



Benha University



Benha Faculty of Engineering



Civil Engineering Department



Civil Engineering Program

B.Sc. Program Specification

Bylaw 2012

Prepared by

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A- Basic Information

Program Title	Civil Engineering Program
Program Type	<input checked="" type="checkbox"/> Single <input type="checkbox"/> Double <input type="checkbox"/> Multiple
Department responsible of program	Civil Engineering Department
Program Coordinator	Prof. Dr. Ahmed Eldebaiky
Quality Coordinator	Dr Ahmed Gamal M. Morsi
Date of program Approval	22/11/2022
Date of Interior Evaluator	July 2023
Name of Interior Evaluator	Prof Dr Hanan Eltobgy
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

1. **PLO1.** Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.
2. **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.
3. **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.
4. **PLO4.** Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.
5. **PLO5.** Practice research techniques and methods of investigation as an inherent part of learning.
6. **PLO6.** Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.
7. **PLO7.** Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.
8. **PLO8.** Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.

9. **PLO9.** Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.
10. **PLO10.** Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.

Level B: Competencies of Civil Engineering Graduate

11. **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.
12. **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.
13. **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.
14. **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 (See Matrix 1)

7.1 Program Duration: five years (10 semesters)

7.2 Program Structure:

- Total hours of program: 346 contact hours
- Theoretical: 179 contact hours
- Tut.: 77 contact hours
- Lab.: 90 contact hours
- Compulsory: 336 contact hours
- Elective: 10 contact hours
- Selective: none

7.3 Program Courses:

7.3.1 Program Courses VS Requirements (See Matrix 1)

Requirements	University Requirements	Faculty Requirements	Discipline Requirements
Total hours 5 years	10	66	270
% Of hours in 5 years	2.9	19.1	78
Reference ratio	Min 8%	Min 20%	Min 35%

7.3.2 Subject Area (See Matrix 2)

Subject Area	Required	Program Total Contact Hours	
		Total hours of five years	% Hours of five years
Humanities and Social Sciences	9-12%	23	6.6
Mathematics and Basic Sciences	20-26%	64	18.5
Basic Engineering Sciences	20-23%	93	26.9
Applied Engineering and Design	20-22%	74	21.4
Computer Applications and ICT	9-11%	31	9
Projects and Practice	8-10%	36	10.4
Discretionary	6-8%	25	7.2

8. Program Admission Requirements

Following the below clauses:

Clause (3)

For obtaining a bachelor's degree in engineering the studying duration is five years, each year is divided into two semesters, starting with a general preparatory year for all students. Then the specialization for the students begins in the second year according to selected courses shown in the regulations.

9. Regulations for Progression and Program Completion

Following the below clauses:

Clause (9)

The student can transfer to the following academic year with failing subjects if he/she fails in no more than two courses from the previous year. Student is enrolled in the courses of a lower level in addition to at most two additional courses from the group of university required courses. The exam for these failed courses is to be taken with the students of the academic year according to the regular schedule. If the student manages to succeed in the courses he/she will not be graded higher than a "pass" grade with a maximum of 64%.

For the two-part courses, student is considered to succeed the course if he passed the two parts constituting the course. However, if a student fails the course, the exam can be retaken in the part he failed in with the students that part is originally taught. If the student manages to succeed, he will not be graded higher than a "pass" grade with a maximum of 64%. This grade is added to the previous part he passed. The student will be graded "fail" if he/she did not pass one or both parts, and if a student failed both parts and then passed them, he will be graded in both of them with the highest grade in the "pass" grade (64%).

Clause (10)

Success in all courses is a must before obtaining a bachelor's degree. For students in the fourth year who have failed in no more than two of their curriculum courses and with two additional university requirement courses at most. A second-round exam is held during October in the new academic year, and the student must pass all the failing courses in this exam. Otherwise, the student remains for repetition and must retake the courses which he failed to pass. Also, the grade will not exceed the "pass" grade with a maximum of 64%, and there is no repetition exam for the graduation project.

Clause (11)

If the exam for one of the courses includes a written exam and another oral or practical part, the student's grade in this course is estimated from the total of the written, oral or practical exams in addition to the work of the term. A student who is absent in the written exam is

considered failed in the course. If one of the courses does not include a written exam (such as the graduation project), the practical or oral exams are treated as the written exam.

Clause (12)

A- The student will be assessed in the exams each academic year, and the total grade will be according to one of the following:

Excellent: 85% or more of the total score
Very good: from 75% to less than 85% of the total score
Good: from 65% to 75% of the total score
Pass: from 50% to less than 65% of the total score

The student's failure is estimated by one of the following two grades:

Poor: from 30% to less than 50% of the total score
Very poor: less than 30% of the total score

B- The student's success grade in the courses he has previously failed in is a "pass" grade with a maximum of 64%.

C- The total grade of students in the bachelor's degree is calculated on the basis of the total grades (cumulative) achieved in all academic years, and the students are ranked according to this total grade.

D- The student is granted honors if his final grade is excellent or at least very good, and his annual grade is not less than very good in any of the academic years except for the preparatory year, and he must not fail any exam in any of the academic years except for the preparatory one.

10.Regulations Governing Field Training

A- For the summer training of the preparatory class, instruction for a group of 20 students is provided by one faculty member and one assistant, or two teaching assistants, in addition to two scientific training supervisors in the workshops or laboratories. These hours are considered outside the regular teaching load and should not exceed a maximum of 36 hours per week.

B- For field training, it takes place in industrial centers and engineering companies, supervised by one faculty member and an assistant. The organization of the training is assisted by one administrator from the college for every 20 students, in addition to one engineer from the factory for every five students. Each of them is to be granted a stipend amounting to 5% of their base salary for each day of training.

11. 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	

12. Student Assessment (Methods and rules for student assessment)

Assessment Methods	
Tests	Oral Test
	Written Exam
	Experimental
	Quizzes
Reports	
Observation	
Discussions	
Projects	Projects
	Mini Projects
Assignments	
Presentations	

13. Program Evaluation

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

14. Program Specifications Approving

Courses Specification are approved by department council No 322 on 22/11/2022 and faculty council No 425 on 13/12/2022

15. Appendix

1. Classification of Courses According to Requirement Matrix

Year	Courses		Weekly Contact Hours			Contact Hours of Requirements		
	Code	Course Title	Lect.	Tut.	Lab.	University Requirements	Faculty Requirements	Program Requirements
Preparatory Year	B 1011	Mathematics (1 - a)	4	2	0		6	
	B 1012	Mathematics (1 - b)	4	2	0		6	
	B 1021	Mechanics (a)	4	1	1		6	
	B 1022	Mechanics (b)	4	1	1		6	
	B 1031	Physics (a)	4	0	2		6	
	B 1032	Physics (b)	4	0	2		6	
	B 1041	Chemistry (a)	2	0	2		4	
	B 1042	Chemistry (b)	2	0	2		4	
	M 1071	Production Eng & Workshops (a)	2	0	3		5	
	M 1072	Production Eng & Workshops (b)	0	0	3		3	
	M 1002	Technology & Society	2	0	0		2	
	E1021	Computer Fundamentals and Programming (a)	0	0	2		2	
	E1022	Computer Fundamentals and Programming (b)	0	0	2		2	
	M 1061	Eng. Drawing (a)	0	0	3		3	
	M 1062	Eng. Drawing (b)	0	0	3		3	
	U 1011	Technical English Language (a)	0	0	2	2		
U 1012	Technical English Language (b)	0	0	2	2			
1st Year	B 1111	Mathematics (2 - a)	3	2	0			5
	B 1112	Mathematics (2 - b)	3	2	0			5
	C 1111	Structural Analysis (1 a)	3	2	0			5
	C 1112	Structural Analysis (1 b)	3	2	0			5
	C 1121	Properties and Testing of Materials	3	1	1			5
	C 1122	Technology of Building Materials	3	1	1			5
	C 1141	Fluid Mechanics	3	1	1			5

Year	Courses		Weekly Contact Hours			Contact Hours of Requirements		
	Code	Course Title	Lect.	Tut.	Lab.	University Requirements	Faculty Requirements	Program Requirements
	C 1132	Plane Surveying	3	1	1			5
	E1105	Electrical Engineering Technology	3	1	0			4
	M 1104	Mechanical Engineering Technology	3	1	0			4
	C 1101	Computer Applications (1 - a)	0	0	2			2
	C 1102	Computer Applications (1 - b)	0	0	2			2
	C 1103	Civil Drawing (a)	1	0	2			3
	C 1104	Civil Drawing (b)	1	0	2			3
	C 1105	Engineering Applications (1 - a)	1	0	2			3
	C 1106	Engineering Applications (1- b) *	1	0	2 + 6*			3 + 6*
	U 1111	English language	0	0	2	2		
U 1122	Human Rights	2	0	0	2			
2nd Year	B 1217	Mathematics (5 - a)	3	2	0			5
	B 1218	Mathematics (5 - b)	3	2	0			5
	C 1211	Structural Analysis (2 - a)	3	2	0			5
	C 1212	Structural Analysis (2 - b)	3	2	0			5
	C 1221	Concrete Technology	3	2	1			6
	C 1252	Design of Concrete Structures (1)	3	2	0			5
	C 1241	Hydraulics	3	1	1			5
	C 1242	Hydrology	3	2	0			5
	C 1231	Topographic Surveying	3	1	1			5
	C 1208	Architectural Engineering	3	1	1			5
	C 1201	Computer Applications (2 - a)	0	0	3			3
	C 1202	Computer Applications (2 - b)	0	0	3			3
	C 1205	Engineering Applications	1	0	2			3
	C 1206	Engineering Applications	1	0	2			3

Year	Courses		Weekly Contact Hours			Contact Hours of Requirements		
	Code	Course Title	Lect.	Tut.	Lab.	University Requirements	Faculty Requirements	Program Requirements
	M 1283	Industrial Safety	2	0	0			2
	C 1204	Profession and Society	3	0	0			3
3rd Year	C 1311	Structural Analysis (3)	3	2	0			5
	C 1351	Design of Concrete Structures (2 -a)	3	2	0			5
	C 1352	Design of Concrete Structures (2 - b)	3	2	0			5
	C 1361	Geotechnical Engineering (a)	3	1	1			5
	C 1362	Geotechnical Engineering (b)	3	1	1			5
	C 1371	Design of Steel Structures (1 - a)	3	2	0			5
	C 1372	Design of Steel Structures (1 - b)	3	2	0			5
	C 1331	Photogrammetry and Geodesy	3	1	1			5
	C 1381	Transportation Planning & Traffic Engineering	3	1	1			5
	C 1382	Highway Engineering	3	1	1			5
	C 1342	Irrigation & Drainage Engineering	3	2	1			6
	C 1392	Water Supply Engineering	3	2	1			6
	C 1301	Personal Skills	0	0	2			2
	C 1304	Pollution and Environment	1	0	1			2
	C 1300	Technical Report	0	0	2			2
4th Year	C 1451	Design of Concrete Structures (3)	3	2	0			5
	C 1472	Steel Structures Design (2)	4	2	0			6
	C 1481	Highway and Airport Engineering	3	2	1			6
	C 1461	Design of Foundation (a)	3	2	0			5
	C 1462	Design of Foundation (b)	3	2	0			5
	C 1491	Sewerage	3	2	1			6
	C 1402	Projects Management	3	2	0			5
	C 1441	Design of Irrigation Works	4	2	0			6
	C15**	Elective course (List A)	3	2	0			5

Year	Courses		Weekly Contact Hours			Contact Hours of Requirements		
	Code	Course Title	Lect.	Tut.	Lab.	University Requirements	Faculty Requirements	Program Requirements
	C15**	Elective course (List B)	3	2	0			5
	C1500	Project	2	0	6			8
	U 1401	Legislations and Contracts	2	0	0	2		
	C 1408	Engineering Economy	1	1	0			2
	C 1400	Field Training	0	0	2		2	
Total hours of five years, Contact Hours			179	77	90	346		
Hours of five years, %					100	2.9	19.1	78
Reference Ratio						Min 8%	Min 20%	Max 30%

* 6 Contact hours are added to C 1106 course due to the summer training in the Preparatory Year

**** List of Elective Courses:**

Code	Elective course (List A)	Code	Elective course (List B)
C 1512	Earthquake Engineering and Structural Dynamics	C 1532	The Global Positioning System (GPS)
C 1522	New Construction Materials	C 1534	Remote Sensing
C 1552	Repair and strengthening of Concrete Structures	C 1582	Highway Construction Management and Quality control
C 1554	Special Concrete Structures	C 1584	Simulation Models of Transportation and Traffic
C 1562	Special Foundation	C 1592	Advanced Sanitary Engineering
C 1572	Advanced Steel Structures	C 1594	Modeling of Water & Wastewater Networks

2. Classification of Courses According to Subject Area Matrix

Courses		Weekly Contact Hours			Contact Hours of Subject Area						
Code	Course Title	Lect.	Tut.	Lab.	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary
U 1011	Technical English Language (a)	0	0	2	2						
U 1012	Technical English Language (b)	0	0	2	2						
U 1111	English language	0	0	2	2						
U 1122	Human Rights	2	0	0	2						
U 1401	Legislations and Contracts	2	0	0	2						
C 1408	Engineering Economy	1	1	0	2						
C 1204	Profession and Society	3	0	0	3						
C 1301	Personal Skills	0	0	2	2						
C 1300	Technical Report	0	0	2	2						
M 1002	Technology & Society	2	0	0	2						
M 1283	Industrial Safety	2	0	0	2						
B 1011	Mathematics (1 - a)	4	2	0		6					
B 1012	Mathematics (1 - b)	4	2	0		6					
B 1021	Mechanics (a)	4	1	1		6					
B 1022	Mechanics (b)	4	1	1		6					
B 1031	Physics (a)	4	0	2		6					
B 1032	Physics (b)	4	0	2		6					

Courses		Weekly Contact Hours			Contact Hours of Subject Area						
Code	Course Title	Lect.	Tut.	Lab.	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary
B 1041	Chemistry (a)	2	0	2		4					
B 1042	Chemistry (b)	2	0	2		4					
B 1111	Mathematics (2 - a)	3	2	0		5					
B 1112	Mathematics (2 - b)	3	2	0		5					
B 1217	Mathematics (5 - a)	3	2	0		5					
B 1218	Mathematics (5 - b)	3	2	0		5					
M 1071	Production Eng & Workshops (a)	2	0	3			5				
M 1072	Production Eng & Workshops (b)	0	0	3			3				
M 1061	Eng. Drawing (a)	0	0	3			3				
M 1062	Eng. Drawing (b)	0	0	3			3				
C 1111	Structural Analysis (1 a)	3	2	0			4		1		
C 1112	Structural Analysis (1 b)	3	2	0			4		1		
C 1121	Properties and Testing of Materials	3	1	1			5				
C 1122	Technology of Building Materials	3	1	1			5				
C 1141	Fluid Mechanics	3	1	1			4		1		
C 1132	Plane Surveying	3	1	1			5				
C 1103	Civil Drawing (a)	1	0	2			3				
C 1104	Civil Drawing (b)	1	0	2			3				

Courses		Weekly Contact Hours			Contact Hours of Subject Area						
Code	Course Title	Lect.	Tut.	Lab.	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary
C 1211	Structural Analysis (2 - a)	3	2	0			4		1		
C 1212	Structural Analysis (2 - b)	3	2	0			4		1		
C 1221	Concrete Technology	3	2	1			6				
C 1241	Hydraulics	3	1	1			4		1		
C 1231	Topographic Surveying	3	1	1			5				
C 1311	Structural Analysis (3)	3	2	0			4		1		
C 1331	Photogrammetry and Geodesy	3	1	1			5				
C 1242	Hydrology	3	2	0			4		1		
C 1361	Geotechnical Engineering (a)	3	1	1			5				
C 1362	Geotechnical Engineering (b)	3	1	1			5				
C 1252	Design of Concrete Structures (1)	3	2	0				4	1		
C 1351	Design of Concrete Structures (2 - a)	3	2	0				4	1		
C 1352	Design of Concrete Structures (2 - b)	3	2	0				4	1		
C 1371	Design of Steel Structures (1 - a)	3	2	0				4	1		
C 1372	Design of Steel Structures (1 - b)	3	2	0				4	1		
C 1381	Transportation Planning & Traffic Engineering	3	1	1				4		1	
C 1382	Highway Engineering	3	1	1				4	1		
C 1342	Irrigation & Drainage Engineering	3	2	1				5	1		

Courses		Weekly Contact Hours			Contact Hours of Subject Area						
Code	Course Title	Lect.	Tut.	Lab.	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary
C 1392	Water Supply Engineering	3	2	1				5		1	
C 1451	Design of Concrete Structures (3)	3	2	0				4		1	
C 1472	Steel Structures Design (2)	4	2	0				4	1		
C 1481	Highway and Airport Engineering	3	2	1				5		1	
C 1461	Design of Foundation (a)	3	2	0				4		1	
C 1462	Design of Foundation (b)	3	2	0				4		1	
C 1491	Sewerage	3	2	1				5		1	
C 1441	Design of Irrigation Works	4	2	0				5		1	
C 1402	Projects Management	3	2	0				4	1		
E1021	Computer Fundamentals and Programming (a)	0	0	2					2		
E1022	Computer Fundamentals and Programming (b)	0	0	2					2		
C 1101	Computer Applications (1 - a)	0	0	2					2		
C 1102	Computer Applications (1 - b)	0	0	2					2		
C 1201	Computer Applications (2 - a)	0	0	3					3		
C 1202	Computer Applications (2 - b)	0	0	3					3		
C 1105	Engineering Applications (1 - a)	1	0	2						3	
C 1106	Engineering Applications (1- b)	1	0	2 + 6*						9	
C 1205	Engineering Applications	1	0	2						3	

Courses		Weekly Contact Hours			Contact Hours of Subject Area						
Code	Course Title	Lect.	Tut.	Lab.	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary
C 1206	Engineering Applications	1	0	2						3	
C1500	Project	2	0	6						8	
C 1400	Field Training	0	0	2						2	
C15**	Elective course (List A)	3	2	0							5
C15**	Elective course (List B)	3	2	0							5
E1105	Electrical Engineering Technology	3	1	0							4
M 1104	Mechanical Engineering Technology	3	1	0							4
C 1208	Architectural Engineering	3	1	1							5
C 1304	Pollution and Environment	1	0	1							2
Total hours of five year = 346 Contact Hours					23	64	93	74	31	36	25
% Hours of five years					6.6	18.5	26.9	21.4	9	10.4	7.2
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. Faculty Mission vs. NARS 2018 CBE Matrix

Faculty Mission		NARS 2018 CBE													
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14
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		√	√	√	√					√	√	√	√	

5. Program Mission vs. Program Objectives Matrix

Program Mission		Program Objectives						
		P01	P02	P03	P04	P05	P06	P07
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
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14
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	B1	B2	B3	B4
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													
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14
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
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14
Conventional teaching methods														
Lecture	√		√	√		√		√			√	√	√	√
Tutorials	√		√	√		√		√			√	√	√	√
Computer-based Instruction		√	√								√	√		
Practical-based Learning		√		√		√	√		√		√	√		
Unconventional teaching methods														
Problem-based Learning	√			√					√		√	√	√	√
Project-based Learning			√			√	√		√		√	√	√	√
Interactive Learning							√				√	√	√	√
Presentations			√		√				√		√	√	√	√
Report					√		√		√	√	√	√	√	√
Co-operative Learning					√						√	√	√	√
Brainstorming							√	√	√		√	√	√	√
Projects			√			√	√	√	√		√	√	√	√
Simulation		√									√	√	√	
Discussion	√	√	√					√			√	√	√	√
Self-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
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14
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	Design Studio	Problem-based Learning	Project-based Learning	Interactive Learning	Presentations	Case Study	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

Year	Code	Course Title	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14	TOTAL	
Preparatory Year	B 1011	Mathematics (1 - a)	1	1													2	
	B 1012	Mathematics (1 - b)	1	1													2	
	B 1021	Mechanics (a)	1	1													2	
	B 1022	Mechanics (b)	1	1													2	
	B 1031	Physics (a)	1	1													2	
	B 1032	Physics (b)	1	1													2	
	B 1041	Chemistry (a)	1	1													2	
	B 1042	Chemistry (b)	1	1													2	
	M 1071	Production Eng. & Workshops (a)				1		1										2
	M 1072	Production Eng. & Workshops (b)				1												1
	M 1002	Technology & Society								1			1					2
	E1021	Computer Fundamentals and Programming (a)				1							1					2
	E1022	Computer Fundamentals and Programming (b)				1							1					2
	M 1061	Eng. Drawing (a)							1		1							2
	M 1062	Eng. Drawing (b)							1		1							2
	U 1011	Technical English Language (a)						1			1		1					3
	U 1012	Technical English Language (b)						1			1		1					3
	1st Year	B 1111	Mathematics (2 - a)	1	1													2
B 1112		Mathematics (2 - b)	1	1													2	
C 1111		Structural Analysis (1 a)	1										1				2	
C 1112		Structural Analysis (1 b)	1										1				2	
C 1121		Properties and Testing of Materials		1										1				2
C 1122		Technology of Building Materials		1										1	1			3

Year	Code	Course Title	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14	TOTAL
	C 1141	Fluid Mechanics		1									1				2
	C 1132	Plane Surveying		1			1						1				3
	E1105	Electrical Engineering Technology	1		1												2
	M 1104	Mechanical Engineering Technology	1		1												2
	C 1101	Computer Applications (1 - a)				1								1			2
	C 1102	Computer Applications (1 - b)				1								1			2
	C 1103	Civil Drawing (a)						1		1							2
	C 1104	Civil Drawing (b)						1		1							2
	C 1105	Engineering Applications (1 - a)						1					1				2
	C 1106	Engineering Applications (1- b)						1					1				2
	U 1111	English language					1			1		1					3
	U 1122	societal issues								1		1					2
2nd Year	B 1217	Mathematics (5 - a)	1	1													2
	B 1218	Mathematics (5 - b)	1	1													2
	C 1211	Structural Analysis (2 - a)	1										1				2
	C 1212	Structural Analysis (2 - b)	1										1				2
	C 1221	Concrete Technology		1									1		1		3
	C 1252	Design of Concrete Structures (1)			1	1								1			3
	C 1241	Hydraulics		1									1				2
	C 1242	Hydrology	1										1				2
	C 1231	Topographic Surveying		1			1						1				3
	C 1208	Architectural Engineering					1			1							2
	C 1201	Computer Applications (2 - a)		1										1			2
	C 1202	Computer Applications (2 - b)		1										1			2
	C 1205	Engineering Applications						1					1				2

Year	Code	Course Title	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14	TOTAL
	C 1206	Engineering Applications						1					1				2
	M 1283	Industrial Safety	1		1	1											3
	C 1204	Profession and Society				1	1		1			1					4
3rd Year	C 1311	Structural Analysis (3)	1										1				2
	C 1351	Design of Concrete Structures (2 - a)			1	1								1			3
	C 1352	Design of Concrete Structures (2 - b)			1	1								1			3
	C 1361	Geotechnical Engineering (a)		1									1				2
	C 1362	Geotechnical Engineering (b)		1									1				2
	C 1371	Design of Steel Structures (1 - a)			1	1								1			3
	C 1372	Design of Steel Structures (1 - b)			1	1								1			3
	C 1331	Photogrammetry and Geodesy		1			1						1				3
	C 1381	Transportation Planning & Traffic Engineering					1								1	1	3
	C 1382	Highway Engineering		1		1								1			3
	C 1342	Irrigation & Drainage Engineering	1											1			2
	C 1392	Water Supply Engineering		1										1			2
	C 1301	Personal Skills									1	1					2
	C 1304	Pollution and Environment				1									1		2
	C 1300	Technical Report					1				1	1					2
4th Year	C 1451	Design of Concrete Structures (3)			1	1								1			3
	C 1472	Steel Structures Design (2)			1	1								1			3
	C 1481	Highway and Airport Engineering												1	1		2
	C 1461	Design of Foundation (a)			1									1			2
	C 1462	Design of Foundation (b)			1									1			2
	C 1491	Sewerage		1										1			2
	C 1402	Projects Management	1					1							1		3

Year	Code	Course Title	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14	TOTAL
	C 1441	Design of Irrigation Works												1	1		2
	C15**	Elective course (List A)															**
	C15**	Elective course (List B)															**
	C1500	Project			1		1		1	1		1		1		1	7
	U 1401	Legislations and Contracts													1	1	2
	C 1408	Engineering Economy									1					1	2
	C 1400	Field Training					1	1	1		1	1					5
**Elective Courses																	
Elective course (List A)	C 1512	Earthquake Engineering and Structural Dynamics					1						1				2
	C 1522	New Construction Materials		1									1		1		3
	C 1552	Repair and strengthening of Concrete Structures					1								1		2
	C 1554	Special Concrete Structures			1									1			2
	C 1562	Special Foundation			1									1			2
	C 1572	Advanced Steel Structures			1	1								1			3
Elective course (List B)	C 1532	The Global Positioning System (GPS)		1									1				2
	C 1534	Remote Sensing		1									1				2
	C 1582	Highway Construction Management and Quality control						1						1	1		2
	C 1584	Simulation Models of Transportation and Traffic												1	1		2
	C 1592	Advanced Sanitary Engineering												1	1		2
	C 1594	Modeling of Water & Wastewater Networks		1										1			2

19. Courses Vs. Program Objectives Matrix

Year	Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7
Preparatory Year	B 1011	Mathematics (1 - a)	1						
	B 1012	Mathematics (1 - b)	1						
	B 1021	Mechanics (a)	1						
	B 1022	Mechanics (b)	1						
	B 1031	Physics (a)	1						
	B 1032	Physics (b)	1						
	B 1041	Chemistry (a)	1						
	B 1042	Chemistry (b)	1						
	M 1071	Production Eng. & Workshops (a)				1		1	
	M 1072	Production Eng. & Workshops (b)				1			
	M 1002	Technology & Society		1					
	E1021	Computer Fundamentals and Programming (a)				1			
	E1022	Computer Fundamentals and Programming (b)				1			
	M 1061	Eng. Drawing (a)		1	1				
	M 1062	Eng. Drawing (b)		1	1				
	U 1011	Technical English Language (a)						1	
	U 1012	Technical English Language (b)						1	
	1st Year	B 1111	Mathematics (2 - a)	1					
B 1112		Mathematics (2 - b)	1						
C 1111		Structural Analysis (1 a)	1						
C 1112		Structural Analysis (1 b)	1						
C 1121		Properties and Testing of Materials	1					1	
C 1122		Technology of Building Materials	1					1	
C 1141		Fluid Mechanics	1						
C 1132		Plane Surveying	1				1		
E1105		Electrical Engineering Technology	1					1	
M 1104		Mechanical Engineering Technology	1	1					
C 1101		Computer Applications (1 - a)				1			
C 1102		Computer Applications (1 - b)				1			
C 1103		Civil Drawing (a)				1		1	
C 1104		Civil Drawing (b)				1		1	
C 1105		Engineering Applications (1 - a)	1					1	
C 1106		Engineering Applications (1- b)	1					1	
U 1111		English language							

Year	Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	U 1122	societal issues							
2nd Year	B 1217	Mathematics (5 - a)	1						
	B 1218	Mathematics (5 - b)	1						
	C 1211	Structural Analysis (2 - a)	1					1	
	C 1212	Structural Analysis (2 - b)	1					1	
	C 1221	Concrete Technology	1					1	
	C 1252	Design of Concrete Structures (1)		1		1		1	
	C 1241	Hydraulics						1	
	C 1242	Hydrology	1						
	C 1231	Topographic Surveying	1			1			
	C 1208	Architectural Engineering					1		
	C 1201	Computer Applications (2 - a)	1					1	
	C 1202	Computer Applications (2 - b)	1					1	
	C 1205	Engineering Applications	1					1	
	C 1206	Engineering Applications	1					1	
	M 1283	Industrial Safety	1	1		1			
	C 1204	Profession and Society			1	1	1		
3rd Year	C 1311	Structural Analysis (3)	1						
	C 1351	Design of Concrete Structures (2 - a)		1		1		1	
	C 1352	Design of Concrete Structures (2 - b)		1		1		1	
	C 1361	Geotechnical Engineering (a)	1						
	C 1362	Geotechnical Engineering (b)	1						
	C 1371	Design of Steel Structures (1 - a)		1				1	
	C 1372	Design of Steel Structures (1 - b)		1				1	
	C 1331	Photogrammetry and Geodesy	1				1		
	C 1381	Transportation Planning & Traffic Engineering					1	1	
	C 1382	Highway Engineering	1			1		1	
	C 1342	Irrigation & Drainage Engineering						1	
	C 1392	Water Supply Engineering	1					1	
	C 1301	Personal Skills			1		1		
	C 1304	Pollution and Environment				1		1	
	C 1300	Technical Report			1		1		
4th Year	C 1451	Design of Concrete Structures (3)		1		1		1	
	C 1472	Steel Structures Design (2)		1				1	
	C 1481	Highway and Airport Engineering						1	
	C 1461	Design of Foundation (a)		1				1	

Year	Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	C 1462	Design of Foundation (b)		1				1	
	C 1491	Sewerage		1				1	
	C 1402	Projects Management							
	C 1441	Design of Irrigation Works						1	
	C15**	Elective course (List A)							
	C15**	Elective course (List B)							
	C1500	Project		1	1	1	1	1	1
	U 1401	Legislations and Contracts						1	1
	C 1408	Engineering Economy			1				1
	C 1400	Field Training			1		1		
**Elective Courses									
Elective course (List A)	C 1512	Earthquake Engineering and Structural Dynamics	1				1		
	C 1522	New Construction Materials	1						1
	C 1552	Repair and strengthening of Concrete Structures					1	1	
	C 1554	Special Concrete Structures		1				1	1
	C 1562	Special Foundation						1	
	C 1572	Advanced Steel Structures		1				1	
Elective course (List B)	C 1532	The Global Positioning System (GPS)	1						
	C 1534	Remote Sensing	1						
	C 1582	Highway Construction Management and Quality control				1		1	
	C 1584	Simulation Models of Transportation and Traffic						1	
	C 1592	Advanced Sanitary Engineering						1	
	C 1594	Modeling of Water & Wastewater Networks	1					1	

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