	Civil Engineering	Structural Engineering			✓	
Asst. Prof. Dr. Ali Khalil Ismail	Civil Engineering	Structural Engineering			✓	
Assist. Prof. Dr. Amjad Mohammed	Civil Engineering	Water Resources Engineering			✓	
Assist. Prof. Dr. Yousif Abdul Kadhim	Surveying Engineering	Remote Sensing			✓	
Assist. Prof. Dr. Talib Kamil Qasim	Civil Engineering	Geotechnical Engineering			✓	
Lect. Dr. Moataz Mohammed Al-Hassan	Civil Engineering	Structures				✓

### Professional Development

#### Mentoring new faculty members

- Preparing a comprehensive orientation program that explains the academic regulations and policies adopted by the university, college, and department.

- Involving new faculty members in pedagogical and training courses on modern teaching methods, classroom management, and assessment methods in higher education.
- Introducing them to the mechanisms of postgraduate studies and the requirements of academic and research supervision.
- Supporting their integration into the academic environment through follow-up and guidance by the scientific committees and the head of department

### **Professional development of faculty members**

- Encouraging participation in workshops and continuous training courses in the fields of teaching, scientific research, and modern educational technologies.
- Supporting scientific publication in reputable journals and attendance at local and international conferences and seminars.
- Providing opportunities for academic missions, research visits, and scientific cooperation with universities and other academic institutions for the exchange of expertise.
- Conducting periodic evaluation of teaching and research performance in order to identify individual developmental needs and improve the quality of academic performance.
- Promoting a culture of continuous development that positively reflects on the quality of the program and its educational and research outcomes.

## **12. Acceptance Criterion**

Applicants holding a Bachelor's degree in Civil Engineering are eligible for admission to the Master of Civil Engineering program, in accordance with the postgraduate studies regulations and the criteria approved by the Ministry of Higher Education and Scientific Research.

## **13. The most important sources of information about the program**

- \* Approved textbooks available in the department.
- \* Supporting books and references available in the library.
- \* Faculty lecture notes.

## **14. Program Development Plan**

1. Measuring Learning Outcomes (GOs):

- Assessment Tools: Exams, student evaluations, graduate surveys.
  - Standard: Achievement rate of 60% or higher.
  - Review: Annually by the department and faculty members.
2. Reviewing Program Educational Objectives (PEOs):
- Methods: Surveys for students, graduates, parents, faculty members, and employers.
  - Review: Every 4–6 years.
3. Accreditation Indicators (ICAEE):
- Curriculum Review: Courses, study plan, and sequencing of courses (every 3 years).
  - Follow-up: Graduation requirements, faculty competence, financial and administrative support (annually to every 2 years).
  - Evaluation: Infrastructure and services (as needed).

Program Skills Outline																
Required program Learning outcomes																
Year/L level	Course Code	Course Name	Basic or optional	Knowledge			Skills					Ethics				
				A1	A2	A3	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5
First Year	MS-101	Technical English Language I	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√
	MS-S101	Sustainable Engineering	Elective	√	√	√	√	√	√	√	√	√	√	√	√	√
	MS-S102	Advanced Reinforced	Elective	√	√	√	√	√	√	√	√	√	√	√	√	√
	MS-S103	Theory of Elasticity and	Elective	√	√	√	√	√	√	√	√	√	√	√	√	√
	MS-S104	Advanced Structural Analysis	Elective	√	√	√	√	√	√	√	√	√	√	√	√	√
	MS-S105	Advanced Numerical Analysis	Elective	√	√	√	√	√	√	√	√	√	√	√	√	√
	MS-201	Finite Element Analysis	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√
	MS-202	Research Methodology	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√
	MS-203	Technical English Language II	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√
	MS-S201	Structural Dynamics	Elective	√	√	√	√	√	√	√	√	√	√	√	√	√
	MS-S202	Design of Precast and Prestressed Concrete	Elective	√	√	√	√	√	√	√	√	√	√	√	√	√
	MS-S203	Plates and Shells	Elective	√	√	√	√	√	√	√	√	√	√	√	√	√

- Please tick the boxes corresponding to the individual program learning outcomes under evaluation.

# Program Description

## Course Description Form

<b>1. Course Name:</b>	
Technical English Language (I)	
<b>2. Course Code:</b>	
MS-103	
<b>3. Semester / Year:</b>	
First Semester / 2025-2026	
<b>4. Description Preparation Date:</b>	
01/09/2025	
<b>5. Available Attendance Forms:</b>	
Attendance	
<b>6. Number of Credit Hours (Total) / Number of Units (Total)</b>	
30 hrs. /1 Unit	
<b>7. Course administrator's name (mention all, if more than one name)</b>	
Name: Assist. Prof. Riyadh Dakhel Mansoor Email: <a href="mailto:riyadhdmu@mu.edu.iq">riyadhdmu@mu.edu.iq</a>	
<b>8. Course Objectives</b>	
<b>Course Objectives</b>	(a) Understand the five steps for successful reading and writing in English. (b) Understand how to use abbreviations in the engineering field and writing resume, progress report, activity report, test report, special purpose internal proposal, and questionnaire. (c) Increase skills in reading and writing memos and bar graphs, and use headings in a document. (d) Increase the ability to provide professional presentations and meetings. (e) Increase ability to write abstracts and use citation.
<b>9. Teaching and Learning Strategies</b>	
<b>Strategy</b>	An ability to apply knowledge of English Language; Reading, Writing, Speaking and Listening

10. Course Structure					
<i>Week</i>	<i>Hours</i>	<i>Required Learning Outcomes</i>	<i>Unit or subject name</i>	<i>Learning method</i>	<i>Evaluation method</i>
Week-1	2	D4, D3, D2, D1	Introduction to the steps for technical reading and writing in English.		Quiz

Week-2	2	D4, D3, D2, D1	Establishing purpose, identifying audience or readers, considering a context for writing, determining scope and coverage, and selecting the medium.	Report
Week-3	2	D4, D3, D2, D1	Brainstorm to determine what you already know and conduct research. Take note, interview for information, create and use questionnaires, avoid plagiarism, and document sources	Seminar
Week-4	2	D4, D3, D2, D1	Checking your writing: error correction – punctuate on and spelling. Writing an informal email	Exam
Week-5	2	D4, D3, D2, D1	Student Résumé for an entry level position (highlighting professional credentials). Writing résumé for applicant with management experience.	Quiz
Week-6	2	D4, D3, D2, D1	Advanced Résumé: Showing promotion within a single company, and combining functional and chronological elements.	Report
Week-7	2	D4, D3, D2, D1	Progress reports, activity reports, test reports, special purpose internal proposals, and questionnaires.	Seminar
Week-8	2	D4, D3, D2, D1	Writing a progress report, activity report, test report, special purpose internal proposal, and questionnaire. (continue)	Exam
Week-9	2	D4, D3, D2, D1	Typical Memo Format (Printed with Sender's Handwritten Initials)	Quiz
Week-10	2	D4, D3, D2, D1	Bar graph (quantities of different items during a fixed period). Bar (column) graph (showing the parts that make up the whole)	Report
Week-11	2	D4, D3, D2, D1	Headings used in a document.	Seminar
Week-12	2	D4, D3, D2, D1	Presentations and Meetings. Meeting agenda, e-mail to accompany an agenda, minutes of a meeting, slides for a presentation.	Exam

Week-13	2	D4, D3, D2, D1	Informative abstract		Quiz
Week-14	2	D4, D3, D2, D1	Documenting sources (e.g. APA, IEEE, MLA, etc.)		Report
Week-15	2	D4, D3, D2, D1	Final exam (date to be assigned later)		Seminar

### 11. Course Structure/ Lab

<i>Week</i>	<i>Hours</i>	<i>Required Learning Outcomes</i>	<i>Unit or subject name</i>	<i>Learning method</i>	<i>Evaluation method</i>
<i>Week-1</i>					
<i>Week-2</i>					
<i>Week-3</i>					
<i>Week-4</i>					
<i>Week-5</i>					
<i>Week-6</i>					
<i>Week-7</i>					
<i>Week-8</i>					
<i>Week-9</i>					
<i>Week-10</i>					
<i>Week-11</i>					
<i>Week-12</i>					
<i>Week-13</i>					
<i>Week-14</i>					
<i>Week-15</i>					

### 12. Course Evaluation

Quiz; 15 Mark, Exam; 10 Mark, Seminar; 5 Marks Final Exam; 70 Mark

### 13. Learning and Teaching Resources

Required textbooks (curriculum books, if any)	Philpot, S., & Curnick, L. (2013). Headway Academic Skills: Reading, Writing, and Study Skills: Level 2: Student's Book. Oxford University Press.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

## Course Description Form

<b>1. Course Name:</b>	
Sustainable Engineering	
<b>2. Course Code:</b>	
MS-S101	
<b>3. Semester / Year:</b>	
First Semester / 2025–2026	
<b>4. Description Preparation Date:</b>	
01/09/2025	
<b>5. Available Attendance Forms:</b>	
Attendance	
<b>6. Number of Credit Hours (Total) / Number of Units (Total)</b>	
30	
<b>7. Course administrator's name (mention all, if more than one name)</b>	
Name: Prof. Dr. Isam Alyaseri Email: <a href="mailto:ialyase@mu.edu.iq">ialyase@mu.edu.iq</a>	
<b>8. Course Objectives</b>	
<b>Course Objectives</b>	<p>Upon successful completion of this course, students are expected to be able to:</p> <ul style="list-style-type: none"> <li>• Describe the concepts and principles of sustainability and sustainable engineering.</li> <li>• Describe and apply the principles of design for environment and sustainability for analysis of consumer product, building, or infrastructure.</li> <li>• Apply life cycle assessment (LCA) methodology in their fields.</li> <li>• Build a life cycle inventory (LCI) and use LCA tools (i.e. SimaPro Software).</li> <li>• Understand the basics of pollution prevention during his/her work in field.</li> <li>• Analyze energy, water, construction, transportation, and all urban development in the context of sustainability.....</li> </ul>
<b>Teaching and Learning Strategies</b>	
<b>Strategy</b>	<p>The focus is on active, experiential, and student–centered approaches. These approaches include:</p>

**Project-Based Learning (PBL):** Students engage in hands-on, real-world design projects—such as renewable energy systems or green buildings—that require incorporating sustainability principles from the start.

**Case Studies and Problem-Based Learning:** Using real-world examples to analyze the environmental and social impacts of engineering decisions, which promotes critical thinking about sustainability trade-offs.

**System Thinking and Interdisciplinary Approaches:** Encouraging students to look at the entire lifecycle of a product or process, integrating environmental science, ethics, and economics into engineering design.

## 10. Course Structure

<i>Week</i>	<i>Hours</i>	<i>Required Learning Outcomes</i>	<i>Unit or subject name</i>	<i>Learning method</i>	<i>Evaluation method</i>
Week-1	2	Introduction. Concepts of Sustainability, green infrastructures, and Sustainable Engineering.			
Week-2	2	Concepts of Sustainability and Sustainable Engineering (continued). Social and economic aspects of Sustainability.			
Week-3	2	Green engineering and challenges faced by today's infrastructures. Discipline specific problems (e.g. buildings, roads, waste facilities) and common issues.	Project topic selection		
Week-4	2	Design for environment and sustainability: process, products, building, infrastructures, and constraints in engineering design.			
Week-5	2	Design for environment and sustainability (continued). Sustainability certification and indicator (e.g. LEED)			Quiz#1
Week-6	2	Life Cycle Assessment (LCA) and application (e.g. method, flow chart, boundary, limit, scope)	Building LCI for your project		
Week-7	2	Streamlining the LCA process. LCA modeling and tool (e.g. SimaPro software).	SimaPro tutorial		
Week-8	2	Engineering design and energy consumption			
Week-9	2	Engineering design and water consumption.	Project progress report		
Week-10	2	Urban infrastructures analysis and design. Extending the life and capacity of infrastructures through innovative technologies and creative management			
Week-11	2	Resources consumption and depletion			
Week-12	2	Sustainable Engineering for developing countries			Quiz#2
Week-13	2	Sustainability in corporation, government, and society			Report due date

Week-14	2	Class review.			Presentation of student projects. Project report due
Week-15		Final Exam (date to be decided by the department)			

11. Course Structure/ Lab					
<i>Week</i>	<i>Hours</i>	<i>Required Learning Outcomes</i>	<i>Unit or subject name</i>	<i>Learning method</i>	<i>Evaluation method</i>
<i>Week-1</i>					
<i>Week-2</i>					
<i>Week-3</i>					
<i>Week-4</i>					
<i>Week-5</i>					
<i>Week-6</i>					
<i>Week-7</i>					
<i>Week-8</i>					
<i>Week-9</i>					
<i>Week-10</i>					
<i>Week-11</i>					
<i>Week-12</i>					
<i>Week-13</i>					
<i>Week-14</i>					
<i>Week-15</i>					

12. Course Evaluation
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30% Student annual effort, 70% final

13. Learning and Teaching Resources
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Required textbooks (curricular books, if any)	T. E. Graedel & B. R. Allenby (2011) "Industrial Ecology and Sustainable Engineering", 1 <sup>st</sup> ed., Pearson/Prentice Hall, ISBN 0-13-600806-2
Main references (sources)	P. L. Bishop (2000) "Pollution Prevention Fundamentals and Practice", Waveland Press Inc. ISBN 1-57766-348-9.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

## Course Description Form

<b>1. Course Name:</b>	
Advanced Reinforced Concrete	
<b>2. Course Code:</b>	
MS-S102	
<b>3. Semester / Year:</b>	
First Semester/ 2025-2026	
<b>4. Description Preparation Date:</b>	
21/09/2025	
<b>5. Available Attendance Forms:</b>	
Attendance	
<b>6. Number of Credit Hours (Total) / Number of Units (Total)</b>	
30 hrs. /2hrs. per week/ 2 units	
<b>7. Course administrator's name (mention all, if more than one name)</b>	
Name: Hussein Kareem Sultan Email: <a href="mailto:Hussein.ksz@mu.edu.iq">Hussein.ksz@mu.edu.iq</a>	
<b>8. Course Objectives</b>	
<b>Course Objectives</b>	The goal of this material is to identify advanced concrete properties like ductility, control of deflection, and cracking, also to study the methods of design members of torsion, R.C. deep beam, R.C. brackets (corbel), and columns. This material will also look for pre-stressed concrete (introduction, analysis of Pre-stress member, losses in pre-stressed, flexural analysis of beam, pressure line or thrust line, concept of load balancing, and deflection).
<b>9. Teaching and Learning Strategies</b>	
<b>Strategy</b>	<ol style="list-style-type: none"> <li>1. Lectures.</li> <li>2. Tutorials.</li> <li>3. Homework and Assignments.</li> <li>4. Tests and Exams.</li> <li>5. In-Class Questions and Discussions.</li> <li>6. Connection between Theory and Application.</li> </ol>

### 10. Course Structure/ Theoretical

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	<b>Ductility:</b> Ultimate bending strength			
2	2	Limit state analysis of Local damage and cracking			
3	2	Limit state analysis - Control of deflection			
4	2	R.C. Deep Beam			

5	2	R.C. Brackets (Corbel)			
6	2	Development Length			
7	2	Columns			
8	2	Shear – friction design method			
9	2	Torsion			
10	2	Introduction, Analysis of Pre-stress Member			
11	2	Losses in pre-stressed			
12	2	Flexural analysis of beam			
13	2	Pressure line or thrust line			
14	2	Concept of load balancing			
15	2	Deflection			

### 11.Course Structure/ Practical

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1				
2	1				
3	1				
4	1				
5	1				
6	1				
7	1				
8	1				
9	1				
10	1				
11	1				
12	1				
13	1				
14	1				
15	1				

### 12.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

### 13.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Nilson and Darwin, 14 <sup>th</sup> edition
Main references (sources)	
Recommended books and references (scientific journals, reports...)	Jack C. McCormac & Russell H. Brown, 9 <sup>th</sup> edition
Electronic References, Websites	

## Course Description Form

<b>1. Course Name:</b>	
Advanced structural analysis	
<b>2. Course Code:</b>	
MS-S104	
<b>3. Semester / Year:</b>	
First Semester / 2025-2026	
<b>4. Description Preparation Date:</b>	
01/09/2025	
<b>5. Available Attendance Forms:</b>	
Attendance	
<b>6. Number of Credit Hours (Total) / Number of Units (Total)</b>	
30 hours	
<b>7. Course administrator's name (mention all, if more than one name)</b>	
Name: Moatez Mohammed Alhassan Email: <a href="mailto:Motaz.Alhassan@mu.edu.iq">Motaz.Alhassan@mu.edu.iq</a>	
<b>8. Course Objectives</b>	
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>• Classification of the structures</li> <li>• The kinematic and static indeterminacy</li> <li>• Stiffness matrix</li> <li>• Analysis of the beams using the stiffness matrix method</li> <li>• Analysis of the trusses using the stiffness matrix method</li> <li>• Analysis of the frames using the stiffness matrix</li> </ul>
<b>9. Teaching and Learning Strategies</b>	
<b>Strategy</b>	<p>By the end of this class, students will understand:</p> <ul style="list-style-type: none"> <li>▪ the classification of structures.</li> <li>▪ determine the kinematic and static indeterminacy, and learn the concept of the stiffness matrix.</li> </ul> <p>They will also be able to</p> <ul style="list-style-type: none"> <li>▪ apply the stiffness matrix method to analyze beams, trusses, and frames</li> <li>▪ calculate the corresponding displacements and internal forces.</li> </ul>

## 10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week-1	2	Understand concepts	Definition	In class	Exam
Week-2	2	Identify determinacy	Determinacy and indeterminacy of the structures	In class	Exam
Week-3	2	Determine DOF	Static and Kinematic indeterminacy of the structures	In class	Exam
Week-4	2	Derive stiffness	Stiffness matrix derivation	In class	Exam
Week-5	2	Analyze beams	Analysis of the beams using the stiffness matrix	In class	Exam
Week-6	2	Solve problems	Examples on beam analysis	In class	Exam
Week-7	2	Evaluate learning	First Exam	In class	
Week-8	2	Formulate stiffness	Stiffness matrix for trusses	In class	Exam
Week-9	2	Analyze trusses	Procedure of analyzing trusses using the stiffness matrix	In class	Exam
Week-10	2	Solve trusses	Examples on analyzing trusses	In class	Exam
Week-11	2	Formulate frames	Stiffness matrix for Frames	In class	Exam
Week-12	2	Analyze frames	Procedure of analyzing Frames using the stiffness matrix	In class	Exam
Week-13	2	Solve frames	Examples on analyzing Frames	In class	Exam
Week-14	2	Evaluate progress	Second Exam	In class	Exam
Week-15	2	Summarize topics	Review	In class	Exam

## 11. Course Evaluation

In the first semester, the assessment is distributed as follows: 12% for the first examination, 12% for the second examination, 1% for attendance, and 5% for quizzes and homework. Accordingly, the total coursework constitutes 30%, while the final examination accounts for 70%, making the overall evaluation 100%.

## 12. Learning and Teaching Resources

Required textbooks (curriculum books, if any)	<ol style="list-style-type: none"> <li>1- Ghali and Navile "Structural analysis a unified classical and matrix approach" 7<sup>th</sup> Edition, 2017, CRC Press.</li> <li>2- McGuire et. Al., Matrix Structural Analysis, 2<sup>nd</sup> Edition, 1999, Wiley.</li> <li>3- Weaver and Gere, Matrix Analysis of Framed Structures, 2<sup>nd</sup> Edition, 1990, CBS.</li> <li>Menon, Advanced Structural Analysis, 2<sup>nd</sup> Edition, 2009, Narosa</li> </ol>
Main references (sources)	<ol style="list-style-type: none"> <li>1- Ghali and Navile "Structural analysis a unified classical and matrix approach" 7<sup>th</sup> Edition, 2017, CRC Press.</li> <li>2- McGuire et. Al., Matrix Structural Analysis, 2<sup>nd</sup> Edition, 1999, Wiley.</li> <li>3- Weaver and Gere, Matrix Analysis of Framed Structures, 2<sup>nd</sup> Edition, 1990, CBS.</li> <li>Menon, Advanced Structural Analysis, 2<sup>nd</sup> Edition, 2009, Narosa</li> </ol>
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

## Course Description Form

<b>1. Course Name:</b>	
Theory of elasticity and plasticity	
<b>2. Course Code:</b>	
MS-S103	
<b>3. Semester / Year:</b>	
First Semester / 2025-2026	
<b>4. Description Preparation Date:</b>	
01/09/2025	
<b>5. Available Attendance Forms:</b>	
Attendance	
<b>6. Number of Credit Hours (Total) / Number of Units (Total)</b>	
30	
<b>7. Course administrator's name (mention all, if more than one name)</b>	
Name: Ali Khalil Ismael Al-Rifaie Email: <a href="mailto:ali.alrifaie@mu.edu.iq">ali.alrifaie@mu.edu.iq</a>	
<b>8. Course Objectives</b>	
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>▪ Understanding the response of materials in the elastic and plastic stage</li> <li>▪ Enhance the student's ability to analyse structures in the plastic stage</li> <li>▪ Develop the student's ability to compare between elastic and plastic response</li> </ul>
<b>9. Teaching and Learning Strategies</b>	
<b>Strategy</b>	The lecturer should explain the lecture contents to the student on the class. All related subjects are discussed in deep. Different problems are discussed and solved in the lecture. Reports are also required to be prepared by the student for more understanding

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week-1		Introduction to elasticity			
Week-2		Stress strain curves			

Week-3		Analysis of rigid columns- Introduction			
Week-4		Analysis of rigid columns			
Week-5		Analysis of elastic column- Introduction			
Week-6		Analysis of elastic columns			
Week-7		Exam-1			
Week-8		Combined elastic and plastic column analysis			
Week-9		Plastic bending- Introduction			
Week-10		Plastic bending analysis			
Week-11		Plastic moment capacity			
Week-12		Plastic analysis of beams			
Week-13		Plastic analysis of continuous beams			
Week-14		Failure theories			
Week-15		Exam-2			

### 11. Course Structure/ Lab

<i>Week</i>	<i>Hours</i>	<i>Required Learning Outcomes</i>	<i>Unit or subject name</i>	<i>Learning method</i>	<i>Evaluation method</i>
<i>Week-1</i>					
<i>Week-2</i>					
<i>Week-3</i>					
<i>Week-4</i>					
<i>Week-5</i>					
<i>Week-6</i>					
<i>Week-7</i>					
<i>Week-8</i>					
<i>Week-9</i>					
<i>Week-10</i>					
<i>Week-11</i>					
<i>Week-12</i>					
<i>Week-13</i>					
<i>Week-14</i>					
<i>Week-15</i>					

## 12. Course Evaluation

Exam-1: 10 marks  
Reopts and presentation: 10 marks  
Exam-2: 10 marks  
Final exam: 70 marks

## 13. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Strength of Materials by Popov
Main references (sources)	Strength of Materials by Hern
Recommended books and references (scientific journals, reports...)	NA
Electronic References, Websites	NA

## Course Description Form

1. Course Name:	
Advanced Numerical Analysis	
2. Course Code:	
MS-S105	
3. Semester / Year:	
First Semester / 2025-2026	
4. Description Preparation Date:	
01/09/2025	
5. Available Attendance Forms:	
Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
۳.	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Yousif A. Mousa Email: <a href="mailto:yousif.mousa@mu.edu.iq">yousif.mousa@mu.edu.iq</a>	
8. Course Objectives	
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. Developing Advanced Computational Skills – Equip students with numerical analysis methods to solve complex structural problems.</li> <li>2. Bridging Theory and Practice – Accurately apply mathematical models to actual engineering structures.</li> <li>3. Improving Problem-Solving Skills – Prepare students to work with nonlinear, dynamic, and large-scale structural systems.</li> <li>4. Enhancing Simulation and Modeling – Enable students to effectively use finite difference method and other numerical analysis methods in structural analysis.</li> <li>5. Promoting Critical Evaluation – Teach students how to assess the accuracy, stability, and convergence of numerical solutions.</li> <li>6. Supporting Design Innovation – Promote the use of advanced numerical analysis tools to improve structural performance and safety.</li> </ol>
9. Teaching and Learning Strategies	
<b>Strategy</b>	The main strategy that will be adopted in delivering this module is to encourage students' participation theoretically and practically, while at the same time refining and expanding their critical thinking skills. This will be achieved through lectures, interactive tutorials, and by considering fieldwork. Lectures are provided first as a pdf (e.g., in Google class),

	before being explained in the class. Then, students are given some examples to work on with some help
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10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week-1	2	Introduction to Advanced Numerical Methods (Approximation and Error)	Introduction to Advanced Numerical Methods (Approximation and Error)	Attendance	Daily Quiz
Week-2	2	Error Analysis, Stability, and Convergence in Numerical Solutions	Error Analysis, Stability, and Convergence in Numerical Solutions	Attendance	Discussion
Week-3	2	Solution of non-linear equations	Solution of non-linear equations	Attendance	Daily Quiz and Report
Week-4	2	Matrix Algebra and Computational Techniques	Matrix Algebra and Computational Techniques	Attendance	Daily Quiz
Week-5	2	System of linear equations	System of linear equations	Attendance	Daily Quiz
Week-6	2	Best fitting using least square adjustment	Best fitting using least square adjustment	Attendance	Reports
Week-7	2	First Exam	First Exam	Attendance	Exam
Week-8	2	Numerical Solution of First Ordinary Differential Equations (Euler Method)	Numerical Solution of First Ordinary Differential Equations (Euler Method)	Attendance	Discussion
Week-9	2	Numerical Solution of Second-order ODE (Taylor Method)	Numerical Solution of Second-order ODE (Taylor Method)	Attendance	Daily Quiz and Report

Week-10	2	Numerical Solution of Second-order ODE (Range-Kutta Method)	Numerical Solution of Second-order ODE (Range-Kutta Method)	Attendance	Daily Quiz
Week-11	2	Finite Difference Methods for Structural Analysis	Finite Difference Methods for Structural Analysis	Attendance	Discussion
Week-12	2	Second exam	Second exam	Attendance	Exam
Week-13	2	Case Studies and Computational Implementation in Structural Engineering	Case Studies and Computational Implementation in Structural Engineering	Attendance	Daily Quiz
Week-14	2	Presentation	Presentation	Attendance	Exam
Week-15	2	Final Review	Final Review	Attendance	Discussion

### 11. Course Structure/ Lab

<i>Week</i>	<i>Hours</i>	<i>Required Learning Outcomes</i>	<i>Unit or subject name</i>	<i>Learning method</i>	<i>Evaluation method</i>
<i>Week-1</i>					
<i>Week-2</i>					
<i>Week-3</i>					
<i>Week-4</i>					
<i>Week-5</i>					
<i>Week-6</i>					
<i>Week-7</i>					
<i>Week-8</i>					
<i>Week-9</i>					
<i>Week-10</i>					
<i>Week-11</i>					
<i>Week-12</i>					
<i>Week-13</i>					
<i>Week-14</i>					
<i>Week-15</i>					

### 12. Course Evaluation

Daily quizzes (5%)  
Exams (15%)  
Project (10%)  
Final exam (70%)

### 13. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Chapra, S. C., & Canale, R. P. (2009). Numerical methods for engineers. McGraw-Hill.
Main references (sources)	Kreyszig, E. (1999). Advanced engineering mathematics. John Wiley & Sons.
Recommended books and references (scientific journals, reports...)	Hibbeler, R. C. (2018). Mechanics of materials (10th ed.). Pearson Education.
Electronic References, Websites	

## Course Description Form

<b>1. Course Name:</b>	
Finite Element Analysis	
<b>2. Course Code:</b>	
MS-201	
<b>3. Semester / Year:</b>	
Second Semester / 2025–2026	
<b>4. Description Preparation Date:</b>	
01/09/2025	
<b>5. Available Attendance Forms:</b>	
Attendance	
<b>6. Number of Credit Hours (Total) / Number of Units (Total)</b>	
30 Hours	
<b>7. Course administrator's name (mention all, if more than one name)</b>	
Name: Othman Hameed Zinkaah Email: <a href="mailto:Othman.h.zinkaah@mu.edu.iq">Othman.h.zinkaah@mu.edu.iq</a>	
<b>8. Course Objectives</b>	
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. Understand the basic principles and applications of FEM.</li> <li>2. Formulate and solve finite element models for beams, trusses, plates, and shell elements.</li> <li>3. Develop strain–displacement relationships and analyze plane stress/strain problems.</li> <li>4. Apply commercial software such as ABAQUS for modeling and analysis.</li> <li>5. Interpret results and critically assess modeling assumptions.</li> </ol>
<b>9. Teaching and Learning Strategies</b>	
<b>Strategy</b>	<ul style="list-style-type: none"> <li>• Learn fundamental FEM principles and element formulations through lectures.</li> <li>• Solve numerical problems for beams, trusses, plates, and shell elements in tutorials.</li> <li>• Model and analyze structures using ABAQUS in lab sessions.</li> <li>• Complete assignments, reports, and quizzes to reinforce understanding and practical skills.</li> </ul>

## 10. Course Structure

<i>Week</i>	<i>Hours</i>	<i>Required Learning Outcomes</i>	<i>Unit or subject name</i>	<i>Learning method</i>	<i>Evaluation method</i>
<i>Week-1</i>	2	Explain the fundamental concepts and applications of FEM.	Introduction	Lecture, discussion	Quiz
<i>Week-2</i>	2	Derive stiffness formulation procedure for structural elements.	General Method for Deriving Stiffness Matrix	Lecture, derivation	Homework
<i>Week-3</i>	2	Formulate stiffness matrix of prismatic and non-prismatic beam elements.	Beam Elements	Lecture, problem solving	Assignment
<i>Week-4</i>	2	Develop truss element equations (prismatic & non-prismatic).	Truss Elements	Lecture, tutorial	Quiz
<i>Week-5</i>	2	Formulate torsion element stiffness relations.	Torsion Elements	Lecture, worked examples	Homework
<i>Week-6</i>	2	Analyze pile elements using FEM formulation.	Pile Elements	Lecture, case study	Assignment
<i>Week-7</i>	2	Apply plane stress and plane strain formulations.	Plane Stress & Strain	Lecture, numerical examples	Midterm Exam
<i>Week-8</i>	2	Develop strain–displacement relationships for 2D problems.	Strain–Displacement Relationship	Lecture, derivation practice	Homework
<i>Week-9</i>	2	Formulate bending equations of thin flat plates.	Bending of Thin Flat Plates (Part I)	Lecture	Quiz
<i>Week-10</i>	2	Construct triangular finite elements.	Triangular Elements	Lecture, computational examples	Assignment
<i>Week-11</i>	2	Formulate rectangular & quadrilateral elements.	Quadrilateral Elements	Lecture, derivation	Homework
<i>Week-12</i>	2	Evaluate rectangular element with 8 DOF.	Rectangular Element (8 DOF)	Lecture, analytical modeling	Quiz
<i>Week-13</i>	2	Analyze advanced bending behavior of thin plates.	Bending of Thin Flat Plates (Part II)	Lecture	Assignment
<i>Week-14</i>	2	Formulate and analyze flat shell elements.	Flat Shell Element	Lecture, modeling session	Project
<i>Week-15</i>	2	Develop and validate FEM models using commercial software.	FE Computer Programs – ABAQUS as an example	Computer Lab, practical training	Final Project / Oral Presentation

## 11. Course Evaluation

Final Written Exam / 70  
 Midterm Exam / 10  
 Monthly Exams / 10  
 Software Report (ABAQUS Project) / 10

## 12. Learning and Teaching Resources

Required textbooks (curricular books, if any) 1. Bathe, K.J., "Finite Element Procedures", 2nd Edition, Prentice Hall, 1996.

	<p>2. Cook, R.D., Malkus, D.S., Plesha, M.E., "Concepts and Applications of Finite Element Analysis", 4th Edition, Wiley, 2002.</p> <p>3. Reddy, J.N., "Introduction to the Finite Element Method", 3rd Edition, McGraw-Hill, 2006.</p>
Main references (sources)	<p>1. Zienkiewicz, O.C., Taylor, R.L., "The Finite Element Method: Its Basis and Fundamentals", Elsevier, 2000.</p> <p>2. Segerlind, L., "Applied Finite Element Analysis", 2nd Edition, Wiley, 1984.</p> <p>3. Rao, S.S., "Finite Elements in Engineering", Butterworth-Heinemann, 2011.</p>
Recommended books and references (scientific journals, reports...)	<p>1. Journals: *Finite Elements in Analysis and Design*, "Engineering Computations", *Computers &amp; Structures*.</p> <p>2. Technical Reports: American Concrete Institute (ACI) reports, American Society of Civil Engineers (ASCE) technical papers.</p>
Electronic References, Websites	<p>1. ABAQUS Documentation: <a href="https://www.3ds.com/products-services/simulia/products/abaqus/">https://www.3ds.com/products-services/simulia/products/abaqus/</a></p> <p>2. MIT OpenCourseWare – Finite Element Method: <a href="https://ocw.mit.edu/courses/mechanical-engineering/">https://ocw.mit.edu/courses/mechanical-engineering/</a></p> <p>3. NPTEL – Finite Element Method Video Lectures: <a href="https://nptel.ac.in/courses/112/105/112105066/">https://nptel.ac.in/courses/112/105/112105066/</a></p> <p>4. Research Databases: ScienceDirect, SpringerLink, Wiley Online Library.</p>

## Course Description Form

<b>1. Course Name:</b>	
Scientific Research Methodology	
<b>2. Course Code:</b>	
MS-202	
<b>3. Semester / Year:</b>	
First Semester / 2025-2026	
<b>4. Description Preparation Date:</b>	
01/09/2025	
<b>5. Available Attendance Forms:</b>	
Attendance	
<b>6. Number of Credit Hours (Total) / Number of Units (Total)</b>	
30	
<b>7. Course administrator's name (mention all, if more than one name)</b>	
Name: Prof. Dr. Isam Alyaseri Email: ialyase@mu.edu.iq:	
<b>8. Course Objectives</b>	
<b>Course Objectives</b>	<p>Upon successful completion of this course, students are expected to be able to:</p> <ul style="list-style-type: none"> <li>(a) Understand the eight steps for successful research conducting.</li> <li>(b) Understand how to recognize problems in your field, conduct a literature review to the publications related, and set a course for research in this field.</li> <li>(c) Increase skills in writing proposals and reports, collecting and treating data, understanding results, forming conclusions, setting recommendations, and providing professional presentations.</li> <li>(d) Increase ability to write abstracts, introductions, methodologies, results' reports, and use citation to your work.</li> </ul>
<b>9. Teaching and Learning Strategies</b>	
<b>Strategy</b>	<p>Effective teaching and learning strategies for research methodology focus on active learning blending theoretical knowledge with practical, hands-on experience. Key approaches include: case study analyses, research-based inquiry, and scaffolded, cumulative assignments (e.g., developing a hypothesis, collecting and then data analysis). The methods promote critical thinking and engagement. For example, the case study method: analyzing published research to understand methodology application, strengths,</p>

weaknesses, while the peer review & discussion means using "muddiest point" (identify least clear concepts) and peer review of work to improve understanding.

#### 10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week-1	2	Introduction: Reasons for doing research and the applications, paradigms, types, characteristics, and requirements of research processes. What to research, planning and conducting a study.			Assignment No. 1
Week-2	2	Step I: Conducting literature review, developing theoretical framework, formulating a research problem, and establishing operational definitions.			Assignment No. 2
Week-3	2	Step I: Identifying variables, types of variables, constructing hypotheses, testing hypotheses, and use of hypotheses in qualitative research.			Assignment No. 3
Week-4	2	Step II: Research design, important functions of research design, and theory of causality and the research design.			Assignment No. 4
Week-5	2	Step II: Differences between quantitative and qualitative study designs and strengths and weaknesses of different study designs.			Assignment No. 5
Week-6	2	Step III: Constructing an instrument for data collection, selecting a method of data collection, and major approaches to information gathering.			Assignment No. 6
Week-7	2	Step III: Constructing an instrument for data collection, attitudinal scales,			Monthly test-1

		developing an attitudinal scale, and measurement scales.			
Week-8	2	Step III: Constructing an instrument for data collection, types of validity in quantitative research, and concept of reliability.			Assignment No. 7
Week-9	2	Step IV: Selecting a sample, differences between sampling in qualitative and quantitative research, and types of sampling.			Assignment No. 8
Week-10	2	Step V: Writing a research proposal, purpose of a research proposal in quantitative and qualitative research, and how to structure it?			Assignment No. 9
Week-11	2	Step VI: Collecting data, research stakeholders, and ethical issues to consider research participants, researcher, and sponsoring organization.			Assignment No. 10
Week-12	2	Step VII: Processing and displaying data, edit and prepare data for coding, coding data in qualitative and quantitative studies, and role of statistics.			Monthly test-2
Week-13	2	Step VII: Processing and displaying data, and methods of communicating and displaying analyzed data in quantitative and qualitative research.			Assignment No. 11
Week-14	2	Step VIII: Writing a research report, develop an outline for a research report, different referencing systems, and writing a bibliography.			Assignment No. 12
Week-15		Practicing Evaluation: process for using evaluation to develop an intervention, different perspectives in classification, and process of evaluation.			Review

11. Course Structure/ Lab					
<i>Week</i>	<i>Hours</i>	<i>Required Learning Outcomes</i>	<i>Unit or subject name</i>	<i>Learning method</i>	<i>Evaluation method</i>
<i>Week-1</i>					
<i>Week-2</i>					
<i>Week-3</i>					
<i>Week-4</i>					
<i>Week-5</i>					
<i>Week-6</i>					
<i>Week-7</i>					
<i>Week-8</i>					
<i>Week-9</i>					
<i>Week-10</i>					
<i>Week-11</i>					
<i>Week-12</i>					
<i>Week-13</i>					
<i>Week-14</i>					
<i>Week-15</i>					

12. Course Evaluation
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30% Student annual effort, 70% final
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13. Learning and Teaching Resources
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Required textbooks (curricular books, if any)	Kumar, R. (2018). "Research methodology: A step-step guide for beginners". Sage.
Main references (sources)	Singh, Y. K. (2006). "Fundamental of research methodology and statistics". New Age International.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

## Course Description Form

<b>1. Course Name:</b>	
Technical English Language (II)	
<b>2. Course Code:</b>	
MS-203	
<b>3. Semester / Year:</b>	
Second Semester / 2025-2026	
<b>4. Description Preparation Date:</b>	
01/09/2025	
<b>5. Available Attendance Forms:</b>	
Attendance	
<b>6. Number of Credit Hours (Total) / Number of Units (Total)</b>	
30 hrs. /1 Unit	
<b>7. Course administrator's name (mention all, if more than one name)</b>	
Name: Assist. Prof. Amjad M. F. Hussein Email: Amjad.muhamad@mu.edu.iq	
<b>8. Course Objectives</b>	
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>(a) Understand the five steps for successful reading and writing in English.</li> <li>(b) Understand how to use abbreviations in the engineering field and writing resume, progress report, activity report, test report, special purpose internal proposal, and questionnaire.</li> <li>(c) Increase skills in reading and writing memos and bar graphs, and use headings in a document.</li> <li>(d) Increase the ability to provide professional presentations and meetings.</li> <li>(e) Increase ability to write abstracts and use citation.</li> </ul>
<b>9. Teaching and Learning Strategies</b>	
<b>Strategy</b>	An ability to apply knowledge of English Language; Reading, Writing, Speaking and Listening

## 10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week-1	2	D4, D3, D2, D1	Introduction to the steps for technical reading and writing in English.		Quiz
Week-2	2	D4, D3, D2, D1	Establishing purpose, identifying audience or readers, considering a context for writing, determining scope and coverage, and selecting the medium.		Report
Week-3	2	D4, D3, D2, D1	Brainstorm to determine what you already know and conduct research. Take note, interview for information, create and use questionnaires, avoid plagiarism, and document sources		Seminar
Week-4	2	D4, D3, D2, D1	Checking your writing: error correction – punctuate on and spelling. Writing an informal email		Exam
Week-5	2	D4, D3, D2, D1	Student Résumé for an entry level position (highlighting professional credentials). Writing résumé for applicant with management experience.		Quiz
Week-6	2	D4, D3, D2, D1	Advanced Résumé: Showing promotion within a single company, and combining functional and chronological elements.		Report
Week-7	2	D4, D3, D2, D1	Progress reports, activity reports, test reports, special purpose internal proposals, and questionnaires.		Seminar
Week-8	2	D4, D3, D2, D1	Writing a progress report, activity report, test report, special purpose		Exam

			internal proposal, and questionnaire. (continue)		
Week-9	2	D4, D3, D2, D1	Typical Memo Format (Printed with Sender's Handwritten Initials)		Quiz
Week-10	2	D4, D3, D2, D1	Bar graph (quantities of different items during a fixed period). Bar (column) graph (showing the parts that make up the whole)		Report
Week-11	2	D4, D3, D2, D1	Headings used in a document.		Seminar
Week-12	2	D4, D3, D2, D1	Presentations and Meetings. Meeting agenda, e-mail to accompany an agenda, minutes of a meeting, slides for a presentation.		Exam
Week-13	2	D4, D3, D2, D1	Informative abstract		Quiz
Week-14	2	D4, D3, D2, D1	Documenting sources (e.g. APA, IEEE, MLA, etc.)		Report
Week-15	2	D4, D3, D2, D1	Final exam (date to be assigned later)		Seminar

### 11. Course Structure/ Lab

<i>Week</i>	<i>Hours</i>	<i>Required Learning Outcomes</i>	<i>Unit or subject name</i>	<i>Learning method</i>	<i>Evaluation method</i>
<i>Week-1</i>					
<i>Week-2</i>					
<i>Week-3</i>					
<i>Week-4</i>					
<i>Week-5</i>					
<i>Week-6</i>					
<i>Week-7</i>					
<i>Week-8</i>					
<i>Week-9</i>					
<i>Week-10</i>					
<i>Week-11</i>					
<i>Week-12</i>					
<i>Week-13</i>					
<i>Week-14</i>					
<i>Week-15</i>					

### 12. Course Evaluation

Quiz; 15 Mark, Exam; 10 Mark, Seminar; 5 Marks Final Exam; 70 Mark

### 13. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Philpot, S., & Curnick, L. (2013). Headway Academic Skills: Reading, Writing, and Study Skills: Level 2: Student's Book. Oxford University Press.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

## Course Description Form

<b>1. Course Name:</b>	
Structural Dynamics	
<b>2. Course Code:</b>	
MS-S201	
<b>3. Semester / Year:</b>	
Second Semester/ 2025-2026	
<b>4. Description Preparation Date:</b>	
1/02/2026	
<b>5. Available Attendance Forms:</b>	
Attendance	
<b>6. Number of Credit Hours (Total) / Number of Units (Total)</b>	
30hrs. /2hrs. per week/ 2 units	
<b>7. Course administrator's name (mention all, if more than one name)</b>	
Name: Hussein Kareem Sultan Email: <a href="mailto:Hussein.ksz@mu.edu.iq">Hussein.ksz@mu.edu.iq</a>	
<b>8. Course Objectives</b>	
<b>Course Objectives</b>	Introduction, Single degree freedom systems, Damping, Impact, earthquake and blast loads, Elastic response spectra Fourier series, Response of SDF system, Time history analysis of SDF system, Multi degree of freedom systems, Application to multi-storey buildings, Vibration of continuous systems, Introduction to inelastic response spectra
<b>9. Teaching and Learning Strategies</b>	
<b>Strategy</b>	<ol style="list-style-type: none"> <li>1. Lectures.</li> <li>2. Tutorials.</li> <li>3. Homework and Assignments.</li> <li>4. Tests and Exams.</li> <li>5. In-Class Questions and Discussions.</li> <li>6. Connection between Theory and Application.</li> </ol>

10. Course Structure/ Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction			
2	2	Single degree freedom systems			
3	2	Damping			
4	2	Impact, earthquake and blast loads			
5	2	Elastic response spectra Fourier series			
6	2	Monthly Exam-1			

7	2	Response of SDF system			
8	2	Time history analysis of SDF system			
9	2	Multi degree of freedom systems			
10	2	Application to multi-storey buildings			
11	2	Vibration of continuous systems			
12	2	Introduction to inelastic response spectra			
13	2	Single degree freedom systems			
14	2	Damping Viscous			
15	2	Monthly Exam-2			

### 11.Course Structure/ Practical

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1				
2	1				
3	1				
4	1				
5	1				
6	1				
7	1				
8	1				
9	1				
10	1				
11	1				
12	1				
13	1				
14	1				
15	1				

### 12.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

### 13.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Hilmi Luş, Sinan Keten, Structural Dynamics, 30 – 0 2024
Recommended books and references (scientific journals, reports...)	Mario Paz, William Leigh, Structural Dynamics, The and Computation Fifth Edition
Electronic References, Websites	

## Course Description Form

<b>1. Course Name:</b>	
Precast and prestress Concrete design I	
<b>2. Course Code:</b>	
MS-S202	
<b>3. Semester / Year: 2025-2026</b>	
Second Semester / 2025-2026	
<b>4. Description Preparation Date:</b>	
10/02/2026	
<b>5. Available Attendance Forms:</b>	
Attendance	
<b>6. Number of Credit Hours (Total) / Number of Units (Total)</b>	
30	
<b>7. Course administrator's name (mention all, if more than one name)</b>	
Name: HusseinYousif Aziz Email: <a href="mailto:huseinyousifaziz@mu.edu.iq">huseinyousifaziz@mu.edu.iq</a>	
<b>8. Course Objectives</b>	
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>▪ Learning</li> <li>▪ Analysis</li> <li>▪ Design</li> </ul>
<b>9. Teaching and Learning Strategies</b>	
<b>Strategy</b>	Theoretical Study

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week-1	3	Design and Analysis	Analysis of Prestress	Theoretical	Written exam and quizzes
Week-2	3	Design and Analysis	Analysis of Prestress	Theoretical	Written exam and quizzes
Week-3	3	Design and Analysis	Analysis of Prestress	Theoretical	Written exam and quizzes

Week-4	3	Design and Analysis	Analysis of Prestress	Theoretical	Written exam and quizzes
Week-5	3	Design and Analysis	Analysis of Prestress	Theoretical	Written exam and quizzes
Week-6	3	Design and Analysis	Analysis of Prestress	Theoretical	Written exam and quizzes
Week-7	3	Design and Analysis	Analysis of Prestress	Theoretical	Written exam and quizzes
Week-8	3	Design and Analysis	Analysis of Prestress	Theoretical	Written exam and quizzes
Week-9	3	Design and Analysis	Analysis of Prestress	Theoretical	Written exam and quizzes
Week-10	3	Design and Analysis	Analysis of Prestress	Theoretical	Written exam and quizzes
Week-11	3	Design and Analysis	Prestress Concrete Design	Theoretical	Written exam and quizzes
Week-12	3	Design and Analysis	Prestress Concrete Design	Theoretical	Written exam and quizzes
Week-13	3	Design and Analysis	Prestress Concrete Design	Theoretical	Written exam and quizzes
Week-14	3	Design and Analysis	Prestress Concrete Design	Theoretical	Written exam and quizzes
Week-15	3	Design and Analysis	Prestress Concrete Design	Theoretical	Written exam and quizzes

### 11. Course Structure/ Lab

<i>Week</i>	<i>Hours</i>	<i>Required Learning Outcomes</i>	<i>Unit or subject name</i>	<i>Learning method</i>	<i>Evaluation method</i>
<i>Week-1</i>					
<i>Week-2</i>					
<i>Week-3</i>					
<i>Week-4</i>					
<i>Week-5</i>					
<i>Week-6</i>					
<i>Week-7</i>					
<i>Week-8</i>					
<i>Week-9</i>					
<i>Week-10</i>					
<i>Week-11</i>					
<i>Week-12</i>					
<i>Week-13</i>					

<i>Week-14</i>					
<i>Week-15</i>					

## 12. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

1. Daily Exam (Quiz): 10
2. Class activity: 5
3. Monthly Exams: 15
4. Final Exam: 70

## 13. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Prestress Books
Main references (sources)	Ferguson
Recommended books and references (scientific journals, reports...)	scientific journals, reports
Electronic References, Websites	Electronic References, Websites

## Course Description Form

14.	Course Name:
Plates and Shells	
15.	Course Code:
MS-S203	
16.	Semester / Year:
Second Semester / 2025-2026	
17.	Description Preparation Date:
19/1/2026	
18. Available Attendance Forms:	
Attendance	
19. Number of Credit Hours (Total) / Number of Units (Total)	
20.	Course administrator's name (mention all, if more than one name)
Name: Talib. K. Q. Alsheakayree Email: <a href="mailto:talib.alsheakayree@mu.edu.iq">talib.alsheakayree@mu.edu.iq</a>	
21.	Course Objectives
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. Understanding Theory: To provide a solid theoretical foundation in the mechanics of plates and shells, including classical theories and modern approaches.</li> <li>2. Analytical Skills: To develop analytical and computational skills necessary for solving complex problems related to the behavior of plates and shells under various loading conditions.</li> <li>3. Material Behavior: To explore the material properties and behavior of different types of plates and shells, including isotropic, composite, and anisotropic materials.</li> <li>4. Design Applications: To apply knowledge of plates and shells to real-world engineering problems, including design considerations, failure modes, and optimization techniques.</li> <li>5. Numerical Methods: To introduce numerical methods and finite element analysis (FEA) techniques for modeling and analyzing plates and shells.</li> <li>6. Interdisciplinary Connections: To connect principles from structural engineering, materials science, and applied mechanics, fostering a multidisciplinary approach to problem-solving.</li> </ol>

7. Research Exposure: To expose students to current research trends and advancements in the field, encouraging critical thinking and innovation.
8. Ethical Considerations: To instill an understanding of the ethical responsibilities of engineers in the design and analysis of structures, ensuring safety and sustainability.

## 22. Teaching and Learning Strategies

<b>Strategy</b>	<ol style="list-style-type: none"> <li>9. Interactive lectures with worked examples and problem-solving sessions.</li> <li>10. Flipped classroom approach for selected topics (students study material before class).</li> <li>11. Computer-aided learning using MATLAB and finite element software (ANSYS) for simulation assignments.</li> <li>12. Weekly homework sets covering both analytical and numerical problems.</li> <li>13. Small group projects on real-world plate/shell structures (e.g., water tanks, aircraft panels).</li> <li>14. Regular quizzes and midterm exams to assess progressive understanding.</li> <li>15. Laboratory sessions dedicated to practical modelling and verification of theoretical results.</li> </ol>
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## 23. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week-1	2	Define thin plates, recall assumptions of plate theory.	Introduction to plates: classification, Kirchhoff-Love hypotheses.	Lecture, discussion	Oral questions
Week-2	2	Derive the governing equation for bending of thin plates.	Small-deflection theory of thin plates (Lagrange equation).	Lecture, derivation	Homework #1
Week-3	2	Solve rectangular plates with simply supported edges.	Navier's solution for double-sinusoidal loading.	Lecture, example	Quiz 1
Week-4	2	Apply Levy's method for other boundary conditions.	Levy's solution for rectangular plates.	Lecture, problem solving	Homework #2
Week-5	2	Analyze circular plates under	Bending of circular plates: governing	Lecture, case study	Quiz 2

		axisymmetric loading.	equations, clamped & simply supported.		
Week-6	2	Introduce thick plate theory.	First-order shear deformation theory (Mindlin-Reissner).	Lecture, comparison	Homework #3
Week-7	2	Determine buckling loads for plates.	Elastic buckling of rectangular plates under in-plane loads.	Lecture, derivation	Quiz 3
Week-8	2	Synthesize knowledge through midterm exam.	Midterm Exam	Exam	Written exam
Week-9	2	Understand geometry of shells, classification.	Introduction to shells: surfaces, curvatures, strain-displacement relations.	Lecture, visual aids	Oral discussion
Week-10	2	Derive membrane equations for shells of revolution.	Membrane theory of shells: cylindrical, spherical.	Lecture, examples	Homework #4
Week-11	2	Apply bending theory to cylindrical shells.	Bending of circular cylindrical shells (Donnell's equations).	Lecture, derivation	Quiz 4
Week-12	2	Analyze shells under symmetric and asymmetric loads.	Solutions for cylindrical shells with various boundary conditions.	Lecture, problem solving	Homework #5
Week-13	2	Use finite element method for plate/shell analysis.	Introduction to FEM for plates and shells (elements, modelling).	Computer demonstration, lecture	Mini-project proposal
Week-14	2	Examine practical applications.	Case studies: water tanks, roof domes, pressure vessels.	Group discussion, presentation	Project progress report
Week-15	2	Review and integrate all topics.	Final Review	Interactive revision session	Preparation for final exam

## 24. Course Evaluation

Assessment Method	Weight (%)
Midterm Exam	20%
Final Exam (theoretical)	70%
Quizzes & Homework	10%
<b>Total</b>	<b>100%</b>

## 25. Learning and Teaching Resources

Required textbooks (curricular books any)	
Main references (sources)	<ol style="list-style-type: none"><li>1. Plates and Shells Theory and analysis .... By Ansel C. Ugural</li><li>2. Theory of Plates and Shells .... By S. Timoshenko</li><li>3. Theory and analysis of elastic plates and Shells .... By J.N. Reddy</li><li>4. Thin plates and Shells theory analysis and Application .... Eduard Ventsel and Theodor Krauthammer</li></ol>
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	