

# CEC Undergraduate Programs

## Bachelor of Science in Civil Engineering

The Bachelor of Science in Civil Engineering is a 4-year undergraduate curriculum that ensures academic success and preparation for a productive career in engineering. The objective of the Bachelor of Science in Civil Engineering is to give the student a comprehensive knowledge of civil, construction and environmental engineering, as well as the interdisciplinary background and skills to meaningfully participate in and contribute to technical advances towards this profession. The Bachelor of Science in Civil Engineering integrates technical aspects with studies in the social sciences to ensure appropriate sensitivity to socially related issues.

1. To Provide students with a critical understanding of civil, construction, and environmental engineering principles and practices.
2. To equip students with the necessary technical expertise and practical skills essential for a successful career in civil engineering, including hands-on experience with tools, software, and technologies used in the field.
3. To encourage collaboration with peers from different disciplines and develop an understanding of the multidisciplinary nature of engineering projects, preparing students to work effectively in diverse teams.
4. To foster ethical considerations, integrity, responsibility, and sustainable practices in civil engineering, emphasizing the importance of ethical behavior and promoting sustainable solutions in civil engineering projects.

## Program Learning Outcomes (PLOs)

The Program Learning Outcomes (PLOs) are those required by the Engineering Accreditation Commission of ABET in its Criterion 3. PLOs are outcomes (1) through (7).

- ✓ Identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics.
- ✓ 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.
- ✓ Communicate effectively with a range of audiences.
- ✓ Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which consider the impact of engineering solutions in global, economic, environmental and societal contexts.
- ✓ Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives.
- ✓ Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- ✓ Acquire and apply new knowledge as needed, using appropriate learning strategies.

## Program Structure

All students pursuing the Bachelor of Science in Civil Engineering must complete a minimum of 130 credits with a cumulative GPA of 2.0 or better. Specifically, the requirements are as follows:

- A minimum of (39) credits of General Education Requirements
- A minimum of (26) credits of Engineering Core Requirements
- A minimum of (50) credits of Major Requirements
- A minimum of (6) credits of Professional Elective Options
- A minimum of (9) credits of Major Electives
- Graduate Portfolio

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## Curriculum Plan – BSc in Civil Engineering

Course Code	Course Title	CH	Pre-requisites
<b>General Education Requirements</b>	<b>Total Credits</b>	<b>39</b>	
<b>National Requirements</b>	<b>Total Credits</b>	<b>7</b>	
ARHG 104/ARHG 101	Arabic for Arabic Speakers/Arabic for Non-Arabic Speakers	3	
ARHG 106	Modern History of Bahrain	2	
ARHG 107	Human Rights	2	
<b>English Requirements</b>	<b>Total Credits</b>	<b>6</b>	
ENGL 101	Composition I	3	
ENGL 102	Composition II	3	ENGL 101
<b>Mathematics Requirements</b>	<b>Total Credits</b>	<b>8</b>	
MATH 153	Calculus I	4	
MATH 154	Calculus II	4	MATH 153
<b>ICT Requirements</b>	<b>Total Credits</b>	<b>3</b>	
COSC 101	Introduction to Computing	3	
<b>Lifelong Learning Requirements</b>	<b>Total Credits</b>	<b>1</b>	
UNSS 101	University Success	1	
<b>Natural Science Requirements</b>	<b>Total Credits</b>	<b>8</b>	
Students should complete a minimum of 8 credits, including at least 2 credit lab from the Natural Science list of the general Education tabulated below.			
<b>Arts and Humanities Requirements</b>	<b>Total Credits</b>	<b>3</b>	
Students should complete a minimum of 3 credits from the Arts and Humanities list of the general Education tabulated below			
<b>Social and Behavioral Science Requirements</b>	<b>Total Credits</b>	<b>3</b>	
Students should complete a minimum of 3 credits, from the Social and Behavioral Science list of the general Education tabulated below.			
<b>Arts and Humanities List</b>			
ANTH 152	Introduction to Cultural Anthropology	3	
HUMS 101	Forms and Ideas in the Humanities	3	
HIST 201	World History	3	
TURK 101	Turkish for Beginners	3	
CCHN 101	Spoken Mandarin	3	
COMS 356	Intercultural Communication	3	ENGL 101
PHIL 101	Introduction to Philosophy	3	
ENGL 103	Public Speaking	3	
PHIL 201	Oriental and Islamic Philosophy	3	
<b>Natural Sciences List</b>			
CHEM 101	Introductory Chemistry	3	co-requisite of CHEM 101L
CHEM 101L	Introductory Chemistry Laboratory	1	co-requisite of CHEM 101
PHYS 101	Principles of Physics I	3	co-requisite of PHYS 101L
PHYS 101L	Principles of Physics I Laboratory	1	co-requisite of PHYS 101
<b>Social and Behavioral Sciences List</b>			
PSYC 101	Introduction to Psychology	3	
SOCS 101	Introduction to Sociology	3	
ENGL 205	Business Communication	3	
SUST 101	Principles of Sustainability	3	
POLS 321	Comparative Political Ideologies	3	
PSYC 202	Mind Matters: A Practical Exploration	3	

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Program Core Requirements	Total Credits	26
ENGR 100	Introduction to Engineering	1
ENGR 105	Programming for Engineers	2
CIVL 200	Engineering Mechanics - Statics	3
ENGR 202	Engineering Mathematics	3
MECH 241	Engineering Materials	2
MATH 252	Calculus III	4
PHYS 102	Principles of Physics II	3
PHYS 102L	Principles of Physics II Laboratory	1
ENGR 342	Engineering Economic Analysis	3
ENGR 401	Entrepreneurship for Engineers	2
ENGR 205	Multidisciplinary Research Methods	2
Program Major Requirements	Total Credits	50
CIVL 121	Computer Graphics for the Built Environment	3
CIVL 210	Statistical Methods for the Built Environment	3
CIVL 218	Surveying for Civil Engineering and Construction	3
MECH 241L	Engineering Materials Laboratory	1
CIVL 302	Mechanics of Materials	3
CIVL 302L	Mechanics of Materials Laboratory	1
CIVL 303	Engineering Geology	3
CIVL 321	Structural Analysis I	3
CIVL 330	Construction Engineering and Management	3
CIVL 355	Environmental Engineering	3
MECH 451	Fluid Mechanics	3
MECH 451L	Fluid Mechanics Laboratory	1
CIVL 421	Reinforced Concrete Design	3
CIVL 462	Geotechnical Engineering	3
CIVL 462L	Geotechnical Engineering Laboratory	1
CIVL 465	Foundation Engineering and Earth Retaining Structures	3
CIVL 481	Transportation Engineering	3
CIVL 499A	Engineering Design: Capstone Project I	2
CIVL 499B	Engineering Design: Capstone Project II	2
CIVL 406	Civil Engineering Internship	3
Program Major Electives Options	Total Credits	9
Students pursuing the Bachelor of Science in Civil Engineering must complete a minimum of 9 elective credits from the following list or any other course approved by the College of Engineering and Computing		
CIVL 430	Advanced Project Management	3
CIVL 441	Structural Analysis II	3
CIVL 444	Applied Hydraulics	3
CIVL 445	Applied Hydrology	3
CIVL 483	Traffic Engineering Design	3
CIVL 491	Construction Methods	3
Professional Elective Options	Total Credits	6
Students pursuing the Bachelor of Science in Civil Engineering must complete a minimum of 6 elective credits from general education course or any other programs at 200 level or above		
Internship	Total Credits	3
To qualify for the Bachelor of Science in Civil Engineering, a student must fulfill the internship requirements prior to graduation. The purpose of the internship is to expose students to the profession and give them an opportunity to apply their academic knowledge in a practical setting. The internship consists of a minimum of 280 work hours (8 weeks) with an approved employer. Internships are evaluated by the internship coordinator with a pass/fail grade.		
Program Total Credits		130

# CEC Undergraduate Programs

## Proposed Study Plan (CIVL) - AY 2025 - 2026 – BSc in Civil Engineering

## First Year

1 <sup>st</sup> Semester				2 <sup>nd</sup> Semester			
Course Code	Course Title	CH	Pre-requisites	Course Code	Course Title	CH	Pre-requisites
ENGL 101	Composition I	3		ENGL 102	Composition II	3	ENGL 101
UNSS 101	University Success	1		ARHG 106	Modern History of Bahrain	2	
COSC 101	Introduction to Computing	3		MATH 154	Calculus II	4	MATH 153
MATH 153	Calculus I	4		PHYS 101	Principles of Physics I	3	co-requisite of PHYS 101L
CHEM 101	Introductory Chemistry	3	co-requisite of CHEM 101L	PHYS 101L	Principles of Physics I Laboratory	1	co-requisite of PHYS 101
CHEM 101L	Introductory Chemistry Laboratory	1	co-requisite of CHEM 101	XXXX	Arts and Humanities Requirements	3	
				ENGR 100	Introduction to Engineering	1	
TOTAL		15		TOTAL		17	

## Second Year

3 <sup>rd</sup> Semester				4 <sup>th</sup> Semester			
Course Code	Course Title	CH	Pre-requisites	Course Code	Course Title	CH	Pre-requisites
CIVL 200	Engineering Mechanics - Statics	3	PHYS 101	XXXX	Social Sciences Requirements	3	
PHYS 102	Principles of Physics II	3	PHYS 101, PHYS 101L, MATH 153, co-requisite: PHYS 102L	CIVL 210	Statistical Methods for the Built Environment	3	MATH 154
PHYS 102L	Principles of Physics II Laboratory	1	PHYS 101, PHYS 101L, MATH 153, co-requisite: PHYS 102	ARHG 107	Human Rights	2	
ARHG 104/ARHG 101	Arabic for Arabic Speakers/Arabic for Non-Arabic Speakers	3		ENGR 202	Engineering Mathematics	3	MATH 154
MATH 252	Calculus III	4	MATH 154	ENGR 205	Multidisciplinary Research Methods	2	ENGL 102
ENGR 105	Programming for Engineers	2	COSC 101	CIVL 121	Computer Graphics for the Built Environment	3	COSC 101
TOTAL		16		TOTAL		16	

## Third Year

5 <sup>th</sup> Semester				6 <sup>th</sup> Semester			
Course Code	Course Title	CH	Pre-requisites	Course Code	Course Title	CH	Pre-requisites
CIVL 218	Surveying for Civil Engineering and Construction	3	CIVL 210	CIVL 303	Engineering Geology	3	PHYS 101
MECH 241	Engineering Materials	2	CIVL 200, CHEM 101	CIVL 321	Structural Analysis I	3	CIVL 302
MECH 241L	Engineering Materials Laboratory	1	Co-requisite: MECH 241	CIVL 355	Environmental Engineering	3	CHEM 101
CIVL 302	Mechanics of Materials	3	CIVL 200	MECH 451	Fluid Mechanics	3	MATH 252
CIVL 302L	Mechanics of Materials Laboratory	1	Co-requisite: CIVL 302	MECH 451L	Fluid Mechanics Laboratory	1	Co-requisite: MECH 451
ENGR 342	Engineering Economic Analysis	3	MATH 154	XXXX	Professional Elective (1)	3	
ENGR 401	Entrepreneurship for Engineers	2	ENGR 205				
CIVL 330	Construction Engineering and Management	3	ENGR 100				
TOTAL		18		TOTAL		16	

## Summer Semester

Course Code	Course Title	CH	Pre-requisites
CIVL 406	Civil Engineering Internship	3	86 credits, CGPA 2.0
TOTAL		3	

## Fourth Year

7 <sup>th</sup> Semester				8 <sup>th</sup> Semester			
Course Code	Course Title	CH	Pre-requisites	Course Code	Course Title	CH	Pre-requisites
CIVL 481	Transportation Engineering	3	CIVL 218	CIVL 499B	Engineering Design: Capstone Project II	2	CIVL 499A
XXXX	Major Elective (1)	3		XXXX	Major Elective (2)	3	
CIVL 499A	Engineering Design: Capstone Project I	2	Senior level (90 credits), CGPA 2.0	XXXX	Major Elective (3)	3	
CIVL 421	Reinforced Concrete Design	3	CIVL 321	XXXX	Professional Elective (2)	3	
CIVL 462	Geotechnical Engineering	3	CIVL 302	CIVL 465	Foundation Engineering and Earth Retaining Structures	3	CIVL 462
CIVL 462L	Geotechnical Engineering Laboratory	1	Co-requisite: CIVL 462				
TOTAL		15		TOTAL		14	