المعهد العالى للهندسة
بمحافظة 6أكتوبر
إشراف وزارة التعليم العالى

culture & science city
مدينة الثقافة والعلوم

مرفق (3-1/3/2)

توصيف برنامج هندسة التشييد والبناء طبقا لمعايير المراجعة القياسية NARS 2018

Specifications of Construction & Building Engineering Program

High Institute of Engineering, 6th of October City.
Department: Construction & Building Engineering
Specifications of Construction & Building Engineering
(B.Sc. Program)
2023-2024

A- Basic Information

1. **Program title:** Construction & Building Engineering Program
2. **Program type:** Single
3. **Department:** Construction & Building Engineering
4. **Coordinator:** Assoc. Prof. Dr. Mostafa Abdelmohsen
5. **External evaluator:** Prof. Dr. Ehab B. Matar

B- Professional Information

1. Institute Mission:

The High Institute of Engineering - 6th of October is committed to graduating engineers capable of meeting the needs of the local and regional labor market at a distinguished competitive level within the framework of values and customs that support community service, continuous self- learning and innovation through the development of educational programs and tools for scientific research and entrepreneurship.

2. Program Mission:

The Construction and Building Engineering Department is committed to preparing a distinguished graduate capable of competing locally and regionally through distinguished engineering education in the field of construction and building engineering, and providing him with the skills of continuous self-learning, scientific research and innovation, while adhering to the rules and ethics of the profession within a framework of moral and societal values.

Key Words of Program Mission \ Key Words of Institute Mission	meeting the needs of the local and regional labor market	a distinguished competitive level	within the framework of values and customs that support community service	self-learning	innovation	Scientific research and entrepreneurship .
preparing a distinguished graduate		√				
capable of competing locally and regionally	√	√				
providing him with the skills of continuous self-learning				√		
scientific research and innovation					√	√
adhering to the rules and ethics of the profession within a framework of moral and societal values			√			

3. Program Educational Objectives:

The construction & building engineering program objectives are:

3.1. Utilize mathematical, scientific, and engineering principles to address engineering challenges within the construction and building engineering industry, as well as in scientific research.

3.2. Demonstrate a dedication to ethical standards and professionalism, incorporating modern engineering techniques, skills, and tools essential for the design, implementation, and project management within the realm of construction and building engineering.

3.3. Develop proficient communication and leadership capabilities, along with the capacity to collaborate efficiently within multidisciplinary teams.

3.4. Developing both personal and engineering skills while actively participating in continuous lifelong learning.

3.5. Implement engineering solutions with consideration for their impact on both the community and the environment.

3.6. Understand the ethical and social implications of the profession regarding public safety and sustainability issues.

3.7. Equip students with creative thinking and innovation skills to address diverse project challenges, encompassing aspects like risks, cost, time, optimal resource utilization, contracts, bids, etc.

Key Words of Program Mission / Program Objectives	preparing a distinguished graduate	capable of competing locally and regionally	providing him with the skills of continuous self-learning	scientific research and innovation	adhering to the rules and ethics of the profession within a framework of moral and societal values
Objective #1	√			√	
Objective #2	√				√
Objective #3	√	√			
Objective #4	√		√		
Objective #5					√
Objective #6					√
Objective #7				√	

4. Graduate Attributes

According to the National Academic Reference Standard (NARS2018), the graduates of any engineering program must satisfy the following attributes:

1) 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) Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation.
3) Behave professionally and adhere to engineering ethics and standards.
4) Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance.
5) Recognize his/her role in promoting the engineering field and contribute in the development of the profession and the community.
6) Value the importance of the environment, both physical and natural, and work to promote sustainability principles.
7) Use techniques, skills and modern engineering tools necessary for engineering practice.
8) 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) Communicate effectively using different modes, tools and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner.
10) Demonstrate leadership qualities, business administration and entrepreneurial skills.

To judge the compatibility of graduate attributes with program objectives, the following matrix is used

Program Objectives / Graduate Attributes	Objective #1	Objective #2	Objective #3	Objective #4	Objective #5	Objective #6	Objective #7
Attribute #1	√			√			
Attribute #2	√	√					√
Attribute #3		√					
Attribute #4			√				
Attribute #5					√		
Attribute #6					√	√	
Attribute #7							
Attribute #8				√			
Attribute #9							√
Attribute #10			√				√

5. Academic Standards of Program

5.1. Program Competencies

According to the National Academic Reference Standard, the program in Mechanical Power Engineering must satisfy the following Competencies:

5.1. General Engineering NARS Competencies in 2018		
Level A (NARS)	A.1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.
	A.2	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.
	A.3	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.
	A.4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.
	A.5	Practice research techniques and methods of investigation as an inherent part of learning.
	A.6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.
	A.7	Function efficiently as an individual and as a member of multi-disciplinary and multi- cultural teams.
	A.8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.
	A.9	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.
	A.10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.

5.2. Civil Engineering NARS		
Level B (NARS)	B.1	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 and Fluid Mechanics.
	B.2	Achieve an optimum design of Reinforced Concrete and Steel Structures, Foundations and Earth Retaining Structures, Roadways, Sanitary Works and Irrigation structures.
	B.3	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.
	B.4	Deal with biddings, contracts and financial issues including project insurance and guarantees.

5.3. Construction & Building Competencies (ARS)		
Level C (ARC)	C.1	Use diversity of analytical, design, construction engineering, construction techniques and methods to solve some project management problems and optimize project time, cost, and resources issues, and supervise construction sites and projects efficiently
	C.2	Acquire and improve personal skills, communication skills, leadership skills, lifelong learning, be able to work collaboratively in a multidisciplinary team, able to lead individual or group and supervise the work in construction sites or offices.
	C.3	Apply team approach and alternate solutions, and incorporating realistic constraints that include economic, environmental, ethical, health and safety, social, and political considerations in regards to project and public safety and sustainability issues.

To judge the compatibility of program objectives with its competencies, the following matrix isused:

Program Competencies / Program Objectives	Engineering Competencies (2018)										"Department" Construction & Building Engineering Competencies (NARS)				"Discipline" Construction & Building Engineering Competencies (ARS)		
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	C1	C2	C3
Objective #1	√	√			√										√		
Objective #2	√			√		√						√			√		
Objective #3			√				√	√								√	
Objective #4										√						√	
Objective #5	√			√							√		√				√
Objective #6											√						√
Objective #7									√				√	√	√		√

6. National Academic References Standards (NARS)

The department is adopted exactly **NARS** as reference academic standards for levels A and B of this program (*National Academic Reference Standards (NARS) for Engineering 2nd edition, issued in 2018).* When developing the program competencies for Level C (ARS), some programs were referred to, such as the Construction Sites Engineering and Management Program in the Faculty of Engineering at Shoubra, Banha University.

7. Curriculum Structure and Content

7. a. Program Duration: 10 semesters (5-years)

7. b. Program Structure: Credit hours' system

7.b.i– No. of Credit hours: 180	Compulsory hours: 168	Elective hours: 12
7.b.ii– No. of Contact hours: 253	Lectures: 123	Tutorial/Exercises: 130
7.b.iii– No. of Contact hours of humanities& social sciences: 18 hrs		
7.b.iv– No. of Contact hours of basic science: 69 hrs		
7.b.v– No. of Contact hours of general construction & building program requirements (Major) (Applied Engineering and Design subjects & Basic Engineering science): 106 hrs		
7.b.vi– No. of Contact hours of specialized requirements (Minor), (Computer Application and ICT& Project and Practice& Discretionary subjects): 60 hrs		

Subject Area	Hours	%	Tolerance
Humanities and Social Sciences (Univ. Req.)	17	9.44	9 - 12 %
Mathematics and Basic Sciences	44	24.5	20 - 26 %
Basic Engineering Sciences (Faculty/Spec. Req.)	38	21.1	20 - 23 %
Applied Engineering and Design	37	20.5	20 - 22 %
Computer Applications and ICT	17	9.5	9 - 11 %
Projects and Practice	16	8.9	8 - 10 %
Subtotal	169	93.9	92 - 94 %
Discretionary (Institution character-identifying) subjects	11	6.1	6 - 8 %
Total	180	100	100%

7. c. Program Description

Humanities and Social Sciences (Institute Requirements) (9 - 12%)

No.	Code	Course	Credit Hours.
1	HUM001	English Language	1
2	HUM002	History Of Engineering &Technology	2
3	HUM103	Scientific Thinking	2
4	HUM205	Economic	2
5	HUM308	Business Administration	2
6	HUM1XX	Human Elective Course 1	2
7	HUM2XX	Human Elective Course 1	2
8	HUM3XX	Human Elective Course 1	2
9	HUM4XX	Human Elective Course 1	2
Total			**17**
Ratio%			**9.45%**

Table (1): Humanities and Social Sciences (Elective Courses)

No.	Code	Course	Credit Hours
1	HUM104	Industrial Safety and Environment	2
2	HUM105	Environmental Sciences	2
3	HUM206	Law and Ethics for Engineering	2
4	HUM207	Research Methods	2
5	HUM307	Communication Skills	2
6	HUM309	Psychology	2
7	HUM410	Technical Report Writing	2
8	HUM411	Marketing	2

Mathematics & Basic Sciences (20 - 26%)

No.	Code	Course	Credit Hours
1	BAS001	Mathematics 1	3
2	BAS002	Physics 1	3
3	BAS003	Mechanics 1	3
4	MTE001	Engineering Drawing 1	3
5	MTE011	Production Technology	3
6	BAS006	Mathematics 2	3
7	BAS007	Physics 2	3
8	BAS008	Mechanics 2	3
9	BAS009	Chemistry Engineering	3
10	MTE002	Engineering Drawing 2	4
11	CBE101	Structure Analysis 1	3
12	CBE102	Engineering Surveying 1	2
13	CBE106	Engineering Geology	3
14	CBE109	Properties Of Material 1	3
15	CBE110	Introduction To Fluid Mechanics	2
Sum			**44**
Percentage%			**24.5%**

Basic Engineering Science (Major. Req) (20 - 23%)

No.	Code	Course	Credit Hours
1	BAS101	Mathematics 3	3
2	BAS106	Mathematics 4	3
3	CBE104	Structure Analysis 2	3
4	CBE202	Structure Analysis 3	3
5	CBE205	Design Of Concrete Structures 1	3
6	CBE210	Design Of Concrete Structures 2	3
7	CBE304	Design of Steel Structures 1	3
8	CBE308	Design of Steel Structures 2	3
9	CBE206	Properties of material 3	4
10	CBE204	Soil Mechanics 1	4
11	CBE302	Foundations Engineering 1	3
12	CBE203	Hydraulics	3
Sum			**38**

Percentage%	21.1%

Applied Engineering and Design (program. Req) (20 - 22%)

No.	Code	Course	Credit Hours
1	CBE208	Irrigation Structure	2
2	CBE403	Inspection Maintenance and Repair Of structure	2
3	CBE408	Steel Bridges	3
4	CBE401	High Way Engineering	3
5	CBE207	Structure Analysis 4	3
6	CBE303	Design Of Concrete Structures 3	3
7	CBE307	Design Of Concrete Structures 4	3
8	CBE407	Rc Bridges	3
9	CBE107	Properties of material 2	2
10	CBE209	Soil Mechanics 2	4
11	CBE306	Foundation Engineering 2	3
12	CBE 410	Electrical Installations in Buildings	2
13	CBE309	Environmental & Sanitary Engineering	2
14	CBE 4XX	Elective Course 2	2
Sum			**37**
Percentage%			**20.5%**

Table (2): Elective courses

No.	Code	Course	Credit Hours
1	CBE420	Properties Of Materials 4	2
2	CBE422	Risks Management	2
3	CBE425	Special Steel Structures	2
4	CBE426	Special Foundation	2
5	CBE427	special Concrete	2
6	CBE428	Structure Analysis (5)	2

Computer Application ICT (Minor. Req) (9 - 11%)

No.	Code	Course	Credit Hours
1	CBE301	Computer Aided Design	2
2	CCE001	Computer Introduction	2
3	CBE108	Civil Drawing	2
4	CBE105	Architectural Design	3
5	CBE409	Techniques of Planning, Scheduling and Control	3
6	CBE103	Building Construction	3
7	CBE4XX	Elective Course 3	2
Sum			**17**
% Percentage			**9.5%**

Table (3): Elective courses

No.	Code	Course	Credit Hours
1	CBE421	Structural Dynamics	2
2	CBE423	High Way Engineering 2	2
3	CBE424	High Rise Building	2

Project and Practical (8 - 10%)

No.	Code	Course	Credit Hours
1	CBE406	Graduation project (Phase 1)	4
2	CBE412	Graduation project (Phase 2)	4
3	CBE201	Engineering survey (2)	3
4	CBE310	Methods & Equipment of Construction	2
5	CBE402	Financial Management and Accounting	3
Sum			**16**
Percentage%			**8.9%**

Discretionary (Institution Character-Identifying) (6 - 8%)

No.	Code	Course	Credit Hours
1	BAS302	Statistics	3
2	CBE311	Quality Control	3
3	CBE305	Introduction to construction Management	2
4	CBE411	Construction Project Specifications	3
Sum			11
% Percentage			6.1%

Year of Program: 1 (Freshman (0)), Semester 1

Compulsory (Level 000)

Code	Course	Credit Hours	No. of hours / week				Prerequisite
			Lect.	Tut.	Lab.	Total	
BAS001	Mathematics 1	3	2	2	0	4	
BAS002	Physics 1	3	2	0	3	5	
BAS003	Mechanics 1	3	2	2	0	4	
MTE001	Engineering Drawing 1	3	2	2	0	4	
MTE011	Production Technology	3	2	0	3	5	
HUM001	English Language	1	1	0	0	1	
ICE001	Computer Introduction	2	1	0	3	4	

Year of Program: 1 (Freshman (0)), Semester 2

Compulsory (Level 000)

Code	Course	Credit Hours	No. of hours / week				Prerequisite
			Lect.	Tut.	Lab.	Total	
BAS006	Mathematics 2	3	2	2	0	4	BAS001
BAS007	Physics 2	3	2	2	3	7	BAS002
BAS008	Mechanics 2	3	2	2	0	4	BAS003
BAS009	Engineering Chemistry	3	2	0	3	5	
MTE002	Engineering Drawing 2	4	2	2	3	7	MTE001
HUM002	History Of Engineering & Technology	2	2	0	0	2	

Year of Program: 2 (First year Construction & Building), Semester 1

Compulsory (Level 100)

Code	Course	Credit Hours	No. of hours / week				Prerequisite
			Lect.	Tut.	Lab.	Total	
HUM103	Scientific Thinking	2	1	2	0	3	
BAS101	Mathematics 3	3	2	2	0	4	BAS006
CBE 101	Structural Analysis 1	3	2	2	0	4	BAS003
CBE109	Properties Of Materials 1	3	2	0	3	5	
CBE 102	Engineering Surveying 1	2	1	0	3	4	
CBE 103	Building Construction	3	2	2	0	4	
CBE 110	Introduction To Fluid Mechanics	2	1	2	0	3	BAS002

Year of Program: 2 (First year Construction & Building), Semester 2

Compulsory (Level 100)

Code	Course	Credit Hours	No. of hours / week				Prerequisite
			Lect.	Tut.	Lab.	Total	
HUM 1xx	Elective course (table 1)	2	2	0	0	2	
BAS106	Mathematics 4	3	2	2	0	4	BAS101
CBE 104	Structural Analysis 2	3	2	2	0	4	CBE101
CBE105	Architectural Design	3	2	2	0	4	
CBE 106	Engineering geology	3	2	2	0	4	
CBE 107	Properties of Materials 2	2	1	2	0	3	CBE109
CBE 108	Civil Drawing	2	1	2	0	4	

Year of Program: 3 (Second year Construction & Building), Semester 1

Compulsory (Level 200)

Code	Course	Credit Hours	No. of hours / week				Prerequisite
			Lect.	Tut.	Lab.	Total	
HUM 2xx	Elective course (table 1)	2	2	0	0	2	
CBE 201	Engineering Surveying 2	3	1	2	3	6	CBE102
CBE 202	Structural Analysis 3	3	2	2	0	4	CBE104
CBE 203	Hydraulics	3	2	2	0	4	CBE110
CBE 204	Soil Mechanics 1	4	2	2	3	7	CBE106
CBE 205	Design of Concrete Structures 1	3	2	2	0	4	CBE104

Year of Program: 3 (Second year Construction & Building), Semester 2

Compulsory (Level 200)

Code	Course	Credit Hours	No. of hours / week				Prerequisite
			Lect.	Tut.	Lab.	Total	
HUM 2xx	Elective course (table 1)	2	2	0	0	2	
CBE 206	Properties of Materials 3	4	2	2	3	7	CBE107
CBE 207	Structural Analysis 4	3	2	2	0	4	CBE202
CBE 208	Irrigation Structures	2	2	1	0	3	CBE203
CBE 209	Soil Mechanics 2	4	2	2	3	7	CBE204
CBE 210	Design of Concrete Structures 2	3	2	2	0	4	CBE205

Year of Program: 4 (Third year Construction & Building), Semester 1

Compulsory (Level 300)

Code	Course	Credit Hours	No. of hours / week				Prerequisite
			Lect.	Tut.	Lab.	Total	
HUM 308	Business Administration	2	2	0	0	2	
BAS 302	Statistics	3	2	2	0	4	
CBE 301	Computer Aided Design	2	1	0	3	4	CBE207
CBE 302	Foundations Engineering 1	3	2	2	0	4	CBE209
CBE 303	Design of Concrete Structures 3	3	2	2	0	4	CBE210
CBE 304	Design of Steel Structures 1	3	2	2	0	4	CBE104
CBE 305	Introduction to construction Management	2	2	0	0	2	

Year of Program: 4 (Third year Construction & Building), Semester 2

Compulsory (Level 300)

Code	Course	Credit Hours	No. of hours / week				Prerequisite
			Lect.	Tut.	Lab.	Total	
HUM 3xx	Elective course (table 1)	2	2	0	0	2	
CBE 306	Foundations Engineering 2	3	2	2	0	4	CBE302
CBE 307	Design of Concrete Structures 4	3	2	2	0	4	CBE210
CBE 308	Design of Steel Structures 2	3	2	2	0	4	CBE304
CBE 309	Environmental & Sanitary Engineering	2	1	2	0	3	CBE203
CBE 310	Methods & Equipment of Construction	2	1	2	0	3	
CBE 311	Quality Control	3	2	2	0	4	BAS302

Year of Program: 5 (Fourth year Construction & Building), Semester 1

Compulsory (Level 400)

Code	Course	Credit Hours	No. of hours / week				Prerequisite
			Lect.	Tut.	Lab.	Total	
HUM 410	Technical Report Writing	2	2	0	0	2	HUM001
CBE 401	Highway Engineering	3	2	2	0	4	CBE201
CBE 402	Financial Management & Accounting	3	2	2	0	4	CBE305
CBE 403	Inspection, Maintenance and Repair of Structures	2	1	2	0	3	
CBE 4xx	Elective course (table 2)	2	2	0	0	2	
CBE 4xx	Elective course (table 3)	2	2	0	0	2	
CBE 406	Graduation project phase 1	4	4	0	0	4	

Year of Program: 5 (Fourth year Construction & Building), Semester 2

Compulsory (Level 400)

Code	Course	Credit Hours	No. of hours / week				Learning Outcomes
			Lect.	Tut.	Lab.	Total	
CBE407	R.C Bridges	3	2	2	0	4	CBE210
CBE 408	Steel Bridges	3	2	2	0	4	CBE308
CBE 409	Techniques Of Planning	3	2	2	0	4	CBE305
CBE 410	Electrical Installations in Building	2	1	2	0	3	
CBE 411	Construction Project Specifications	3	2	2	0	4	CBE305
CBE 412	Graduation Project Phase 2	4	4	0	0	4	CBE 406

8. Program Admission Requirements

Having Egyptian Secondary education or equivalent certificate with major in Mathematics, then after passing the preparatory year and fulfilling the admission requirements the students will be able to attend the department.

9. Regulations for progression and program completion

a) If the student requests for the repeat of a course, that he previously gained (F), he/ she will not gain more than (B+) of the repetition grade. When the cumulative grade is counted, the final grade only is counted. The final two grades will be recorded on the student's record. If the student gets fail grade more than one time, only one fail grade will be counted in the final cumulative average.

b) The points obtained by the student in each course are counted as the number of hours approved for the course multiplied by the points obtained by the student according to the scale of estimates

c) The average grade point (GPA) for each semester as well as CGPA is calculated according to the following equations:

$$\text{Average Quarterly Assessment Points (GPA)} = \frac{\text{The total point of credit hours awarded by the student in the semester}}{\text{Total credit hours for these courses registered in the semester}}$$

$$\text{Average Quarterly Assessment Points (CGPA)} = \frac{\text{Total credit points for all courses studied by the student until their date}}{\text{Total credit hours for all courses studied by the student until their date}}$$

The total points of the grade of any course

Total Points	Grade	The student's Percentage
4.00	A+	97% and above
4.00	A	93% and less than 97%
3.70	A-	89% and less than 93%
3.30	B+	84% and less than 89%
3.00	B	80% and less than 84%
2.70	B-	76% and less than 80%

Total Points	Grade	The student's Percentage
2.30	C+	73% and less than 76%
2.00	C	70% and less than 73%
1.70	C-	67% and less than 70%
1.30	D+	64% and less than 67%
1.00	D	60% and less than 64%
0.00	F	Less than 60%

10. Teaching and Learning Methods

Considering that the program competences illustrate a wholistic status that would be achieved through a journey involves many different courses within different levels, and the final competence achievement can only be assessed at the end of its journey, each single competence is broken-down into measurable Learning Outcomes LOs that should be achieved in different courses. Thus, the program graduate competence may be considered as the final goal, while the courses LOs may be considered as the procedural aims/objectives. Hence, different teaching and learning methods are applied in program courses to cover the three domains given by the following table. For more details, please refer to the course specifications.

- Teaching and Learning Methods
  - Face-to-face Lecture
  - Online Education
  - Tutorial / Exercise
  - Group Discussions
  - Laboratory
  - Site Visit
  - Presentation
  - Collaborate Learning (Team Project)
  - Research and Reporting
  - Class Activity
  - Case Study
  - Assignments/homework
  - Brain Storming

Teaching & Learning Methods	Learning Outcomes Domains (Courses LOs)		
	Cognitive	Psychomotor	Affective
Face-to-face Lecture	✓	✓	✓
Online Education	✓		✓
Tutorial / Exercise		✓	✓
Group Discussions	✓		
Laboratory	✓	✓	
Site Visit			✓
Presentation	✓		✓
Collaborate Learning (Team Project)	✓		✓
Research and Reporting		✓	✓
Class Activity	✓	✓	
Case Study	✓	✓	
Assignments/homework		✓	✓
Brain Storming	✓	✓	

11. Assessment Methods of Program Intended Learning Outcomes:

Different assessment methods are applied in the program courses to assess these Learning Outcomes. The following table illustrates the assessment methods and what they assess in most cases. For further detail, refer to the courses' specifications

- Written Exams
- Online Exams
- Oral Exam
- Quizzes
- Lab Exam
- Take-Home Exam
- Research Assignments
- Reporting Assignments

- Project Assignments
- In-class Questions
- Class activities

Formative assessment	Learning Outcomes Domains (Courses LOs)		
	Cognitive	Psychomotor	Affective
Quizzes	✓	✓	✓
Research Assignments	✓		✓
In-class Questions	✓	✓	✓
Class activities	✓	✓	✓

Summative assessments	Learning Outcomes Domains (Courses LOs)		
	Cognitive	Psychomotor	Affective
Written Exams	✓	✓	✓
Online Exams	✓	✓	
Oral Exam	✓	✓	✓
Lab Exam	✓	✓	
Take-Home Exam	✓	✓	✓
Reporting Assignments	✓		✓
Project Assignments	✓	✓	✓

12. Evaluation of Program Intended Learning Outcomes

Evaluator	Tool	Sample
1- Senior students	Questionnaire	Sample of 25% out of students in years 1,2 and 3
2- Alumni	Questionnaire	Sample of 25% of final year students
3- Stakeholders (Employers)	Questionnaire	Samples from different sectors
4-Internal Evaluator(s)	Internal Report	1-2 reports
5-ExternalEvaluator(s)	External Report	1-2 reports
6- Other	Non	----

Course Matrix with program Competence

The following matrix is used to judge the compatibility between the program competences and program courses

Course Code	Course Name	Semester	year	Engineering Competencies (2018)										"Department" Construction & Building Engineering Competencies (NARS)				Discipline Construction & Building Competencies (ARS)		
				A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	C1	C2	C3
BAS001	MATHEMATICS (1)	1st semester	Preparatory year	√							√									
BAS 002	PHYSICS (1)			√	√						√									
BAS 003	MECHANICS (1)			√				√					√							
MTE011	PRODUCTION TECHNOLOGY			√		√	√	√												
MTE001	ENGINEERING DRAWING (1)			√		√						√								
ICE 001	COMPUTER INTRODUCTION			√		√		√												
HUM 001	ENGLISH LANGUAGE									√	√									
BAS 007	PHYSICS (2)	2nd semester		√	√						√									
BAS 006	MATHEMATICS (2)			√							√									
BAS 008	MECHANICS (2)			√		√														
BAS 009	ENGINEERING CHEMISTRY			√	√						√									
MTE002	ENGINEERING DRAWING (2)			√		√						√	√							
HUM 002	HISTORY OF ENGINEERING & TECHNOLOGY					√					√	√								

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				A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	C1	C2	C3
HUM 103	SCIENTIFIC THINKING	1st semester	First year	√		√		√	√		√		√							
BAS 101	MATHEMATICS (3)			√							√									
CBE 101	STRUCTURAL ANALYSIS (1)			√		√					√			√						
CBE 109	PROPERTIES OF MATERIALS (1)			√	√			√		√										
CBE 103	BUILDING CONSTRUCTION			√		√								√		√		√		
CBE 110	INTRODUCTION TO FLUID MECHANICS			√		√					√			√						
CBE 102	ENGINEERING SURVEYING 1				√	√					√			√		√				
HUM 104	INDUSTRIAL SAFETY & ENVIRONMENTAL	2nd semester		√		√	√													
HUM 105	ENVIROMENTAL SCIENCES					√	√					√	√							
BAS 106	MATHEMATICS 4			√							√									
CBE 104	STRUCTURAL ANALYSIS 2			√		√					√			√						
CBE 105	ARCHITECTURAL DESIGN						√		√										√	
CBE 106	ENGINEERING GEOLOGY			√	√		√	√		√										
CBE 107	PROPERTIES OF MATERIALS 2				√		√	√						√						
CBE 108	CIVIL DRAWING					√								√						

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				A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	C1	C2	C3
HUM 206	LAW AND ETHICS FOR ENGINEERING	1st semester	Second year				√			√		√								
CBE 201	ENGINEERING SURVEYING 2				√	√					√			√		√				
CBE 202	STRUCTURAL ANALYSIS 3			√		√					√	√		√						
CBE 203	HYDRAULICS			√	√		√					√		√						
CBE 204	SOIL MECHANICS 1			√					√					√	√					
CBE 205	DESIGN OF CONCRETE STRUCTURE 1			√			√						√	√	√					
HUM 207	RESEARCH METHODS	2nd semester			√			√												
CBE 206	PROPERTIES OF MATERIAL 3				√		√	√					√	√		√				
CBE 207	STRUCTURAL ANALYSIS 4			√		√					√	√		√						
CBE 208	IRRIGATION STURCTURES				√	√					√			√		√				
CBE 209	SOIL MECHANICS 2				√		√		√					√	√					
CBE 210	DESIGN OF CONCRETE STRUCTURE 2			√		√	√						√	√	√					

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				A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	C1	C2	C3
HUM 308	BUSINESS ADMINISTRATION	1st semester	Third year	√		√		√			√	√					√			
BAS 302	STATISTICS			√		√	√	√		√						√			√	
CBE 301	COMPUTER AIDED DESIGN			√	√	√	√	√						√	√					
CBE 304	DESIGN OF STEEL STRUCTURES 1			√			√								√	√				√
CBE 302	FOUNDATIONS ENGINEERING 1			√			√						√	√	√			√		
CBE 303	DESIGN OF CONCRETE STRUCTURES 3			√		√	√						√	√	√					
CBE 305	INTRODUCTION TO CONSTRUCTION MANEGMENT			√					√			√				√	√	√	√	
HUM 307	COMMUNICATION SKILLS	2nd semester								√	√								√	
HUM 309	PSYCHOLOGY							√		√	√									
CBE 309	ENVIRONMENTAL & SANITARY ENGINEERING			√			√							√	√					
CBE 310	METHODS & EQUIPMENT OF CONSTRUCTION						√		√							√		√		
CBE 308	DESIGN OF STEEL STRUCTURES 2			√			√								√	√				√
CBE 306	FOUNDATIONS ENGINEERING 2			√			√								√	√		√		
CBE 307	DESIGN OF CONCRETE STRUCTURES 4			√			√						√	√	√					
CBE 311	QUALITY CONTROL								√		√			√		√			√	√

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				A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	C1	C2	C3
CBE 406	GRADUATION PROJECT PHASE 1	1st semester	Fourth year	√	√			√	√	√			√	√	√	√		√	√	√
HUM 410	THECHNICAL REPORT WRITING							√		√	√	√	√							
HUM 411	MARKETING											√	√							
CBE 401	HIGH WAY ENGINEERING				√	√					√			√		√				
CBE 402	FINANCIAL MANAGEMENT & ACCOUNTING						√						√			√	√			
CBE 403	INSPECTION, MAINTENANCE AND REPAIR OF STRUCTURE						√					√				√	√	√		
CBE420	PROPERTIES OF MATERIALS 4						√	√					√	√		√				√
CBE422	RISKS MANAGEMENT						√		√				√			√	√		√	
CBE425	SPECIAL STEEL STRUCTURES			√			√								√	√				√
CBE426	SPECIAL FOUNDATION			√			√						√	√	√			√		
CBE427	SPECIAL CONCRETE			√			√					√	√	√	√					
CBE428	STRUCTURAL ANALYSIS 5			√		√					√	√	√	√						
CBE421	STRUCTURAL DYNAMICS			√		√					√	√	√	√	√					
CBE423	HIGH WAY ENGINEERING 2			√			√						√	√	√			√		
CBE424	HIGH RISE BUILDING								√				√	√	√					

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				A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	C1	C2	C3
CBE 411	CONSTRUCTION PROJECT SPECIFICATIONS	2nd semester	Fourth year			√							√			√	√			
CBE 409	TECHNIQUES OF PLANNING, SCHEDULING AND CONTROL											√	√			√	√			
CBE 410	ELECTRICAL INSTALLATIONS IN BUILDINGS								√		√	√	√	√						
CBE 407	RC BRIDGES							√	√				√	√	√					
CBE 408	STEEL BRIDGES												√	√	√					√
CBE 412	GRADUATION PROJECT PHASE 2			√	√			√	√	√			√	√	√	√		√	√	√