

Sana'a University
Faculty of Engineering
Department Civil Engineering



Doctor of Philosophy
in Civil Engineering
Program
Specifications

August - 2022

Faculty of Engineering, Sana'a University

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Program Specification

1. Program Introduction/Description

This program is designed to provide in-depth theoretical knowledge and research in Civil Engineering Field. Thesis and researches, which mainly on structure, transportation, water resource, management and geotechnical design.

2. Program Identification and General Information

Program Title	Doctor of Philosophy in Civil Engineering.
Awarding Institution	Sana'a University.
Department	Department of Civil Engineering.
Other Departments with major Teaching Contributions	-
Language of study	English and Arabic Language.
Date of Specification Preparation/Revision	October 2022.
Mode of Study	Full time
Study System	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	Doctor of Philosophy in Civil Engineering.
Qualification required to join the program:	Master of Science in Civil Engineering or any other equivalent field.
Minimum grade requirements to enroll in the program	Very Good.
Other admission requirements	Detailed below/
Name of the program coordinator	Prof. Dr. Hamoud Aldhfiri.
Approval date:	

3. Program Curriculum Committee

د. عبدالكريم يحيي الخطابي	د. عبد الملك هزاع الجولحي
د. طارق عبدالله بركات	أ.م.د. شرف الدين عبد الله أحمد صالح
أ.د. سليمان إسماعيل الصافي	أ.م.د. عبد الولي حزام الشرجبي
أ.م.د. محمد عبدالله الجرافي	د. محمد عبد الودود سيف العريقي
د. عبدالله أحمد المسوري	د. محمد عبد الله عبده أحمد
د. عبدالوهاب محمد النونو	أ.د. فضل علي صالح النزيلي

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Program Specification

أ.د. أحمد حسن أحمد الوظائف	أ.د. حسان سعد محمد عبدالمعني
د. منصور احمد ثابت حيدرة	د زمزم عبده يحيى مبارك

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 quality of work .
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. ----- No need.
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.

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Program Specification

2. 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.
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 Ph.D. program in Civil Engineering locally and regionally that integrate advanced education and scientific research.

Mission of the Program

To graduate highly-qualified Ph.D. holders in the field of Civil engineering through qualified academic program, staff, and suitable research infrastructure that meet the research and development requirements as well as local and regional labor market needs.

Aims of the Program

1. To provide focused studies and encourage fundamental and applied research in different

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Program Specification

Civil Engineering disciplines.
2. To bridge the gap between the academic educational and industrial / technological environment.
3. To provide graduates with up-to-date advanced knowledge and skills needed to create high-quality systems, attain the excellence in Civil engineering and solve the technical problems and challenges in industry.
4. To graduate independently researchers in Civil engineering disciplines who can pursue further studies and contribute to the scientific research community.
5. Develop leadership, skills and ethics of the profession and engaging in lifelong learning.
6. Develop new methods and new high-tech components for effective, reliable, sustainable systems and industrial products.

8. Program Standards & Benchmarks
Program Standards
1. Post-Graduate Studies Rules and Regulations of the Ministry of Higher Education and Scientific Research, Yemen.
2. -----
Program Benchmarks
1. Doctor of Philosophy in Civil Engineering, Qatar University , Qatar (research & courses).
2. PhD Program in Civil and Environmental Engineering, Norwegian University of Science and Technology, Norway.
3. Doctor of Philosophy Field of Research: Civil Engineering, University Technology Malaysia UTM, Malaysia.
4. Doctor of Philosophy in Civil Engineering, The University of Alabama, USA.
5. Doctoral Program in Civil and Environmental Engineering ,Rutgers University, USA
6. Doctor of Philosophy in Civil Engineering, Qatar University , Qatar (research).

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Program Specification

9. Summary of Similar Programs (Benchmarks) for Ph.D. Civil Program							
The Program Title	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	Doctor of Philosophy in Civil Engineering	PhD Program in Civil and Environmental Engineering	Doctor of Philosophy Field of Research: Civil Engineering	Doctor of Philosophy In Civil Engineering	doctoral program in Civil and Environmental Engineering	Doctor of Philosophy (PhD) Program (Research-based – Research Intensive) in Civil Engineering	Doctor of Philosophy in Civil Engineering
The Faculty	College of Engineering	Faculty of Engineering	Faculty of Engineering School of Civil Engineering	College of Engineering	College of Engineering	College of Engineering	College of Engineering
The University	Qatar University	Norwegian University of Science and Technology	University Technology Malaysia UTM	The university of Alabama	Rutgers	Qatar University	Sana'a University
The Country	Qatar	Norway	Malaysia	USA	USA	Qatar	Yemen
Type of Program	Courses + PhD Thesis	Courses + PhD Thesis	Courses + PhD Thesis	Courses + PhD Thesis	Courses + PhD Thesis	PhD Thesis	PhD Thesis + 2Papers
Study Methods in the Program:	Regular	Regular	Regular	Regular	Regular	Regular	Full time
Number of Semesters	8 semesters	6-16 semesters	6 semesters	8-12 semesters	6-10 semesters	6-10 semesters	2-3 Years
Total Credit Hours (without Thesis)	27	35ECTS	3	48	48	12	-
Credit Hours for compulsory courses	15	ECTS5	3	9+3	18	3	-
No. of Courses for Electives courses	4	6	13	3+1	10	3	-
No. of	5	1	2	12	6	1	-

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Courses for compulsory courses							
Credit Hours for Electives courses	12	30ESTS	0	36	30	9	-
Complementary courses to join the program and their number	6						0-5
Credit Hours for Thesis	33	150ECTS	87	24	24	48	48
Total Credit Hours for courses & Thesis	60	185	90	72	72	60	48
The period for thesis completion	3 semesters						2-3 Years
The min. period to complete the program	6 semesters		6 semesters				2 Years
The max. period to complete the program	6-10 semesters	8 semester	6-16 semester	6 semester	8-12 semester	6-10 semesters	3 years

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	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	
Graduation Requirements	Pass the qualifying exam At least two publications accepted in peer-reviewed and indexed journals.		Master Degree with cumulative grade average of 3.00, or equivalent from a recognized university TOEFL score of 550 or IELTS band 6.0, or equivalent. A local student must produce a satisfactory score from MUET. Accepted by the post-graduate selection committee of the faculty involved. At least one member from the faculty who has at least a Master degree in the field of study is qualified and willing to supervise the candidate.		72 credit credits– at least 48 credits of coursework, which may include MS degree coursework course credits and at least 24 credits of thesis research At least six credits in the areas of mathematics, numerical methods, and statistics are required Written and oral qualifying exams Dissertation proposal and defense	A minimum of 12 credit hours of course work must be completed. The grade point average (GPA) must be 3.0 or higher on a scale of 4.00. Pass the oral defense while completing the 48 thesis credit hours. At least two accepted papers in Q1/Q2 peer-reviewed and indexed journals. An acceptable thesis must be completed within five years after admission.	
Admission Requirements	○					Earned master's degree in Civil Engineering or a related field with a minimum GPA of 3.00/4.00 in a master's degree course work from a university or college accredited by an international accreditation organization or by the Ministry of	

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Program Specification

9. Summary of Similar Programs (Benchmarks) for Ph.D. Civil 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	
						Higher Education or equivalent authority in that country. <ul style="list-style-type: none"> ○ Achieved a minimum score of 520 on the paper-based TOEFL or equivalent English proficiency test (e.g., IELTS score of 6.0), taken within 2 years of the start of the intended semester of admission, OR earned a previous degree from an accredited institution of higher education in a program where English was the language of instruction. ○ Passing an interview with the Department of Civil and Architectural Engineering admission committee. 	

10 . Program Intended Learning Outcomes (PILOs)			
A. Knowledge and Understanding			
Upon successful completion of the Ph.D. in Civil Engineering Program, graduates should be able to:			
A1.	Demonstrate deep understanding of knowledge of applied mathematics and engineering science in the field of Civil Engineering.		
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Program Specification

10 . Program Intended Learning Outcomes (PILOs)	
A2.	Recognize and explain the contemporary engineering technologies and issues in the specializations of Civil Engineering.
A3.	Acquire advanced knowledge of research methodologies in Civil Engineering and related fields.
B. Intellectual Skills	
Upon successful completion of the Ph.D. in Civil Engineering Program, graduates should be able to:	
B1.	Assess and select appropriate principles, methodologies, techniques, tools and packages in the analysis, specification, development and evaluation of Civil Engineering systems
B2.	Identify, formulate, analyze research and solve complex Civil Engineering problems.
B3.	Critically review the scientific literature for effective justification and support of results and decisions.
B4.	Evaluate the application of different civil system, component, or process to meet desired needs.
B5.	Recognize and select the application of different methods and contribute to the development of new knowledge in research areas
C. Practical and Professional Skills	
Upon successful completion of the Ph.D. in Civil Engineering Program, graduates should be able to:	
C1.	Conduct original researches to solve Civil Engineering problems.
C2.	Use advanced methodology, tools, and skills to solve complex Civil Engineering problems.
C3.	Apply acquired knowledge of analysis and design for Civil Engineering systems and implementation process.
C4.	Apply and validate innovations and discoveries in the lab or real- world settings in more efficient and effective ways.
D. Key Transferrable Skill	
Upon successful completion of the Ph.D. in Civil 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.
D5.	Participate in complex multidisciplinary assignments and projects, provide research and development via recognized national and international channels, participate in debates in the field in international forums and assess the need to take the initiative to drive innovation.

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Program Specification

11. Teaching Strategy to Achieve Program Learning Outcomes		
ILOs	Teaching Strategy	Assessment Methods
A	Seminars, Self-Learning, Independent study.	Oral discussion, experimental and field work, and laboratory report.
B	Analysis and Problem Solving, Seminars, Project supervision, Self-Learning, Simulation exercises, independent study, Brain storming, Research Presentations	Oral discussion, experimental and field work.
C	Analysis and Problem Solving, Seminars, Project supervision, Laboratory works, Self-Learning, independent study, Brain storming, Research Presentations	Oral discussion, experimental and field work.
D	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, and written report.

Teaching Strategy	Description of the Main Strategy Used
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.
Analysis and Problem Solving.	The study of civil 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.

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Program Specification

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 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 Ph. D. student to writing 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, and case studies.

Assessment Strategy	Description of the main strategy used.
Oral Discussion	To know the knowledge of the students.
Presentations	For Final Results displaying, to enhance the level of students in different subjects.
Reports	To demonstrate the personal skills, practical expertise, communication skills, report writing skills, and team work expertise they are expected to be learned and

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Program Specification

	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 Ph. D. student ability to commence and conduct his/her research.
Thesis and Publications	To assess the entire acquired knowledge and skill through the Ph. D. thesis and publications.

12. Intended Learning Outcomes Mapping:

See Annex 3

13. Program Structure

Program Requirement	No	Credit Hours	%
Complementary Courses	0-5	--	--
Thesis	--	48	100%
Total		48	100%

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Program Specification

Complementary Courses (00 hrs)							
All the Master courses XX500							

Compulsory Researches		
No	Paper	Note
1	One accepted research paper in a close access journal in the field of his Ph.D. research program.	
2	One published research paper in a close access journal in the field of his Ph.D. research program.	
Total		

Ph.D. Thesis 48 CH)							
No	Course Code	Course Title	Lec.	Tut.	Pr.	Total C.H.	Prerequisites
	THESIS699	Ph.D. Thesis				48	
Total						48	

Regulations
<p>Thesis</p> <p>The student must prepare and discuss a Ph.D. Thesis by (48) credit hours.</p>
<p>1.Registration for Doctor of Philosophy Program:</p> <p>(Requirements/conditions and procedures for registration of the program as well as controls, responsibilities and procedures of registration guidance)</p> <ul style="list-style-type: none"> • Completion of all university Registration proceeding requirements. • Passing the Comprehensive Exam with very good grade. • Conducting Seminar for Ph.D. Program proposal & research plan. • Providing letter of acceptance of the Ph.D. topic from Supervisor. • Any further requirements and condition related to Ph.D. Program.
<p>Thesis and Its Requirements (if any)</p>

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Program Specification

Regulations

2.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 tow research papers are accepted in a close access journal in the field of research inside.
- Field of Research and precise research topic with short Description and suggested time plan.
- Thesis work should be done in at least 4-semesters starting from Decision letter (Supervisors) date.
- Thesis work should be done in at most 6-semesters starting from Decision letter (Supervisors) date.
- Any further requirements and controls based on post-graduate deanship regulations.

3.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 1-2 supervisors are selected for the supervision of a thesis.
- one or two Associate (or Full) Professors are appointed as supervisor either from the department or from another department outside the faculty.

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.

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

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Program Specification

Regulations

- plan and actively pursue the research;
- identify and deal with any research-related problems;
- comply with administrative requirements;
- 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.

4. 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 two 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 civil engineering addition to the supervisor of the thesis.
- A session for presentation, defense and approval of the thesis should be done based on the 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	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 Research	48

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Program Specification

16. Admission Requirements:

1. Master of Science in Civil Engineering Certificate with not less than “Very Good” grade, or equivalent.
2. Interview.
3. TOEFL / IBT:60.
4.ICDL (Computer Skills).
5.Arabic Language.
6. Student Number Capacity of 10 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 2 paper and 48 credit hours research.

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).

Facilities and Equipment

Policies and Procedure for providing and quality assurance of Facilities and Equipment (Library, laboratories (Structure, material Labs), medical facilities, classrooms, etc.).

List of laboratories

- Material Engineering Laboratory (Upgrading necessary)
- Soil Engineering Laboratory (Upgrading necessary)
- Highway Engineering Laboratory (Upgrading necessary)
- Survey Engineering Laboratory (Upgrading necessary)
- Sanitary Engineering Laboratory (Upgrading necessary)
- hydraulic Engineering Laboratory (Upgrading necessary)
- Computer Laboratory

19. Teaching staff:

	Professor	Associate Professor	Technicians Assistants
Required Number			
Available Number	7	10	6
Note:			

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Program Specification

20. Program Management and Regulations
<p>1. Program Management</p> <p>1.1 Program Structure (Including boards, councils, units, committees, etc.)</p> <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> <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>
<p>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.)</p> <p>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</p>

21. Evaluation of Program Quality Matrix:			
Evaluation Areas/Aspects	Evaluation Sources/References	Evaluation Methods	Evaluation Time
<p>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.)</p>			

22. List of Annexes

Head of the Department Dr. Abdulkarem Alkhtabi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Algorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University		Prof. Dr. Al-Qassim Mohammed Abbas	

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

Annex (1)	Academic Standards Curriculum Criteria of Accreditation Board for Ph.D. in Civil 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 civil Engineering Programs at International Universities.
Annex (4)	Summary of Similar Programs (Benchmarks) for Ph.D. Civil Program.
Annex (5)	Survey of Course Names of Similar Ph.D. Civil Programs.
Annex (6)	Survey/ Mapping of Vision, Mission and Objectives of Similar Accredited Programs at International Universities(Benchmarks) for Ph.D. Civil Programs.
Annex (7)	Mapping of mission and objective of the program with vision, mission and objectives of faculty, and university.
Annex (8)	Main Themes/Sub-Themes with Relative weight for Program (if needed).
Annex (9)	PILOs Distribution to General Themes for Program (if needed).
Annex (10)	Mapping the benchmarks with PILO's (if needed).
Annex (11)	Mapping Program's Goals with Intended Learning Outcomes (if needed).

ملحق (1) المعايير الأكاديمية للمحتوى لهيئة الاعتماد لبرنامج دكتوراه الهندسة المدنية
(Annex-1): Academic Standards Curriculum Criteria of Accreditation Board for Doctor of
Philosophy in Civil Engineering

Accreditation

Head of the Department Dr. Abdulkarem Alkhtabi	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Algorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
Rector of Sana'a University		Prof. Dr. Al-Qassim Mohammed Abbas	

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

ملحق (2) مسح أسماء البرامج المعتمدة المماثلة لبرنامج دكتوراه الهندسة المدنية

Annex (2) Survey of Similar Accredited Programs at Inter. University (Benchmarks) for Doctor of Philosophy in Civil 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 الدرجة التي يمنحها البرنامج للخريج	Year of accreditation سنة الحصول على الاعتماد	Type of program
The 1 st Program البرنامج الاول	Doctor of Philosophy In Civil Engineering	Qatar University	College of Engineering	Civil Engineering	Qatar		Doctor of Ph Doctor of Philosophy In Civil Engineering ilosophy In Civil Engineering	October 2005	thesi s
The 2 nd Program البرنامج الثاني	PhD Program in Civil and Environmental Engineering	Norwegian University of Science and Technology	Faculty of Engineering	Structural Engineering Civil and Environmental Engineering	Norway		PhD Program in Civil and Environmental Engineering		
The 3 rd Program البرنامج الثالث	Doctor of Philosophy Field of Research: Civil Engineering	University Technology Malaysia UTM	Faculty of Engineering SCHOOL OF CIVIL ENGINEERING	Department Structure and Materials,	Malaysia	NA	Doctor of Philosophy in Civil Engineering		Coursew ork and thesis

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

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

#	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 الدرجة التي يمنحها البرنامج للخريج	Year of accreditation سنة الحصول على الاعتماد	Type of program
The 4 th Program البرنامج الرابع	Doctor of Philosophy In Civil Engineering	The university of Alabama	College of Engineering	Civil, Construction and Environmental	USA		Doctor of Philosophy in Civil Engineering		Coursework and thesis
The 5 th Program البرنامج الخامس	doctoral program in Civil and Environmental Engineering	Rutgers	School of Engineering	Civil & Environmental Engineering	USA	top 50 USA	doctoral program in Civil and Environmental Engineering		Coursework and thesis
The 6 th Program البرنامج السادس	Doctor of Philosophy (PhD) Program (Research-based – Research Intensive) in Civil Engineering	Qatar University	College of Engineering	Civil Engineering	Qatar		Doctor of Philosophy In Civil Engineering	October 2005	research and thesis

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

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

ملحق (3) مسح مخرجات التعلم في البرامج المماثلة لبرنامج دكتوراه الهندسة المدنية

Annex (3) Survey of Intended Learning Outcomes for Similar Accredited Program for Doctor of Philosophy in Civil Engineering

Program Intended Outcomes	Suggested PILOs for the Current Program:		1 st Program	2 nd Program	3 rd Program	4 th Program	5 th Program	6 th Program
	Civil Engineering Program		Qatar		UTM	Alabama	Rutgers	Qatar (research)
Knowledge and Understanding	Upon successful completion of Doctor of Philosophy in Civil Engineering Program, graduates should be able to:							
	A1.	Demonstrate deep understanding of knowledge of applied mathematics and engineering science in the field of Civil engineering.	√-(LO1)		PLO 1	2		√-(LO1)
	A2.	Recognize and explain the contemporary engineering technologies and issues in the specializations of Civil engineering.	LO2		PLO 1	3	6	LO2
	A3.	Acquire advanced knowledge of research methodologies in Civil engineering and related fields.	LO2, LO4		PLO 2			LO2, LO4
B. Cogniti	Upon successful completion of PhD program in Civil Engineering , graduates should be able to:							

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

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

Program Intended Outcomes	Suggested PILOs for the Current Program:		1 st Program	2 nd Program	3 rd Program	4 th Program	5 th Program	6 th Program
	Civil Engineering Program		<u>Qatar</u>		<u>UTM</u>	<u>Alabama</u>	<u>Rutgers</u>	<u>Qatar (research)</u>
Intellectual Skills	B1.	Assess and select appropriate principles, methodologies, techniques, tools and packages in the analysis, specification, development and evaluation of Civil engineering systems	LO3		PLO 3	1	6	LO3
	B2.	Identify, formulate, analyze research and solve complex Civil engineering problems.	LO2			2	6	LO2
	B3.	Critically review the scientific literature for effective justification and support of results and decisions	LO2, LO4		PLO 3	1	6	LO2, LO4
	B4	Evaluate the application of different Civil system, component, or process to meet desired needs.	LO3			1	6	LO3
	B5	Recognize and select the application of different methods and contribute to the development of new knowledge in research areas	LO4		PLO 3	4		LO4
C. Practica	Upon successful completion of a Master of Science in Civil Engineering program, graduates should be able to:							

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

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

Program Intended Outcomes	Suggested PILOs for the Current Program:		1 st Program	2 nd Program	3 rd Program	4 th Program	5 th Program	6 th Program
	Civil Engineering Program		<u>Qatar</u>		<u>UTM</u>	<u>Alabama</u>	<u>Rutgers</u>	<u>Qatar (research)</u>
I and Professional Skills	C1.	Conduct original researches to solve Civil engineering problems	LO4		PLO 2	1	2	LO4
	C2.	Use advanced methodology, tools, and skills to solve complex Civil engineering problems.	LO2		PLO 2	2	5	LO2
	C3.	Apply acquired knowledge of analysis and design for Civil engineering systems and implementation process.	LO2			2	6	LO2
	C4.	Apply and validate innovations and discoveries in the lab or real- world settings in more efficient and effective ways.	LO3			4		LO3
D. General and Transferable Skills	Upon successful completion of a Master of Science in Civil Engineering program, graduates should be able to:							
	D1.	Prepare a complete thesis and term-courses works/tasks, write their documents and defend on them.	LO5				2,3	LO5
	D2.	Demonstrate ethical principles, awareness of professional and ethical responsibility as well as	LO4		PLO 4		4,5	LO4

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

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

Program Intended Outcomes	Suggested PILOs for the Current Program:		1 st Program	2 nd Program	3 rd Program	4 th Program	5 th Program	6 th Program
	Civil Engineering Program		<u>Qatar</u>		<u>UTM</u>	<u>Alabama</u>	<u>Rutgers</u>	<u>Qatar (research)</u>
		knowledge of the standards utilized in related fields.						
D3.		Conduct independently and communicate research that advances and extends knowledge and scholarship in related fields.	LO5		PLO 5		3	LO5
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.				3		
D5.		Participate in complex multidisciplinary assignments and projects, provide research and development via recognized national and international channels, participate in debates in the field in international forums and assess the need to take the initiative to drive innovation.				4		

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Program Specification

Intended Outcomes for Similar Programs

Program 1: Qatar University

Student Learning Outcomes

By the time a student completes all requirements of the program, the student will have achieved the following learning outcomes:

- Able to systematically review, analyze, assimilate and interpret the body of scientific literature and innovations in their discipline area,
- Apply and validate innovations and discoveries in the lab or real-world settings in more efficient and effective ways,
- Produce high-quality research
- Disseminate effectively the research output in reputable international journals, conferences, patents, research proposals, and other scientific venues.

By the time a student completes the requirements the Master of Science or the Doctoral of Philosophy in Civil Engineering programs, he/she will have achieved the following Learning Outcomes (LOs):

- LO1: Able to apply knowledge of mathematics and science, and specialized engineering concepts to design, develop, and produce useful products in a chosen area of concentration.
- LO2: Able to review, analyze, and interpret the body of scientific literature, contemporary issues and innovations in their discipline area.
- LO3: Able to apply and validate innovations and discoveries in the lab or real world settings in efficient and effective ways utilizing modern engineering tools.
- LO4: Able to conduct and produce quality research in a chosen area of concentration, and understand professional and ethical responsibility.
- LO5: Able to effectively write and present the research output in international journals, conferences, patents, research proposals and other scientific venues.

Program 3: UTM

(a) Technical Knowledge and Competencies

PLO 1: Advanced Knowledge: Graduate are able to incorporate in-depth relevant knowledge in professional practices for the benefits of both national and International communities.

Graduates are able to apply their knowledge and skills in the planning, analysis, design and supervision of works related to the civil engineering discipline

PLO 2 Research Skills :Graduate are able to formulate hypothesis, design and perform experiments/research scientifically to solve and explain observed

PLO 3 Critical Thinking and Problem Solving Graduate are able to manage conducive working environment qualities problem solving and higher order thinking skills. Graduate

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



Program Specification

are technically competent in solving problems logically, analytically and creatively based on sound facts and ideas.

(b) Generic Skills.

PLO4 Ethics, Values, Professionalism Graduate are able to balance professional and ethical responsibilities including contemporary issues and environmental awareness.

PLO5 Communication Graduate are able to apply a wide range of relevant knowledge through effective oral and written communications. Graduates are able to communicate effectively across a range of contexts and audiences.

PLO6 Life Long Learning Graduate are able to adopt the latest relevant knowledge and cutting-edge technologies through life-long learning process

Program 4: Alabama

Graduates of The University of Alabama PhD program will be able to:

- Evaluate the effectiveness of a designed experiment and the implications of the resulting data.
- Verify and justify the solution to a complex civil engineering problem, including the use of appropriate tools and techniques.
- Develop and evaluate new, advanced technical knowledge in a specialized area of civil engineering.
- Synthesize and explain the relevance and application of new, advanced technical knowledge in both technical and non-technical terms.

Program 5: Rutgers

Student Learning Outcomes

1. Graduates will meet the academic standards set by the graduate school and the department while completing courses pertinent to their specialty area
2. Graduates will conduct the investigation work necessary to satisfy the requirements of PhD dissertation
3. Graduates will write and orally defend a dissertation
4. Graduates will have an understanding of academic, professional and ethical responsibility
5. Graduates will have an ability to use contemporary techniques, skills, and tools necessary for engineering practice in education, industry, and government
6. Graduates will serve in primary roles as graduate research assistants on research projects or on problem investigations sponsored by companies, associations, or government agencies looking for new methodology or science to advance knowledge and solve problems

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



Program Specification

Program 5: Qatar (research)

By the time a student completes all requirements of the program, the student will have achieved the following learning outcomes:

- Able to systematically review, analyze, assimilate and interpret the body of scientific literature and innovations in their discipline area,
- Apply and validate innovations and discoveries in the lab or real-world settings in more efficient and effective ways,
- Produce high-quality research
- Disseminate effectively the research output in reputable international journals, conferences, patents, research proposals, and other scientific venues.

By the time a student completes the requirements the Master of Science or the Doctoral of Philosophy in Civil Engineering programs, he/she will have achieved the following Learning Outcomes (LOs):

- LO1: Able to apply knowledge of mathematics and science, and specialized engineering concepts to design, develop, and produce useful products in a chosen area of concentration.
- LO2: Able to review, analyze, and interpret the body of scientific literature, contemporary issues and innovations in their discipline area.
- LO3: Able to apply and validate innovations and discoveries in the lab or real world settings in efficient and effective ways utilizing modern engineering tools.
- LO4: Able to conduct and produce quality research in a chosen area of concentration, and understand professional and ethical responsibility.
- LO5: Able to effectively write and present the research output in international journals, conferences, patents, research proposals and other scientific venues.

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Sana'a University
Faculty of Engineering
Department: Civil Engineering
Title of the Program:
Doctor of Philosophy in Civil Engineering



Program Specification

ملحق (4) مسح ملخص البرامج المماثلة لبرنامج دكتوراه الهندسة المدنية

Annex (4) Summary of Similar Programs (Benchmarks) for Doctor of Philosophy in Civil Engineering

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	Doctor of Philosophy In Civil Engineering	PhD Program in Civil and Environmental Engineering	Doctor of Philosophy Field of Research: Civil Engineering	Doctor of Philosophy In Civil Engineering	doctoral program in Civil and Environmental Engineering	Doctor of Philosophy (PhD) Program (Research-based – Research Intensive) in Civil Engineering	Doctor of Philosophy In Civil Engineering
The Faculty	College of Engineering	Faculty of Engineering	Faculty of Engineering SCHOOL OF CIVIL ENGINEERING	College of Engineering	School of Engineering	College of Engineering	Faculty of Engineering
The University	Qatar University	Norwegian University of Science and Technology	University Technology Malaysia UTM	The university of Alabama	Rutgers	Qatar University	
The Country	Qatar	Norway	Malaysia	USA	USA	Qatar	
Type of program	<u>Conventional</u> Courses and Research	<u>Conventional</u> Courses and Research	<u>Conventional</u> Courses and Research	<u>Conventional</u> Courses	<u>Conventional</u> Courses and Research	research and thesis	Courses and Research
Head of the Department Dr. Abdulkarem Alkhtabi		Quality Assurance Unit Assoc. Prof. Dr. Mohammad Algorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad			
Rector of Sana'a University		Prof. Dr. Al-Qassim Mohammed Abbas					

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

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	
				and Research			
Study methods in the program:	Regular	Regular	Regular	Regular	Regular	Regular	Regular
Number of semesters	8 semesters	6-16 semesters	6 semesters	8-12 semesters	6-10 semesters	6-10 semesters	
Total Credit Hours (without Thesis)	27	35ECTS	3	48	48	12	
Credit Hours for compulsory courses	15	5ECTS	3	9+3	18	3	
No. of Courses for Electives courses	4	6	13	3+1	10	3	
No. of Courses for compulsory courses	5	1	2	12	6	1	
Credit Hours for	12	30ESTS	0	36	30	9	

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

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

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	
Electives courses							
Complementary courses to join the program and their number	6						
Credit Hours for Thesis	33	150ECTS	87	24	24	48	
Total Credit Hours for courses & Thesis	60	185	90	72	72	60	
The period for thesis completion	3 semesters						
Graduation Requirements	Pass the qualifying exam At least two publications		Master Degree with cumulative grade average of 3.00, or equivalent from a		72 credit credits– at least 48 credits of coursework, which may	A minimum of 12 credit hours of course work must be completed. The grade	

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

Sana'a University
Faculty of Engineering
Department: Civil Engineering
Title of the Program:
Doctor of Philosophy in Civil Engineering



Program Specification

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	
	accepted in peer-reviewed and indexed journals.		recognized university TOEFL score of 550 or IELTS band 6.0, or equivalent. A local student must produce a satisfactory score from MUET. Accepted by the post-graduate selection committee of the faculty involved. At least one member from the faculty who has at least a Master degree in the field of study is qualified and willing to supervise the candidate.		include MS degree coursework course credits and at least 24 credits of thesis research At least six credits in the areas of mathematics, numerical methods, and statistics are required Written and oral qualifying exams Dissertation proposal and	point average (GPA) must be 3.0 or higher on a scale of 4.00. Pass the oral defense while completing the 48 thesis credit hours. At least two accepted papers in Q1/Q2 peer-reviewed and indexed journals. An acceptable thesis must be completed within five years after admission.	

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

Sana'a University
Faculty of Engineering
Department: Civil Engineering
Title of the Program:
Doctor of Philosophy in Civil Engineering



Program Specification

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	
					defense		
Admission Requirements						Earned master's degree in Civil Engineering or a related field with a minimum GPA of 3.00/4.00 in a master's degree course work from a university or college accredited by an international accreditation organization or by the Ministry of Higher Education or equivalent authority	

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

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

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	
						<p>in that country.</p> <p>Achieved a minimum score of 520 on the paper-based TOEFL or equivalent English proficiency test (e.g., IELTS score of 6.0), taken within 2 years of the start of the intended semester of admission, OR earned a previous degree from an accredited institution of higher education in a program where English was the language of instruction.</p>	
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Rector of Sana'a University		Prof. Dr. Al-Qassim Mohammed Abbas					

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

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	
						Passing an interview with the Department of Civil Engineering admission committee.	
The min. period to complete the program	6 semesters		6 semesters				
The max. period to complete the program	6-10 semesters	8 semester	6-16 semester	6 semester	8-12 semester	6-10 semesters	

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

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

ملحق (5) مسح أسماء المقررات الدراسية في البرامج المماثلة لبرنامج دكتوراه الهندسة المدنية

Annex (5) Survey of Course Names of Similar Program for Doctor of Philosophy in Civil Engineering

University	Qatar University	Norwegian University of Science and Technology	University Technology Malaysia UTM	The university of Alabama	Rutgers	Qatar University	
Faculty	College of Engineering	College of Engineering	Faculty of Engineering	Faculty of Engineering school of civil engineering	College of Engineering	School of Engineering	
Program	Doctor of Philosophy In Civil Engineering	PhD Program in Civil and Environmental Engineering	Doctor of Philosophy Field of Research: Civil Engineering	Doctor of Philosophy In Civil Engineering	doctoral program in Civil and Environmental Engineering	Doctor of Philosophy (PhD) Program (Research-based – Research Intensive) in Civil Engineering	
Country	Qatar	Norway	Malaysia	USA	USA	Qatar	
No. of Courses	9	7	51	16	16	4	
Total Cr. Hrs.	27	35ECTS	3	48	48	12	
Total Semesters	3	3	4	4	4	4	
Term	No	Course Name	Course Name	Course Name	Course Name	Course Name	Course Name
1	1	Applied Research Methodology	Computational Methods In Structural Dynamics	Research Methodology Course	Construction Engineering And Management Core Coursework (Mscive, Ph.D.):	Construction Engineering And Management	Core Courses Applied Research Methodology

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

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

	2	Core Required Course I	Concrete: Structure-Property Relationship	Quantitative Analysis		Advanced Construction Engineering Management I (3)	Elective Courses Advanced Special Topics I Advanced Special Topics Ii Advances In Civil Engineering Practice And Research	
	3	Concentration Elective Course I	Continuum Mechanics	Elective Courses	Ce 573 Statistical Applications In Civil Engineering	Advanced Construction Engineering Management Ii		
	4		Creep And Shrinkage In Concrete Structures	Project Estimating	Ce 567 Construction Accounting And Finance	Building Information Modeling (3)		
	5		Durability Of Concrete Structures	It For Civil Engineers	Ce 568 Construction Scheduling	Methods And Models For Infrastructure System Modeling And Management		
2	1	Graduate Seminar	Nanomechanics	Construction Technology	Environmental And Water Resources Engineering Core Coursework (Mscive, Msenev, Ph.D.):	Geotechnical Engineering		
	2	Core Required Course Ii	Nonlinear Static And Dynamic	Construction Project Management		Mechanistic Pavement Design (3) Infrastructure Management System (3)		

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Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

		Analysis By The Finite Element Method			Advanced Pavement Material And Modeling (3) Advanced Soil Mechanics (3) Soils Engineering (3) Groundwater Engineering I (3) Theoretical Soils Mechanics (3) Groundwater Engineering Ii (3) Advanced Foundation Engineering (3) Soil Dynamics (3) Environmental Management Of Maritime Infrastructure (3) Engineering Rock Mechanics (3) Physicochemical Properties And Stabilization Of Soils (3) Dynamic Soil Structure Interaction And Earthquake Engineering (3)		
3	Concentration Elective Course Ii	Numerical Simulation Of Concrete	Construction Site Management And Safety Control	Ce 573 Statistical Applications In Civil Engineering	Structural Engineering		
4		Plasticity Theory	Financial Management	Ce 575 Hydrology	(F) Analytical Methods In Civil Engineering (3) (S) Composite Materials In Civil		

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

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

						<p>Engineering (3)</p> <p>(F) Structural Analysis (3)</p> <p>(S) Advanced Structural Design I (3)</p> <p>(F) Structural Dynamics (3)</p> <p>(S) Design For Lateral Loads (3)</p> <p>(F) Advanced Structural Analysis (3)</p> <p>(S) Finite Element Methods In Civil Engineering (3)</p> <p>(S) Structural Optimization (3)</p> <p>(S) Bridge Design (3)</p> <p>Structural Reliability (3)</p> <p>Structural Stability (3)</p> <p>Bridge Design Ii (3)</p> <p>(F) Advanced Reinforced Concrete I (3)</p> <p>(S) Advanced Reinforced Concrete Ii (3)</p> <p>(S) Prestressed Concrete (3)</p> <p>(S) Theory And Analysis Of Plates And Shells (3)</p>	
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Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

	5		Rheology And Non-Newtonian Fluids	Construction Law And Contract	Ce 626 Physical And Chemical Processes			
	No	Course Name	Course Name	Course Name	Course Name	Course Name	Course Name	Course Name
3	1	Core Required Course Iii	Fatigue Analysis	Project Planning And Scheduling	Structural Engineering And Materials Core Coursework (Mscive, Ph.D.):	Transportation Engineering		
	2	Concentration Elective Course Iii	Timber: Properties, Models, Experiments And Evaluation	Sustainability & Environmental Management In Construction		Security And Safety In Maritime Transportation And Port Operations (3) (F) Maritime Transportation (3) Traffic Engineering (3) Transportation Planning (3)		

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

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

					<p>Traffic Operations (3)</p> <p>Design Of Transportation Facilities (3)</p> <p>(S) Transportation Systems Analysis (3)</p> <p>Intelligent Transportation Systems (3)</p> <p>(S) Freight Transportation Systems (3)</p> <p>(S) Advanced Transportation Economics And Modeling (3)</p> <p>Port Planning, Management And Operations (3)</p> <p>(S) Railroad Transportation System (3)</p> <p>(S) Engineering Risk Analysis In Multimodal Transportation Systems (3)</p> <p>(F) Sustainable Transportation Infrastructure (3)</p> <p>(F) Railway Track Engineering And Safety (3)</p>		
3	Concentration Elective Course Iv		Construction Plants Management	Ce 573 Statistical Applications In Civil Engineering	Water Resources And Environmental Engineering		

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Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

	4		Concrete Technology	Ce 534 Advanced Structural Mechanics	(F) Advanced Water Supply And Sewerage (3) (S) Design Of Water And Wastewater Treatment (3) (F) Advanced Hydrology (3) (S) Unit Processes In Environmental Engineering (3) (S) Biogeochemical Engineering (3) (S) Sediment Transport (3) (S) Analysis Of Receiving Water Quality (3) (S) Thermal Effects On Receiving Waters (3) (S) Groundwater Engineering (3) (S) Advanced Fluid Mechanics (3) (S) Theory Of Hydraulic Models (3) (F) Coastal Engineering (3) (F) Green Infrastructure For Water	
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Rector of Sana'a University		Prof. Dr. Al-Qassim Mohammed Abbas	

Sana'a University
Faculty of Engineering
Department: Civil Engineering
Title of the Program:
Doctor of Philosophy in Civil Engineering



Program Specification

						Management (3) (S) Sustainable Environmental Biotechnology (3)		
5				Ce 531 Structural Dynamics		Engineering Geophysics Certificate Courses>> Transportation Studies Certificate Courses>>		
Core Requirements								
1		Advanced Numerical Analysis Deng			Transportation Systems Engineering Core Coursework (Mscive, Ph.D.):	Applied Mathematics Numerical Analysis Applied Partial Differential Equations Methods Of Applied Mathematics Linear Algebra And Applications Numerical Analysis Numerical Analysis Numerical Solutions Of Partial		

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Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

						Differential Equations Selected Mathematical Topics In System Theory Applied Graph Theory		
2	Applied Statistics Techniques Deng					Statistics Basic Statistics For Research (G3) Regression Methods (G3) Applied Multivariate Analysis (G3) Introduction To Sampling (G3) Basic Applied Statistics (G3) Interpretation Of Data (G3) Introduction To Experimental Design (G3) Statistical Theory For Research Workers I Statistical Theory For Research Workers Ii Nonparametric Statistics Regression Analysis Design Of Experiments Stochastic Processes		
3	Innovation And Technology Management				Ce 573 Statistical Applications In Civil Engineering			
4	Sustainable Development				Ce 559 Pavement Design And			

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Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

				Rehabilitation		
5	Modeling And Simulation			Ce 655 Sustainable Transportation		
	Elective Courses					
1	Theory Of Plates And Shells					
2	Advanced Geomechanics					
3	Traffic Safety Analysis					
4	Advanced Special Topics I					
5	Advanced Special Topics Ii					
6	Advanced Traffic Engineering					
Total CH		27				

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Sana'a University
Faculty of Engineering
Department: Civil Engineering
Title of the Program:
Doctor of Philosophy in Civil Engineering



Program Specification

ملحق (6) مسح الرؤية والرسالة والاهداف للبرامج المعتمدة والمماثلة دكتوراه الهندسة المدنية

Annex (6) Survey of Vision, Mission and Objectives of Similar Accredited Programs at International Universities (Benchmarks) for Doctor of Philosophy in Civil Engineering

	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	Qatar	Norway	Malaysia	USA	USA	Qatar
University	qatar university	norwegian university of science and technology	university technology malaysia utm	the university of alabama	rutgers	qatar university
Faculty	college of engineering	faculty of engineering	faculty of engineering school of civil engineering	college of engineering	school of engineering	college of engineering
The Program Title	civil engineering/phd program	phd program in civil and environmental engineering	doctor of philosophy field of research: civil engineering	doctor of philosophy in civil engineering	doctoral program in civil and environmental engineering	doctor of philosophy (phd) program (research-based – research intensive) in civil engineering
Study Duration	6-10 semesters	8 semester	6-16 semester	6 semester	8-12 semester	6-10 semesters

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

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

	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	Qatar	Norway	Malaysia	USA	USA	Qatar
Program Accrediting Body	accreditation board for engineering and technology (abet)					
Website Link	https://www.qu.edu.qa/engineering/research/graduatestudies/phd-conventional	https://www.ntnu.edu/ibm/phd	https://engineering.utm.my/pg/	http://cce.eng.ua.edu/graduate/doctor-of-philosophy/	https://cee.rutgers.edu/doctor-philosophy	https://www.qu.edu.qa/engineering/research/graduatestudies/phd-program
Department Vision	is to be recognized regionally and internationally as a leading department that provides high quality education, research and community service.					
Department Mission	is to provide students with the highest level of theoretical and practical education that leads them to successful careers. the departmental programs prepare graduates to build effective and interactive skills to face new challenges as innovators and problem solvers and					

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

Sana'a University
Faculty of Engineering
Department: Civil Engineering
Title of the Program:
Doctor of Philosophy in Civil Engineering



Program Specification

	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	Qatar	Norway	Malaysia	USA	USA	Qatar
	enable them to contribute effectively and professionally to society.					
Department Objectives	<ul style="list-style-type: none"> prepare globally competent and socially responsible graduates by providing quality education. establish effective partnerships that can add value and contribute to the college programs. foster research and scholarly endeavor that advance knowledge. contribute to the welfare of the country. <p>create an enriching supportive working environment for the</p>		<p>mastery of competencies and integration of knowledge required in the profession. an appreciation of the value of lifelong learning and possessing enthusiasm and strong commitment to continued acquisition of new knowledge and skills. advanced research skills that allow professionals to become</p>		<p>the objective of the phd program in civil and environmental engineering at rutgers university is to achieve the following goals:</p> <p>prepare students at advanced specialized level to meet present and future challenges in specialty areas in civil and environmental engineering develop engineering research</p>	<p>graduates of the doctoral program will be able to fulfill most of the following educational objectives:</p> <p>foster innovation of new ideas, methods, and techniques in science and engineering. contribute to the advancement of the scientific body of knowledge in engineering and related fields.</p>

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

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

	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	Qatar	Norway	Malaysia	USA	USA	Qatar
	college community.		competent in research. highly developed oral and written communications skills that fit at all level, appropriate to the field of profession. an appreciation of the ethics and integrity in management, leadership and good governance, and responsibility to their professions and community		skills to engage in quality and successful research demonstrate the ability to effectively communicate the results of their research both in writing and through oral presentation train students to have the ability to pursue academic positions, be leaders in industry and government, and be entrepreneurs in their fields	
Program Mission	the mission of the department is to prepare globally competent and socially responsible graduates by providing high quality education. the college through its quality					

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

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

	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	Qatar	Norway	Malaysia	USA	USA	Qatar
	<p>programs and partnerships fosters research and scholarly endeavors that advance knowledge and contributes to the welfare of the country.</p> <p>new the mission of the ph.d. program is to prepare students for university teaching and research careers as well as leading positions in private and public sectors. the program is designed to yield high scholarly achievements and enhance students' abilities to significantly contribute to the existing body of knowledge</p>					

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

Sana'a University
Faculty of Engineering
Department: Civil Engineering
Title of the Program:
Doctor of Philosophy in Civil Engineering



Program Specification

	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	Qatar	Norway	Malaysia	USA	USA	Qatar
Program Objectives	<p>program objectives the graduate study programs in civil engineering are challenging and rewarding way of study for a higher degree. graduates of these programs will be able to fulfill most of the following educational objectives (obj.):</p> <ul style="list-style-type: none"> obj1: act professionally and ethically in a modern work environment through effective communication and leadership, and responsible teamwork. obj2: maintain the desire for innovation and engagement in lifelong learning in response to emerging technologies, social developments, and contemporary issues. 		<p>the objective of the masters and doctoral programs is to graduate students who are in demand by employers and graduate programs and who lead fulfilling professional careers through their abilities to:</p> <p>synthesize technical knowledge of engineering analysis and design to identify, formulate and solve problems of professional interest and importance</p>			<p>program objectives the graduate study programs in civil engineering are challenging and rewarding way of study for a higher degree. graduates of these programs will be able to fulfill most of the following educational objectives (obj.):</p> <ul style="list-style-type: none"> obj1: act professionally and ethically in a modern work environment through effective communication and leadership, and responsible teamwork. obj2: maintain the desire for innovation and engagement in lifelong

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

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

	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	Qatar	Norway	Malaysia	USA	USA	Qatar
	<ul style="list-style-type: none"> obj3: conduct research and present results in scientific forums and contribute to the advancement of the scientific body of knowledge. 		demonstrate the professional practice skills needed to be successful in their professional practice			learning in response to emerging technologies, social developments, and contemporary issues. <ul style="list-style-type: none"> obj3: conduct research and present results in scientific forums and contribute to the advancement of the scientific body of knowledge.

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

Sana'a University

Faculty of Engineering

Department: Civil Engineering

Title of the Program:

Doctor of Philosophy in Civil Engineering



Program Specification

ملحق (7) مؤامة رسالة وأهداف البرنامج

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Program Specification

ملحق 7 موائمة رؤية ورسالة واهداف البرنامج والقسم والكلية والجامعة

Annex (7) Mapping of vision, mission and objectives of Program, Department, 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 Ph.D. program in Civil engineering locally and regionally that integrate advanced education and scientific research.

Mapping of program mission with Department, faculty and university mission			
University Mission	Faculty Mission	Department Mission	Program Mission
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.	To provide excellent and accredited engineering education to meet the development needs and match the labor market requirements locally and regionally.	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.	To graduate highly-qualified Ph.D. holders in the field of Civil engineering through qualified academic program, staff, and suitable research infrastructure that meet the research and development requirements as well as local and regional labor market needs.

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Program Specification

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:	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.	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 focused studies and encourage fundamental and applied research in different Civil engineering disciplines.
2. To boost the level and quality of preparation and qualification tasks.	2. 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 / technological environment.
3. To create a general culture aiming at developing the elements of sound Islamic personality and the proper cognitive and scientific training.	3. 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, attain the excellence in Civil engineering and solve the technical problems
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Rector of Sana'a University		Prof. Dr. Al-Qassim Mohammed Abbas	



Program Specification

Mapping of program objectives with Department, faculty, and university objectives			
University Objectives	Faculty Objectives	Department Objectives	Program Objectives
			and challenges in industry.
4. To stabilize the true Islamic vision emanating from the broad horizons of Islamic knowledge and its perception of the universe, man and life.	4. To strengthen scientific ties with national and international colleges, scientific bodies, and research & development centers.		4. To graduate independently researchers in Civil engineering disciplines who can pursue further studies and contribute to the scientific research community.
5. To develop innovative and critical scientific thinking skills.	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.		5. Develop leadership, skills and ethics of the profession and engaging in lifelong learning.
6. To provide students with the required knowledge and scientific and applied skills for solving problems effectively and efficiently.	6. To develop a spirit of co-operation, group work, effective leadership, sense of responsibility, and ethical commitment.		6. Develop new methods and new high-tech components for effective, reliable, sustainable systems and industrial products.
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Program Specification

ملحق 11 موائمة اهداف البرنامج مع مخرجات التعلم

Annex (11) Mapping Program's Goals with Intended Learning Outcomes

Mapping of program vision with Department ,faculty, and university vision																	
	A 1	A 2	A 3	B 1	B 2	B 3	B 4	B 5	C 1	C 2	C 3	C 4	D 1	D 2	D 3	D 4	D 5
To provide focused studies and encourage fundamental and applied research in different Civil Engineering disciplines.	X	X	X	X				X	X	X	X	X					
To bridge the gap between the academic educational and industrial / technological environment.		X		X			X	X	X	X	X	X					X
To provide graduates with up-to-date advanced knowledge and skills needed to create high-quality systems, attain the excellence in Civil engineering and solve the technical problems and challenges in industry.		X		X			X	X	X	X	X	X					X
To graduate independently researchers in Civil engineering disciplines who can pursue further studies and contribute to the scientific research community.	X		X	X	X				X	X		X	X		X	X	
Develop leadership, skills and ethics of the profession and engaging in lifelong learning.														X	X	X	
Develop new methods and new high-tech components for effective, reliable, sustainable systems and industrial products.		X		X			X	X	X	X	X	X					X

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