Benha University

Benha Faculty of Engineering

Civil Engineering Department

Civil Engineering Program

Program Specification – Bylaw 2023

Prepared by

Dr Ahmed Gamal Mahmoud Morsi

Contents

A- Basic Information

Program Title	**Civil Engineering Program**
Program Type	■ **Single** ☐ **Double** ☐ **Multiple**
Department responsible of program	**Civil Engineering**
Program Coordinator	**Prof. Dr. Hala Refat**
Quality Coordinator	**Dr Ayman Zaki**
Date of program Approval	**2023**
Date of Interior Evaluator	
Name of Interior Evaluator	
Date of Exterior Evaluator	
Name of Exterior Evaluator	
Program URL	**https://www.beng.bu.edu.eg/index.php/departments/civil**

B- Professional Information

1. Program Mission

The mission of the civil engineering program is to develop highly competent professionals, preparing them for positions in civil engineering, continuing education in graduate school, life-long learning, and societal leadership. The program aims to provide undergraduates with outstanding education opportunities founded on comprehensive engineering fundamentals and coupled with modern engineering tools. The program focuses on professional practices in civil engineering preparing its graduates for the labor market, societal needs, while equipping them with lifelong learning skills.

2. Program Objectives

1. **PO1.** Apply a wide spectrum of engineering knowledge, science and specialized skills with analytic, critical and systemic thinking to identify and solve engineering problems in real life situation.
2. **PO2.** Behave professionally and adhere to engineering ethics and standards and work to develop the profession and the community and promote sustainability principles.
3. **PO3.** Work in and lead a heterogeneous team and display leadership qualities, business administration, and entrepreneurial skills.

4. **PO4.** Use techniques, skills, and modern engineering tools necessary for engineering practice.
5. **PO5.** Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields.
6. **PO6.** Design of constructions that meet specified needs with appropriate attention to health and safety risks, applicable standards, economic, environmental, cultural, and societal considerations.
7. **PO7.** Incorporate economics and business practices including project risk and change management into the practice of engineering and to understand their limitations.

3. Graduates Attributes

According to NARS 2018 the graduate attributes of civil engineering are:

1. **GA1.** Master a wide spectrum of engineering knowledge and specialized skills and can apply acquired knowledge using theories and abstract thinking in real life situations.
2. **GA2.** Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation.
3. **GA3.** Behave professionally and adhere to engineering ethics and standards.
4. **GA4.** Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance.
5. **GA5.** Recognize his/her role in promoting the engineering field and contribute in the development of the profession and the community;
6. **GA6.** Value the importance of the environment, both physical and natural, and work to promote sustainability principles.
7. **GA7.** Use techniques, skills and modern engineering tools necessary for engineering practice.
8. **GA8.** Assume full responsibility for own learning and self-development, engage in lifelong learning and demonstrate the capacity to engage in post- graduate and research studies.

9. **GA9.** Communicate effectively using different modes, tools, and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner.

10. **GA10.** Demonstrate leadership qualities, business administration and entrepreneurial skills.

    In addition to all engineering graduate attributes defined by NARS 2018, Civil Engineering graduates should be able to:

11. **GA11.** Design of constructions systems that meet specified needs with applicable standards.

12. **GA12.** Understand the concept of quality control during design and construction, field verification, and review.

13. **GA13.** Incorporate economic and business practices into engineering projects.

4. Program Learning Outcomes (PLO's)

The program courses fulfill the NARS 2018

Level A: General Competencies of Engineering Graduate

A1- PLO1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.

A2- PLO2. Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.

A3- PLO3. Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.

A4- PLO4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.

A5- PLO5. Practice research techniques and methods of investigation as an inherent part of learning.

A6- PLO6. Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.

A7- PLO7. Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.

A8- PLO8. Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.

A9- PLO9. Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.

A10- PLO10. Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.

Level B: Competencies of Civil Engineering Graduate

B1- PLO11. Select appropriate and sustainable technologies for construction of buildings, infrastructures and water structures; using either numerical techniques or physical measurements and/or testing by applying a full range of civil engineering concepts and techniques of: Structural Analysis and Mechanics, Properties and Strength of Materials, Surveying, Soil Mechanics, Hydrology and Fluid Mechanics.
B2- PLO12. Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures; and at least three of the following civil engineering topics: Transportation and Traffic, Roadways and Airports, Railways, Sanitary Works, Irrigation, Water Resources and Harbors; or any other emerging field relevant to the discipline.
B3- PLO13. Plan and manage construction processes; address construction defects, instability and quality issues; maintain safety measures in construction and materials; and assess environmental impacts of projects.
B4- PLO14. Deal with biddings, contracts and financial issues including project insurance and guarantees.

5. Program Academic Standards

Academic reference Standards of Civil Engineering Program approved by faculty council on 12/11/2019-No. 385.

6. Reference Standards

National Academic reference Standards of 2018 which were issued by the National Authority for Quality Assurance & Accreditation of Education NAQAAE.

7. Program Structure and Contents

7.1 Program Duration:

9 semesters

7.2 Program Structure:

Total hours of the program	**160 Credit hours**
Theoretical	113 Credit hours
Practical/Exercises	47 Credit hours (112 Contact hours)
Compulsory Courses (Discipline)	86 Credit hours
Elective Courses	18 Credit hours
Humanity – Elective	6 Credit hours
Selective	None

7.3 Program Courses VS Requirements (See Matrix 1)

Requirements	**University Requirements**	**Faculty Requirements**	**Discipline Requirements**
Total hours of 9 semesters	14	32	114
% Of hours in 9 semesters	8.75%	20%	71.25%
Reference ratio	Min 8%	Min 20%	Min 35%

8. Subject Area (See Matrix 2)

Subject Area	**Required**	**Program Total Credit Hours**	
		Total hours of 9 semesters	**% Hours of 9 semesters**
Humanities and Social Sciences	9-12%	14	8.75
Mathematics and Basic Sciences	20-26%	36	22.5
Basic Engineering Sciences	20-23%	35	21.875
Applied Engineering and Design	20-22%	34	21.25
Computer Applications and ICT	9-11%	14	8.75
Projects and Practice	8-10%	15	9.375
Discretionary	6-8%	12	7.5

Total	160	100 %

9. Registration conditions and enrollment requirements

1. The Faculty of Engineering in Benha is a governmental educational institution affiliated with the University of Benha. It follows the rules and regulations issued by the Council. It also provides education in specialized programs for free. The students who benefit from this free education are those who have completed their secondary school certificate or its equivalent and enrolled in during the coordination office in the same year of obtaining this certificate or what is equivalent to it. The student maintains his free education if the conditions stipulated in the university's regulating law are fulfilled and its executive regulations.
2. All programs in these regulations are presented on a credit hour system.
3. The faculty sets, through the Faculty Council, the general rules for enrollment in various programs such that the student's desire is the principle of equal opportunities is the basis for accepting students into the education system.
4. The top thirty students in high school are exempted - Scientific name (mathematics division)- according to the recurring order of study fees when joining the program C Multi-specialization. The exemption will continue for a period of study if the student maintains a cumulative GPA of no less than 3.7 in every semester, otherwise the student will lose this privilege, and other rules will apply on it.
5. The top five students in the preparatory year are exempted in any government engineering faculty from the tuition fees when enrollment in multi-specialty programs, and the exemption continues if the student maintained a cumulative GPA of 3.7 or greater otherwise, the student would lose this privilege, and the rules will apply on it.
6. Students who excel academically are granted scholarships within multiple programs specializations Discounts in tuition fees as follows:
   If GPA= 3.7 reduction up to 20%
   If 3.7 = GPA = 3.3, a reduction of up to 10%
7. If a student in specialized programs does not achieve a cumulative GPA of = 2.0, four consecutive main semesters, it is possible allowing him to register courses for two semesters to raise his average. If this is not achieved, the student can move to multidisciplinary programs with the payment of tuition fees.
8. If the registered student fails in any of the multiple program's assignments in a course

twice, he is allowed to register this decision will be repeated four more times for an additional fee.

10. Requirements for obtaining the degree

1. The student is required to obtain a Bachelor of Science degree in Study.
2. Successfully passing the required 160 credit hours (credit hours). In one of the programs according to the requirements stipulated with a cumulative GPA of no less than 2.0.
3. Success in all courses that have (0) credit hours.
4. The graduation project is an essential part of the program's requirements for graduation. The graduation project can be completed at a period of two consecutive semesters according to the requirements of the program. The student graduates unless he meets the requirements for success in the project.
5. The student must complete field training twice at least. For a period of no less than four weeks for each training course during his period of study.
6. The student must have passed 70% of the credit hours at least before registering for the graduation project. If the project is divided into two semesters the student will have to study them according to it is not permissible to register for the graduation project during the semester summer study.

11. Duration of study

1. The academic degree is granted when the student fulfills the requirements for obtaining according to what is specified by the internal regulations for the program.
2. It may allow the outstanding student to graduate and obtain a degree bachelor's degree in Engineering The study system is based on credit hours, over a period of 4 academic years or (main eight semesters), after passing all graduation requirements, in addition to extending ordinary study.
3. The maximum duration of the study is twice the stipulated and proposed duration in the program, which does not include class the study was suspended for reasons acceptable to the Faculty Council, and after these for a period of time, the student will be dismissed from the program.

12. Study dates

The academic year is divided into three semesters as follows:

1. The first semester, the fall semester, begins with the beginning of the university year and for a period of 15 weeks of instruction.
2. The second semester, spring semester (main semester) after the mid-year university vacation for a period of 15 weeks of instruction.
3. The summer semester (optional semester), which begins in the month of July for a period of 7 school weeks, with double Course hours.

13.Teaching and Learning Methods

Teaching and Learning Methods
Lecture
Tutorials
Computer-based Instruction (computer lab)
Problem-based Learning
Project-based Learning
Interactive Learning
Presentations
Report
Co-operative Learning
Brainstorming
Projects
Simulation
Discussion
Practical-based Learning
Self-Learning
Hybrid Learning

14.Student Assessment Methods

Assessment Methods	
Formative Assessment Method	
Tests	Oral Test
	Written Exam (Mid-term)
	Experimental
	Quizzes
Reports	
Observation	
Discussions	
Projects	Projects
	Mini Projects
Assignments	

Presentations
Summative Assessment Method
Practical Exam
Oral Exam
Final Exam

15.Program Evaluation

Evaluator	Tool
Senior Students	Questionnaire-meeting
Graduates	Questionnaire-meeting
Stakeholders	Questionnaire-meeting
Internal Evaluator	Report
External Evaluators	Report

16.Appendix

1. Classification of Courses According to Requirements:

Level	Code	Course Title	Pre-requisites	Credit Hours	Weekly Contact Hours				Credit Hours of Requirements		
					Lect.	Lab.	Tut.	Sum	University Requirements	Faculty Requirements	Discipline Requirements
Level 0-١	UHS 101	Foreign Language	----	2	2	0	0	2	2		
	UHS 102	Information and Communication Technology	----	2	2	0	0	2	2		
	MEC 011	Engineering Graphics	----	2	0	0	4	4		2	
	BES 011	Mathematics I	----	3	2	0	2	4		3	
	BES 021	Mechanics I	----	3	2	0	2	4		3	
	BES 031	Physics I	----	3	2	2	1	5		3	
	BES 041	General Chemistry	----	4	3	2	1	6		4	
Level 0-2	UHS 103	Societal Issues	----	2	2	0	0	2	2		
	MEC 012	Production Engineering	----	2	1	3	0	4		2	
	MEC 014	Computer Aided Drafting	MEC 011	2	1	2	0	3		2	
	BES 012	Mathematics II	BES 011	3	2	0	2	4		3	

	BES 022	Mechanics II	BES 021	3	2	0	2	4		3	
	BES 032	Physics II	----	3	2	2	1	5		3	
	ELE 042	Computer Programming Fundamentals	----	2	0	2	2	4		2	
Level 1-1	BES 141	Pollution and Industrial Safety	BES 041	2	2	1	0	3		2	
	BES 111	Differential Equations	BES 012	3	2	0	2	4			3
	CIV 101	CAD for Civil Engineering	MEC 014	2	1	3	0	4			2
	CIV 111	Properties and Testing of Materials	BES 022	3	2	2	0	4			3
	CIV 113	Technology of Building Materials	BES 041	2	2	1	0	3			2
	CIV 121	Structure Analysis I	BES 021	3	2	0	2	4			3
	CIV 161	Fluid Mechanics	BES 031	2	2	1	0	3			2
Level 1-2	UHS 104	Professional Ethics	-----	2	2	0	0	2	2		
	BES 112	Numerical Analysis	BES 111	3	2	2	0	4			3
	BES 148	Water Chemistry	BES 041	3	2	2	0	4			3
	CIV 114	Concrete Technology	CIV 113	3	2	2	0	4			3
	CIV 122	Structure Analysis II	CIV 121	3	2	0	2	4			3
	CIV 142	Surveying for Engineers I	BES 012	3	2	2	0	4			3
	CIV 162	Hydraulics	CIV 161	2	2	1	0	3			2
	FTR 103	Field Training I	Completion of 65 C H	0	-	-	-	-		0	
Level ٢-١	BES 211	Engineering Statistics and Probability	BES 012	3	2	2	0	4			3
	ARC 217	Architectural Engineering	CIV 101	2	1	0	2	3			2
	CIV 221	Structure Analysis III	CIV 122	3	2	0	2	4			3

	CIV 231	Soil Mechanics	CIV 111	3	2	2	0	4			3
	CIV 241	Surveying for Engineers II	CIV 142	3	2	2	0	4			3
	CIV 251	Design of R.C. Structures I	CIV 114, CIV 122	3	2	0	2	4			3
	CIV 261	Hydrology	CIV 162	2	2	0	1	3			2
Level ٢-2	CIV 2XX	Elective I	According to the course title	3	2	2	0	4			3
	CIV 222	Design of Metallic Structures I	CIV 122	3	2	0	2	4			3
	CIV 232	Geotechnical Engineering and Foundations	CIV 231, CIV 251	3	2	2	0	4			3
	CIV 252	Design of R.C. Structures II	CIV 251	3	2	0	2	4			3
	CIV 272	Water Supply Engineering	CIV 162	3	2	2	0	4			3
	CIV 282	Traffic and Transportation Engineering	BES 112, BES 211	3	2	2	0	4			3
	FTR 203	Field Training II	Completion of 96 C H	0	-	-	-	-		0	
Level 3-1	UHS XXX	Humanities Elective I	-----	2	2	0	0	2	2		
	CIV 321	Design of Metallic Structures II	CIV 222	3	2	0	2	4			3
	CIV 331	Design of Foundations and Earth Retaining Structures	CIV 232	2	2	0	1	3			2
	CIV 351	Design of R.C. Structures III	CIV 252	2	2	0	1	3			2
	CIV 361	Irrigation and Drainage Engineering	CIV 161	2	2	0	1	3			2
	CIV 371	Sanitary Engineering	CIV 272	3	2	2	0	4			3
	CIV 381	Highway Engineering I	CIV 142, CIV 231, CIV 282	3	2	2	0	4			3

Level 3-2	CIV 300	Contracts and Legalizations	CIV 222, CIV 252	2	2	0	1	3			2
	CIV 302	Computer Applications in Civil Engineering	ELE 042, CIV 122	2	1	3	0	4			2
	CIV 304	Quality Control and Fundamentals of Repair and Strengthening of Structures	CIV 252, CIV 321	2	2	0	1	3			2
	CIV 306	Engineering Economy	-----	2	2	0	1	3			2
	CIV 3XX	Elective II	According to the course title	3	2	0	2	4			3
	CIV 3XX	Elective III	According to the course title	3	2	0	2	4			3
	CIV 398	Senior Design Project I	112 C H + Completion of the prerequisite courses of the project.	2	0	4	0	4			2
Level 4-1	UHS XXX	Humanities Elective II	-----	2	2	0	0	2	2		
	UHS XXX	Humanities Elective III	-----	2	2	0	0	2	2		
	CIV 401	Construction Project & Management	CIV 300	2	2	0	1	3			2
	CIV 4XX	Elective IV	According to the course title	3	2	0	2	4			3
	CIV 4XX	Elective V	According to the course title	3	2	0	2	4			3
	CIV 4XX	Elective VI	According to	3	2	2	0	4			3

			the course title								
	CIV 499	Senior Design Project II	CIV 398	3	1	4	0	5			3
No of Hours in 9 semesters									14	32	114
% Hours in 9 semesters									8.75%	20%	71.25%
Reference Ratio									Min 8%	Min 20%	Min 35%

2. Classification of Courses According to Subject Area:

Level	Code	Course Title	Pre-requisites	Credit Hours	Weekly Contact Hours				Credit Hours of Subject Area						
					Lect.	Lab.	Tut.	Sum	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary
Level 0-١	UHS 101	Foreign Language	----	2	2	0	0	2	2						
	UHS 102	Information and Communication Technology	----	2	2	0	0	2	2						
	MEC 011	Engineering Graphics	----	2	0	0	4	4			2				
	BES 011	Mathematics I	----	3	2	0	2	4		3					
	BES 021	Mechanics I	----	3	2	0	2	4		3					
	BES 031	Physics I	----	3	2	2	1	5		3					
	BES 041	General Chemistry	----	4	3	2	1	6		4					
Level 0-2	UHS 103	Societal Issues	----	2	2	0	0	2	2						
	MEC 012	Production Engineering	----	2	1	3	0	4			2				
	MEC 014	Computer Aided Drafting	MEC 011	2	1	2	0	3					2		

	BES 012	Mathematics II	BES 011	3	2	0	2	4		3					
	BES 022	Mechanics II	BES 021	3	2	0	2	4		3					
	BES 032	Physics II	----	3	2	2	1	5		3					
	ELE 042	Computer Programming Fundamentals	----	2	0	2	2	4					2		
Level 1-1	BES 141	Pollution and Industrial Safety	BES 041	2	2	1	0	3		2					
	BES 111	Differential Equations	BES 012	3	2	0	2	4		3					
	CIV 101	CAD for Civil Engineering	MEC 014	2	1	3	0	4					2		
	CIV 111	Properties and Testing of Materials	BES 022	3	2	2	0	4			3				
	CIV 113	Technology of Building Materials	BES 041	2	2	1	0	3			2				
	CIV 121	Structure Analysis I	BES 021	3	2	0	2	4			3				
	CIV 161	Fluid Mechanics	BES 031	2	2	1	0	3			2				
Level 1-2	UHS 104	Professional Ethics	-----	2	2	0	0	2	2						
	BES 112	Numerical Analysis	BES 111	3	2	2	0	4		3					
	BES 148	Water Chemistry	BES 041	3	2	2	0	4		3					
	CIV 114	Concrete Technology	CIV 113	3	2	2	0	4			3				
	CIV 122	Structure Analysis II	CIV 121	3	2	0	2	4			3				
	CIV 142	Surveying for Engineers I	BES 012	3	2	2	0	4			3				
	CIV 162	Hydraulics	CIV 161	2	2	1	0	3			2				
	FTR 103	Field Training I	Completion of 65 C H	0	-	-	-	-						0	
Level ٢-١	BES 211	Engineering Statistics and Probability	BES 012	3	2	2	0	4		3					
	ARC 217	Architectural Engineering	CIV 101	2	1	0	2	3						2	
	CIV 221	Structure Analysis III	CIV 122	3	2	0	2	4			3				

	CIV 231	Soil Mechanics	CIV 111	3	2	2	0	4			3				
	CIV 241	Surveying for Engineers II	CIV 142	3	2	2	0	4			3				
	CIV 251	Design of R.C. Structures I	CIV 114, CIV 122	3	2	0	2	4				3			
	CIV 261	Hydrology	CIV 162	2	2	0	1	3			1	1			
Level ٢-2	CIV 2XX	Elective I	According to the course title	3	2	2	0	4						3	
	CIV 222	Design of Metallic Structures I	CIV 122	3	2	0	2	4				3			
	CIV 232	Geotechnical Engineering and Foundations	CIV 231, CIV 251	3	2	2	0	4				3			
	CIV 252	Design of R.C. Structures II	CIV 251	3	2	0	2	4				3			
	CIV 272	Water Supply Engineering	CIV 162	3	2	2	0	4				3			
	CIV 282	Traffic and Transportation Engineering	BES 112, BES 211	3	2	2	0	4				3			
	FTR 203	Field Training II	Completion of 96 C H	0	-	-	-	-						0	
Level 3-1	UHS XXX	Humanities Elective I	-----	2	2	0	0	2	2						
	CIV 321	Design of Metallic Structures II	CIV 222	3	2	0	2	4				3			
	CIV 331	Design of Foundations and Earth Retaining Structures	CIV 232	2	2	0	1	3				2			
	CIV 351	Design of R.C. Structures III	CIV 252	2	2	0	1	3				2			
	CIV 361	Irrigation and Drainage Engineering	CIV 161	2	2	0	1	3				2			
	CIV 371	Sanitary Engineering	CIV 272	3	2	2	0	4				3			
	CIV 381	Highway Engineering I	CIV 142, CIV 231, CIV 282	3	2	2	0	4				3			
Level 3-2	CIV 300	Contracts and Legalizations	CIV 222, CIV 252	2	2	0	1	3						2	
	CIV 302	Computer Applications in Civil Engineering	ELE 042, CIV 122	2	1	3	0	4					2		

	CIV 304	Quality Control and Fundamentals of Repair and Strengthening of Structures	CIV 252, CIV 321	2	2	0	1	3						2	
	CIV 306	Engineering Economy	-----	2	2	0	1	3						2	
	CIV 3XX	Elective II	According to the course title	3	2	0	2	4							3
	CIV 3XX	Elective III	According to the course title	3	2	0	2	4							3
	CIV 398	Senior Design Project I	112 C H + Completion of the prerequisite courses of the project.	2	0	4	0	4					1	1	
Level 4-1	UHS XXX	Humanities Elective II	-----	2	2	0	0	2	2						
	UHS XXX	Humanities Elective III	-----	2	2	0	0	2	2						
	CIV 401	Construction Project & Management	CIV 300	2	2	0	1	3						2	
	CIV 4XX	Elective IV	According to the course title	3	2	0	2	4							3
	CIV 4XX	Elective V	According to the course title	3	2	0	2	4							3
	CIV 4XX	Elective VI	According to the course title	3	2	2	0	4					3		
	CIV 499	Senior Design Project II	CIV 398	3	1	4	0	5					2	1	
No of Hours in 9 semesters									14	36	35	34	14	15	12
% Hours in 9 semesters									8.75	22.5	21.875	21.25	8.75	9.375	7.5

Reference Ratio from NARS	9-12%	20-26%	20-23%	20-22%	9-11%	8-10%	6-8%

3. Faculty Mission vs. Program Mission Matrix

Faculty Mission		Program Mission		
		The mission of the civil engineering program is to develop highly competent professionals, preparing them for positions in civil engineering, continuing education in graduate school, life-long learning, and societal leadership. The program aims to provide undergraduates with outstanding education opportunities founded on comprehensive engineering fundamentals and coupled with modern engineering tools. The program focuses on professional practices in civil engineering preparing its graduates for the labor market, societal needs, while equipping them with lifelong learning skills.		
		The program aims to provide undergraduates with outstanding education opportunities founded on comprehensive engineering fundamentals and coupled with modern engineering tools.	The program focuses on professional practices in civil engineering preparing its graduates for the labor market	Develop highly competent professionals, preparing them for positions in civil engineering, continuing education in graduate school, life-long learning, and societal leadership.
Benha Faculty of Engineering - Benha University is committed to graduate well prepared engineers equipped with knowledge and skills necessary to compete in labor market, and capable of using and developing modern technology, and providing research in engineering fields to serve society and community.	Benha Faculty of Engineering - Benha University is committed to graduate well prepared engineers equipped with knowledge and skills necessary to compete in labor market		√	
	Capable of using and developing modern technology	√		
	Providing research in engineering fields to serve society and community			√

4. Program Mission vs. NARS 2018 CBE Matrix

Program Mission		NARS 2018 CBE													
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4
The mission of the civil engineering program is to develop highly competent professionals, preparing them for positions in civil engineering, continuing education in graduate school, life-long learning, and societal leadership. The program aims to provide undergraduates with outstanding education opportunities founded on comprehensive engineering fundamentals and coupled with modern engineering tools. The program focuses on professional practices in civil engineering preparing its graduates for the labor market, societal needs, while equipping them with lifelong learning skills.	The program aims to provide undergraduates with outstanding education opportunities founded on comprehensive engineering fundamentals and coupled with modern engineering tools.	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	The program focuses on professional practices in civil engineering preparing its graduates for the labor market		√		√			√	√		√	√	√	√	√
	Develop highly competent professionals, preparing them for positions in civil engineering, continuing education in graduate school, life-long learning, and societal leadership.		√	√	√	√					√	√	√	√	√

5. Program Mission vs. Program Objectives Matrix

Program Mission		Program Objectives						
		PO1	PO2	PO3	PO4	PO5	PO6	PO7
The mission of the civil engineering program is to develop highly competent professionals, preparing them for positions in civil engineering, continuing education in graduate school, life-long learning, and societal leadership. The program aims to provide undergraduates with outstanding education opportunities founded on comprehensive engineering fundamentals and coupled with modern engineering tools. The program focuses on professional practices in civil engineering preparing its graduates for the labor market, societal needs, while equipping them with lifelong learning skills.	The program aims to provide undergraduates with outstanding education opportunities founded on comprehensive engineering fundamentals and coupled with modern engineering tools.	√			√			√
	The program focuses on professional practices in civil engineering preparing its graduates for the labor market		√	√		√	√	
	Develop highly competent professionals, preparing them for positions in civil engineering, continuing education in graduate school, life-long learning, and societal leadership.		√	√		√		

6. Program Objectives vs. NARS 2018 CBE Matrix

Program Objectives	NARS 2018 CBE													
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4
PO1	√	√									√			
PO2			√											
PO3						√	√	√	√					
PO4				√				√				√		
PO5					√			√		√				
PO6			√	√		√					√	√	√	
PO7			√											√

7. Program Objectives vs. Graduate Attributes Matrix

Program Objectives	Graduate Attributes												
	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12	GA13
PO1	√	√											
PO2			√		√	√							
PO3				√						√			
PO4							√		√	√			
PO5								√	√				
PO6											√	√	
PO7													√

8. Program Objectives vs. Requirements Matrix

Program Objectives	Requirements		
	University	Faculty	Discipline
PO1		√	
PO2			√
PO3			√
PO4		√	
PO5	√		
PO6			√
PO7			√

9. Program Objectives vs. Subject Area Matrix

Program Objectives	Subject Area						
	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary
PO1	√	√	√	√	√	√	
PO2	√		√	√		√	
PO3	√					√	
PO4	√	√	√	√	√	√	√
PO5	√	√	√	√	√	√	√
PO6				√		√	√
PO7	√					√	√

10. Student Competences vs. NARS 2018 CBE Matrix

Student Competences	NARS 2018 CBE													
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B11	B12	B13	B14
A1	√													
A2		√												
A3			√											
A4				√										
A5					√									
A6						√								
A7							√							
A8								√						
A9									√					
A10										√				
B1											√			
B2												√		
B3													√	
B4														√

11. Student Competences vs. Program Learning Outcomes Matrix

Student Competences	Program Learning Outcomes													
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PLO 13	PLO 14
A1	√													
A2		√												
A3			√											
A4				√										
A5					√									
A6						√								
A7							√							
A8								√						
A9									√					
A10										√				
B1											√			
B2												√		
B3													√	
B4														√

12. Student Competences vs. Graduate Attributes Matrix

Student Competences	Graduate Attributes												
	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12	GA13
A1	√	√											
A2		√											
A3			√		√	√					√	√	√
A4						√	√				√		√
A5								√					
A6				√							√	√	
A7				√									
A8									√				
A9										√			
A10								√					
B1											√		
B2											√		
B3												√	
B4													√

13. Graduate Attributes vs. Requirements Matrix

Graduate Attributes	Requirements		
	University	Faculty	Discipline
GA1	√	√	√
GA2	√	√	√
GA3		√	√
GA4	√		√
GA5		√	√
GA6		√	√
GA7		√	√
GA8	√		√
GA9	√		√
GA10	√		√
GA11			√
GA12			√
GA13			√

14. Graduate Attributes vs. Subject Area Matrix

Graduate Attributes	Subject Area						
	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary
GA1	√	√	√	√	√		
GA2	√	√	√	√	√	√	√
GA3		√	√	√		√	√
GA4	√					√	
GA5				√		√	√
GA6		√		√		√	√
GA7			√	√	√	√	√
GA8	√	√	√	√	√	√	√
GA9	√	√	√		√		
GA10	√					√	√
GA11				√		√	√
GA12				√	√	√	√
GA13						√	√

15. Student Competences Vs. Learning and Teaching Methods Matrix

Teaching and Learning Methods	Student Competences													
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4
Conventional methods														
Lecture	√		√	√		√		√			√	√	√	√
Tutorials	√		√	√		√		√			√	√	√	√
Computer-based Instruction		√		√							√	√		
Practical-based Learning		√				√	√		√		√	√		
Unconventional methods														
Problem-based Learning	√			√					√		√	√	√	√
Project-based Learning			√			√	√		√		√	√	√	√
Interactive Learning		√					√	√	√	√	√	√	√	√
Presentations			√		√				√		√	√	√	√
Report					√		√		√	√	√	√	√	√
Co-operative Learning					√		√				√	√	√	√
Brainstorming				√			√	√	√		√	√	√	√
Projects			√			√	√	√	√		√	√	√	√
Simulation		√									√	√	√	
Discussion	√		√					√			√	√	√	√
Self-Learning					√					√	√	√	√	√
Hybrid Learning			√	√	√				√	√	√	√	√	√

16. Student Competencies Vs Assessment Methods Matrix

Assessment Methods		Student Competences													
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4
Formative assessment methods															
Tests	Oral Test	√	√	√		√	√	√	√	√	√	√	√	√	√
	Written Exam	√		√	√		√		√			√	√	√	√
	Experimental		√					√				√	√		
	Quizzes	√		√	√		√		√			√	√	√	√
Assignments		√	√	√	√		√		√	√		√	√	√	√
Presentations				√		√	√	√		√	√	√	√	√	√
Reports		√		√		√	√	√	√	√	√	√	√	√	√
Observation		√			√	√		√	√	√		√	√	√	√
Discussions		√		√	√	√	√	√	√	√	√	√	√	√	√
Projects	Projects	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Mini Projects	√	√	√		√	√	√	√	√	√	√	√	√	√
Summative Assessment Method															
Practical			√					√				√	√		
Oral Exam		√	√	√		√	√	√	√	√	√	√	√	√	√
Final Exam		√		√	√		√		√			√	√	√	√

17. Assessment Methods Vs. Teaching and Learning Methods Matrix

Assessment Methods		Teaching and Learning Methods															
		Lecture	Tutorials	Computer-based Instruction	Problem-based Learning	Project-based Learning	Interactive Learning	Presentations	Report	Co-operative Learning	Brainstorming	Projects	Simulation	Discussion	Practical-based Learning	Self-Learning	Hybrid Learning
Formative Assessment Method																	
Tests	Oral Test					√		√	√			√		√	√	√	√
	Written Exam	√	√														√
	Experimental			√											√		
	Quizzes	√	√														√
Reports								√	√					√		√	√
Observation					√		√			√	√						
Discussions		√	√		√	√		√	√		√	√		√			√
Projects	Projects				√		√	√	√	√		√	√	√	√	√	√
	Mini Projects					√	√			√		√	√	√	√		√
Assignments			√	√	√												√
Presentations						√		√	√			√					√
Summative Assessment Method																	
Practical				√											√		
Oral Exam						√						√		√	√	√	√
Final Exam		√	√		√									√		√	√

18. Courses Vs. Program Learning Outcomes Matrix

Code	Title	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14	Total
Compulsory Humanities Courses																
UHS 101	Foreign Language								1		1					2
UHS 102	Information and Communication Technology				1						1					2
UHS 103	Societal Issues							1			1					2
UHS 104	Professional Ethics				1	1										2
Elective Humanities Courses																
UHS XXX	Humanities Elective I			1	1											2
UHS XXX	Humanities Elective II								1	1						2
UHS XXX	Humanities Elective III					1					1					2
Basic Science Courses																
BES 011	Mathematics I	1		1												2
BES 012	Mathematics II	1		1												2
BES 111	Differential Equations	1	1													2
BES 112	Numerical Analysis	1	1													2
BES 211	Engineering Statistics and Probability	1	1													2
BES 041	General Chemistry	1	1													2
BES 148	Water Chemistry	1	1		1											3

BES 141*	Pollution and Industrial Safety	1		1	1										3
BES 031	Physics I	1	1												2
BES 032	Physics II	1	1												2
Faculty Requirements Courses															
MEC 011	Engineering Graphics						1		1						2
MEC 012	Production Engineering				1		1								2
MEC 014	Computer Aided Drafting				1				1						2
ELE 042	Computer Programming Fundamentals	1		1											2
BES 021	Mechanics I	1	1												2
BES 022	Mechanics II	1	1												2
FTR 103	Field Training I							1			1				2
FTR 203	Field Training II							1			1				2
Civil Program Compulsory Courses															
		PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**	**PLO6**	**PLO7**	**PLO8**	**PLO9**	**PLO10**	**PLO11**	**PLO12**	**PLO13**	**PLO14**	**Total**
CIV 101	CAD for Civil Engineering				1								1			2
CIV 111	Properties and Testing of Materials		1									1				2
CIV 113	Technology of Building Materials		1									1				2
CIV 114	Concrete Technology		1									1		1		3
CIV 121	Structure Analysis I	1										1				2
CIV 122	Structure Analysis II	1										1				2
CIV 142	Surveying for Engineers I		1			1						1				3
CIV 161	Fluid Mechanics		1									1				2
CIV 162	Hydraulics		1							1		1				3

ARC 217	Architectural Engineering								1	1						2
CIV 221	Structure Analysis III	1										1				2
CIV 222	Design of Metallic Structures I			1	1								1			3
CIV 231	Soil Mechanics		1			1						1				3
CIV 232	Geotechnical Engineering and Foundations			1								1	1			3
CIV 241	Surveying for Engineers II		1			1						1				3
CIV 251	Design of R.C. Structures I			1	1								1			3
CIV 252	Design of R.C. Structures II			1	1								1			3
CIV 261	Hydrology	1										1				2
CIV 272	Water Supply Engineering		1										1			2
CIV 282	Traffic and Transportation Engineering					1							1	1		3
CIV 300	Contracts and Legalizations								1	1				1	1	4
CIV 302	Computer Applications in Civil Engineering		1										1			2
CIV 304	Quality Control and Fundamentals of Repair and Strengthening of Structures				1	1				1	1			1		5
CIV 306	Engineering Economy									1					1	2
CIV 321	Design of Metallic Structures II			1	1								1			3
CIV 331	Design of Foundations and Earth Retaining Structures			1									1			2
CIV 351	Design of R.C. Structures III			1	1								1			3
CIV 361	Irrigation and Drainage Engineering	1											1			2
CIV 371	Sanitary Engineering		1										1			2
CIV 381	Highway Engineering I			1	1								1			3
CIV 398	Senior Design Project I			1	1		1	1	1	1	1	1	1	1	1	11

CIV 401	Construction Project & Management						1			1				1	1	4
CIV 499	Senior Design Project II			1	1		1	1	1	1	1	1	1	1	1	11
Civil Program Elective Courses																
Code	**Title**	**PLO1**	**PLO2**	**PLO3**	**PLO4**	**PLO5**	**PLO6**	**PLO7**	**PLO8**	**PLO9**	**PLO10**	**PLO11**	**PLO12**	**PLO13**	**PLO14**	**Total**
CIV 2XX	Elective I						1					1				2
CIV 3XX	Elective II					1						1				2
CIV 3XX	Elective II												1	1		2
CIV 4XX	Elective IV						1							1	1	3
CIV 4XX	Elective V					1								1		2
CIV 4XX	Elective VI		1									1				2
Total		19	21	15	17	9	7	5	8	9	9	18	17	10	6	170