

Sana'a University
Faculty of Engineering
Department Civil Engineering



Master of Science in Structural Engineering

Program Specifications

June - 2021

Faculty of Engineering, Sana'a University

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University of Sana'a
 Faculty of Engineering
 Department: Civil Engineering
 Title of the Program:
 Master of Science in Structural Engineering



Program Specification

1. Program Introduction/Description

This program is designed to provide in-depth theoretical knowledge and research in structural engineering field. Courses encompasses the cores and electives, which mainly on structural behavior, analysis, and design of different structural systems.

2. Program Identification and General Information

Program Title	Master of Science in Structural Engineering
Awarding Institution	Sana'a University
Department	Department of Civil Engineering
Other Departments with major Teaching Contributions	-
Language of study	English Language.
Date of Specification Preparation/Revision	May 2021
Mode of Study	Full time
Study System	Courses & Thesis
Main Location of Study	Faculty of Engineering/Sana'a University
Mode of Delivery	Full-time
Study Duration	Minimum: 2 Academic years (Two terms each, full-time) Maximum: 3 Academic years (two terms each - full time)
Award(s) or Final Award	Master of Science in Structural Engineering
Qualification required to join the program:	BSc. in Civil Engineering or any other equivalent field
Minimum grade requirements to enroll in the program	Good 65%
Other admission requirements	Detailed below
Name of the program coordinator	Prof. Dr. Ahmed Hasan Alwathaf
Approval date:	

3. Program Curriculum Committee:

Prof. Dr. Hamoud Ahmed Ahmed Al-Dafiry	Dr. Mohammad Abdulla Ismail Algorafi
Prof. Dr. Hassan Saad Mohamed Abdulmoghni	Dr. Mohamed Abdullah Abdo Ahmed
Prof. Dr. Abdulmalek Haza'a Al-Jolahy	Dr. Abdulwahab Mohamed Al-Nono
Dr. Sulaiman Ismail Haider Al-Safi	Dr. Abdulkareem Yahya Al-Khatabi
Prof. Dr. Ahmed Hasan Ahmed Alwathaf	Dr. Ibrahem Mohammed Alshaikh

Head of the Department	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Algorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Prof. Dr. Huda Al-Emad
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4. Vision, Mission & Aims of the University

Vision of the University

Sana'a University aspires to achieve a national leading role in teaching, learning, scientific research and community service; and to be among the best regional universities and the foremost house of expertise and think tank in Yemen.

Mission of the University

To contribute to the sustainable development efforts by providing an accredited higher education environment and excellent research services within a fruitful national partnership based on transparency, professionalism and creativity.

Aims of the University

The University seeks to achieve the following objectives:

1. To provide specialized and in-depth academic opportunities for students in different fields of knowledge to meet the country's needs of specialties, technicians and experts, with special focus on the following:
2. To boost the level and quality of preparation and qualification tasks.
3. To create a general culture aiming at developing the elements of sound Islamic personality and the proper cognitive and scientific training.
4. To stabilize the true Islamic vision emanating from the broad horizons of Islamic knowledge and its perception of the universe, man and life.
5. To develop innovative and critical scientific thinking skills.
6. To provide students with the required knowledge and scientific and applied skills for solving problems effectively and efficiently.

5. Vision, Mission & Aims of the Faculty

Vision of the Faculty

To excel in engineering education & scientific research with distinction at the local and regional levels.

Mission of the Faculty

To provide excellent and accredited engineering education to meet the development needs and match the labor market requirements locally and regionally.

Aims of the Faculty

1. To offer study programs in various fields of knowledge and equip students with required knowledge and scientific and know-how skills to utilize them in resolving problems effectively and efficiently.
2. To develop positive trends towards engineering science and its accelerating developments and

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enable students to use the techniques and methods of conducting scientific research in engineering fields.

3. To develop skills of scientific, innovative and critical thinking as well as the concept of continuous self-education.
4. To strengthen scientific ties with national and international colleges, scientific bodies, and research & development centers.
5. To provide technical and specialized studies and consultations to various state bodies and institutions, both public and semi-public, and utilize them in resolving the environment and society issues to promote sustainable development.
6. To develop a spirit of co-operation, group work, effective leadership, sense of responsibility, and ethical commitment.

6. Mission & Aims of the Department

Mission of the Department

To provide students with good quality Civil Engineering education that prepares them to be qualified and committed professionals who could pursue graduate studies and research and play a leading role in the sustainable development of the country and its integration into the regional economy.

Aims of the Department

1. Provide a high-quality educational experience through an appropriate depth over the full range of core engineering subject areas for undergraduate and postgraduate programs.
2. Applying the quality assurance standards and targeting the academic accreditation levels (local, regional and international levels).
3. Serving the community and labor market needs through the consultancy, research, laboratory tests and training services.

7. Vision, Mission & Aims of the Program

Vision of the Program

To be distinguished post-graduate program education & scientific research in structural engineering, locally and regionally.

Mission of the Program

To graduate well qualified post-graduate students in the field of structural engineering and research through qualified academic program, staff, and suitable infrastructure that meet the development requirements as well as local and regional labor markets.

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Aims of the Program	
1.	To provide specialized studies and encourage fundamental and applied research in different structural engineering disciplines.
2.	To bridge the gap between the academic educational and industrial and technological environment.
3.	To provide graduates with up-to-date advanced knowledge and skills needed to create high-quality systems, attain the excellence in structural engineering and solve the technical problems and challenges in structural industry.
4.	To contribute effectively to the structural engineering profession by applying ethical practices and communication skills, sharing innovative and clear ideas and pursuing further education through lifelong learning
5.	To graduate researchers in structural engineering disciplines who can pursue further studies and contribute to the scientific research community.

8. Program Standards & Benchmarks	
Program Standards	
1.	The Quality Assurance Agency for Higher Education (QAA), Subject Benchmark – Engineering 2019.
2.	Engineering Technology Accreditation Commission, Accreditation Board for Engineering and Technology (ABET), 2019-2020.
Program Benchmarks	
1.	MSc Advanced Structural Engineering Cluster Program, Imperial College, UK.
2.	MSc Structural Engineering Program, Brunel University, UK.
3.	MSc Civil Engineering/Structural Engineering Program, King Saud University, KSA
4.	MSc Structural Engineering Program, University Science Malaysia (USM), Malaysia
5.	MSc Civil Eng./Structural Engineering and Mechanics Program, University of Washington, USA
6.	MSc Civil Engineering/Structural Engineering Program, University of Jordan, Jordan

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9. Summary of Similar Programs (Benchmarks) for Structural Engineering Program

	The Similar Programs (Benchmarks)						Current Program
	1 st Program	2 nd Program	3 rd Program	4 th Program	5 th Program	6 th Program	
Program Title	MSc Advanced Structural Engineering Cluster	MSc Structural Engineering	MSc Civil Engineering /Structural Engineering	MSc Structural Engineering	MSc Civil Eng./Structural Engineering and Mechanics	MSc Civil Engineering /Structural Engineering	MSc. in Structural Engineering
Faculty	Faculty of Engineering	College of Engineering, Design and Physical Sciences	College of Engineering	School of Civil Engineering	College of Engineering	Faculty of Engineering and technology	Faculty of Engineering
University	Imperial College	Brunel University	King Saud University	University Science Malaysia (USM)	University of Washington	University of Jordan	Sana'a University
Country	UK	UK	KSA	Malaysia	USA	Jordan	Yemen
Type of Program	Courses + project/dissertation	Courses + dissertation	Courses + thesis	Courses + thesis	Courses + thesis	Courses + thesis	Courses + thesis
Study methods in the program:	Full-time	Full-time	Full-time	Full-time	Full-time	Full-time	Full-time
Number of semesters	Maximum =4 Minimum =2	Maximum =4 Minimum =2	Maximum =8 Minimum =4	Maximum =6 Minimum =2	Maximum =6 Minimum =4	Maximum =6 Minimum =4	Maximum =6 Minimum =4
Total Credit Hours (without Thesis)	60	135	24	20	33	24	30
No. of Compulsory Courses (with Faculty requirement)	5	9	5	4	4	6	6
Credit Hours for Compulsory Courses	25	135	15	16	12	18	18
No. of Elective Courses	7	--	3	2	7	2	4
Credit Hours for Elective Courses	35	--	9	4	21	6	12
Complementary courses to join the program and their	--	--	--	--	--	--	--

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9. Summary of Similar Programs (Benchmarks) for Structural Engineering Program

number							
Credit Hours for Thesis	30	60	6	20	9	9	6
Total Credit Hours for courses & Thesis	90	195	30	40	42	33	36
The period for thesis completion	Max =2 semesters Min =1 semester	Max =2 semesters Min =1 semester	Max =4 semesters Min =2 semesters	Max =6 semesters Min =2 semesters	Max =6 semesters Min =4 semesters	Max =4 semesters Min =2 semesters	Min.=2 semesters Max.=4 semesters
The min. period to complete the program	2 semesters	2 semesters	4 semesters	2 semesters	4 semesters	4 semesters	4 semesters
The max. period to complete the program	4 semesters	4 semesters	8 semesters	6 semesters	6 semesters	6 semesters	6 semesters

10. Program Intended Learning Outcomes (PILOs)

A. Knowledge and Understanding

Upon successful completion of the Master of Science in Structural Engineering Program, graduates should be able to:

A1.	Demonstrate in depth understanding of knowledge of applied mathematics and engineering science to the field of structural engineering.
A2.	Recognize and explain the contemporary engineering technologies and issues in the specialization field of structural engineering.
A3.	Explain in-depth the principles of sustainable design and development of structural engineering.
A4.	Acquire advanced knowledge of research principles and methods applicable to the field of work or academic in structural engineering and related fields.

B. Intellectual Skills

Upon successful completion of the Master of Science in Structural Engineering Program, graduates should be able to:

B1.	Assess, select and apply appropriate principles, methodologies, techniques, tools and packages in the analysis, specification, development and evaluation of structural engineering systems.
B2.	Identify, formulate, analyze research and solve complex structural engineering problems.
B3.	Apply acquired knowledge of analysis and design for complex structural engineering systems and implementation process.

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10. Program Intended Learning Outcomes (PILOs)

C. Practical and Professional Skills

Upon successful completion of the Master of Science in Structural Engineering Program, graduates should be able to:

C1.	Develop research to solve structural engineering problems.
C2.	Use advanced methodology and skills to solve structural engineering problems.
C3.	Design structural system, component, or process to meet desired needs within realistic constraints.

D. Key Transferrable Skills

Upon successful completion of the Master of Science in Structural Engineering Program, graduates should be able to:

D1.	Prepare a complete thesis and term-courses works/ tasks, write their documents and defend on them.
D2.	Demonstrate ethical principles, awareness of professional and ethical responsibility as well as knowledge of the standards utilized in related fields.
D3.	Conduct independently and communicate research that advances and extends knowledge and scholarship in related fields.
D4.	Own intellectual independence, with initiative and creativity in new situations and/or for further learning, plan and execute original research with full responsibility and accountability for personal outputs.

11. Teaching Strategy to Achieve Program Learning Outcomes

ILOs	Teaching Strategy	Assessment Methods
A1	Lectures, Seminars, Active learning, Self-Learning, Independent study, Computer hands-on sessions, Laboratory works	Written Exam, Assignments, Quizzes, Oral discussion, Experimental and field work, Laboratory Report
A2		
A3		
A4		
B1	Lectures, Analysis and Problem Solving, Seminars, Project supervision, Laboratory works, Self-Learning, Simulation exercises, independent study, Brain storming, Research Presentations	Written Exam, Assignments, Quizzes, Course project and Course research, Oral discussion, Experimental and field work, Laboratory Report
B2		
B3		
C1	Lectures, Analysis and Problem Solving, Seminars, Project supervision, Laboratory works, Self-Learning, Simulation exercises, independent study, Brain storming, Research Presentations	Written Exam, Assignments, Quizzes, Course project and Course research, Oral discussion, Experimental and field work, Laboratory Report
C2		
C3		
D1	Dissertation supervision, independent study, presenting reports, Brainstorming, presenting researches, Publish research papers, Survey	Written research proposal, thesis and publication, Written Exam, Assignments, Experimental and field work, laboratory report, survey, presentation, written report.
D2		
D3		
D4		

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Teaching Strategy	Description of the Main Strategy Used
Lectures.	These are interactive lectures weekly conducted according to course plan in a classroom and supported with variety of teaching formats including, lectures and multimedia presentations, use of whiteboard and solved examples, and class discussions, in which concepts, approaches, and case studies are presented, explored, and shown students what they need to know.
Independent study	Independent study is an individualized learning experience that allows students to select a topic focus, define problems or questions, gather and analyze information, apply skills, and create a product to show what has been learned.
Self-Learning.	Students are encouraged to undertake independent study to both supplement and consolidate what are being learned.
Computer hands-on sessions.	Practical applications using a variety of software before the real design and implementation. A variety of web-based searches students will be assigned to learn how they can search for solutions using the Web.
Simulation exercises	Practical applications of software modeling program through modeling of real structures.
Analysis and Problem Solving.	The study of structural engineering involves applying knowledge and problem-based learning. This allows students to become more active in their learning as they work out what information, they need to find out how to solve a particular problem. They can work out a problem collaboratively, practice research as well as testing different components to come up with a valid solution.
Laboratory works.	During laboratory sessions, students will be given experiments to work in groups where they can apply the theories and principles gained. This gives them the opportunity to have hands-on experience to design and conduct experiments in addition to analyzing, interpreting data obtained from experiments, and maximize their learning through actual simulation
Presentations/ Presenting researches	students present their work to the whole group, for discussion, criticism, and suggestions for improvement. Presentation sessions provide an opportunity to address questions, queries, and problems.
Project supervision	The teacher needs to set advance work for students, and then have the students present their work to the whole group, for discussion, criticism, and suggestions

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Teaching Strategy	Description of the Main Strategy Used
	for improvement. Project sessions provide an opportunity to address questions, and problems.
Brain storming	Brainstorming is an effective technique for generating lists of ideas and creating interest and enthusiasm for new concepts or topics. Brainstorming provides teachers and students with an overview of what students know and/or think about a specific topic. Students can use brainstorming to organize their knowledge and ideas.
Dissertation supervision	Guiding, reviewing, and approving the MSc research work at all stages.
Publish research	Guiding and reviewing MSc student to write a research paper to be accepted for publication.
Seminar	The teacher needs to set advance work for a selected number of students, and then have the selected students present their work to the whole group, for discussion, criticism, and suggestions for improvement. Seminar sessions provide an opportunity to address questions, queries, and problems.
Research activities	Research-led activities envisage activities in which students learn about current research in the discipline and are frequently an audience. The emphasis is put on the research content.
Survey	Searching and investigating previous scientific papers, studies, reports, thesis, case studies.

Assessment Strategy	Description of the main strategy used.
Written Exam	Mid-term test is conducted in the 8 th week and final exam is conducted at the end of each course. Both tests are closed or open book, notes and resources. At least two quizzes must be done through the course.
Oral Discussion	To know the knowledge of the students.
Presentations	For Final Results displaying, to enhance the level of students in different subjects.
Quizzes	The entire assessment of Quizzes activities during the teaching period of each course.

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Assessment Strategy	Description of the main strategy used.
Reports	To demonstrate the personal skills, practical expertise, communication skills, report writing skills, and team work expertise they are expected to be learned and gained through their education.
Experimental and field work	For evaluation, to demonstrate the personal skills, practical expertise, communication skills, report writing skills, and team work expertise they are expected to be learned and gained through their education.
Assignments	The entire assessment of coursework activities during the teaching period of each course (which includes group and individual work, tests and presentations, etc.)
Written research proposal	To assess the MSc student ability to commence and conduct his/her research.
Thesis and publications	To assess the entire acquired knowledge and skill through the MSc thesis and publications.

2. 10. Intended Learning Outcomes Mapping:
 See Annex 10

3. Program Structure

Program Requirement	No. of Courses	Credit Hours	%
Complementary Courses	6	0	
Faculty Requirement	1	3	8%
Compulsory Courses	5	15	42%
Elective Courses	4	12	33%
Thesis	-	6	17%
Total		36	100%

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Complementary Courses (00 hrs)							
No	Course Code	Course Title	Lec.	Tut.	Pr.	Total C.H.	Prerequisites
1	CE 304	Reinforced Concrete 3					
2	CE 305	Steel Structures 1					
3	CE 310	Steel Structures 2					
4	CE 313	Computer Applications					
5	CE 406	Bridge Engineering					
6	CE ---	Structural Analysis 2					
Total						00	

Faculty Requirement (1 course, 3 CH)							
No	Course Code	Course Title	Lec.	Tut.	Pr.	Total C.H.	Prerequisites
	FR501	Scientific Research Methodology	3			3	
Total						3	

Compulsory Courses (5 Courses, 15 CH)							
No	Course Code	Course Title	Lec.	Tut.	Pr.	Total C.H.	Prerequisites
1	CE580	Advanced Structural Analysis	3			3	Structural analysis 1 and 2 (BSc)
2	CE588	Advanced Structural Steel Design	3			3	Steel Structures 1 and 2 (BSc)
3	CE587	Prestressed & Precast Concrete	3			3	Reinforced concrete 1 and 2 (BSc)
4	CE584	Structural Dynamics	3			3	Engineering mechanics 2, Structural analysis 1 and 2 (BSc)
5	CE586	Earthquake Engineering	3			3	Structural analysis 1 and 2 (BSc)
Total						15	

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Elective Courses (4 Courses, 12 CH) (Selected from the courses shown below)							
No	Course Code	Course Title	Lec.	Tut.	Pr.	Total C.H.	Prerequisites
1	CE585	Advanced Concrete Technology	3			3	Building materials (BSc)
2	CE581	Finite Element Method in Structural Analysis	2		2	3	Advanced Structural Analysis
3	CE582	Computer Applications in Structural Engineering	2		2	3	Computer application (BSc)
4	CE589	Design of Masonry Structures	3			3	Strength of materials (BSc)
5	CE509	Advanced Bridge Engineering	2		2	3	Bridge Engineering (BSc)
6	CE519	Structural Rehabilitation	3			3	Structural analysis 1 and 2, Reinforced Concrete 1 and 2 (BSc)
7	CE583	Advance Solids and Structures Mechanics	3			3	Strength of materials (BSc)
8	CE5xx	Advanced Concrete Structural Design	3			3	Reinforced concrete 1 and 2 (BSc)
9	CE5xx	Advanced Earthquake Engineering	3			3	Structural Dynamics
Elective Courses of Advanced Mathematics (Select 1 course from the 2 courses shown below)							
10	CE5xx	Advanced Statistics	3			3	Math 1, 2, 3,4 (BSc)
11	CE5xx	Advanced Numerical Methods	3			3	Math 1, 2, 3,4 (BSc)
Elective Courses Can Be Taken from Other MSc Programs							
12	CExxx	Advanced Engineering Project Management	3			3	Project Management (BSc)
13	CExxx	Applied Bridge Engineering	2		2	3	Bridge Engineering (BSc)
14	MExxx	Fracture Mechanics	3			3	Strength of Materials (BSc)
Total						42	

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MSc Thesis (6 CH)							
No	Course Code	Course Title	Lec.	Tut.	Pr.	Total C.H.	Prerequisites
	CE5xx	MSc Thesis				6	
Total						06	

Thesis

The student must prepare and discuss a MSc Thesis by (6) credit hours.

Thesis and Its Requirements (if any)

1. Registration of the thesis:

(Requirements/conditions and procedures for registration of the thesis as well as controls, responsibilities and procedures of scientific guidance)

- Completion of all required Compulsory & Elective Courses with average grade more than or equal to 75% .
- Completion of all university requirements.
- Field of Research and precise research topic with short Description and suggested time plan.
- First Department Seminar.
- Decision letter (Supervisors) of acceptance of the research topic.
- Thesis work should be done in at least 2-semester.
- Thesis work should be done in at most 4-semester.
- Any further requirements and controls based on post-graduate deanship regulations.

2. Scientific Supervision:

(The regulations of the selection of the scientific supervisor and his/her responsibilities, as well as the procedures/mechanisms of the scientific supervision and follow-up)

- At most 2-supervisors are selected for the supervision of a thesis.
 - At least 1-Associate (or Full) Professor is appointed as supervisor either from the department or from another department outside the faculty.
 - Any Assistant Professor appointed as supervisor should have at least 4-year experience in the field of research and have published at least one paper.
- Candidates may apply for one-year extension (full-time) for completion of the thesis to the Postgraduate Program Administration at the Faculty of Engineering, which will be granted if the candidate provides a valid reason for extension.

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The supervisor responsibilities are - :

- Help and assist the candidate/researcher in preparing the research plan.
- Guide the candidate to adhere to certain standards of academic integrity and research ethics, including combating plagiarism.
- Monthly, follow up and meeting with the researcher (at least one meeting per month) .
- Guide the researcher at every step to be done during thesis work.
- Write follow-up (progress report) after each meeting
- Write a follow-up (evaluation report) every semesters.
- The supervisor shall submit copies of these reports to the Postgraduate-Program coordinator, the Head of the Department and the Head of the Faculty Post-graduate.
- Write the final thesis acceptance report in order to prepare the final department seminar and then initiating the preparation for thesis presentation, defense and approve.

The candidate/student responsibilities are - :

- Student present his/her accomplishment at the end of every semesters
- plan and actively pursue the research.
- identify and deal with any research-related problems.
- comply with administrative requirement.
- meet ethical guidelines.
- take responsibility for the final form of the thesis
- A thesis or research portfolio is the outcome of independent research, or creative activity conducted under supervision.
- The length of a 6 credit hours thesis or research portfolio will be appropriate to the discipline and must not exceed 30,000 words, including bibliography, footnotes or endnotes and essential appendices, unless specific permission has been granted by the Department.

3.Thesis Defense/Examination:

(The regulations for selection of the defense/examination committee and the requirements to proceed for thesis defense, the procedures for defense and approval of the thesis, and criteria for evaluation of the thesis)

- A thesis proceeds for defense following completion of:
- At least one research paper is accepted in a journal in the field of research.
- Final acceptance letters provided by the supervisor(s) and the department final seminar committee (at least 3-department members).
- The examination committee should consist of - :
- One -Associate (or Full) Professor specialized in the field of research from an external university .
- One -Associate (or Full) Professor from the department of electrical engineering in addition to the supervisor of the thesis.
- A session for presentation, defense and approval of the thesis should be done based on the

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following- :

- At least two members of the examination committee accept their assignment and reply by acceptance letter and approve the thesis for defense within one month.
- The session of defense should be declared within two weeks after receiving of examination committee members' approval letters.

14. System of Study

Type of program	Courses + Thesis
Study methods in the program:	Full time
The period to complete the program	Min. 2 Years (4 Terms) Max. 3 Years (6 Terms)
Total Credit Hours for Courses + Research	36

15. Study Plan

FR stands for Faculty Requirements.

CE5XX stands for Civil Department Requirements.

First Year		First Semester						
No.	Course Code	Course Name	اسم المقرر	Credit Hours				Prerequisites
				Lec.	Tut.	Pr.	Total C.H.	
1	CE588	Advanced Steel and Composite Structures	منشآت معدنية ومركبة متقدمة	3			3	Steel Structures 1 and 2 (BSc)
2	CE580	Advanced Structural Analysis	تحليل انشائي متقدم	3			3	Structural analysis 1 and 2 (BSc)
3	CE587	Prestressed & Precast Concrete	خرسانة مسبقة الصب والاجهاد	3			3	Reinforced concrete 1 and 2 (BSc)
4	CE584	Structural Dynamics	ديناميكا الانشاءات	3			3	Engineering mechanics 2, Structural analysis 1 and 2 (BSc)
5	CE586	Earthquake Engineering	هندسة الزلازل	3			3	Structural analysis 1 and 2 (BSc)
Total Credit Hours							15	

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First Year				Second Semester				
No.	Course Code	Course Name	اسم المقرر	Credit Hours				Prerequisites
				Lec.	Tut.	Pr.	Total C.H.	
1	FR501	Scientific Research Methodology	طرق البحث العلمي	3			3	
2		Elective 1	اختياري 1					
3		Elective 2	اختياري 2	--			3	
4		Elective 3	اختياري 3	--			3	
5		Elective 4	اختياري 4	--			3	
Total Credit Hours							15	

Second Year				First Semester				
No.	Course Code	Course Name	اسم المقرر	Credit Hours				Prerequisites
				Lec.	Tut.	Pr.	Total C.H.	
	CE5xx	MSc Thesis					3	
Total Credit Hours							3	

Second Year				Second Semester				
No.	Course Code	Course Name	اسم المقرر	Credit Hours				Prerequisites
				Lec.	Tut.	Pr.	Total C.H.	
	CE5xx	MSc Thesis					3	
Total Credit Hours							3	

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Elective Courses (4 Courses, 12 CH)								
(Selected from the courses shown below)								
No.	Course Code	Course Name	اسم المقرر	Credit Hours				Prerequisites
				Lec.	Tut.	Pr.	Total C.H.	
1	CE585	Advanced Concrete Technology	تكنولوجيا الخرسانة المتقدمة	3			3	Building materials (BSc)
2	CE581	Finite Element Method in Structural Analysis	طريقة العنصر المحدد في التحليل الانشائي	2		2	3	Advanced Structural Analysis
3	CE582	Computer Applications in Structural Engineering	تطبيقات الحاسوب في الهندسة الانشائية	2		2	3	Computer application (BSc)
4	CE589	Design of Masonry Structures	تصميم المنشآت الجدارية	3			3	Strength of materials (BSc)
5	CE509	Advanced Bridge Engineering	هندسة الجسور المتقدمة	2		2	3	Bridge Engineering (BSc)
6	CE519	Structural Rehabilitation	تأهيل المنشآت	3			3	Structural analysis 1 and 2, Reinforced Concrete 1 and 2 (BSc)
7	CE583	Advance Solids and Structures Mechanics	ميكانيكا المواد الصلبة والمنشآت المتقدمة	3			3	Strength of materials (BSc)
8	CE5xx	Advanced Concrete Structural Design	تصميم خرسانة انشائية متقدمة	3			3	Reinforced concrete 1 and 2 (BSc)
9	CE5xx	Advanced Earthquake Engineering	هندسة الزلازل المتقدمة	3			3	Structural Dynamics
Elective Courses of Advanced Mathematics								
(Select 1 course from the 2 courses shown below)								
10	CE5xx	Advanced Statistics	احصاء متقدم	3			3	Math 1, 2, 3,4 (BSc)
11	CE5xx	Advanced Numerical Methods	طرق عددية متقدمة	3			3	Math 1, 2, 3,4 (BSc)

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Elective Courses (4 Courses, 12 CH)

(Selected from the courses shown below)

Elective Courses Can Be Taken from Other MSc Programs							
12	CExxx	Advanced Engineering Project Management	ادارة مشاريع هندسية متقدمة	3		3	Project Management (BSc)
13	CExxx	Applied Bridge Engineering	هندسة الجسور التطبيقية	2	2	3	Bridge Engineering (BSc)
14	MExxx	Fracture Mechanics	ميكانيكا التمزق	3		3	Strength of Materials (BSc)

16. Admission Requirements:

1. Bachelor of Civil Engineering Certificate with not less than 65 % passing ratio, or equivalent.
2. Interview
3. TOEFL / IBT: 60
4. ICDL (Computer Skills):
5. Arabic Language:
6. Student number capacity of 20 students per year
7. Transfer Requirements, and Courses Equivalency
8. Annex -13: shows the Admission Requirements for the Program.

17. Graduation Requirements:

- Student attendance should not be less than 75%.
- Student will graduate after successfully passing the 30 credit hours courses and 6 credit hours Research.
- Student must achieve a minimum average score for all courses is 75% degree
- Minimum score for any student to pass any credit hours course is 65% degree.
- Grading System:
- | | |
|---------------------------------|-----------|
| From 90% to 100% of total marks | Excellent |
| From 80% to less than 90% | Very Good |
| From 75% to less than 80% | Good |
| From 65% to less than 75% | Pass |
| Less than 65% | Poor/Fail |

18. Learning Resources, Facilities, and Equipment for Running the Program

Learning Resources.

Policies and Procedure for providing and quality assurance of learning resources textbooks, references and other resource materials, including electronic and web-based resources, Journal Database, etc.

- textbooks, reference

Library upgrading necessary, List of required new publications to be provided by Master Program teaching staff

Electronic Library (Existing, allows access to international research papers and publications).

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18. Learning Resources, Facilities, and Equipment for Running the Program
<p>Facilities and Equipment Policies and Procedure for providing and quality assurance of Facilities and Equipment (Library, laboratories (Structure, material Labs), medical facilities, classrooms, etc.).</p>
<p>List of laboratories Structural Engineering Laboratory (Upgrading necessary) Material Engineering Laboratory (Upgrading necessary) Computer Laboratory</p>

19. Teaching staff:				
	Professor	Associate Professor	Assistant Professor	Technicians Assistants
Required Number				
Available Number	4	1	4	4
Note:				

20. Program Management and Regulations
<p>1. Program Management 1.1 Program Structure (Including boards, councils, units, committees, etc.)</p> <hr style="border-top: 1px dashed black;"/> <p>Civil Engineering Department Board Postgraduate Studies Administration Vice Dean for Postgraduate Studies College of Engineering Board Vice Presidency of the University for Postgraduate Studies</p>
<p>1.2 Stakeholders' Involvement Describe the representation and involvement of stakeholders in the program planning and development. (Students, professional bodies, scientific societies, alumni, employers, etc.)</p> <hr style="border-top: 1px dashed black;"/> <p>The stakeholders were involved in designing the program, including universities, research centers, the public and private sectors, through their participation in a workshop as well as in responding to and submitting a questionnaire.</p>

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20. Program Management and Regulations

2. Program Regulations

Provide a list of related program regulations, including their link to online version: admission, study and exams, recruitment, appeals and complaint regulations, etc.)

Decision of the Presidency of the Council of Ministers No. 40 of 2008

Decision of the Presidency of the Council of Ministers No. 141 of 2008

Graduate Studies Guide to Sana'a University

21. Evaluation of Program Quality Matrix:

Evaluation Areas/Aspects	Evaluation Sources/References	Evaluation Methods	Evaluation Time

Note:

Evaluation Areas/Aspects (e.g., leadership, effectiveness of teaching & assessment, learning resources, partnerships, etc.)

Evaluation Sources (students, graduates, alumni, faculty, program leaders, administrative staff, employers, independent reviewers, and others (specify))

Evaluation Methods (e.g., Surveys, interviews, visits, etc.)

Evaluation Time (e.g., beginning of semesters, end of academic year, etc.)

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Program Specification

22. List of Annexes

Annex (1)	Academic Standards Curriculum Criteria of Accreditation Board for Structural Engineering program.
Annex (2)	Survey of names of Similar Accredited Programs at International Universities (Benchmarks) for Structural Engineering Programs.
Annex (3)	Survey of Intended Learning Outcomes for similar Accredited Structural Engineering Programs at International Universities.
Annex (4)	Summary of similar Programs (Benchmarks) for Master of Science in Structural Engineering Program.
Annex (5)	Survey of course names of Similar Programs.
Annex (6)	Survey/Mapping of Vision, Mission and Objectives of similar Accredited Programs at International Universities (Benchmarks) for Masters of Science in Structural Engineering programs.
Annex (7)	Mapping of the mission and objectives of the program with the vision, mission and objectives of faculty, and the university.
Annex (8)	Main Themes/Sub-Themes with Relative weight for Program (if need)
Annex (9)	PILOs Distribution to General Themes for Program (if need)
Annex (10)	Matrix of mapping program P- ILO's with courses
Annex (11)	Mapping the benchmarks with PILO's (if need)
Annex (12)	Mapping Program's Goals with Intended Learning Outcomes

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23. Attachment of Courses specification and Syllabi of the Program

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ملحق (1) المعايير الأكاديمية للمحتوى لهيئة الاعتماد المقترحة لبرنامج ماجستير الهندسة الإنشائية

(Annex-1): Academic Standards Curriculum Criteria of Accreditation Board for Master of Science in structural engineering program

1. The Quality Assurance Agency for Higher Education (QAA), Subject Benchmark – Engineering 2019.

https://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/subject-benchmark-statement-engineering.pdf?sfvrsn=1f2c881_16



2. Engineering Technology Accreditation Commission, Accreditation Board for Engineering and Technology (ABET), 2019-2020.

<https://www.abet.org/accreditation/accreditation-criteria/criteria-for-accrediting-engineering-technology-programs-2019-2020/>



Engineering Technology Accreditation Commission

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ملحق (2) - مسح أسماء البرامج المعتمدة المماثلة لبرنامج ماجستير الهندسة الإنشائية

Annex (2) Survey of names Similar Accredited Programs at International Universities (Benchmarks) for Master of Science in Structural Engineering

#	The Academic Program اسم البرنامج المماثل	The University الجامعة	The Faculty الكلية	The Department القسم	The Country الدولة	Program Accrediting Body جهة اعتماد البرنامج	Degree Award at Program Completion التي يمنحها الدرجة البرنامج للخريج	Year of accreditation سنة الحصول على الاعتماد	Type of program
The 1 st Program البرنامج الاول	MSc Advanced Structural Engineering Cluster	Imperial College	Faculty of Engineering	Department of Civil and Environmental Engineering	UK	The Quality Assurance Agency for Higher Education (QAA)	MSc	---	Courses + project/dissertation
The 2 nd Program البرنامج الثاني	MSc Structural Engineering	Brunel University	College of Engineering, Design and Physical Sciences	Dept. Civil and Environmental Engineering	UK	The Quality Assurance Agency for Higher Education (QAA)	Master of Science in Structural Engineering	---	Courses + dissertation
The 3 rd Program البرنامج	MSc Civil Engineering/Structural	King Saud University	College of Engineering	Civil Engineering Department	KSA	---	Master of Science in Civil Engineering	---	Courses + thesis

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#	The Academic Program اسم البرنامج المماثل	The University الجامعة	The Faculty الكلية	The Department القسم	The Country الدولة	Program Accrediting Body جهة اعتماد البرنامج	Degree Award at Program Completion التي يمنحها الدرجة البرنامج للخريج	Year of accreditation سنة الحصول على الاعتماد	Type of program
الثالث	Engineering								
The 4 th Program البرنامج الرابع	MSc Structural Engineering	University Science Malaysia (USM)	School of Civil Engineering	School of Civil Engineering	Malaysia	--	Master of Science in Structural Engineering	--	Courses + thesis
The 5 th Program البرنامج الخامس	MSc Civil Eng./Structural Engineering and Mechanics	University of Washington	College of Engineering	Department of Civil & Environmental Eng.	USA	--	Master of Science in Civil Eng./Structural Engineering and Mechanics	--	Courses + thesis
The 6 th Program البرنامج السادس	MSc Civil Engineering/Structural Engineering	University of Jordan	Faculty of Engineering and technology	Civil Engineering Department	Jordan	--	Master of Science in Civil Engineering	--	Courses + thesis

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ملحق (3) مسح مخرجات التعلم في البرامج المماثلة لبرنامج ماجستير الهندسة الإنشائية

Annex-3, Survey of Intended Learning Outcomes for Similar Accredited for Master of Science in Structural Engineering Program at International Universities

Program Intended Outcomes	Suggested PILOs for the Current Program: MSc Structural Engineering Program at Sana'a University	1st Program	2nd Program	3rd Program	4th Program	5th Program	6th Program
		Imperial College	Brunel University	King Saud University	University Science Malaysia (USM)	University of Washington	University of Jordan
A. Knowledge and Understanding	Upon successful completion of the Master of Science in Structural Engineering Program, graduates should be able to:						
	A1. Demonstrate in depth understanding of knowledge of applied mathematics and engineering science to the field of structural engineering.						
	A2. Recognize and Explain the contemporary engineering technologies and issues in the specialization field of structural engineering.	√ (A2,A3)		√ (K1)			√ (b)
	A3. Explain in-depth the principles of sustainable design and development of structural engineering.		√ (K1, K2, K4)	√ (K1)			

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Program Intended Outcomes	Suggested PILOs for the Current Program: MSc Structural Engineering Program at Sana'a University		1 st Program	2 nd Program	3 rd Program	4 th Program	5 th Program	6 th Program
			Imperial College	Brunel University	King Saud University	University Science Malaysia (USM)	University of Washington	University of Jordan
A4.	Acquire advanced knowledge of research principles and methods applicable to the field of work or academic in structural engineering and related fields.		√ (A1, A4)					√ (b, d)
B. Cognitive/ Intellectual Skills	Upon successful completion of the Master of Science in Structural Engineering program, graduates should be able to:							
	B1.	Assess, select and apply appropriate principles, methodologies, techniques, tools and packages in the analysis, specification, development and evaluation of structural engineering systems.	√ (B1, B2)	√ (C1, C2, S5)	√ (S1, S2)			√ (a, c)
	B2.	Identify, formulate, analyze research and solve complex structural engineering problems.	√ (B3, B4)		√ (S1, S2)			√ (e)
	B3.	Apply acquired knowledge of analysis and design for complex structural engineering systems and implementation process.			√ (C2)			

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Program Intended Outcomes	Suggested PILOs for the Current Program: MSc Structural Engineering Program at Sana'a University		1 st Program	2 nd Program	3 rd Program	4 th Program	5 th Program	6 th Program
			Imperial College	Brunel University	King Saud University	University Science Malaysia (USM)	University of Washington	University of Jordan
C. Practical and Professional Skills	Upon successful completion of the Master of Science in Structural Engineering program, graduates should be able to:							
	C1.	Develop research to solve structural engineering problems.		√ (S2)	√ (S2, C1)			√ (e)
	C2.	Use advanced methodology and skills to solve structural engineering problems.	√ (C2, C3)	√ (S3)	√ (S1)			
	C3.	Design structural system, component, or process to meet desired needs within realistic constraints.	√ (C3)	√ (S3)				√ (a, c)
D. General	Upon successful completion of the Master of Science in Structural Engineering program, graduates should be able to:							

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Program Intended Outcomes	Suggested PILOs for the Current Program: MSc Structural Engineering Program at Sana'a University		1st Program	2nd Program	3rd Program	4th Program	5th Program	6th Program
			Imperial College	Brunel University	King Saud University	University Science Malaysia (USM)	University of Washington	University of Jordan
and Transferable Skills	D1.	Prepare a complete thesis and term-courses works/tasks, write their documents and defend on them.	√ (D1)	√ (S1)	√ (C1)			√ (e)
	D2.	Demonstrate ethical principles, awareness of professional and ethical responsibility as well as knowledge of the standards utilized in related fields.			√ (C1)			
	D3.	Conduct independently and communicate research that advances and extends knowledge and scholarship in related fields.		√ (S1, S6)	√ (C1)			√ (e)
	D4.	Own intellectual independence, with initiative and creativity in new situations and/or for further learning, plan and execute original research with full responsibility and accountability for personal outputs.	√ (D8)		√ (C1)			

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Intended Outcomes for Similar Programs

Program 1: MSc Advanced Structural Engineering Cluster- Imperial College

Knowledge and Understanding

- A1 A selection of the major topics in the subject, their recognition and underlying fundamental principles.
- A2 Research techniques which might include information retrieval, experimental design and statistics, modelling and safety.
- A3 The essential facts, concepts, principles and theories relevant to the students' chosen areas of research.
- A4 Management and communication skills, including problem definition, project design, decision processes, teamwork, written and oral reports, and scientific publications.

Intellectual/Thinking Skills:

- B1 Analyze and solve problems using a multidisciplinary approach, applying professional judgements to balance costs, benefits, safety and social and environmental impact.
- B2 Integrate and critically evaluate information.
- B3 Formulate and apply appropriate solutions.
- B4 Plan, conduct and write-up a program of individual research.

Practical Skills:

- C1 Plan and execute safely a series of experiments or computations.
- C2 Use laboratory methods or computer-based tools to generate data.
- C3 Analyze results, determine their strength and validity, and make recommendations.
- C4 Prepare technical and design reports.
- C5 Give technical presentations.

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C6 Use the scientific literature effectively.

Transferable Skills:

D1 Communicate effectively through oral presentations, computer processing and presentations, and written reports.

D2 Apply knowledge and modelling skills.

D3 Management skills: decision processes, objective criteria, problem definition, project design and evaluation needs.

D4 Integrate and evaluate information from a variety of sources.

D5 Transfer techniques and solutions from one discipline to another.

D6 Use Information and Communications Technology.

D7 Manage resources and time.

D8 Learn independently with open-mindedness and critical enquiry.

D9 Learn effectively for the purpose of continuing professional development

Program 2: MSc Structural Engineering - Brunel University

K: Knowledge and Understanding

K1 The principles and theories of structural design, analysis.

K2 The principles and theories of structural safety and sustainability.

K3 The basis for the recognition and understanding of the major features of structural engineering.

K4 The basis for the recognition and understanding of the major features of structures' safety and sustainability.

K5 The research techniques including information retrieval, experimental design, theoretical derivation, and/or modelling

K6 The role of structural engineers in sustainable development of infrastructure engineering.

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C: cognitive (thinking) skills

- C1 Identify, analyses and solve engineering problems using a multidisciplinary approach, applying professional judgements to balance costs, buildability, safety and environmental impact and sustainability.
- C2 Integrate and critically evaluate different design options.
- C3 Plan and execute safely a series of experiments or computations.
- C4 Use laboratory, field, and/or computational methods to conduct innovative structural design.
- C5 Prepare technical reports, give technical presentations, and use the scientific literature for research and practical structural design effectively

S: other skills and attributes

- S1 Communicate effectively through oral and electronic presentations, written reports and effective networking.
- S2 Select and employ appropriate advanced research methods.
- S3 Apply knowledge and modelling skills.
- S4 Use information and communication technology.
- S5 Integrate and evaluate information from a variety of sources to define objectives and problems, solve problems, and make appropriate decision.
- S6 Work independently with open-mindedness and critical thinking.
- S7 Work as part of a team.
- S8 Develop management and leadership skills.

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Program 3: MSc Civil Engineering/Structural Engineering - King Saud University

Knowledge

K1. Recognize advanced engineering knowledge, concepts and techniques to identify, interpret and analyze complex and real-life engineering problems.

Skills

S1. Provide solution for complex and real-life engineering problems through critical thinking and using modern engineering tools and identify its impact on social and ethical issues.

S2. Investigate scientific research problems independently or through a team work using critical thinking, appropriate techniques, advanced tools, and management principles.

Competence

C1. Criticize and discuss scientific research reports /papers related to Civil Engineering issues with high level of ethics and proficiency, independently, or as a team work.

C2. Design novel advanced Civil Engineering systems and evaluate its performance and effectiveness for engineering practice and its impact on society.

Program 4: MSc Structural Engineering – University Science Malaysia

Non

Program 5: MSc Civil Eng./Structural Engineering and Mechanics – University of Washington

Non

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Program 6: MSc Civil Eng./Structural Engineering– University of Jordan

After completing his or her studies in the Structure Engineering program, the student is expected to be able to:

- a. Applying knowledge and skills in new fields of structural engineering with the aim of performing advanced tasks and projects.
- b. Getting advanced knowledge in the analysis, design and rehabilitation of structures.
- c. Using advanced analysis methods, critical evaluation skills to solve complex problems.
- d. Enhance the engineering understanding of structural behavior and to be able to diagnose and describe failure patterns
- e. Using relevant knowledge for research and profession independently.

Learning Outcomes for The Current Program:

Upon successful completion of a Master of Science in structural engineering Program, graduates should be able to:

A. Knowledge and Understanding

- A1 Demonstrate in depth understanding of knowledge of applied mathematics and engineering science to the field of structural engineering.
- A2 Recognize and Explain the contemporary engineering technologies and issues in the specialization field of structural engineering.
- A3 Explain in-depth the principles of sustainable design and development of structural engineering.
- A4 Acquire advanced knowledge of research principles and methods applicable to the field of work or academic in structural engineering and related fields.

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B. Cognitive/ Intellectual Skills

- B1 Assess, select and apply appropriate principles, methodologies, techniques, tools and packages in the analysis, specification, development and evaluation of structural engineering systems.
- B2 Identify, formulate, analyze research and solve complex structural engineering problems.
- B3 Apply acquired knowledge of analysis and design for complex structural engineering systems and implementation process.

C. Practical and Professional Skills

- C1 Develop research to solve structural engineering problems.
- C2 Use advanced methodology and skills to solve structural engineering problems.
- C3 Design structural system, component, or process to meet desired needs within realistic constraints.

D. Transferable Skills

- D1 Prepare a complete thesis and term-courses works/ tasks, write their documents and defend on them.
- D2 Demonstrate ethical principles, awareness of professional and ethical responsibility as well as knowledge of the standards utilized in related fields.
- D3 Conduct independently and communicate research that advances and extends knowledge and scholarship in related fields.
- D4 Own intellectual independence, with initiative and creativity in new situations and/or for further learning, plan and execute original research with full responsibility and accountability for personal outputs.

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Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas			

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Program Specification

ملحق (4) مسح ملخص البرامج المماثلة لبرنامج ماجستير الهندسة الإنشائية

Annex-4 Summary of Similar Programs (Benchmarks) for Master of Science in Structural Engineering Program

1.Summary of Similar Programs (Benchmarks) for Civil Engineering Program							
	The Similar Programs (Benchmarks)						Current program
	The 1 st Program	The 2 nd Program	The 3 rd Program	The 4 th Program	The 5 th Program	The 6 th Program	
The Program Title	Master's Program in Civil Engineering/ General Structural Engineering	MSc Structural Engineering	Master's Program in Civil Engineering/ Structural Engineering	MSc Structural Engineering	MSc Civil Eng./Structural Engineering and Mechanics	MSc Civil Engineering/Structural Engineering	MSc Structural Engineering
The Faculty	Faculty of Engineering	College of Engineering, Design and Physical Sciences	College of Engineering	School of Civil Engineering	College of Engineering	Faculty of Engineering and technology	Faculty of Engineering
The University	Imperial College	Brunel University	King Saud University	University Science Malaysia	University of Washington	University of Jordan	Sana'a University

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1.Summary of Similar Programs (Benchmarks) for Civil Engineering Program

	The Similar Programs (Benchmarks)						Current program
	The 1 st Program	The 2 nd Program	The 3 rd Program	The 4 th Program	The 5 th Program	The 6 th Program	
				(USM)			
The Country	UK	UK	KSA	Malaysia	USA	Jordan	Yemen
Type of program	Courses + project/dissertation	Courses + dissertation	Courses + Thesis	Courses + Thesis	Courses + thesis	Courses + thesis	Courses + Thesis
Study methods in the program:	Full time	Full time	Full time	Full time	Full time	Full time	Full Time
Number of semesters	Maximum =4 Minimum =2	Maximum =4 Minimum =2	Maximum =8 Minimum =4	Maximum =6 Minimum =2	Maximum =6 Minimum =4	Maximum =6 Minimum =4	Maximum =6 Minimum =4
Total Credit Hours (without Thesis)	60	135	24	20	33	24	30
No. of Courses for compulsory courses (with Faculty	5	9	5	4	4	6	6

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1. Summary of Similar Programs (Benchmarks) for Civil Engineering Program

	The Similar Programs (Benchmarks)						Current program
	The 1 st Program	The 2 nd Program	The 3 rd Program	The 4 th Program	The 5 th Program	The 6 th Program	
requirement)							
Credit Hours for compulsory courses	25	135	15	16	12	18	18
No. of Courses for Electives courses	7	--	3	2	7	2	4
Credit Hours for Electives courses	35	--	9	4	21	6	12
Complementary courses to join the program and their number	--	--	--	--	--	--	--
Credit Hours for Thesis	30	60	6	20	9	9	6
Total Credit Hours for courses & Thesis	90	195	30	40	42	33	36

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1.Summary of Similar Programs (Benchmarks) for Civil Engineering Program

	The Similar Programs (Benchmarks)						Current program
	The 1 st Program	The 2 nd Program	The 3 rd Program	The 4 th Program	The 5 th Program	The 6 th Program	
The period for thesis completion	Max =2 semesters Min =1 semesters	Max =2 semesters Min =1 semesters	Max =4 semesters Min =2 semesters	Max =6 semesters Min =2 semesters	Max =6 semesters Min =4 semesters	Max =4 semesters Min =2 semesters	Min.=2 semesters Max.=4 semesters
The min. period to complete the program	2 semesters	2 semesters	4 semesters	2 semesters	4 semesters	4 semesters	4 semesters
The max. period to complete the program	4 semesters	4 semesters	8 semesters	6 semesters	6 semesters	6 semesters	6 semesters

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Program Specification

ملحق (5) مسح أسماء المقررات الدراسية في البرامج المماثلة لبرنامج ماجستير الهندسة الإنشائية

Annex-5, Survey of Course Names of Similar Program

University	Imperial College	Brunel University	King Saud University	University Science Malaysia (USM)	University of Washington	University of Jordan	Sana'a University
Faculty	Faculty of Engineering	College of Engineering, Design and Physical Sciences	College of Engineering	School of Civil Engineering	College of Engineering	Faculty of Engineering and technology	Faculty of Engineering
Program	MSc Advanced Structural Engineering Cluster	MSc Structural Engineering	MSc Civil Engineering/Structural Engineering	MSc Structural Engineering	MSc Civil Eng./Structural Engineering and Mechanics	MSc Civil Engineering/Structural Engineering	MSc Structural Engineering
Country	UK	UK	KSA	Malaysia	USA	Jordan	Yemen
No. of Courses	12	9	8	5	11	8	10
Total Cr. Hrs.	60 without thesis 90 with thesis	135 without thesis 195 with thesis	24 without thesis 30 with thesis	20 without thesis 40 with thesis	33 without thesis 42 with thesis	24 without thesis 33 with thesis	30 without thesis 36 with thesis
Total Years	Maximum =2 years Minimum =1	Maximum =2 years Minimum =1 year	Maximum =4 years Minimum =2 years	Maximum =3 years Minimum =1 year	Maximum =3 years Minimum =2	Maximum =3 years Minimum =2 years	Maximum =3 years Minimum =2 years

Head of the Department	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Algorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Prof. Dr. Huda Al-Emad
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Term	No	Course Name	Course Name	Course Name	Course Name	Course Name	Course Name	Course Name
1	1			Advanced Concrete Technology (3 units)				Advanced Concrete Technology
	2	Structural Analysis Nonlinear Structural Analysis		Advanced Structural Analysis (3 units)	Advanced Structural Mechanics (4 units)	Nonlinear Analysis of Structural Systems, 3 CR	Advanced structural analysis	Advanced Structural Analysis
	3	Prestressed Concrete	Advanced Reinforced and Prestressed Concrete Design	Prestressed Concrete Structures (3 units)		Prestressed Concrete Design, 3 CR	Pre-stressed concrete design	Prestressed & Precast Concrete
	4	Structural Dynamics	Structural Dynamics & Seismic Design	Structural Dynamics (3 units)	Dynamic and Stability of Structures (4 units)	Structural Dynamics, 3 CR	Structural dynamics	Structural Dynamics
	5					Earthquake Engineering I, II, 3 CR	Earthquake resistant structures	Earthquake Engineering
	6	Finite Element Analysis	Nonlinear Structural Analysis & Finite Element Method	Finite Element Method in Structural Analysis (3 units)		Finite Element Methods in Structural Mechanics, 3 CR	Finite element method	Finite Element Method in Structural Analysis
	7	Steel Components	Advanced Steel Design	Behavior of Metallic		Advanced Steel I, 3 CR	Advanced steel and composite structures	Advanced Structural Steel

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		Design of Steel Buildings		Structures (3 units)				Design
	8	Reinforced Concrete I Reinforced Concrete II Concrete Structures		Behavior of Reinforced Concrete Members (3 units)	Principle of Structural Design (4 units)	Advanced Reinforced Concrete, 3 CR	Advanced reinforced concrete	Advanced Concrete Structural Design
2	1		Research Methods and Professional Development	Special Topics in Structural Engineering (3 units)		Structures Seminar, 1 CR	Seminar (Research methods)	Scientific Research Methodology
	2			Numerical Linear Algebra (3 units)			Numerical analysis	Advanced Numerical Methods
	3			Computer Applications in Civil Engineering (3 units)				Computer Applications in Structural Engineering
	4	Design of Timber and Masonry Structures						Design of Masonry Structures
	5	Design of Bridges			Bridge Engineering (4 units)		Bridge engineering	Advanced Bridge Engineering
	6		Advanced Construction		Structural			Structural

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			Materials and Structural Retrofitting Technology		Retrofitting Technology (4 units)			Rehabilitation
	7			Advanced Solid Mechanics (3 units)		Structural Mechanics, 6 CR	Solid (or Structural) mechanics	Advance Solids and Structures Mechanics
	8	Structural Reliability Theory		Probability and Mathematical Statistics (3 units), Structural Reliability (3 units) ,		Reliability and Design, 3 CR		Advanced Statistics
	No	Course Name	Course Name	Course Name	Course Name	Course Name	Course Name	Course Name
3	1							Advanced Engineering Mathematics
	2		Infrastructure Management		Engineering Management (4 units)			Advanced Engineering Project Management
	3	Theory of Shells Plated Structures		Theory of Plates and Shells (3 units)			Theory of plates and shells	
	4			Plasticity in Structural Engineering (3 units)			Plastic analysis	

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	5	Structural Stability		Stability of Structures (3 units)			Structural Stability	
	6		Contemporary Structures and Sustainable Construction			Wind Engineering Design, 3 CR		
	Advanced Structural Systems, 3 CR							
4	1	Design Project - Dissertation	MSc Civil Engineering Dissertation - 60 credits	Thesis Research Proposal (1 unit)	RESEARCH (20 units)	RESEARCH	Thesis	Thesis
	2			Thesis in Plan A (1 unit)				
	3							
	4							
	5							
Total CH		90	195	30	40	42	33	36

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ملحق (6) مسح الرؤية والرسالة والاهداف البرامج المعتمدة المماثلة لبرنامج الهندسة الإنشائية

Annex (6) Survey/ Mapping of Vision, Mission and Objectives of Similar Accredited Programs at International Universities (Benchmarks) for Master of Science in structural engineering program

	The 1 st Program	The 2 nd Program	The 3 rd Program	The 4 th Program	The 5 th Program	The 6 th Program
Country	UK	UK	KSA	Malaysia	USA	Jordan
University	Imperial College	Brunel University	King Saud University	University Science Malaysia (USM)	University of Washington	University of Jordan
Faculty	Faculty of Engineering	College of Engineering, Design and Physical Sciences	College of Engineering	School of Civil Engineering	College of Engineering	Faculty of Engineering and technology
Department/ Program	MSc Advanced Structural Engineering Cluster	MSc Structural Engineering	Master's Program in Civil Engineering/ Structural Engineering	MSc Structural Engineering	Department of Civil & Environmental Eng.	MSc Civil Engineering/Structural Engineering
Study Duration	Min: 2 semesters Max: 4 semesters	Min: 2 semesters Max: 4 semesters	Min: 4 semesters Max: 8 semesters	Min: 2 semesters Max: 4 semesters	Min: 4 semesters Max: 6 semesters	Maximum =6 Minimum =4
Program Accrediting Body	The Quality Assurance Agency for Higher Education (QAA)	The Quality Assurance Agency for Higher Education (QAA)	--	--	--	--
Website	http://www.imperial.ac.u	https://www.brunel	https://engineering.ksu	School of Civil	https://www.ce.washin	http://engineering.ju.e

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	The 1 st Program	The 2 nd Program	The 3 rd Program	The 4 th Program	The 5 th Program	The 6 th Program
Link	k/civil-engineering/prospective-students/postgraduate-taught-admissions/advanced-structural-engineering-cluster/	ac.uk/study/postgraduate/structural-engineering-msc	edu.sa/en/courses_plan_CE_Master	Engineering_USM - Postgraduate Studies	gton.edu/future/gradmasters/structures	du.jo/Lists/ProgramSpecifications/SchoolProgSpic_last.aspx?prog=11&categ=15
Department Vision	non	non	To be a world-class department in civil engineering education, innovation and technological advancement.	non	non	non
Department Mission	non	non	Provide highly qualified civil engineers to attain excellence in quality and sustainability of Civil and Surveying Engineering Industry to meet the challenges of KSA's 2030 vision related to civil engineering industry, and to serve the society through	To nurture and sustain excellence in I. delivering comprehensive education; ii. imparting knowledge; iii. exploring frontiers of technology, and iv. providing services to	The Department of Civil and Environmental Engineering seeks to provide the highest quality of undergraduate and graduate education	non

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	The 1 st Program	The 2 nd Program	The 3 rd Program	The 4 th Program	The 5 th Program	The 6 th Program
			involvement in knowledge sharing outreach and professional activities that include innovative research, developing new technologies, and continuing education and professional activities.	the industry and community, at the local and international levels, by applying a. the most advance knowledge and leading expertise; b. creating innovative ventures; c. being truthful and d. upholding USM's motto 'WE LEAD'		
Department Objectives	<ul style="list-style-type: none"> To advance the very basic science at the core of civil engineering and its sub-disciplines. To explore opportunities for discovery at the intersections of existing disciplines. Build a future without walls by participation in 	non	Major goals are as follows: 1. Implement civil engineering principles and knowledge to create systems, and provide services that meet society needs and improve the quality of life. 2. Increase personal knowledge and technical skills through professional	PEO 1 To produce competent, creative and innovative graduates who are able to solve civil engineering problems within the global, societal and sustainable development contexts PEO 2 To produce graduates with good leadership qualities and	Within a few years of graduation, UW BSCE alumni are expected to attain: Technical proficiency with formulating, investigating and solving engineering problems using fundamental principles and applied engineering techniques.	non

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The 1 st Program	The 2 nd Program	The 3 rd Program	The 4 th Program	The 5 th Program	The 6 th Program
<p>cross-disciplinary research teams to address the world's most challenging problems.</p> <ul style="list-style-type: none"> • Foster long-term, strategic relationships with companies, foundations, governmental organizations, and other partners to advance research. • Nurture and develop the next generation of globally recognized engineers and researchers. • To engage with the world and communicate the importance and benefits of science to society. 		<p>and graduate study, certifications, and work responsibilities; and to be the preferred choice of employers.</p> <p>3. Contribute time, knowledge and skills to the profession, community, and the world beyond job responsibilities.</p> <p>4. Provide high quality educational, research and scientific environment for students and faculty to support and serve the civil engineering industry.</p>	<p>communication skills who are able to engage in engineering task both independently and via interdisciplinary team</p> <p>PEO 3 To produce graduates with professional and ethical attributes</p> <p>PEO 4 To produce graduates who are engaged in continuous pursuit of knowledge through research, continuing education and/or professional development activities</p>	<p>Expertise in using advanced technologies in their civil engineering sub-discipline.</p> <p>An ethical engineering practices.</p> <p>A practice of continuous education and learning to grow as a professional engineer.</p> <p>Success in industry, continuing their education, academia, or public service by providing technical expertise for their business, profession and community.</p>	

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	The 1 st Program	The 2 nd Program	The 3 rd Program	The 4 th Program	The 5 th Program	The 6 th Program
Program Mission	non	non	Provide a distinguished high-quality graduate education program to promote Civil Engineering applications and produce specialized Civil Engineers to attain a sustainable excellence in Civil Engineering industry during the 21st century, and to serve the society through involvement in knowledge sharing outreach, innovative research, developing new technologies, continuing education and professional activities...	non	non	non
Program Objectives	provides advanced training in the design, analysis, assessment and evaluation of concrete, steel and composite structures including bridges and	• To provide education at postgraduate level in civil engineering, focusing on structural engineering with	The main aims for establishing the program are: 1. To provide highly qualified Engineers with	The main objective of the postgraduate program at School of Civil Engineering is to produce research scholars who are capable	UW CEE's Structural Engineering and Mechanics Master's Program offers students a comprehensive, practical and theoretical	non

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	The 1 st Program	The 2 nd Program	The 3 rd Program	The 4 th Program	The 5 th Program	The 6 th Program
	<p>buildings. These courses are career-oriented and cover both the theoretical background and practical design considerations. The courses are suitable for both practicing engineers with several years' experience and recent graduates. The program aims to produce graduates equipped to pursue careers in structural engineering design and analysis in industry, the public sector and nongovernmental organizations.</p>	<p>structures' safety and sustainability.</p> <ul style="list-style-type: none"> To provide students with a solid technical basis of the current theories and practices in structural engineering with structures' safety and sustainability. To foster the critical acquisition and implementation of broad research and analytical skills related to structural engineering with structures' safety and sustainability. To provide advanced training in the design, analysis, assessment, evaluation and 	<p>variety of civil engineering specializations who can fulfil the construction industry needs and challenges to promote the Kingdom's continuous economic and social inspirations.</p> <p>2. To highly qualified human resources and distinguished researchers equipped with the specialized knowledge, recent technologies and professional developments needed to create high-quality systems, attain the excellence in civil engineering infrastructure and solve the technical problems and challenges in CE industry.</p> <p>3. To provide the graduates with greater</p>	<p>of advancing knowledge and educating future scholars for the benefit of mankind.</p>	<p>background that prepares them be successful in engineering practice or a future Ph.D. program</p>	

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The 1 st Program	The 2 nd Program	The 3 rd Program	The 4 th Program	The 5 th Program	The 6 th Program
		renovation of modern structures. • To develop creative and professional working knowledge to enable graduates to follow successful civil engineering careers with national and international organizations. * To provide a pathway that will prepare graduates for successful careers including progression to Chartered Engineer status.	breadth and depth of technical knowledge, skills and competence to promote the rapid growth and advancements in different CE specializations. This is necessary for solving effectively and efficiently the encountered problems and challenges that face the infrastructure development of the Kingdom through its 2030 vision.		

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ملحق (7) مؤامة رسالة وأهداف البرنامج مع رؤية ورسالة وأهداف الكلية والجامعة

Annex (7) Mapping of mission and objective of the program with vision, mission and objectives of faculty, and university

Mapping of program vision with Department, faculty, and university vision

University Vision	Faculty Vision	Department vision	Program vision
Sana'a University aspires to achieve a national leading role in teaching, learning, scientific research and community service; and to be among the best regional universities and the foremost house of expertise and think tank in Yemen.	To excel in engineering education & scientific research with distinction at the local and regional levels.	--	To be distinguished post-graduate program education & scientific research in structural engineering, locally and regionally.

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Mapping of program mission with Department, faculty and university mission

University Mission	Faculty Mission	Department Mission	Program Mission
<p>To contribute to the sustainable development efforts by providing an accredited higher education environment and excellent research services within a fruitful national partnership based on transparency, professionalism and creativity.</p>	<p>To provide excellent and accredited engineering education to meet the development needs and match the labor market requirements locally and regionally.</p>	<p>To provide students with good quality Civil Engineering education that prepares them to be qualified and committed professionals who could pursue graduate studies and research and play a leading role in the sustainable development of the country and its integration into the regional economy.</p>	<p>To graduate well qualified post-graduate students in the field of structural engineering and research through qualified academic program, staff, and suitable infrastructure that meet the development requirements as well as local and regional labor markets.</p>

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Mapping of program objectives with Department, faculty, and university objectives

University Objectives	Faculty Objectives	Department Objectives	Program Objectives
1. To provide specialized and in-depth academic opportunities for students in different fields of knowledge to meet the country's needs of specialties, technicians and experts, with special focus on the following:	7. To offer study programs in various fields of knowledge and equip students with required knowledge and scientific and know-how skills to utilize them in resolving problems effectively and efficiently.	1. provide a high quality educational experience through an appropriate depth over the full range of core engineering subject areas for undergraduate and postgraduate programs,	1. To provide specialized studies and encourage fundamental and applied research in different structural engineering disciplines.
2. To boost the level and quality of preparation and qualification tasks.	8. To develop positive trends towards engineering science and its accelerating developments and enable students to use the techniques and methods of conducting scientific research in engineering fields.	2. applying the quality assurance standards and targeting the academic accreditation levels (local, regional and international levels).	2. To bridge the gap between the academic educational and industrial and technological environment.

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Mapping of program objectives with Department, faculty, and university objectives

University Objectives	Faculty Objectives	Department Objectives	Program Objectives
3. To create a general culture aiming at developing the elements of sound Islamic personality and the proper cognitive and scientific training.	9. To develop skills of scientific, innovative and critical thinking as well as the concept of continuous self-education.	3. Serving the community and labor market needs through the consultancy, research, laboratory tests and training services.	3. To provide graduates with up-to-date advanced knowledge and skills needed to create high-quality systems and attain excellence in solving technical problems and challenges in the structural engineering field.
4. To stabilize the true Islamic vision emanating from the broad horizons of Islamic knowledge and its perception of the universe, man and life.	10. To strengthen scientific ties with national and international colleges, scientific bodies, and research & development centers.		4. To contribute effectively to the structural engineering profession by applying ethical practices and communication skills, sharing innovative and clear ideas and pursuing further education through lifelong learning
5. To develop innovative and critical scientific thinking skills.	11. To provide technical and specialized studies and consultations to various state bodies and institutions, both public and semi-public, and		5. To graduate researchers in structural engineering disciplines who can pursue further studies and contribute to the scientific research community.

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Mapping of program objectives with Department, faculty, and university objectives

University Objectives	Faculty Objectives	Department Objectives	Program Objectives
	utilize them in resolving the environment and society issues to promote sustainable development.		
6. To provide students with the required knowledge and scientific and applied skills for solving problems effectively and efficiently.	12. To develop a spirit of co-operation, group work, effective leadership, sense of responsibility, and ethical commitment.		

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ملحق (8) المساقات الرئيسية وأوزانها الفرعية لبرنامج ماجستير الهندسة الإنشائية
Appendix (8) Main Themes/Sub-Themes with Relative weight for structural engineering Program.

No.	Themes	Credit Hours	Courses Number	Relative weight for Theme	Sub-Themes
0	NA				-
1					-
2					-
3					-
4					-
	Total			100%	

* This total is the overall total of both Compulsory and Elective courses.

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ملحق (9) توزيع مخرجات التعلم لبرنامج ماجستير الهندسة الإنشائية مع المساقات الرئيسية

Appendix (9) P- ILOs Distribution to Main Themes for Master of Science in structural engineering program

No	PIL Os	Themes							
		1st Theme	2nd Theme	3rd Theme	4th Theme	5th Theme	6th Theme	7th Theme	8th Theme
1	A1	NA							
2	A2								
3	A3								
4	A4								
5	B1								
6	B2								
7	B3								
8	C1								
9	C2								
10	C3								
11	D1								
12	D2								

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13	D3							
14	D4							

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ملحق (10) موائمة مخرجات تعلم برنامج ماجستير الهندسة الإنشائية مع المقررات

Appendix (10) Mapping Program Intended Learning Outcomes with courses for Master of Science in structural engineering program

Course Name	Program Intended Learning Outcomes (P-IOLs)															
	(A)				(B)				(c)				(D)			
	A1	A2	A3	A4	B1	B2	B3		C1	C2	C3		D1	D2	D3	D4
Scientific Research Methodology		X		X		X			X				X			
Advanced Structural Analysis	X		X		X			X				X				
Advanced Structural Steel Design			X		X		X			X				X		
Prestressed & Precast Concrete		X		X		X			X				X			
Structural Dynamics	X		X		X			X				X				
Earthquake Engineering			X		X		X			X				X		
Advanced Concrete Technology		X		X		X			X				X			
Finite Element Method in Structural Analysis	X		X		X			X				X				

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Course Name	Program Intended Learning Outcomes (P-IOLs)															
	(A)				(B)				(c)				(D)			
	A1	A2	A3	A4	B1	B2	B3		C1	C2	C3		D1	D2	D3	D4
Computer Applications in Structural Engineering			X		X		X			X				X		
Design of Masonry Structures		X		X		X		X					X			
Advanced Bridge Engineering	X		X		X			X				X				
Structural Rehabilitation			X		X		X			X				X		
Advance Solids and Structures Mechanics		X		X		X			X				X			
Advanced Concrete Structural Design	X		X		X			X				X				
Advanced Earthquake Engineering			X		X		X			X				X		
Advanced Statistics	X					X								X		
Advanced Numerical Methods		X		X		X			X				X			

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Course Name	Program Intended Learning Outcomes (P-IOLs)															
	(A)				(B)				(c)				(D)			
	A1	A2	A3	A4	B1	B2	B3		C1	C2	C3		D1	D2	D3	D4
Advanced Engineering Project Management	X		X		X			X				X				
Applied Bridge Engineering			X		X		X			X				X		
Fracture Mechanics																
THESIS599													X	X	X	X

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Program Intended Learning Outcomes (PILOs)

Upon successful completion of the Master of Science in Structural Engineering Program, graduates should be able to:

E. Knowledge and Understanding	
A1.	Demonstrate in depth understanding of knowledge of applied mathematics and engineering science to the field of structural engineering.
A2.	Recognize and Explain the contemporary engineering technologies and issues in the specialization field of structural engineering.
A3.	Explain in-depth the principles of sustainable design and development of structural engineering.
A4.	Acquire advanced knowledge of research principles and methods applicable to the field of work or academic in structural engineering and related fields.
F. Intellectual Skills	
B1.	Assess, select and apply appropriate principles, methodologies, techniques, tools and packages in the analysis, specification, development and evaluation of structural engineering systems.
B2.	Identify, formulate, analyze research and solve complex structural engineering problems.
B3.	Apply acquired knowledge of analysis and design for complex structural engineering systems and implementation process.
G. Practical and Professional Skills	
C1.	Develop research to solve structural engineering problems.
C2.	Use advanced methodology and skills to solve structural engineering problems.
C3.	Design structural system, component, or process to meet desired needs within realistic constraints.
H. Key Transferrable Skills	
D1.	Prepare a complete thesis and term-courses works/ tasks, write their documents and defend on them.
D2.	Demonstrate ethical principles, awareness of professional and ethical responsibility as well as knowledge of the standards utilized in related fields.
D3.	Conduct independently and communicate research that advances and extends knowledge and scholarship in related fields.
D4.	Own intellectual independence, with initiative and creativity in new situations and/or for further learning, plan and execute original research with full responsibility and accountability for personal outputs.

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ملحق (11) موائمة مخرجات تعلم برنامج ماجستير الهندسة الإنشائية مع المرجعيات

Appendix (11) Mapping Program Intended Learning Outcomes with the benchmarks for Master of Science in structural engineering program

Standards and Benchmarks	(IOLs) Intended Learning Outcomes															
	(A)				(B)				(c)				(D)			
	A1	A2	A3	A4	B1	B2	B3		C1	C2	C3		D1	D2	D3	D4
N/A																

Program Intended Learning Outcomes (PILOs)

Upon successful completion of the Master of Science in Structural Engineering Program, graduates should be able to:

A. Knowledge and Understanding

A1.	Demonstrate in depth understanding of knowledge of applied mathematics and engineering science to the field of structural engineering.
A2.	Recognize and Explain the contemporary engineering technologies and issues in the specialization field of structural engineering.
A3.	Explain in-depth the principles of sustainable design and development of structural engineering.
A4.	Acquire advanced knowledge of research principles and methods applicable to the field of work or academic in structural engineering and related

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Program Intended Learning Outcomes (PILOs)

Upon successful completion of the Master of Science in Structural Engineering Program, graduates should be able to:

	fields.
B. Intellectual Skills	
B1.	Assess, select and apply appropriate principles, methodologies, techniques, tools and packages in the analysis, specification, development and evaluation of structural engineering systems.
B2.	Identify, formulate, analyze research and solve complex structural engineering problems.
B3.	Apply acquired knowledge of analysis and design for complex structural engineering systems and implementation process.
C. Practical and Professional Skills	
C1.	Develop research to solve structural engineering problems.
C2.	Use advanced methodology and skills to solve structural engineering problems.
C3.	Design structural system, component, or process to meet desired needs within realistic constraints.
D. Key Transferrable Skills	
D1.	Prepare a complete thesis and term-courses works/ tasks, write their documents and defend on them.
D2.	Demonstrate ethical principles, awareness of professional and ethical responsibility as well as knowledge of the standards utilized in related fields.
D3.	Conduct independently and communicate research that advances and extends knowledge and scholarship in related fields.
D4.	Own intellectual independence, with initiative and creativity in new situations and/or for further learning, plan and execute original research with full responsibility and accountability for personal outputs.

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ملحق (12) موازنة أهداف البرنامج مع مخرجات التعلم المقصودة لبرنامج ماجستير الهندسة الإنشائية

Annex-12, Alignment of Civil Engineering Program Objectives with Program Intended Learning Outcomes

Program Objectives رقم ونص المعيار	Program Intended Learning Outcomes (PILOs) رموز مخرجات التعلم للبرنامج													
	A1	A2	A3	A4	B1	B2	B3	C1	C2	C3	D1	D2	D3	D4
Upon successful completion of the MSc Structural Engineering program, graduates should be able to:														
1. To provide specialized studies and encourage fundamental and applied research in different structural engineering disciplines.	√	√	√	√	√	√	√	√	√	√	√	√	√	√
2. To bridge the gap between the academic educational and industrial and technological environment.		√			√	√	√	√	√	√	√	√	√	
3. To provide graduates with up-to-date advanced knowledge and skills needed to create high-quality systems, attain the excellence in structural engineering and solve the technical problems and challenges in structural industry.		√	√		√	√	√	√	√	√	√	√		√

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Program Objectives رقم ونص المعيار	Program Intended Learning Outcomes (PILOs) رموز مخرجات التعلم للبرنامج													
	A1	A2	A3	A4	B1	B2	B3	C1	C2	C3	D1	D2	D3	D4
4. To contribute effectively to the structural engineering profession by applying ethical practices and communication skills, sharing innovative and clear ideas and pursuing further education through lifelong learning			√		√	√	√	√	√	√	√	√	√	√
5. To graduate researchers in structural engineering disciplines who can pursue further studies and contribute to the scientific research community.		√		√	√	√	√	√	√	√	√		√	√

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Program Intended Learning Outcomes (PILOs)

Upon successful completion of the Master of Science in Structural Engineering Program, graduates should be able to:

A. Knowledge and Understanding

A1.	Demonstrate in depth understanding of knowledge of applied mathematics and engineering science to the field of structural engineering.
A2.	Recognize and Explain the contemporary engineering technologies and issues in the specialization field of structural engineering.
A3.	Explain in-depth the principles of sustainable design and development of structural engineering.
A4.	Acquire advanced knowledge of research principles and methods applicable to the field of work or academic in structural engineering and related fields.

B. Intellectual Skills

B1.	Assess, select and apply appropriate principles, methodologies, techniques, tools and packages in the analysis, specification, development and evaluation of structural engineering systems.
B2.	Identify, formulate, analyze research and solve complex structural engineering problems.
B3.	Apply acquired knowledge of analysis and design for complex structural engineering systems and implementation process.

C. Practical and Professional Skills

C1.	Develop research to solve structural engineering problems.
C2.	Use advanced methodology and skills to solve structural engineering problems.
C3.	Design structural system, component, or process to meet desired needs within realistic constraints.

D. Key Transferrable Skills

D1.	Prepare a complete thesis and term-courses works/ tasks, write their documents and defend on them.
D2.	Demonstrate ethical principles, awareness of professional and ethical responsibility as well as knowledge of the standards utilized in related fields.

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Program Intended Learning Outcomes (PILOs)

Upon successful completion of the Master of Science in Structural Engineering Program, graduates should be able to:

D3.	Conduct independently and communicate research that advances and extends knowledge and scholarship in related fields.
D4.	Own intellectual independence, with initiative and creativity in new situations and/or for further learning, plan and execute original research with full responsibility and accountability for personal outputs.

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