Bachelor of Science in Civil and Infrastructure Engineering

Program Description

The Civil and Infrastructure Engineering (CIEN) program is a unique undergraduate program in the United Arab Emirates and in the region as it concentrates on infrastructure engineering in addition to traditional civil engineering areas. The CIEN program prepares students to excel in several sectors including building design and construction, highways and transportation, planning and management, and consulting.

The program has 134 credit hours over the duration of eight semesters including hours at internship programs. The curriculum of the program covers construction engineering and management, structural and materials engineering, highway and transportation engineering, geotechnical engineering, and water and environmental engineering. The program was prepared according to the International Standards of Accreditation Board for Engineering and Technology (ABET) and has passed all the conditions and criteria set by the Commission for Academic Accreditation (CAA) at the Ministry of Higher Education and Scientific Research, United Arab of Emirates.

The faculty members of the Civil and Infrastructure Engineering program have graduated from top universities in the world and their expertise covers a broad range of technical areas, including structural engineering, geotechnical engineering, construction engineering and management, environmental systems, hydraulics and water resources, and transportation systems engineering.

The Bachelor of Science in Civil and Infrastructure Engineering is overseen by the School of Engineering and Computing and is designed to satisfy QF Emirates Level 7 requirements.

Program Mission

The Bachelor of Science in Civil and Infrastructure Engineering program at AURAK educates students to become qualified engineers who are capable of generating effective solutions by using engineering approaches in the field of Civil and Infrastructure Engineering. The graduates of the program will be well versed in technology and social and environmental issues.

To fulfill this mission, the program provides the undergraduate student with a thorough foundation in the basic tenets of civil and infrastructure technologies and a broad introduction into structures, engineering materials, transport systems, soil engineering, and environment protection. The program provides a strong background for graduate study in the diverse areas branching out of the civil and infrastructure field. The technical focus is complemented with topics in general education leading to a well-rounded member of a global society.

Program Educational Objectives

The Bachelor of Science in Civil and infrastructure Engineering program at AURAK, based on student outcomes, produces graduates, who are armed with knowledge and skills to engage in lifelong learning and application of sustainable technologies to become:

1. Leaders in their profession who serve society in the construction industry, the transportation sector, project management, and in shaping public environmental and infrastructure policies;
2. Competent civil engineers who are engaged in the design of civil engineering and infrastructure systems; and
3. Contributors to the advancement of the civil engineering discipline at the national and global levels.

Program Learning Outcomes

AURAK has adopted ABET's student outcomes for the Civil and Infrastructure Engineering program. The outcomes for the program are for the student to acquire:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Degree Requirements

The Bachelor of Science in Civil and Infrastructure Engineering requires the completion of 134 credits in the following areas:

Area	Credit
University General Education Requirements	32
School of Engineering and Computing Requirements	30
Civil and Infrastructure Engineering Department	72

University General Education Requirements — 32 Credit Hours

The program requires completion of the General Education Component. For information relating directly to the General Education requirements, please review the catalog section entitled, “General Education Component.” You must speak with your advisor to ensure that the General Education Component requirements are satisfied. **The fifth writing intensive course for the BS in Civil and Infrastructure Engineering is CIEN 334 Civil Engineering Testing and Materials.**

Course Code	Title	Credits
ARAB 101 or ARAB 110	Arabic Language and Culture for Non-Native Learners I OR Arabic Language and Culture for Native Arabic Speakers I	3
ENGL 101	Composition **(Writing Intensive)**	3
CSCI 114	Applied Computational Thinking	3
CSCI 115	Applied Computational Tools	1
UNIV 100	University First-Year Transition	1
UNIV 200	Innovation, Entrepreneurship, and Sustainability **(Writing Intensive)**	3
PHIL 100 or ENGL 200	Critical Thinking and Reasoning **(Writing Intensive)** OR Advanced Composition **(Writing Intensive)**	3
MEST 100	Introduction to Islam in World Culture **(Writing Intensive)**	3
UAES 200	Survey of United Arab Emirates Studies	3
MATH 113	Calculus I	3
ECON 103	Principles of Microeconomics	3
CHEM 211	General Chemistry I	3

School of Engineering and Computing Requirements **30 Credit Hours**

Course Code	Course Title	Credits
ENGR 107	Introduction to Engineering	2
PHYS 110	University Physics I	3
PHYS 111	University Physics I Lab.	1
MATH 114	Calculus II	3
MATH 213	Calculus III	3
MATH 214	Elementary Differential Equations	3
PHYS 220	University Physics II	3
PHYS 221	University Physics II Lab.	1
ENGR 200	Engineering Statistics	3
ENGR 390	Internship I	3
ENGR 391	Internship II	3
ENGR 450	Engineering Seminar	1
CHEM 212	General Chemistry I Lab	1

Civil and Infrastructure Engineering Department Requirements **72 Credit Hours**

Core Courses **63 Credit Hours**

Course Code	Course Title	Credits
CIEN 201	Computer Aided Drawings	3
CIEN 211	Statics	3
CIEN 212	Mechanics of Materials	3
CIEN 241	Infrastructure Management	3
ENGR 210	Sustainability in Engineering	2
CIEN 251	Fluid Mechanics	3
CIEN 261	Surveying	1
CIEN 265	Geographical Information System	2
CIEN 301	Numerical Analysis	3
CIEN 311	Structural Analysis	3
CIEN 321	Reinforced Concrete Design	3
CIEN 331	Construction Materials	3
CIEN 332	Construction Materials Lab	1
CIEN 333	Geotechnical Engineering	3
CIEN 334	Civil Engineering Testing and Materials **(Writing Intensive Course)**	1
CIEN 351	Environmental Engineering	2
CIEN 361	Highway Engineering and Design	3
CIEN 362	Transportation Engineering	3
CIEN 421	Structural Steel Design	3
CIEN 440	Infrastructure Financing	3
CIEN 441	Construction Management	3
CIEN 451	Infrastructure Systems	3
CIEN 491	Senior Design Project (1)	2
CIEN 492	Senior Design Project (2)	4

Basic Science Electives **3 Credit Hours**

Course Code	Course Title	Credits
PENG 101	Physical Geology	3
BIOL 112	University Biology	3

Technical Electives **6 Credit Hours**

Course Code	Course Title	Credits
CIEN 422	Advanced Reinforced Concrete Design	3
CIEN 424	Bridge Design	3
CIEN 431	Foundation Engineering	3
CIEN 442	Construction Planning and Scheduling	3
CIEN 444	Construction Cost Analysis and Estimating	3
CIEN 457	Water Resources Sustainability	3
ENGR 410	Climate Change	3
CIEN 456	Sustainable Urban Building Sites	3
CIEN 462	Advanced Pavement Design	3
CIEN 464	Airport Planning and Design	3
CIEN 493	Special Topics in Civil Engineering	3
ENGR 399	Undergraduate Research Project	3

Civil and Infrastructure Engineering Four-Year Sample Schedule

First Year, First Semester			First Year, Second Semester		
Course Code	**Course Title**	**Credits**	**Course Code**	**Course Title**	**Credits**
ENGL 101	Composition	3	ARAB 101 or ARAB 110	Arabic Language and Culture for Non-Native Learners I OR Arabic Language and Culture for Native Arabic Speakers I	3
ENGR 107	Introduction to Engineering	2	MATH 114	Calculus II	3
MATH 113	Calculus I	3	MEST 100	Introduction to Islam in World Culture	3
UNIV 100	University First-Year Transition	1	CSCI 114	Applied Computational Thinking	3
PHYS 110	University Physics I	3	CSCI 115	Applied Computational Tools	1
PHYS 111	University Physics I Lab.	1	PHYS 220	University Physics II	3
CHEM 211	General Chemistry I	3	PHYS 221	University Physics II Lab.	1
CHEM 212	General Chemistry I Lab.	1			
Subtotal =		**17**	**Subtotal =**		**17**
Second Year, First Semester			**Second Year, Second Semester**		
Course Code	**Course Title**	**Credits**	**Course Code**	**Course Title**	**Credits**
CIEN 201	Computer Aided Drawings	3	CIEN 212	Mechanics of Materials	3
CIEN 211	Statics	3	CIEN 251	Fluid Mechanics	3
CIEN 241	Infrastructure Management	3	CIEN 261	Surveying	1
ENGR 210	Sustainability in Engineering	2	CIEN 265	Geographical Information System	2
MATH 213	Calculus III	3	MATH 214	Elementary Differential Equations	3
ECON 103	Principles of Microeconomics	3	PENG 101 or BIOL 112	Physical Geology or University Biology I	3
Subtotal =		**17**	**Subtotal =**		**15**
Second Year, Summer Session					
Course Code	**Course Title**	**Credits**			
ENGR 390	Internship I	3			
Third Year, First Semester			**Third Year, Second Semester**		
Course Code	**Course Title**	**Credits**	**Course Code**	**Course Title**	**Credits**
CIEN 301	Numerical Analysis	3	CIEN 321	Reinforced Concrete Design	3
CIEN 311	Structural Analysis	3	CIEN 334	Civil Engineering Testing and Materials	1
CIEN 331	Construction Materials	3	CIEN 351	Environmental Engineering	2
CIEN 332	Construction Materials Lab.	1	CIEN 361	Highway Engineering and Design	3
CIEN 333	Geotechnical Engineering	3	CIEN 362	Transportation Engineering	3
UNIV 200	Innovation, Entrepreneurship, and Sustainability	3	ENGR 200	Engineering Statistics	3
Subtotal =		**16**	**Subtotal =**		**15**
Third Year, Summer Semester					
Course Code	**Course Title**	**Credits**	**Course Code**	**Course Title**	**Credits**
ENGR 391	Internship II	3			
Fourth Year, First Semester			**Fourth Year, Second Semester**		
Course Code	**Course Title**	**Credits**	**Course Code**	**Course Title**	**Credits**
CIEN 421	Structural Steel Design	3	CIEN ---	Technical Elective II	3
CIEN 440	Infrastructure Financing	3	CIEN 492	Senior Design Project (2)	4
CIEN 441	Construction Management	3	PHIL 100 or ENGL 200	Critical Thinking and Reasoning or Advanced Composition	3
ENGR 450	Engineering Seminar	1	UAES 200	Survey of United Arab Emirates Studies	3
CIEN 491	Senior Design Project (1)	2			
CIEN 451	Infrastructure Systems	3			
CIEN ---	Technical Elective I	3			
Subtotal =		**18**	**Subtotal =**		**13**
Total 134 Semester Credit Hours					