



University of Warith Al-Anbiyaa / College of Engineering

Ministry of Higher Education and Scientific Research

Supervision and Scientific Evaluation Authority

Quality Assurance and Accreditation Directorate

Accreditation Department



Academic Program and Course Description Guide

2026-2025

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Academic Program Description Form

Faculty/Institute: College of Engineering

Scientific Department: Air Conditioning and Refrigeration Techniques

Academic or Professional Program Name: Bachelor's degree in Refrigeration and Air Conditioning Engineering

Final Certificate Name: Bachelor's degree in Refrigeration and Air Conditioning Engineering

Academic Degree System: Bologna + Annual

Description Preparation Date: 17.08.2025

File Completion Date: 25.08.2025

Signature:

Scientific Associate Name:

Dr. Hassan. T. Hashim

Signature.

Head of Department Name:

Dr. Mohammed Hassan

The file is checked by: Dr. Salam Al-Rbeawi

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance

Date:15.09.2025

Signature:

Approval of the Dean

Introduction

The academic program is regarded as a coordinated and organized package of study courses that includes procedures and experiences systematically designed to cover the fundamental purpose of building and refining graduates' skills. This qualifies them to meet the requirements of the labor market. The program is reviewed and evaluated annually through internal and external auditing procedures, such as the external examiner program.

The program description provides a concise summary of the main features of the program and its courses, highlighting the skills intended to be developed in students in alignment with the academic program's objectives. The importance of this description lies in its role as a cornerstone for obtaining program accreditation, with its preparation shared by the teaching staff under the supervision of the scientific committees in the academic departments.

This manual, in its second edition, includes a description of the academic program after updating its courses and sections, in light of recent developments and transformations in the educational system in Iraq. It also incorporates the description of the academic program in its traditional format (annual or semester system), as well as the standardized academic program description adopted according to the directive of the Directorate of Studies dated 03/06/2023, Ref. No. 290, regarding programs that adopt the Bologna Pathway as their basis.

In this context, we emphasize the importance of writing program and course descriptions to ensure the smooth implementation of the educational process.

Concepts and Terminologies

Academic Program Description: Provides a concise summary of the program's vision, mission, and objectives, including a clear specification of the targeted learning outcomes in accordance with defined learning strategies.

Course Description: Provides a brief overview of the main characteristics of the course and the expected learning outcomes to be achieved by the student, indicating whether the student has maximized the available learning opportunities, and must be aligned with the program description.

Program Vision: An ambitious outlook for the future of the academic program, aiming to be advanced, inspiring, motivating, realistic, and applicable.

Program Mission: Outlines the objectives and the activities required to achieve them in a concise manner, while defining the pathways and directions for the program's development.

Program Objectives: Statements that describe what the academic program intends to achieve within a specified period of time, and they must be measurable and observable.

Curriculum Plan: All the courses/subjects included in the academic program according to the adopted system (semester, annual, or Bologna Pathway), whether required by the Ministry, University, College, or Department, along with the assigned credit units.

Learning Outcomes: A set of knowledge, skills, and values acquired by the student upon completion of the academic program or course, reflecting whether the course or program has achieved its intended educational objectives.

Teaching and Learning Strategies: The strategies employed by faculty members to develop student learning, which are planned approaches followed to achieve the learning objectives. They describe all in-class and extracurricular activities to ensure the achievement of the program's learning outcomes.



1. Program Vision

The Refrigeration and Air Conditioning Engineering program strives for academic and professional excellence by adhering to quality assurance and program accreditation standards. It aims to prepare highly qualified technical engineers with advanced theoretical and practical knowledge and skills in refrigeration and air conditioning, capable of meeting labor market demands, keeping pace with scientific and technological advancements, and actively contributing to sustainable development. The program also aspires to build an integrated educational system based on:

- 1 -Continuous improvement of curricula and teaching methods.
- 2 -Employment of modern technologies and outcomes-based learning.
- 3 -Promotion of applied research and community service.
- 4- Commitment to professional ethics and safety, quality, and energy requirements in accordance with national and international standards. This commitment to academic accreditation enhances the department's and college's standing as a leading educational institution in technical engineering disciplines.

2. Program Mission

The mission of the Refrigeration and Air Conditioning Engineering Program is to prepare scientifically and practically qualified technical engineers in the fields of refrigeration and air conditioning, by providing a high-quality educational environment based on learning outcomes, in line with quality assurance and program accreditation standards, keeping pace with scientific and technological development, meeting labor market requirements, and contributing to community service and sustainable development, while adhering to professional ethics, occupational safety and energy efficiency. Level I: introduces students to the basics of general mechanical engineering and is suitable for progression to all programs in the field of mechanical energy including thermal energy. In addition, students will be provided with mechanical, electrical and computer control knowledge of refrigeration and air conditioning systems.

Level II: Prepares the student for specialized topics in levels III and IV. Therefore, students of refrigeration and air conditioning engineering are trained to search for academic information, in line with the university and college trends.

3. Program Objectives



- 1.The program aims to achieve the following objectives upon graduation and professional practice.
- 2.To prepare graduates with a solid scientific and technical foundation in refrigeration and air conditioning engineering, enabling them to work efficiently in various industrial and service sectors.
- 3 .To empower graduates to design, operate, and maintain refrigeration and air conditioning systems according to approved engineering standards and quality, safety, and energy requirements.
- 4 .To develop graduates' abilities to analyze engineering problems and propose appropriate solutions using scientific methods and modern technologies.
- 5 .To enhance graduates' continuous learning and self-development skills to keep pace with technological advancements and professional demands.
- 6 .To prepare graduates capable of working within multidisciplinary teams and communicating effectively in the engineering work environment.
7. To instill a commitment to professional ethics, social responsibility, environmental conservation, and the sustainable use of energy resources.

4. Program Accreditation

The program seeks to obtain academic accreditation in the near future, as part of its strategic plans aimed at improving the quality of academic programs and aligning them with national and international accreditation standards.

5. Other External Influences

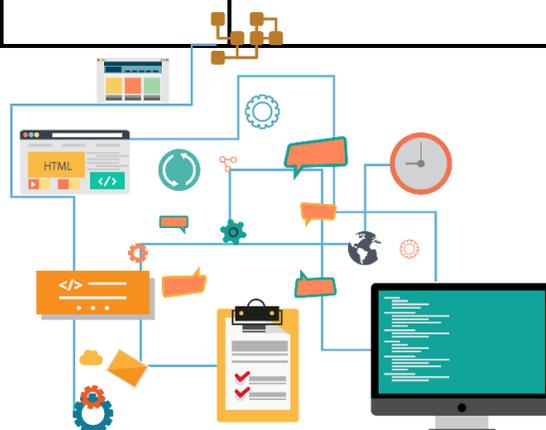
Currently, there are no external sponsoring or supporting entities for the program. It relies entirely on the resources and capabilities available within the university, including libraries, laboratories, software, and infrastructure.

6. Program Structure (Annual system for the fourth stage only)

Program Component	No. of Courses	Credit Units	Percentage	Remarks*
Institutional Requirements	2	6	11%	
College Requirements	2	6	11%	
Department Requirements	39	153	69.55	First, Second, and Third Stages (Bologna Pathway)
Summer Training	Available	Completed		
Others	–	–		

- This can include notes whether the course is basic or optional

6, Program Structure (Bologna process)				
Program Structure	Number of Courses	Credits hours	Percentage	Reviews
Institution Requirements	5	11	4.8%	Basic course
College Requirements	7	42	18.5%	Basic course
Department Requirements	31	174	76.7%	Basic Course
Summer Training	2 months			
Other				



7. Program Description

Year/Level	Course Code	Course Name	Credit Hours		ECTS
			theoretical	practical	
First level - First Semester	UoW011	English Language I	3		3
	UoW012	Human Rights and Democracy	2		2
	ENG013	Mathematics I	5		6
	ENG014	Engineering Drawing	1	3	5
	ENG015	Physics and Workshops	4	3	7
	ENG016	Building Materials	4	2	7
First level - Second Semester	UoW021	Arabic Language	2		2
	UoW022	Computer Science	1	2	3
	ENG023	Mathematics II	5		6
	CIV024	Engineering Mechanics	6		8
	CIV025	Statistical Applications in Civil Engineering	6		7
	CIV026	Engineering Geology	4		4
Second level - First Semester	UoW031	English Language II	2		2
	ENG032	Mathematics III	5		6
	CIV033	Strength of Materials I	4		5
	CIV034	Concrete Technology I	2	2	5
	CIV035	Engineering Surveying I	3	2	5
	CIV036	Fluid Mechanics	6	2	7
Second level - second Semester	ENG041	Computer Programming	2	4	5
	CIV042	Building Construction	4	2	5
	CIV043	Strength of Materials II	4		5
	CIV044	Concrete Technology II	4	2	7

	CIV045	Engineering Surveying II	3	2	5
	CIV046	Engineering Drawing with AutoCAD	1	2	3
Third level - First Semester	ENG051	Engineering Analysis	2	2	5
	CIV052	Theory of Structure I	4		5
	CIV053	Soil Mechanics I	3	2	6
	CIV054	Design of Reinforced Concrete I	6		5
	CIV055	Traffic Engineering	4	2	5
	CIV056	Project Management & Engineering Economy	4	0	4
Third level - second Semester	ENG061	Numerical Methods and Statistics	5	1	6
	CIV062	Theory of Structure II	4		5
	CIV063	Soil Mechanics II	3	2	6
	CIV064	Design of Reinforced Concrete II	4		5
	CIV065	Water Resources Engineering	6		6
	UOK066	Engineering Ethics	2	0	2
Fourth Stage - First Semester	WCV-41-01	Foundation Engineering I	4		
	WCV-41-02	Environmental and Sanitary Engineering I	3	1	
	WCV-41-03	Road Engineering I	2	1	
	WCV-41-04	Steel Structure Design I	3		
	WCV-41-05	Hydrology I	3		
	WCV-41-06	Reinforced Concrete III	3		
	WCV-41-07	Hydraulic Structures I	2		
	WCV-41-08	Construction Methods I	2	1	

	WCV-41-09	Engineering Project I		4	
Fourth Stage - second Semester	WCV-42-01	Foundation Engineering II	4		
	WCV-42-02	Environmental and Sanitary Engineering II	3	1	
	WCV-42-03	Road Engineering II	2	1	
	WCV-42-04	Steel Structure Design II	3		
	WCV-42-05	Hydrology II	3		
	WCV-42-06	Reinforced Concrete IV	3		
	WCV-42-07	Hydraulic Structures II	2		
	WCV-42-08	Construction Methods II	2	1	
	WCV-42-09	Engineering Project II		4	

8. Expected Program Learning Outcomes

Skills

1. Analyze engineering problems related to refrigeration and air conditioning systems and propose appropriate solutions.
2. Design refrigeration and air conditioning systems according to performance and efficiency requirements.
3. Conduct laboratory experiments, interpret results, and analyze data.
4. Utilize modern technologies and engineering software in analysis and design.
5. Perform operation and maintenance work and diagnose faults in thermal systems.
6. Prepare technical reports and communicate effectively in the work environment.
7. Manage time and resources efficiently within engineering projects.
8. Keep abreast of scientific and technological advancements through continuous learning.

Knowledge

1. Demonstrate a solid understanding of the fundamental mathematics and engineering principles related to refrigeration and air conditioning.
2. Understand the principles of thermodynamics, heat transfer, and fluid mechanics, and their application to thermal systems.
3. Identify the components and types of refrigeration and air conditioning systems and understand how they operate.
4. Be familiar with the standard specifications and engineering criteria used in the design and operation of HVAC systems.
5. Understand the impact of environmental and economic factors on the performance and efficiency of thermal systems.

Ethics

1. Engineering ethics and integrity in scientific and practical performance.
2. Professional responsibility in the design and operation of refrigeration and air conditioning systems.
3. Observance of occupational safety and environmental protection during work.
4. Respect for relevant national and international laws and standards.
5. Fostering teamwork and collaboration with other disciplines.

9. Teaching and Learning Strategies

- Lectures
- Laboratories
- Workshops
- Systematic training
- Scientific field visits.

10. Assessment Methods

- Written examinations

- Quizzes
- Preparation of scientific reports
- Homework assignments
- Scientific seminars
- Final-year project discussion committees

Affective and Value Objectives

1. Ability to solve engineering and managerial problems using effective engineering methods.
2. Foster collaboration and teamwork between engineers and geologists to serve the public interest.
3. Develop students' ability to engage with modern technologies related to course content.
4. Enhance students' capacity for sound engineering and managerial decision-making.

11. Faculty Members

Faculty Member	Academic Rank	General Specialty	Specific Specialty	Full-time	Part-time
Prof. / Hassan Taleb Hashem	Professor	Mechanical Engineering	Power Mechanics	√	
Asst. Prof/ Mohamed Hassan Abboud	Assistant Professor	Mechanical Engineering	Power Mechanics	√	
Lect./ Ehab Omar Abbas	Lecturer (PHD)	Mechanical Engineering	Air Conditioning and Refrigeration Machines and Equipment	√	
Asst.Lect/ Zainab Abdul Karim Salem	Assistant Lecturer	Mechanical Engineering	Power Mechanics	√	

Lect / Ali Hammoudi Al- Wazir	Lecturer	Mechanical Engineering	Motion Systems Engineering Technology	√	
Prof / Muhammad Wahab Kazim	Professor	Mechanical Engineering	Power Mechanics		√
Prof / Uday Hussein Kadhim	Professor	Mechanical Engineering	Refrigeration and Air Conditioning Engineering		√
Asst.Pof/ Raouf Mohamed Rady	Assistant Professor	Mechanical Engineering	Power Mechanics	√	
Prof/ Hussein Salem Kitan	Professor	Production and Metallurgy	Smart Manufacturing Systems	√	
Asst. Lect. / Riyam Abdul Razzaq Salman	Assistant Lecturer	Mechanical Engineering	Applied Mechanics	√	
Asst.Lect. / Mustafa Abbas Abdul Hussein	Assistant Lecturer	Electromechanical engineering	Electromechanical Systems Engineering	√	
Assoc. Prof/ Malik Naama Hawas	Associate Professor	Mechanical Engineering	Applied Mechanics		√
Asst. Lect. / Nour El-Hoda Salam Ahmed	Assistant Lecturer	Computer Science	Artificial Intelligence	√	
Lect / Ahmed Aliwi Samarmad	Lecturer (PHD)	Mechanical Engineering	Power Mechanics		√
Asst. Lect. / Hussein Ali Jaafar	Assistant Lecturer	Electromechanical engineering	Electromechanical Systems Engineering		√
Asst. Lect. / Noor Karim	Assistant Lecturer	Mechanical Engineering	Applied Mechanics	√	

Prof /Salah Abdel Hadi	Professor	Sciences	Computers		√
Asst. Lect. / Rasoul Hamad Rashid	Assistant Lecturer	Mechanical Engineering	Power Mechanics		√
Lect/ Ali Muslim Abdul Mohsen	Lecturer	Mechanical Engineering	Power Mechanics		√
Asst. Lect. / Musa Ali Sakr	Assistant Lecturer	Private Law	Civil Law		√
Asst. Lect. / Amin Sami Amin	Assistant Lecturer	Mechanical Engineering	Power Mechanics		√

12. Professional Development

Mentoring new Faculty members

The Department of Refrigeration and Air Conditioning Technologies follows a structured orientation process for new, visiting, and prospective faculty members. This begins with a formal reception and introduction to the institution's policies, vision, and mission, followed by an overview of the department's administrative and academic structure. This is followed by introductory meetings with faculty and administrative staff, and the provision of an orientation guide detailing academic and educational procedures. Lecture schedules and study plans are also provided, along with orientation to the department's academic facilities and technical workshops. The process concludes with the appointment of an academic advisor or coordinator to follow up on their adaptation and provide the necessary support during their initial period of joining.

Professional development of faculty members

The plan relies on developing faculty members' competencies through recurring programs that include workshops and training courses on effective teaching

strategies, active learning, and e-learning. The plan enhances course design skills and content updates in line with labor market requirements, with a focus on developing tools for assessing and analyzing learning outcomes to improve the quality of education. The plan also includes activities for continuing professional development, such as conference attendance, scholarly publishing, and research collaborations. Implementation of this plan is monitored through periodic evaluations of faculty performance and the provision of constructive feedback that contributes to raising the academic and professional level within the institution.

13. Admission Criteria

- Graduate of preparatory school / scientific branch.
- Admission based on the regulations of the Ministry of Higher Education and Scientific Research (Central Admission).
- Medical fitness for the chosen specialization.
- Compliance with department-specific admission requirements.
- Student's preferences ranked by priority.
- Secondary school average (admission score).
- Departmental intake capacity.

14. Main Sources of Program Information

1. Accredited sources from international universities.
2. Local trends and policies.
3. Labor market needs.
4. Surveys and studies.
5. Specialized seminars and workshops with stakeholders.

15. Program Development Plan

Objective

To improve the quality of the academic program to meet global standards, labor market requirements, and achieve academic accreditation.

Key Steps

- **Situation Analysis:**
 - Evaluate the curriculum and available resources.
 - Collect feedback from students, graduates, and employers.
- **Development Planning:**
 - Update curricula by adding new courses and enhancing practical skills.
 - Organize training workshops for faculty members.
 - Improve infrastructure (labs and technology).
- **Implementation:**
 - Gradual application of the updated plan.
 - Establish partnerships with industrial institutions.
 - Enhance student assessment mechanisms.
- **Evaluation and Follow-up:**
 - Regular performance reports.
 - Continuous improvements based on feedback.

Timeline

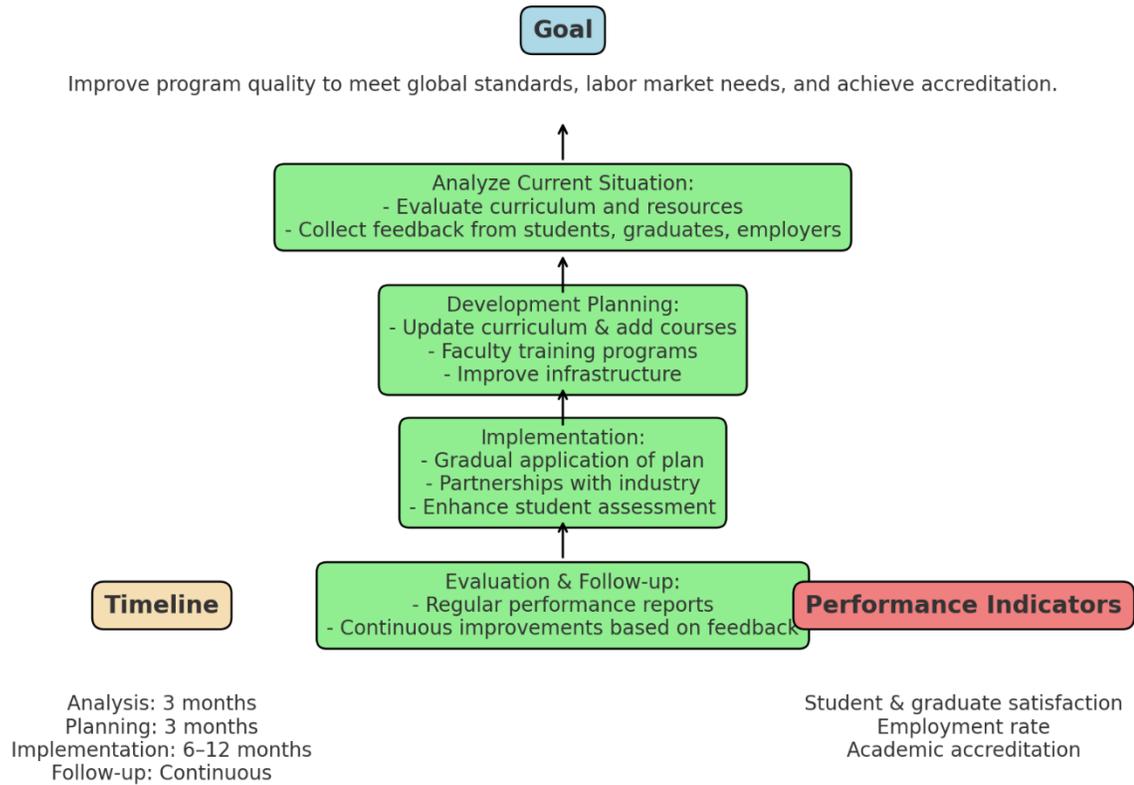
- Situation Analysis: 3 months
- Planning: 3 months
- Implementation: 6–12 months
- Follow-up: Ongoing

Performance Indicators

- Student and graduate satisfaction.

- Employment rate.
- Achievement of academic accreditation.

Program Development Plan - Flow Structure



Program Skills Outline

■ المرحلة الأولى – First Level

Year/Level	Course Code	Course Name	Basic	S1	S2	K1	K2	K3	K4	E1
1st – 1st Sem.	UOW011	English Language I	Basic		✓		✓			
1st – 1st Sem.	UOW012	Human Rights and Democracy	Basic				✓			✓
1st – 1st Sem.	ENG013	Mathematics I	Basic	✓		✓				
1st – 1st Sem.	ENG014	Engineering Drawing	Basic	✓	✓			✓		
1st – 1st Sem.	ENG015	Physics and Workshops	Basic	✓		✓			✓	
1st – 1st Sem.	ENG016	Building Materials	Basic		✓	✓			✓	✓
1st – 2nd Sem.	UOW021	Arabic Language	Basic		✓		✓			
1st – 2nd Sem.	UOW022	Computer Science	Basic	✓	✓	✓			✓	
1st – 2nd Sem.	ENG023	Mathematics II	Basic	✓		✓				
1st – 2nd Sem.	CIV024	Engineering Mechanics	Basic	✓	✓	✓		✓		
1st – 2nd Sem.	CIV025	Statistical Applications	Basic	✓		✓	✓		✓	
1st – 2nd Sem.	CIV026	Engineering Geology	Basic		✓	✓			✓	✓

■ المرحلة الثانية – Second Level

Year/Level	Course Code	Course Name	Basic	S1	S2	K1	K2	K3	K4	E1
2 nd – 1 st Sem.	UOW031	English Language II	Basic		✓		✓			
2 nd – 1 st Sem.	ENG032	Mathematics III	Basic	✓		✓				
2 nd – 1 st Sem.	CIV033	Strength of Materials I	Basic	✓	✓	✓			✓	
2 nd – 1 st Sem.	CIV034	Concrete Technology I	Basic	✓	✓	✓		✓	✓	✓
2 nd – 1 st Sem.	CIV035	Engineering Surveying I	Basic	✓	✓	✓		✓		
2 nd – 1 st Sem.	CIV036	Fluid Mechanics	Basic	✓	✓	✓			✓	
2 nd – 2 nd Sem.	ENG041	Computer Programming	Basic	✓	✓	✓			✓	
2 nd – 2 nd Sem.	CIV042	Building Construction	Basic	✓	✓	✓		✓		✓
2 nd – 2 nd Sem.	CIV043	Strength of Materials II	Basic	✓	✓	✓			✓	
2 nd – 2 nd Sem.	CIV044	Concrete Technology II	Basic	✓	✓	✓		✓	✓	✓
2 nd – 2 nd Sem.	CIV045	Engineering Surveying II	Basic	✓	✓	✓		✓		
2 nd – 2 nd Sem.	CIV046	Engineering Drawing AutoCAD	Basic	✓	✓			✓		

■ المرحلة الثالثة – Third Level

Year/Level	Course Code	Course Name	Basic	S1	S2	K1	K2	K3	K4	E1
3 rd – 1 st Sem.	ENG051	Engineering Analysis	Basic	✓	✓	✓			✓	
3 rd – 1 st Sem.	CIV052	Theory of Structures I	Basic	✓	✓	✓		✓	✓	
3 rd – 1 st Sem.	CIV053	Soil Mechanics I	Basic	✓	✓	✓			✓	✓
3 rd – 1 st Sem.	CIV054	Design of RC I	Basic	✓	✓	✓		✓	✓	✓
3 rd – 1 st Sem.	CIV055	Traffic Engineering	Basic	✓	✓	✓		✓		✓
3 rd – 1 st Sem.	CIV056	Project Mgmt & Economy	Basic	✓	✓	✓	✓	✓	✓	✓
3 rd – 2 nd Sem.	ENG061	Numerical Methods & Stats	Basic	✓	✓	✓			✓	
3 rd – 2 nd Sem.	CIV062	Theory of Structures II	Basic	✓	✓	✓		✓	✓	
3 rd – 2 nd Sem.	CIV063	Soil Mechanics II	Basic	✓	✓	✓			✓	✓
3 rd – 2 nd Sem.	CIV064	Design of RC II	Basic	✓	✓	✓		✓	✓	✓
3 rd – 2 nd Sem.	CIV065	Water Resources Eng.	Basic	✓	✓	✓			✓	✓
3 rd – 2 nd Sem.	UOK066	Engineering Ethics	Basic				✓	✓		✓

■ المرحلة الرابعة – Fourth Level

Year/Level	Course Code	Course Name	Basic	S1	S2	K1	K2	K3	K4	E1
4 th – 1 st Sem.	WCV-41-01	Foundation Eng. I	Basic	✓	✓	✓			✓	✓
4 th – 1 st Sem.	WCV-41-02	Env. & Sanitary Eng. I	Basic	✓	✓	✓		✓	✓	✓
4 th – 1 st Sem.	WCV-41-03	Road Engineering I	Basic	✓	✓	✓		✓		✓
4 th – 1 st Sem.	WCV-41-04	Steel Structure Design I	Basic	✓	✓	✓		✓	✓	✓
4 th – 1 st Sem.	WCV-41-05	Hydrology I	Basic	✓	✓	✓			✓	✓
4 th – 1 st Sem.	WCV-41-06	Reinforced Concrete III	Basic	✓	✓	✓		✓	✓	✓
4 th – 1 st Sem.	WCV-41-07	Hydraulic Structures I	Basic	✓	✓	✓			✓	✓
4 th – 1 st Sem.	WCV-41-08	Construction Methods I	Basic	✓	✓	✓		✓	✓	✓
4 th – 1 st Sem.	WCV-41-09	Engineering Project I	Basic	✓	✓	✓	✓	✓	✓	✓
4 th – 2 nd Sem.	WCV-42-01	Foundation Eng. II	Basic	✓	✓	✓			✓	✓
4 th – 2 nd Sem.	WCV-42-02	Env. & Sanitary Eng. II	Basic	✓	✓	✓		✓	✓	✓
4 th – 2 nd Sem.	WCV-42-03	Road Engineering II	Basic	✓	✓	✓		✓		✓
4 th – 2 nd Sem.	WCV-42-04	Steel Structure Design II	Basic	✓	✓	✓		✓	✓	✓
4 th – 2 nd Sem.	WCV-42-05	Hydrology II	Basic	✓	✓	✓			✓	✓
4 th – 2 nd Sem.	WCV-42-06	Reinforced Concrete IV	Basic	✓	✓	✓		✓	✓	✓
4 th – 2 nd Sem.	WCV-42-07	Hydraulic Structures II	Basic	✓	✓	✓			✓	✓
4 th – 2 nd Sem.	WCV-42-08	Construction Methods II	Basic	✓	✓	✓		✓	✓	✓
4 th – 2 nd Sem.	WCV-42-09	Engineering Project II	Basic	✓	✓	✓	✓			