Benha University

Benha Faculty of Engineering

Civil Engineering Program

B.Sc. Program Civil Matrices

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
	C 1132	Plane Surveying	3	1	1			5
	E1105	Electrical Engineering Technology	3	1	0			4

Year	Courses		Weekly Contact Hours			Contact Hours of Requirements		
	Code	Course Title	Lect.	Tut.	Lab.	University Requirements	Faculty Requirements	Program Requirements
	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
	M 1283	Industrial Safety	2	0	0			2
	C 1204	Profession and Society	3	0	0			3

Year	Courses		Weekly Contact Hours			Contact Hours of Requirements		
	Code	Course Title	Lect.	Tut.	Lab.	University Requirements	Faculty Requirements	Program Requirements
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
	C15**	Elective course (List B)	3	2	0			5
	C1500	Project	2	0	6			8

Year	Courses		Weekly Contact Hours			Contact Hours of Requirements		
	Code	Course Title	Lect.	Tut.	Lab.	University Requirements	Faculty Requirements	Program Requirements
	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 Competency-Based Education (CBE) Matrix

Faculty Mission		NARS 2018 CBE													
		A1	**A2**	**A3**	**A4**	**A5**	**A6**	**A7**	**A8**	**A9**	**A10**	**B1**	**B2**	**B3**	**B4**
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						
		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 Competency-Based Education (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. 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														√

11. 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													√

12. Graduate Attributes vs. Requirements Matrix

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

13. 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						√	√

14. Student Competences Vs. Teaching and Learning Methods Matrix

Teaching and Learning Methods	Student Competences													
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4
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					√					√	√	√	√	√

15. 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		√		√	√		√		√			√	√	√	√

16. 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
Tests	Oral Test					√		√	√			√		√	√	√
	Written Exam	√	√											√		
	Experimental			√											√	
	Quizzes	√	√													
Reports								√	√					√		√
Observation					√		√			√	√					
Discussions		√	√		√	√		√	√		√	√		√		
Projects	Projects				√		√	√	√	√		√	√	√	√	√
	Mini Projects					√	√			√		√	√	√	√	
Assignments			√	√	√									√		
Presentations						√		√	√			√				
Practical				√											√	
Oral Exam						√						√		√	√	√
Final Exam		√	√		√									√		√

17. Courses Vs. Student Competences Matrix

Year	Code	Course Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	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

Year	Code	Course Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	TOTAL
	C 1121	Properties and Testing of Materials		1									1				2
	C 1122	Technology of Building Materials		1									1		1		3
	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

Year	Code	Course Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	TOTAL
	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
	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						2
4th Yea	C 1451	Design of Concrete Structures (3)			1	1								1			3
	C 1472	Steel Structures Design (2)			1	1								1			3

Year	Code	Course Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	TOTAL
	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
	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	1	1	1	10
	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		3
	C 1584	Simulation Models of Transportation and												1	1		2

Year	Code	Course Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	TOTAL
		Traffic															
	C 1592	Advanced Sanitary Engineering												1	1		2
	C 1594	Modeling of Water & Wastewater Networks		1									1				2

18. 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						
	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					1		
	U 1122	societal issues							
2nd Year	B 1217	Mathematics (5 - a)	1						
	B 1218	Mathematics (5 - b)	1	1					
	C 1211	Structural Analysis (2 - a)	1						

Year	Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	C 1212	Structural Analysis (2 - b)	1						
	C 1221	Concrete Technology	1					1	
	C 1252	Design of Concrete Structures (1)		1		1		1	
	C 1241	Hydraulics	1					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	
	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	
	C 1462	Design of Foundation (b)		1				1	
	C 1491	Sewerage		1				1	
	C 1402	Projects Management	1		1			1	
	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

Year	Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	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	
	C 1584	Simulation Models of Transportation and Traffic						1	
	C 1592	Advanced Sanitary Engineering						1	
	C 1594	Modeling of Water & Wastewater Networks	1					1	

19. Courses Vs. Teaching and Learning Methods Matrix

year	Code	Title	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
Preparatory Year	B 1011	Mathematics (1 - a)	1	1		1											
	B 1012	Mathematics (1 - b)	1	1		1											
	B 1021	Mechanics (a)	1	1													
	B 1022	Mechanics (b)	1	1													
	B 1031	Physics (a)	1	1												1	
	B 1032	Physics (b)	1	1												1	
	B 1041	Chemistry (a)	1	1												1	
	B 1042	Chemistry (b)	1	1												1	
	M 1071	Production Eng. & Workshops (a)	1	1		1				1			1		1		
	M 1072	Production Eng. & Workshops (b)		1						1			1				
	M 1002	Technology & Society	1							1					1		1
	E1021	Computer Fundamentals and Programming (a)			1	1											
	E1022	Computer Fundamentals and Programming (b)			1	1											
	M 1061	Eng. Drawing (a)	1	1											1		
	M 1062	Eng. Drawing (b)	1	1											1		
	U 1011	Technical English Language (a)	1												1		
	U 1012	Technical English Language (b)	1			1			1						1		
1st Year	B 1111	Mathematics (2 - a)	1	1	1										1		
	B 1112	Mathematics (2 - b)	1	1		1											
	C 1111	Structural Analysis (1 a)	1	1													

year	Code	Title	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
	C 1112	Structural Analysis (1 b)	1	1													
	C 1121	Properties and Testing of Materials	1	1												1	
	C 1122	Technology of Building Materials	1	1											1	1	
	C 1141	Fluid Mechanics	1	1						1						1	
	C 1132	Plane Surveying	1	1						1						1	
	E1105	Electrical Engineering Technology	1	1											1		
	M 1104	Mechanical Engineering Technology	1	1											1		
	C 1101	Computer Applications (1 - a)			1												
	C 1102	Computer Applications (1 - b)			1		1										
	C 1103	Civil Drawing (a)	1				1								1		
	C 1104	Civil Drawing (b)	1				1								1		
	C 1105	Engineering Applications (1 - a)	1				1									1	1
	C 1106	Engineering Applications (1- b)	1												1	1	
	U 1111	English language		1						1					1		1
	U 1122	societal issues															
2nd Year	B 1217	Mathematics (5 - a)	1	1											1		
	B 1218	Mathematics (5 - b)	1	1		1											
	C 1211	Structural Analysis (2 - a)	1	1													
	C 1212	Structural Analysis (2 - b)	1	1											1		
	C 1221	Concrete Technology	1	1												1	
	C 1252	Design of Concrete Structures (1)	1	1			1										
	C 1241	Hydraulics	1	1												1	

year	Code	Title	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
	C 1242	Hydrology	1	1										1			
	C 1231	Topographic Surveying	1	1		1		1		1	1					1	
	C 1208	Architectural Engineering	1	1			1		1								1
	C 1201	Computer Applications (2 - a)			1									1			
	C 1202	Computer Applications (2 - b)			1												
	C 1205	Engineering Applications	1													1	
	C 1206	Engineering Applications	1												1	1	
	M 1283	Industrial Safety	1												1		
	C 1204	Profession and Society	1						1	1							
3rd Year	C 1311	Structural Analysis (3)	1	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	1												1	
	C 1362	Geotechnical Engineering (b)	1	1												1	
	C 1371	Design of Steel Structures (1 - a)	1	1													
	C 1372	Design of Steel Structures (1 - b)	1	1						1							
	C 1331	Photogrammetry and Geodesy	1	1						1						1	1
	C 1381	Transportation Planning & Traffic Engineering	1	1						1						1	
	C 1382	Highway Engineering	1	1			1									1	
	C 1342	Irrigation & Drainage Engineering	1	1						1							
	C 1392	Water Supply Engineering	1	1			1								1	1	

year	Code	Title	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
	C 1301	Personal Skills							1	1					1		
	C 1304	Pollution and Environment	1	1													
	C 1300	Technical Report							1	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	1			1									1	
	C 1461	Design of Foundation (a)	1	1			1										
	C 1462	Design of Foundation (b)	1	1			1								1		
	C 1491	Sewerage	1	1			1								1	1	
	C 1402	Projects Management	1	1			1								1		
	C 1441	Design of Irrigation Works	1	1			1			1							
	C15**	Elective course (List A)															
	C15**	Elective course (List B)															
	C1500	Project	1	1	1	1				1		1	1			1	1
	U 1401	Legislations and Contracts	1														
	C 1408	Engineering Economy	1	1					1	1							
	C 1400	Field Training								1						1	1
Elective course (List A)	C 1512	Earthquake Engineering and Structural Dynamics	1	1						1							1
	C 1522	New Construction Materials	1	1											1		
	C 1552	Repair and strengthening of Concrete Structures	1	1						1							
	C 1554	Special Concrete Structures	1	1			1										
	C 1562	Special Foundation	1	1											1		

year	Code	Title	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
	C 1572	Advanced Steel Structures	1	1											1		
Elective course (List B)	C 1532	The Global Positioning System (GPS)	1	1	1												
	C 1534	Remote Sensing	1	1											1		
	C 1582	Highway Construction Management and Quality control	1	1						1							
	C 1584	Simulation Models of Transportation and Traffic	1	1			1										
	C 1592	Advanced Sanitary Engineering	1	1													
	C 1594	Modeling of Water & Wastewater Networks	1	1													

20. Courses Vs. Assessment Methods Matrix

Year	Code	Title	Formative Assessment Method										Summative Assessment Method		
			Oral Test	Written Exam	Experimental	Quizzes	Reports	Observation	Discussions	Projects	Mini Projects	Assignments	Presentations	Practical	Oral Exam	Final Exam
Preparatory Year	B 1011	Mathematics (1 - a)		1		1			1							1
	B 1012	Mathematics (1 - b)		1		1						1				1
	B 1021	Mechanics (a)	1	1		1										1
	B 1022	Mechanics (b)	1	1		1						1				1
	B 1031	Physics (a)		1	1	1										1
	B 1032	Physics (b)		1		1								1		1
	B 1041	Chemistry (a)		1										1		1
	B 1042	Chemistry (b)		1										1		1
	M 1071	Production Eng. & Workshops (a)		1			1		1	1						1
	M 1072	Production Eng. & Workshops (b)					1			1				1		
	M 1002	Technology & Society	1	1												
	E1021	Computer Fundamentals and Programming (a)		1		1						1				1
	E1022	Computer Fundamentals and Programming (b)		1		1						1				1
	M 1061	Eng. Drawing (a)		1								1				1
	M 1062	Eng. Drawing (b)		1								1				1
	U 1011	Technical English Language (a)		1								1				1
1st	U 1012	Technical English Language (b)		1					1			1				1
	B 1111	Mathematics (2 - a)		1					1			1				1

Year	Code	Title	Formative Assessment Method											Summative Assessment Method		
			Oral Test	Written Exam	Experimental	Quizzes	Reports	Observation	Discussions	Projects	Mini Projects	Assignments	Presentations	Practical	Oral Exam	Final Exam
Year	B 1112	Mathematics (2 - b)		1		1			1							1
	C 1111	Structural Analysis (1 a)		1		1										1
	C 1112	Structural Analysis (1 b)		1		1										1
	C 1121	Properties and Testing of Materials	1	1	1											1
	C 1122	Technology of Building Materials	1	1	1							1				1
	C 1141	Fluid Mechanics	1	1	1	1										1
	C 1132	Plane Surveying	1	1	1		1		1							1
	E1105	Electrical Engineering Technology		1		1						1				1
	M 1104	Mechanical Engineering Technology		1		1	1					1				1
	C 1101	Computer Applications (1 - a)			1							1		1		
	C 1102	Computer Applications (1 - b)			1						1			1		
	C 1103	Civil Drawing (a)		1							1	1			1	
	C 1104	Civil Drawing (b)		1							1	1			1	
	C 1105	Engineering Applications (1 - a)	1	1		1	1				1					
	C 1106	Engineering Applications (1- b)		1		1						1			1	
	U 1111	English language	1	1			1		1							1
	U 1122	societal issues														
2nd Year	B 1217	Mathematics (5 - a)		1		1			1			1				1
	B 1218	Mathematics (5 - b)		1		1			1							1
	C 1211	Structural Analysis (2 - a)		1		1			1			1				1
	C 1212	Structural Analysis (2 - b)		1		1						1				1
	C 1221	Concrete Technology	1	1	1							1				1

Year	Code	Title	Formative Assessment Method											Summative Assessment Method		
			Oral Test	Written Exam	Experimental	Quizzes	Reports	Observation	Discussions	Projects	Mini Projects	Assignments	Presentations	Practical	Oral Exam	Final Exam
	C 1252	Design of Concrete Structures (1)		1					1		1	1				1
	C 1241	Hydraulics	1	1	1							1				1
	C 1242	Hydrology		1		1					1					1
	C 1231	Topographic Surveying	1	1	1		1	1	1							1
	C 1208	Architectural Engineering		1			1				1	1				1
	C 1201	Computer Applications (2 - a)		1							1	1		1		
	C 1202	Computer Applications (2 - b)			1							1		1		
	C 1205	Engineering Applications		1		1			1						1	
	C 1206	Engineering Applications		1		1						1			1	
	M 1283	Industrial Safety		1			1		1							1
	C 1204	Profession and Society		1			1						1			1
3rd Year	C 1311	Structural Analysis (3)		1		1						1				1
	C 1351	Design of Concrete Structures (2 -a)	1	1							1	1				1
	C 1352	Design of Concrete Structures (2 - b)		1					1		1	1				1
	C 1361	Geotechnical Engineering (a)	1	1	1							1				1
	C 1362	Geotechnical Engineering (b)	1	1	1	1						1				1
	C 1371	Design of Steel Structures (1 - a)		1		1						1				1
	C 1372	Design of Steel Structures (1 - b)		1		1			1			1				1
	C 1331	Photogrammetry and Geodesy	1	1	1		1									1
	C 1381	Transportation Planning & Traffic Engineering	1	1					1		1	1				1
	C 1382	Highway Engineering	1	1	1						1	1				1

Year	Code	Title	Formative Assessment Method										Summative Assessment Method		
			Oral Test	Written Exam	Experimental	Quizzes	Reports	Observation	Discussions	Projects	Mini Projects	Assignments	Presentations	Practical	Oral Exam	Final Exam
	C 1342	Irrigation & Drainage Engineering	1	1			1					1				1
	C 1392	Water Supply Engineering		1	1	1					1	1				1
	C 1301	Personal Skills	1				1		1				1			
	C 1304	Pollution and Environment		1		1						1				1
	C 1300	Technical Report					1						1		1	
4th Year	C 1451	Design of Concrete Structures (3)	1	1							1	1				1
	C 1472	Steel Structures Design (2)		1		1						1				1
	C 1481	Highway and Airport Engineering	1	1	1						1	1				1
	C 1461	Design of Foundation (a)		1		1					1	1				1
	C 1462	Design of Foundation (b)		1		1	1				1	1				1
	C 1491	Sewerage		1	1	1					1	1				1
	C 1402	Projects Management		1							1	1				1
	C 1441	Design of Irrigation Works	1	1		1	1				1					1
	C15**	Elective course (List A)														
	C15**	Elective course (List B)														
	C1500	Project								1					1	
	U 1401	Legislations and Contracts														1
	C 1408	Engineering Economy		1		1	1					1	1			1
	C 1400	Field Training					1						1		1	
**Elective Courses																
ve co urs	C 1512	Earthquake Engineering and Structural Dynamics		1		1	1					1	1			1

Year	Code	Title	Formative Assessment Method										Summative Assessment Method		
			Oral Test	Written Exam	Experimental	Quizzes	Reports	Observation	Discussions	Projects	Mini Projects	Assignments	Presentations	Practical	Oral Exam	Final Exam
	C 1522	New Construction Materials	1	1								1				1
	C 1552	Repair and strengthening of Concrete Structures	1	1			1					1				1
	C 1554	Special Concrete Structures		1	1	1			1		1	1				1
	C 1562	Special Foundation		1			1					1				1
	C 1572	Advanced Steel Structures		1		1	1					1				1
Elective course (List B)	C 1532	The Global Positioning System (GPS)		1		1						1				1
	C 1534	Remote Sensing		1		1										1
	C 1582	Highway Construction Management and Quality control	1	1					1			1				1
	C 1584	Simulation Models of Transportation and Traffic	1	1							1	1				1
	C 1592	Advanced Sanitary Engineering		1		1						1				1
	C 1594	Modeling of Water & Wastewater Networks		1		1						1				1

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