



BETHLAHEM INSTITUTE OF ENGINEERING

KARUNGAL - 629 157, KANYAKUMARI DIST., TAMIL NADU.

(Approved by AICTE Vide : FNo. 06/05/TN/E&T/2007/25 dt. 02-06-2008 &

Affiliated to Anna University, Chennai)

Phone : 04651 - 268466, 268655, Fax : 04651 - 268466

E-mail : mail@bethlahem.org, Website : www.bethlahem.org

BETHLAHEM INSTITUTE OF ENGINEERING



DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES

AND

CO-PO MAPPING



BETHLAHEM INSTITUTE OF ENGINEERING

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DEPARTMENT OF CIVIL ENGINEERING

Anna University Regulation 2017

List of Course Names

Sl. No	Course Code	Course Title	L	T	P	C
SEMESTER-I						
1	HS8151	CommunicativeEnglish	4	0	0	4
2	MA8151	Engineering Mathematics – I	4	0	0	4
3	PH8151	Engineering Physics	3	0	0	3
4	CY8151	EngineeringChemistry	3	0	0	3
5	GE8151	Problem Solving andPython Programming	3	0	0	3
6	GE8152	Engineering Graphics	2	0	4	4
7	GE8161	Problem Solving andPython Programming Laboratory	0	0	4	2
8	BS8161	Physics and Chemistry Laboratory	0	0	4	2
SEMESTER-II						
1	HS8251	Technical English	4	0	0	4
2	MA8251	Engineering Mathematics – II	4	0	0	4
3	PH8201	Physics For Civil Engineering	3	0	0	3
4	BE8251	Basic Electrical and Electronics Engineering	3	0	0	3
5	GE8291	EnvironmentalScience and Engineering	3	0	0	3
6	GE8292	EngineeringMechanics	3	2	0	4
7	GE8261	Engineering PracticesLaboratory	0	0	4	2
8	CE8211	Computer Aided Building Drawing	0	0	4	2
SEMESTER-III						
1	MA8353	Transforms and PartialDifferential Equations	4	0	0	4
2	CE8301	Strength ofMaterials I	3	0	0	3



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3	CE8302	Fluid Mechanics	3	0	0	3
4	CE8351	Surveying	3	0	0	3
5	CE8391	Construction Materials	3	0	0	3
6	CE8392	Engineering Geology	3	0	0	3
7	CE8311	Construction Materials Laboratory	0	0	4	2
8	CE8361	Surveying Laboratory	0	0	4	2
9	HS8381	Interpersonal Skills / Listening and Speaking	0	0	2	1
SEMESTER-IV						
1	MA8491	Numerical Methods	4	0	0	4
2	CE8401	Construction Techniques and Practices	3	0	0	3
3	CE8402	Strength of Materials II	3	0	0	3
4	CE8403	Applied Hydraulic Engineering	3	0	0	3
5	CE8404	Concrete Technology	3	0	0	3
6	CE8491	Soil Mechanics	3	0	0	3
7	CE8481	Strength of Materials Laboratory	0	0	4	2
8	CE8461	Hydraulic Engineering Laboratory	0	0	4	2
9	HS8461	Advanced Reading and Writing	0	0	2	1
SEMESTER-V						
1	CE8501	Design of Reinforced Cement Concrete Elements	3	2	0	4
2	CE8502	Structural Analysis I	3	0	0	3
3	EN8491	Water Supply Engineering	3	0	0	3
4	CE8591	Foundation Engineering	3	0	0	3
5	GI8013	Advanced Surveying	3	0	0	3
6	OAI551	Environment & Agricultural Engineering	3	0	0	3
7	CE8511	Soil Mechanics Laboratory	0	0	4	2
8	CE8512	Water and Waste Water Analysis Laboratory	0	0	4	2



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9	CE8513	Survey Camp (2 weeks -During IVSemester)	0	0	0	2
SEMESTER-VI						
1	CE8601	Design of Steel Structural Elements	3	2	0	4
2	CE8602	Structural Analysis II	3	0	0	3
3	CE8603	Irrigation Engineering	3	0	0	3
4	CE8604	Highway Engineering	3	0	0	3
5	EN8592	WastewaterEngineering	3	0	0	3
6	CE8001	Ground Improvement Technique	3	0	0	3
7	CE8611	Highway EngineeringLaboratory	0	0	4	2
8	CE8612	Irrigation and Environmental Engineering Drawing	0	0	4	2
9	HS8581	Professional Communication	0	0	2	1
SEMESTER-VII						
1	CE8701	Estimation, Costing and Valuation Engineering	3	0	0	3
2	CE8702	Railways, Airports,Docks and Harbour Engineering	3	0	0	3
3	CE8703	Structural Designand Drawing	3	0	2	4
4	EN 8591	Municipal Solid Waste Management	3	0	0	3
5	OME 754	Industrial Safety	3	0	0	3
6	CE8711	Creative and Innovative Project(Activity Based - Subject Related)	0	0	4	2
7	CE8712	Industrial Training(4 weeks During VI Semester –Summer)	0	0	0	2
SEMESTER-VIII						
1	CE 8016	Ground Water Engineering	3	0	0	3
2	CE 8020	Maintenance Repair & Rehabilitation of Structures	3	0	0	3
3	CE8811	Project Work	0	0	20	10



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DEPARTMENT OF CIVIL ENGINEERING

Anna university regulation 2017

Course outcomes and CO-PO mapping

YEAR	I	SEM	01	SUBJECT CODE	HS8151
SUBJECT	COMMUNICATIVE ENGLISH				

The students will be able to:

C01	Share and collect personal information.
C02	Read and write general articles.
C03	Acquire basic grammar and apply in language usage.
C04	Participate in intensive reading and formal writing.
C05	Develop fragments to short essays/group conversations.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	-	-	-	-	-	-	-	3	3	-	-	-	-	1
C02	-	2	-	2	-	-	-	-	-	3	-	-	-	-	1
C03	-	-	-	-	-	-	-	-	-	3	-	-	-	-	1
C04	-	2	-	1	-	-	-	-	-	3	-	-	-	-	1
C05	-	-	-	-	-	-	-	-	2	3	-	-	-	-	1
AVG	-	0.8	-	0.6	-	-	-	-	1	3	-	-	-	-	1



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YEAR	I	SEM	01	SUBJECT CODE	MA8151
SUBJECT	ENGINEERING MATHEMATICS I				

The students will be able to:

C01	Explain the different types of Matrices, properties of matrices and Cayley-Hamilton.
C02	Identify the partial differentiation and Lagrange calculation.
C03	Examine the different techniques of integral calculus.
C04	Examine the different kinds of integrals. understand how to find area and volume by using double and triple integrals.
C05	Analyze the different kinds of Linear differential equations by various methods.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	2	1	1	-	-	1	3	1	-	1	2	1	-
C02	3	3	2	2	-	1	1	-	2	1	-	3	1	-	2
C03	3	2	1	2	2	-	-	2	2	1	1	1	3	-	-
C04	3	3	2	3	-	2	1	-	1	1	-	2	2	2	-
C05	3	2	3	2	1	-	-	1	2	-	-	3	2	-	2
AVG	3	2.4	2	2	0.8	0.6	0.4	0.8	2	0.8	0.2	2	2	0.6	0.8



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YEAR	I	SEM	01	SUBJECT CODE	PH8151
SUBJECT	ENGINEERING PHYSICS				

The students will be able to:

C01	Develop knowledge on the basics of properties of matter and its applications.
C02	Build knowledge on the concepts of waves and optical devices and their applications in fiber optics.
C03	Apply knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers.
C04	Develop knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes.
C05	Illustrate the basics of crystals, their structures and different crystal growth techniques.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	2	2	2	1	-	-	1	-	-	2	3	-	-
C02	3	3	2	-	2	1	-	-	-	-	-	2	2	-	2
C03	3	2	3	2	2	2	3	-	-	-	-	2	2	1	-
C04	3	2	2	-	2	2	-	-	-	-	-	2	-	1	2
C05	2	3	3	2	2	1	1	-	-	-	-	3	2	-	1
AVG	2.8	2.4	2.4	1.2	2	1.4	0.8	0	0.2	0	0	2.2	1.8	0.4	1



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YEAR	I	SEM	01	SUBJECT CODE	CY8151
SUBJECT	ENGINEERING CHEMISTRY				

The students will be able to:

C01	Illustrate the various water quality parameters and propose suitable methods for water treatment.
C02	Identify and apply the basic concepts of nanoscience and nanotechnology for the production of nanomaterials to be applied for engineering and technological needs.
C03	Adapt sound knowledge about phase rule and composites for the selection of materials.
C04	Analyze and classify the available fuels for their appropriate use in industry.
C05	Recognize the available forms of energy resources and their judicious use in energy sectors by providing due emphasis for attaining sustainable energy.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	1	2	-	2	2	2	-	-	-	-	2	2	-	2
C02	3	-	2	-	3	2	2	-	-	2	-	-	2	-	-
C03	3	-	2	-	3	2	1	-	-	2	-	-	1	-	3
C04	2	-	3	-	-	2	3	-	-	-	-	2	-	-	2
C05	3	-	3	-	2	2	3	-	-	-	-	3	2	-	2
AVG	2.4	0.2	2.4	-	2	2	2.2	-	-	0.8	-	1.4	1.4	-	1.8



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YEAR	I	SEM	01	SUBJECT CODE	GE8151
SUBJECT	PROBLEM SOLVING AND PYTHON PROGRAMMING				

The students will be able to:

C01	Explain the principles of problem solving techniques.
C02	Develop simple python programs.
C03	Develop programs based on control flow.
C04	Analyze compound data using lists, tuples, dictionaries.
C05	Design files, modules & packages.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	3	-	-	-	-	3	1	3	-	-	3	2
C02	3	3	3	3	-	-	-	-	3	1	3	-	-	1	2
C03	3	3	3	3	2	-	-	-	3	1	3	-	-	3	2
C04	3	3	3	3	2	-	-	-	3	1	3	-	-	3	2
C05	3	3	3	3	2	-	-	-	3	1	3	-	-	3	2
AVG	3	3	3	3	1.2	-	-	-	3	1	3	-	-	2.6	2



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YEAR	I	SEM	01	SUBJECT CODE	GE8152
SUBJECT	ENGINEERING GRAPHICS				

The students will be able to:

C01	Construct the conic curves, involutes and cycloid.
C02	Design the projection of points, lines and planes located in different quadrants.
C03	Design the projection of sectioned solids and develop surfaces of a given objects.
C04	Design the projection of solids and Produce orthographic projection of engineering components.
C05	Create pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	1	-	2	-	-	-	-	-	-	1	-	-	1	-	-
C02	1	-	2	-	-	-	-	-	-	1	-	-	1	-	-
C03	1	-	2	-	-	-	-	-	-	1	-	-	1	2	-
C04	1	-	2	-	-	-	-	-	-	1	-	-	1	2	-
C05	1	-	2	-	-	-	-	-	-	1	-	-	1	2	-
AVG	1	-	2	-	-	-	-	-	-	1	-	-	1	1.2	-



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YEAR	I	SEM	01	SUBJECT CODE	BS8161
SUBJECT	PHYSICS AND CHEMISTRY LABORATORY				

The students will be able to:

C01	Demonstrate different experiments to test basic understanding of physics concepts applied in optics.
C02	Relate different experiments to test basic understanding of physics concepts applied in thermal physics.
C03	Demonstrate different experiments to test basic understanding of physics concepts in properties of matter.
C04	Develop practical skills in the determination of water quality parameters through volumetric and instrumental analysis.
C05	Examine the determination of molecular weight of a polymer by viscometer.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	3	3	-	-	-	-	2	-	1	3	1	-
C02	3	3	3	1	3	2	-	2	-	-	-	1	1	-	1
C03	3	3	3	1	3	-	-	-	1	-	-	1	-	1	-
C04	3	3	3	-	-	2	-	-	-	-	-	-	-	-	-
C05	3	3	3	-	-	-	-	-	1	-	-	1	-	1	1
AVG	3	3	3	1	1.8	0.8	-	0.4	0.4	0.4	-	0.8	0.8	0.6	0.4



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YEAR	I	SEM	01	SUBJECT CODE	GE8161
SUBJECT	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY				

The students will be able to:

C01	Develop simple algorithms, Pseudo code, flowchart for simple problems.
C02	Develop and execute simple Python programs.
C03	Build programs in Python using conditionals statement and loop statement.
C04	Develop simple programs using functions and use Python data structures to implement programs.
C05	Create files, packages and modules in python.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	3	-	-	-	-	3	1	3	-	3	3	2
C02	3	3	3	3	-	-	-	-	3	1	3	-	1	1	2
C03	3	3	3	3	2	-	-	-	3	1	3	-	3	3	2
C04	3	3	3	3	2	-	-	-	3	1	3	-	3	3	2
C05	3	3	3	3	2	-	-	-	3	1	3	-	3	2	2
AVG	3	3	3	3	1.2	-	-	-	3	1	3	-	2.6	2.4	2



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YEAR	I	SEM	02	SUBJECT CODE	HS8251
SUBJECT	TECHNICAL ENGLISH				

The students will be able to:

C01	Develop the ability to comprehend and respond to scientific and technical talks.
C02	Develop proficiency in reading and interpreting longer technical texts and graphs
C03	Build the skills required for effective technical writing, including process descriptions and sequence words.
C04	Demonstrate proficiency in composing various professional documents such as emails, job applications, and analytical essays.
C05	Build competence in participating in group discussions and writing reports for different purposes in professional contexts.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	-	-	-	-	-	-	-	-	3	-	-	1	-	-
C02	-	-	-	2	-	-	-	-	-	3	-	-	1	-	-
C03	-	-	-	2	-	-	-	-	-	3	-	-	1	-	-
C04	-	2	-	-	-	-	-	-	-	3	-	-	1	-	-
C05	-	-	-	-	-	-	-	-	3	3	-	-	-	-	2
AVG	-	0.4	-	0.8	-	-	-	-	0.6	3	-	-	0.8	-	0.4



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YEAR	I	SEM	02	SUBJECT CODE	MA8251
SUBJECT	ENGINEERING MATHEMATICS II				

The students will be able to:

C01	Solve the Eigen values and eigenvectors diagonalization of a matrix, symmetric matrices, Positive definite matrices and similar matrices.
C02	Solve the gradient divergence and curl of a vector point function and related identities.
C03	Analyze the standard techniques of complex variable theory in particular analytic function and its property.
C04	Apply the complex integration techniques and contour integration techniques which can be used in real integrals.
C05	Relate Laplace transform and inverse transform of simple functions with constant coefficients.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	3	2	2	-	-	1	1	1	-	-	2	1	-
C02	3	3	2	2	-	1	-	2	-	2	2	-	1	-	2
C03	3	2	1	2	2	-	-	2	2	1	2	1	2	-	-
C04	3	3	2	3	-	1	2	-	1	2	-	2	1	2	-
C05	3	2	3	2	2	-	-	1	2	-	-	3	2	-	1
AVG	3	2.4	2.2	2.2	1.2	0.6	0.6	0.8	1.6	0.4	2.2	1.6	1.6	0.6	0.6



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YEAR	I	SEM	02	SUBJECT CODE	PH8201
SUBJECT	PHYSICS FOR CIVIL ENGINEERING				

The students will be able to:

C01	Develop the knowledge on classical and quantum electron theories, and energy band structures.
C02	Build knowledge on basics of semiconductor physics and its applications in various devices.
C03	Construct the knowledge on magnetic properties of materials and their applications in data storage.
C04	Summarize the functioning of optical materials for optoelectronics.
C05	Summarize the basics of quantum structures and basics of quantum computing.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	1	-	1	-	1	-	-	1	-	1	2	1	-
C02	3	3	2	-	3	-	1	-	-	1	-	1	1	1	2
C03	3	3	2	-	1	-	2	-	-	1	-	1	2	1	1
C04	3	2	1	-	1	-	-	-	-	1	-	1	2	-	-
C05	3	3	2	-	-	-	1	-	-	1	-	2	1	1	2
AVG	3	2.4	1.6	-	1.2	-	0.8	-	-	1	-	1.2	1.6	0.8	1



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YEAR	I	SEM	02	SUBJECT CODE	BE8255
SUBJECT	BASIC ELECTRICAL, ELECTRONICS AND MEASUREMENT ENGINEERING				

The students will be able to:

C01	Discover the electric circuit parameters for simple problems.
C02	Explain the working principle and applications of electrical machines.
C03	Explain the different energy sources, protective devices and their field applications.
C04	Analyze the characteristics of analog electronic devices.
C05	Explain the operating principles of measuring instruments.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	2	3	2	-	-	2	-	3	2	2	-	2
C02	3	3	3	2	-	2	-	-	2	-	-	2	2	-	2
C03	3	3	2	2	2	-	-	-	1	-	-	2	2	-	2
C04	3	3	3	3	3	2	-	-	3	-	3	3	2	-	2
C05	3	3	2	1	1	-	-	-	1	-	-	2	2	1	-
AVG	3	3	2.6	2	1.8	1.2	-	-	1.8	-	1.2	2.2	2	0.2	1.6



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YEAR	I	SEM	02	SUBJECT CODE	GE8291
SUBJECT	ENVIRONMENTAL SCIENCE AND ENGINEERING				

The students will be able to:

C01	Extend knowledge to protect environment.
C02	Determine the value of environment at infant stage.
C03	Identify ignorance and misconceptions about environment.
C04	Build a lifestyle that would reduce environmental disasters.
C05	Analyze the importance of clean environment and healthy society.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	-	2	-	-	2	3	-	2	3	-	2	3	-	-
C02	2	-	2	-	2	-	2	-	3	-	-	-	2	-	2
C03	-	-	-	2	-	-	2	-	1	2	-	1	3	1	-
C04	1	-	2	3	2	2	2	-	-	2	-	-	-	1	2
C05	-	-	-	2	3	3	-	1	-	-	-	-	2	-	1
AVG	0.6	0	1.2	1.4	1.4	1.4	1.8	0.2	1.2	1.4	0	0.2	2	0.4	1



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YEAR	I	SEM	02	SUBJECT CODE	GE8292
SUBJECT	ENGINEERING MECHANICS				

The students will be able to:

C01	Illustrate the vectorial and scalar representation of forces and moments
C02	Analyze the rigid body in equilibrium
C03	Evaluate the properties of surfaces and solids
C04	Calculate dynamic forces exerted in rigid body
C05	Determine the friction and the effects by the laws of friction

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	-	-	-	-	-	1	2	1	2	2	2	1
C02	3	3	3	-	-	-	-	-	1	2	1	2	2	3	1
C03	3	3	3	-	-	-	-	-	1	2	1	2	2	3	1
C04	3	-	3	-	-	-	-	-	-	-	1	2	2	3	1
C05	3	-	3	-	-	-	-	-	1	-	1	-	2	3	2
AVG	3	1.8	3	-	-	-	-	-	0.8	1.2	1	1.6	2	2.8	1.2



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YEAR	I	SEM		02	SUBJECT CODE	GE8261
SUBJECT	ENGINEERING PRACTICES LABORATORY					

The students will be able to:

C01	Explain all the fundamental concepts involving Electrical Engineering.
C02	Create various electrical joints in common household electrical wire work.
C03	Construct simple common household equipment.
C04	Test simple electronic circuits.
C05	Develop simple electronic components on PCB.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	2	3	2	-	-	2	-	3	2	2	-	2
C02	3	-	3	2	-	2	-	-	2	-	-	2	2	-	2
C03	3	3	2	2	2	-	-	-	1	-	-	2	2	-	-
C04	3	3	3	3	3	2	-	-	3	-	3	3	2	-	-
C05	-	3	2	1	1	-	-	-	1	-	-	2	2	-	-
AVG	2.4	2.4	2.6	2	1.8	1.2	-	-	1.8	-	1.2	2.2	2	-	0.8



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YEAR	I	SEM	02	SUBJECT CODE	CE8211
SUBJECT	COMPUTER AIDED BUILDING DRAWING				

The students will be able to:

C01	Illustrate the knowledge on Building Drawing.
C02	Develop building drawing with load bearing walls.
C03	Develop drawing with sloping roof.
C04	Develop drawing in RCC framed structure.
C05	Develop drawing in Industrial buildings – North light roof structures.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	2	2	-	-	-	-	-	-	-	3	2	3	3
C02	3	2	2	2	-	-	-	-	-	-	-	3	2	3	3
C03	3	2	2	2	-	-	-	-	-	-	-	3	2	3	3
C04	3	2	2	2	2	-	-	-	-	-	-	3	2	3	3
C05	3	2	2	2	2	-	-	-	-	-	-	3	2	3	3
AVG	3	2	2	2	0.8	-	-	-	-	-	-	3	2	3	3



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YEAR	II	SEM	03	SUBJECT CODE	MA8353
SUBJECT	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS				

The students will be able to:

C01	Understand how to solve the given standard partial differential equations
C02	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
C03	Appreciate the physical significance of Fourier series techniques in solving one- and two-dimensional heat flow problems and one-dimensional wave equations.
C04	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
C05	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	-	3	-	2	-	-	1	3	1	-	2	-	1	-
C02	2	2	2	2	-	2	1	-	3	2	-	2	-	-	2
C03	3	2	-	2	2	-	-	2	2	1	2	1	2	-	-
C04	2	3	2	3	-	1	2	-	1	-	-	2	1	2	-
C05	3	-	3	-	2	-	-	1	-	-	-	2	-	-	1
AVG	2.6	1.4	2	1.4	1.2	0.6	0.6	0.8	1.8	0.8	0.4	1.8	0.6	0.6	0.6



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YEAR	II	SEM	03	SUBJECT CODE	CE8301
SUBJECT	STRENGTH OF MATERIALS I				

The students will be able to:

C01	Understand the concepts of stress and strain, principal stresses and principal planes.
C02	Determine Shear force and bending moment in beams and understand concept of theory of simple bending.
C03	Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.
C04	Apply basic equation of torsion in design of circular shafts and helical springs, .
C05	Analyze the pin jointed plane and space trusses

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	2	1	-	-	-	-	1	-	-	-	3	-	-
C02	3	2	2	1	-	-	-	-	-	-	-	-	3	-	-
C03	3	3	3	2	-	-	-	-	1	-	-	-	3	-	-
C04	3	3	3	2	-	-	-	-	1	-	-	-	3	-	-
C05	3	3	3	2	-	-	-	-	1	-	-	-	3	-	-
AVG	3	3	2.6	1.6	-	-	-	-	0.8	-	-	-	3	-	-



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YEAR	II	SEM	03	SUBJECT CODE	CE8302
SUBJECT	FLUID MECHANICS				

The students will be able to:

C01	Understand the knowledge of fluids in static, kinematic and dynamic equilibrium.
C02	Understand and solve the problems related to equation of motion.
C03	Create knowledge about dimensional and model analysis.
C04	Understand the types of flow and losses of flow in pipes.
C05	Understand and solve the boundary layer problems.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	1	1	2	1	1	1	1	-	2	3	1	1
C02	3	3	3	1	1	2	1	1	1	1	-	2	3	1	1
C03	3	3	3	1	-	1	1	1	1	1	-	2	3	1	1
C04	3	3	3	1	2	2	1	1	1	1	-	2	3	1	1
C05	3	3	3	-	2	1	1	1	1	1	-	2	3	1	1
AVG	3	3	3	0.8	1.2	1.6	1	1	1	1	-	2	3	1	1



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YEAR	II	SEM	03	SUBJECT CODE	CE8351
SUBJECT	SURVEYING				

The students will be able to:

C01	Explain the use of various surveying instruments and mapping
C02	Determine the Horizontal angle and vertical angle using different instruments
C03	Determine the methods of Leveling and setting Levels with different instruments
C04	Apply concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth
C05	Apply the concept and principle of modern surveying.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	1	1	1	1	2	-	-	-	-	-	-	2	3	-	-
C02	1	1	1	1	2	-	-	-	-	-	-	2	3	-	-
C03	1	1	1	1	2	-	-	-	-	-	-	2	3	-	-
C04	1	1	1	1	2	-	-	-	-	-	-	2	3	-	-
C05	1	1	1	1	2	1	-	-	1	1	-	2	3	-	-
AVG	1	1	1	1	2	0.2	-	-	0.2	0.2	-	2	3	-	-

[illegible]



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YEAR	II	SEM	03	SUBJECT CODE	CE8392
SUBJECT	ENGINEERING GEOLOGY				

The students will be able to:

C01	Understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies.
C02	Know the properties of minerals.
C03	Gain knowledge about types of rocks, their distribution and uses.
C04	Understand the methods of study on geological structure.
C05	Understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbor

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	-	-	-	-	-	-	2	-	2	-	-	-	-	-
C02	2	-	-	2	2	2	-	-	-	-	-	-	2	-	-
C03	2	2	3	3	-	2	-	-	-	-	-	-	-	-	2
C04	-	2	-	3	2	-	-	2	2	2	2	2	2	2	-
C05	-	3	3	3	-	2	1	2	2	2	2	2	2	2	2
AVG	1.2	1.4	1.2	2.2	0.8	1.2	0.2	1.2	0.8	1.2	0.8	0.8	1.2	0.8	0.8

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YEAR	II	SEM	03	SUBJECT CODE	CE8311
SUBJECT	CONSTRUCTION MATERIALS LABORATORY				

The students will be able to:

C01	Explain the various types of special concretes
C02	Select the different processing of steel and applications of coating
C03	Explain the manufacturing process and applications of polymer composites
C04	Identify the different flooring materials and application of façade materials
C05	Apply the knowledge of smart and intelligent materials in construction field

CO-PO MAPPING

[illegible]



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YEAR	II	SEM	03	SUBJECT CODE	CE8361
SUBJECT	SURVEYING LABORATORY				

The students will be able to:

C01	Explain the basic surveying instruments like chain/tape, compass and levelling instruments
C02	Explain the levelling instrument for surveying operations
C03	Apply the theodolite for various surveying operations
C04	Analyze the necessary surveys for social infrastructures
C05	Determine the planimetric maps

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
C01	3	2	3	3	2	3	2	3	3	3	3	1	3	3	3
C02	3	2	3	-	3	3	3	3	3	3	3	1	3	3	3
C03	3	1	2	-	3	2	-	-	3	-	-	2	3	3	3
C04	3	3	2	3	2	3	3	2	3	3	3	1	3	3	3
C05	3	3	3	2	2	3	3	2	3	3	3	1	3	3	3
AVG	3	2.2	2.6	1.6	2.4	2.8	2	2.6	3	2.4	2.4	1.2	3	3	3



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YEAR	II	SEM	03	SUBJECT CODE	HS8381
SUBJECT	INTERPERSONAL SKILLS/LISTENING AND SPEAKING				

The students will be able to:

C01	Listen and respond appropriately.
C02	Participate in group discussions.
C03	Make effective presentations.
C04	Participate confidently and appropriately in conversations both formal and informal.
C05	Develop the tonal modulation.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
C02	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
C03	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
C04	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
C05	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
AVG	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-



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YEAR	II	SEM	04	SUBJECT CODE	MA8491
SUBJECT	NUMERICAL METHODS				

The students will be able to:

C01	Understand the basic concepts and techniques of solving algebraic and transcendental equations.
C02	Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.
C03	Apply the numerical techniques of differentiation and integration for engineering problems.
C04	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
C05	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	2	2	-	-	-	-	-	1	2	2	2	-
C02	3	2	2	3	3	3	-	-	-	-	-	2	3	2	-
C03	3	2	3	3	3	-	-	-	-	1	-	2	2	-	-
C04	3	2	2	2	-	-	-	-	-	-	-	3	3	-	2
C05	3	2	2	3	3	-	-	-	-	2	-		2	-	2
AVG	3	2.2	2.2	2.6	2.2	0.6	-	-	-	0.6	0.2	1.8	2.4	0.8	0.8



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YEAR	II	SEM	04	SUBJECT CODE	CE8401
SUBJECT	CONSTRUCTION TECHNIQUES AND PRACTICES				

The students will be able to:

C01	know the different construction techniques and structural systems
C02	Understand various techniques and practices on masonry construction, flooring, and roofing.
C03	Plan the requirements for substructure construction.
C04	Know the methods and techniques involved in the construction of various types of super structures
C05	Select, maintain and operate hand and power tools and equipment used in the building construction sites.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	2	2	1	-	-	-	-	-	1	-	1	2	1	-
C02	2	2	2	1	-	-	-	-	-	1	-	1	1	1	-
C03	1	1	2	1	-	-	-	-	-	1	-	1	1	1	-
C04	2	2	3	1	-	-	-	-	-	1	-	2	1	1	-
C05	2	2	2	1	-	-	-	-	-	1	-	2	1	1	-
AVG	1.8	1.8	2.2	1	-	-	-	-	-	1	-	1.4	1.2	1	-



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YEAR	II	SEM	04	SUBJECT CODE	CE8402
SUBJECT	STRENGTH OF MATERIALS II				

The students will be able to:

C01	Determine the strain energy and compute the deflection of determinate beams, frames and trusses using energy principles.
C02	Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements.
C03	find the load carrying capacity of columns and stresses induced in columns and cylinders
C04	Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure
C05	Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and find the stresses in curved beams.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	3	2	-	-	-	-	2	-	2	3	2	-
C02	3	3	3	3	1	-	-	-	-	-	-	1	2	1	3
C03	3	3	3	3	-	-	-	-	-	-	-	1	2	-	-
C04	3	3	3	3	-	-	-	-	-	-	-	2	2	-	3
C05	3	3	3	3	2	-	-	-	-	-	-	1	3	2	-
AVG	3	3	3	3	1	-	-	-	-	0.4	-	1.4	2.4	1	1.2



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E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	II	SEM	04	SUBJECT CODE	CE8403
SUBJECT	APPLIED HYDRAULIC ENGINEERING				

The students will be able to:

C01	Apply their knowledge of fluid mechanics in addressing problems in open channels.
C02	Understand an effective section for flow in different cross sections.
C03	Solve problems in uniform, gradually and rapidly varied flows in steady state conditions.
C04	Understand the principles, working and application of turbines.
C05	Understand the principles, working and application of pumps.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	2	-	-	-	2	1	2	3	2	2	3	-
C02	3	3	2	2	-	-	-	2	1	3	2	2	2	3	-
C03	3	3	2	2	-	-	-	3	1	2	3	2	2	3	-
C04	3	3	2	2	-	-	-	3	1	3	2	2	2	3	-
C05	3	3	2	2	-	-	-	2	1	2	3	2	2	3	-
AVG	3	3	2	2	-	-	-	2.4	1	2.4	2.6	2	2	3	-



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YEAR	II	SEM	04	SUBJECT CODE	CE8404
SUBJECT	CONCRETE TECHNOLOGY				

The students will be able to:

C01	Know the various requirements of cement, aggregates and water for making concrete
C02	Explain the effect of admixtures on properties of concrete
C03	Determine the concept and procedure of mix design as per IS method
C04	Examine the properties of concrete at fresh and hardened state
C05	Know the importance and application of special concretes.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	1	2	-	-	-	-	-	1	2	2	1	3	-	3	2
C02	1	2	-	-	2	-	-	1	2	2	1	3	-	3	2
C03	3	3	2	-	2	-	-	1	2	2	1	3	-	3	2
C04	2	3	2	-	1	-	-	1	1	2	3	3	-	3	2
C05	2	2	-	-	2	-	-	1	1	2	2	3	-	3	2
AVG	1.8	2.4	0.8	-	1.4	-	-	1	1.6	2	1.6	3	-	3	2



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YEAR	II	SEM	04	SUBJECT CODE	CE8491
SUBJECT	SOIL MECHANICS				

The students will be able to:

C01	classify the soil and assess the engineering properties, based on index properties.
C02	Understand the stress concepts in soils
C03	Understand and identify the settlement in soils.
C04	Determine the shear strength of soil
C05	Analyze both finite and infinite slopes.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	3	2	2	3	1	1	1	2	1	2	3	3	3	2
C02	3	2	3	2	3	1	1	1	2	1	2	3	2	2	3
C03	3	3	2	2	2	2	1	1	2	1	2	3	2	2	3
C04	2	3	3	2	2	1	1	1	1	1	2	3	2	3	2
C05	3	3	2	2	2	1	1	2	1	1	1	3	2	2	3
AVG	2.6	2.8	2.4	2	2.4	1.2	1	1.2	1.6	1	1.8	3	2.2	2.4	2.6



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YEAR	II	SEM	04	SUBJECT CODE	CE8481
SUBJECT	STRENGTH OF MATERIALS LABORATORY				

The students will be able to:

C01	Determine the mechanical properties of steel.
C02	Determine the physical properties of cement
C03	Determine the physical properties of fine and coarse aggregate. C05 Determine the strength of brick and wood.
C04	Determine the workability and compressive strength of concrete
C05	Determine the strength of brick and wood.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	2	1	3	1	2	2	1	3	1	1	2	2	2	2
C02	3	2	1	3	1	2	2	1	3	1	1	2	2	2	2
C03	3	3	2	3	1	2	2	1	3	1	1	2	3	2	2
C04	3	3	2	3	1	2	2	1	3	1	1	2	3	2	2
C05	3	3	2	3	2	2	2	1	3	1	1	2	3	2	2
AVG	2.8	2.6	1.6	3	1.2	2	2	1	3	1	1	2	2.6	2	2



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YEAR	II	SEM	04	SUBJECT CODE	CE8461
SUBJECT	HYDRAULIC ENGINEERING LABORATORY				

The students will be able to:

C01	Apply Bernoulli equation for calibration of flow measuring devices.
C02	Determine the performance characteristics of positive displacement pumps.
C03	Measure friction factor in pipes and compare with Moody diagram
C04	Determine the performance characteristics of positive displacement pumps.
C05	Determine the performance characteristics of turbines.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	1	3	1	2	2	1	2	1	1	2	2	1	1
C02	3	2	1	3	1	2	2	1	2	1	1	2	3	1	1
C03	3	2	1	3	1	2	2	1	2	1	1	2	2	1	1
C04	3	2	1	3	1	2	2	1	2	1	1	2	3	1	1
C05	3	2	1	3	1	2	2	1	2	1	1	2	2	1	1
AVG	3	2	1	3	1	2	2	1	2	1	1	2	3	1	1



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YEAR	II	SEM	04	SUBJECT CODE	HS8461
SUBJECT	ADVANCED READING AND WRITING				

The students will be able to:

C01	Write different types of essays.
C02	Write winning job applications.
C03	Read and evaluate texts critically.
C04	Display critical thinking in various professional contexts.
C05	Learn to write projects.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	-	-	2	-	-	-	-	2	3	1	-	-	-	-
C02	-	-	-	2	-	-	-	-	2	3	1	-	-	-	-
C03	-	-	-	2	-	-	-	-	2	3	1	-	-	-	-
C04	-	-	-	2	-	-	-	-	2	3	1	-	-	-	-
C05	-	-	-	2	-	-	-	-	2	3	1	-	-	-	-
AVG	-	-	-	2	-	-	-	-	2	3	1	-	-	-	-



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YEAR	III	SEM	05	SUBJECT CODE	CE8501
SUBJECT	DESIGN OF REINFORCED CEMENT CONCRETE ELEMENTS				

The students will be able to:

C01	Understand the various design methodologies for the design of RC elements.
C02	Know the analysis and design of flanged beams by limit state method and sign of beams for shear, bond and torsion.
C03	design the various types of slabs and staircase by limit state method.
C04	Design columns for axial, uniaxial and biaxial eccentric loadings.
C05	Design of footing by limit state method.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	3	1	3	1	1	3	2	1	2	3	3	3
C02	3	3	3	3	1	3	1	1	3	2	1	2	3	3	3
C03	3	3	3	3	1	3	1	1	3	2	1	2	3	3	3
C04	3	3	3	3	1	3	1	1	3	2	1	2	3	3	3
C05	3	3	3	3	1	3	1	1	3	2	1	2	3	3	3
AVG	3	3	3	3	1	3	1	1	3	2	1	2	3	3	3



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YEAR	III	SEM	05	SUBJECT CODE	CE8502
SUBJECT	STRUCTURAL ANALYSIS I				

The students will be able to:

C01	Analyze continuous beams, pin-jointed indeterminate plane frames and rigid plane frames by strain energy method
C02	Analyse the continuous beams and rigid frames by slope deflection method.
C03	Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway.
C04	Analyse the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.
C05	Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	3	2	1	3	1	-	2	1	3	2	2	3	3	-
C02	2	3	-	1	3	1	-	2	1	3	2	2	3	3	-
C03	2	3	-	2	3	1	3	2	1	3	2	2	3	3	3
C04	2	3	-	2	3	1	3	2	1	3	2	2	3	3	3
C05	2	3	-	2	3	1	2	2	1	3	2	2	3	3	-
AVG	2	3	0.4	1.6	3	1	1.6	2	1	3	2				



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YEAR	III	SEM	05	SUBJECT CODE	EN8491
SUBJECT	WATER SUPPLY ENGINEERING				

The students will be able to:

C01	Explain the structure of drinking water supply systems, including water transport, treatment and distribution
C02	Apply the knowledge in various unit operations and processes in water treatment
C03	Design the various functional units in water treatment
C04	Understand the water quality criteria and standards, and their relation to public health
C05	Design and evaluate water supply project alternatives on basis of chosen

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	3	2	1	3	1	-	2	1	3	2	2	3	3	-
C02	2	3	-	1	3	1	-	2	1	3	2	2	3	3	-
C03	2	3	-	2	3	1	3	2	1	3	2	2	3	3	3
C04	2	3	-	2	3	1	3	2	1	3	2	2	3	3	3
C05	2	3	-	2	3	1	2	2	1	3	2	2	3	3	-
AVG	2	3	0.4	1.6	3	1	1.6	2	1	3	2				



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YEAR	III	SEM	05	SUBJECT CODE	CE8591
SUBJECT	FOUNDATION ENGINEERING				

The students will be able to:

C01	Understand the site investigation, methods and sampling.
C02	Get knowledge on bearing capacity and testing methods.
C03	Design shallow footings.
C04	Determine the load carrying capacity, settlement of pile foundation.
C05	Determine the earth pressure on retaining walls and analysis for stability.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	2	3	1	1	2	-	-	2	-	1	3	-	2
C02	2	3	2	2	2	3	2	-	-	1	-	2	3	-	1
C03	2	2	3	2	2	1	1	-	-	3	-	1	3	-	1
C04	2	2	3	2	1	3	1	-	-	2	-	1	1	-	3
C05	2	2	3	3	1	1	1	1	2	2	-	1	2	-	3
AVG	3	2	2	3	1	1	2	-	-	2	-	1	3	-	2



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YEAR	III	SEM	05	SUBJECT CODE	GI8013
SUBJECT	ADVANCED SURVEYING				

The students will be able to:

C01	Know the astronomical surveying
C02	Analyze the photogrammetric surveying and interpretation
C03	Solve the field problems with Total station
C04	Know the GPS surveying and the data processing
C05	Understand the route surveys and tunnel alignments

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	2	2	-	-	-	-	-	-	-	2	2	-
C02	3	3	3	2	2	-	-	-	-	-	-	-	1	1	-
C03	3	3	3	1	-	-	-	-	-	-	-	-	1	1	1
C04	3	3	3	1	-	-	-	-	-	-	-	-	2	2	2
C05	3	3	1	2	-	-	-	-	-	-	-	-	1	1	-
AVG	3	3	2.4	1.6	0.8	-	-	-	-	-	-	-	1.4	1.4	0.6



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YEAR	III	SEM	05	SUBJECT CODE	OAI551
SUBJECT	ENVIRONMENT AND AGRICULTURE ENGINEERING				

The students will be able to:

C01	Analyze the role of environment in the current practice of agriculture and concerns of sustainability, especially in the context of climate change and emerging global issues.
C02	Illustrate ecological context of agriculture and its concerns will be understood
C03	Analyze the environment change and climatic change in the ecosystem
C04	Examine the impact on the environment in the ecological diversity and agriculture
C05	Analyze the global environmental governance under emerging issues

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	3	-	3	-	2	3	2	1	-	3	-	3	-	-
C02	-	3	3	-	3	2	-	2	2	-	2	-	3	-	-
C03	-	3	2	2	3	-	3	-	-	-	3	-	3	-	2
C04	2	-	3	-	-	2	2	1	3	-	1	-	-	-	3
C05	2	3	-	3	3	1	1	2	2	-	2	-	-	-	3
AVG	0.8	2.4	1.6	1.6	1.8	1.4	1.8	1.4	1.6	-	2.2	-	1.8	-	1.6



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YEAR	III	SEM	05	SUBJECT CODE	CE8511
SUBJECT	SOIL MECHANICS LABORATORY				

The students will be able to:

C01	Determine the Index Properties
C02	Determine the Insitu density and compaction characteristics
C03	Determination of Engineering Properties
C04	Determine the test on Geosynthetics
C05	Determine the strength of brick and wood.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	2	3	3	1	1	1	1	3	1	1	3	3	3	3
C02	1	2	3	3	1	1	1	1	3	2	1	3	2	3	2
C03	3	3	3	3	1	1	1	1	3	1	1	3	2	3	3
C04	1	2	2	3	2	1	1	1	3	1	1	3	2	2	3
C05	1. 75	2. 25	2. 75	3	1. 25	1	1	1	3	1. 25	1	3	2.2 5	2.7 5	2.7 5
AVG	2	2	3	3	1	1	1	1	3	1	1	3	3	3	3



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YEAR	III	SEM	05	SUBJECT CODE	CE8512
SUBJECT	WATER AND WASTE WATER ANALYSIS LABORATORY				

The students will be able to:

C01	Calibrate And Standardize The Equipment
C02	Collect Proper Sample For Analysis
C03	Know The Sample Preservation Methods
C04	Perform Field Oriented Testing Of Water, Wastewater
C05	Perform Coliform Analysis

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	-	-	2	-	-	2	1	2	3	-	1	3	1	3
C02	1	-	-	3	-	-	2	3	1	1	-	1	3	1	3
C03	1	-	-	3	-	-	2	1	3	1	-	3	3	1	3
C04	1	-	-	3	-	-	2	3	1	1	-	1	3	1	3
C05	1	-	-	3	-	-	2	1	3	1	-	3	3	1	3
AVG	1.4	-	-	2.8	-	-	2	1.8	2	1.4	-	1.8	3	1	3



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YEAR	III	SEM	05	SUBJECT CODE	CE8513
SUBJECT	SURVEY CAMP				

The students will be able to:

C01	Handle the modern surveying instruments like Total station and GPS
C02	Apply modern surveying techniques in field to establish horizontal control
C03	Understand the surveying techniques in field to establish vertical control
C04	Apply different survey adjustment techniques
C05	Carry out different setting out works in the field

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	-	3	3	3	2	2	2	2	2	3	3	3	3
C02	3	3	-	3	3	3	2	2	2	2	2	3	3	3	3
C03	3	3	2	3	3	2	2	2	3	2	2	3	3	3	3
C04	3	3	2	-	3	2	2	2	2	2	2	3	3	3	3
C05	3	3	2	-	3	2	2	-	2	2	2	3	3	3	3
AVG	3	3	1.2	1.8	3	2.4	2	1.6	2.2	2	2	3	3	3	3



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YEAR	III	SEM	06	SUBJECT CODE	CE8601
SUBJECT	DESIGN OF STEEL STRUCTURAL ELEMENTS				

The students will be able to:

C01	Understand the concepts of various design philosophies
C02	Design common bolted and welded connections for steel structures
C03	Design tension members and understand the effect of shear lag.
C04	Understand the design concept of axially loaded columns and column base connections.
C05	Understand specific problems related to the design of laterally restrained and unrestrained steel beams.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	1	1	1	-	-	1	-	2	1	3	2	2	1	1	-
C02	3	3	3	1	-	1	-	2	1	3	2	2	3	3	-
C03	3	3	3	1	-	1	2	2	1	3	2	2	3	3	3
C04	3	3	3	1	-	1	2	2	1	3	2	2	3	3	3
C05	3	3	3	1	-	1	-	2	1	3	2	2	3	3	-
AVG	2.6	2.6	2.6	0.8	-	1	0.8	2	1	3	2	2	2.6	2.6	1.2



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YEAR	III	SEM	06	SUBJECT CODE	CE8602
SUBJECT	STRUCTURAL ANALYSIS II				

The students will be able to:

C01	Analyze and draw influence lines for statically determinate structures and calculate critical stress resultants.
C02	Understand Muller Breslau principle and
C03	Analyse of three hinged, two hinged and fixed arches.
C04	Analyse the suspension bridges with stiffening girders
C05	Understand the concept of Plastic analysis and the method of analyzing beams and rigid frames.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	3	2	1	3	1	-	2	1	3	2	2	3	3	-
C02	2	3	-	1	3	1	-	2	1	3	2	2	3	3	-
C03	2	3	-	2	3	1	3	2	1	3	2	2	3	3	3
C04	2	3	-	2	3	1	3	2	1	3	2	2	3	3	3
C05	2	3	-	2	3	1	2	2	1	3	2	2	3	3	-
AVG	2	3	0.4	1.6	3	1	1.6	2	1	3	2	2	3	3	0.2



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YEAR	III	SEM	06	SUBJECT CODE	CE8603
SUBJECT	IRRIGATION ENGINEERING				

The students will be able to:

C01	Apply the knowledge and skills on crop water requirements.
C02	Understand the methods and management of irrigation.
C03	Explain and get knowledge on types of Impounding structures
C04	Understand methods of irrigation including canal irrigation.
C05	Explain the water management on optimization of water use.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	3	1	2	2	2	3	3	2	2	1	1	3	2	1
C02	2	3	3	3	2	2	3	1	2	2	1	2	3	2	1
C03	2	3	2	1	2	3	3	1	2	1	1	3	2	1	3
C04	2	3	2	1	1	2	2	2	1	3	3	2	3	2	1
C05	2	2	3	3	2	1	2	3	1	1	2	1	3	1	1
AVG	2	2.8	2.2	2	1.8	2	2.6	2	1.6	1.8	1.6	1.8	2.8	1.6	1.4



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YEAR	III	SEM	06	SUBJECT CODE	CE8604
SUBJECT	HIGHWAY ENGINEERING				

The students will be able to:

C01	Planning and aligning of highway.
C02	Design of highways
C03	Design flexible and rigid pavements.
C04	Determine the Highway construction materials, properties, testing methods
C05	Understand the concept of pavement management system, evaluation of distress and maintenance of pavements.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	3	1	3	2	2	3	2	1	2	3	1	3	2	1
C02	2	3	3	2	3	2	2	2	2	1	2	1	3	1	2
C03	1	3	2	2	3	1	3	2	1	1	3	2	3	1	2
C04	2	2	3	1	2	2	2	1	3	3	1	1	2	2	3
C05	2	3	1	3	3	1	1	2	2	1	2	2	2	1	3
AVG	1.8	2.8	2	2.2	2.6	1.6	2.2	1.8	1.8	1.6	2.2	1.4	2.6	1.4	2.2



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YEAR	III	SEM	06	SUBJECT CODE	EN8592
SUBJECT	WASTEWATER ENGINEERING				

The students will be able to:

C01	Estimate sewage generation and design sewer system including sewage pumping stations
C02	Understand the characteristics and composition of sewage, self-
C03	Explain the purification of streams
C04	Design of the unit operations and processes that are used in sewage treatment
C05	Understand the standard methods for disposal of sewage.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	1	1	2	1	1	1	1	-	2	3	1	1
C02	3	3	3	1	1	2	1	1	1	1	-	2	3	1	1
C03	3	3	3	1	-	1	1	1	1	1	-	2	3	1	1
C04	3	3	3	1	2	2	1	1	1	1	-	2	3	1	1
C05	3	3	3	-	2	1	1	1	1	1	-	2	3	1	1
AVG	3	3	3	0.8	1.2	1.6	1	1	1	1	-	2	3	1	1



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YEAR	III	SEM	06	SUBJECT CODE	CE8611
SUBJECT	HIGHWAY ENGINEERING LABORATORY				

The students will be able to:

C01	Explain the principles and procedures of testing of highway materials
C02	Know the techniques to characterize various pavement materials through relevant tests.
C03	Know the Penetration test on Bitumen
C04	Apply the Ductility test on Bitumen
C05	Determine the bitumen content in the bituminous mixes

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	1	3	2	1	1	1	1	3	3	1	3	3	3	2
C02	3	1	3	2	1	1	1	1	3	3	1	3	3	3	2
C03	3	1	3	2	1	1	1	1	3	3	1	3	3	3	2
C04	3	1	3	2	1	1	1	1	3	3	1	3	3	3	2
C05	3	1	3	2	1	1	1	1	3	3	1	3	3	3	2
AVG	3	1	3	2	1	1	1	1	3	3	1	3	3	3	2



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YEAR	III	SEM	06	SUBJECT CODE	CE8612
SUBJECT	IRRIGATION AND ENVIRONMENTAL ENGINEERING DRAWING				

The students will be able to:

C01	Design and draw Irrigation and Environmental structures in detail showing the plan, elevation and section
C02	Design and draw various units of municipal water treatment plants
C03	Design and draw various units of sewage treatment plants
C04	Design and draw canal regulators
C05	Design and draw cross drainage works

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	1	3	2	1	1	1	1	3	3	1	3	3	3	2
C02	3	1	3	2	1	1	1	1	3	3	1	3	3	3	2
C03	3	1	3	2	1	1	1	1	3	3	1	3	3	3	2
C04	3	1	3	2	1	1	1	1	3	3	1	3	3	3	2
C05	3	1	3	2	1	1	1	1	3	3	1	3	3	3	2
AVG	3	1	3	2	1	1	1	1	3	3	1	3	3	3	2



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YEAR	III	SEM	06	SUBJECT CODE	HS8581
SUBJECT	PROFESSIONAL COMMUNICATION				

The students will be able to:

C01	Create effective presentations.
C02	Participate confidently in Group Discussions.
C03	Attend job interviews and be successful in them.
C04	Develop adequate Soft Skills required for the workplace.
C05	Manage stress in the workplace.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
C02	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
C03	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
C04	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
C05	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
AVG	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-



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YEAR	IV	SEM	07	SUBJECT CODE	CE8701
SUBJECT	ESTIMATION, COSTING AND VALUATION ENGINEERING				

The students will be able to:

C01	Estimate the quantities for buildings,
C02	Analysis for all Building works, canals, and Roads and Cost Estimate.
C03	Understand types of specifications, principles for report preparation, tender notices types.
C04	Explain the types of contracts
C05	Evaluate valuation for building and land.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	3	3	3	3	2	3	2	3	3	3	3	3
C02	3	2	3	3	3	3	3	2	3	2	3	3	3	3	3
C03	3	1	2	3	1	3	2	2	3	2	2	3	3	3	3
C04	3	1	1	3	1	3	2	2	3	2	2	3	3	3	3
C05	3	2	2	3	3	3	2	2	3	2	2	3	3	3	3
AVG	3	1.8	2.2	3	2.2	3	2.4	2	3	2	2.4	3	3	3	3



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YEAR	IV	SEM	07	SUBJECT CODE	CE8702
SUBJECT	RAILWAYS, AIRPORTS, DOCKS AND HARBOUR ENGINEERING				

The students will be able to:

C01	Understand the methods of route alignment and design elements in Railway Planning and Constructions.
C02	Understand the Construction techniques and Maintenance of Track laying and Railway stations.
C03	Plan and site selection of Airport Planning and design.
C04	Analyze and design the elements for orientation of runways and passenger facility systems.
C05	Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	3	2	2	2	1	1	1	3	1	2	1	3	1	1
C02	2	3	2	1	3	1	1	1	2	2	2	1	3	1	2
C03	2	2	3	1	2	3	2	1	2	1	2	1	3	1	1
C04	2	3	2	1	3	1	2	1	1	1	1	1	3	1	2
C05	2	2	2	3	1	1	3	1	1	1	1	1	2	1	3
AVG	2	2.6	2.2	1.6	2.2	1.4	1.8	1	1.8	1.2	1.6	1	2.8	1	1.8



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YEAR	IV	SEM	07	SUBJECT CODE	CE8703
SUBJECT	STRUCTURAL DESIGN AND DRAWING				

The students will be able to:

C01	Design and draw reinforced concrete Cantilever and Counterfort Retaining Walls
C02	Design and draw flat slab as per code provisions
C03	Design and draw reinforced concrete and steel bridges
C04	Design and draw reinforced concrete and steel water tanks
C05	Design and detail the various steel trusses and cantry girders

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	-	2	-	-	3	-	2	1	2	3	3	-
C02	3	3	3	-	1	-	-	3	-	2	2	-	3	3	-
C03	3	3	3	-	2	-	-	3	-	-	2	-	3	3	-
C04	3	3	-	-	3	-	-	1	-	-	3	-	3	3	-
C05	3	3	-	-	3	-	-	2	-	-	1	-	3	3	-
AVG	3	3	1.8	-	2.2	-	-	2.4	-	0.8	1.8	0.4	3	3	-



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YEAR	IV	SEM	07	SUBJECT CODE	CE8711
SUBJECT	CREATIVE AND INNOVATIVE PROJECT				

The students will be able to:

C01	Prepare Plan For Various Types Of Structures
C02	Analyze And Design Various Components Of Structures Using Software and Manually
C03	Apply Suitable Software For The Projects
C04	Prepare The Project Reports In The Prescribed Formats
C05	Present Project Proposals Efficiently

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	2	2	1	1	1	2	2	3	2	3	3	3
C02	3	3	3	2	2	1	1	1	2	2	3	2	3	3	3
C03	3	3	3	2	2	1	1	1	2	2	3	2	3	3	3
C04	3	3	3	2	2	1	1	1	2	2	3	2	3	3	3
C05	3	3	3	2	2	1	1	1	2	2	3	2	3	3	3
AVG	3	3	3	2	2	1	1	1	2	2	3	2	3	3	3



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YEAR	IV	SEM	07	SUBJECT CODE	OME754
SUBJECT	INDUSTRIAL SAFETY				

The students will be able to:

C01	Explain and to prevent fire and mechanical hazards
C02	Know to prevent chemical hazards
C03	Know to Identify and control of environment.
C04	Analysis of hazard
C05	Apply proper safety techniques on safety engineering and management

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	3	3	2	-	2	1	2	-	1	-	1	3	-	2
C02	2	3	3	2	-	2	1	2	-	1	-	1	3	-	2
C03	2	3	3	2	2	2	1	2	-	1	-	1	3	1	2
C04	2	3	3	2	-	2	1	1	-	1	-	1	3	1	2
C05	2	3	3	2	-	2	1	2	-	1	-	1	3	1	2
AVG	2	3	3	2	0.4	2	1	2	-	1	-	1.0	3	0.6	2



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YEAR	IV	SEM	08	SUBJECT CODE	CE8020
SUBJECT	MAINTENANCE, REPAIR AND REHABILITATION OF STRUCTURES				

The students will be able to:

C01	Explain the importance of maintenance and assessment method of distressed structures.
C02	Know the strength and durability properties, their effects due to climate and temperature.
C03	Determine the recent development in concrete
C04	Know the techniques for repair and protection methods
C05	Explain repair, rehabilitation and retrofitting of structures and demolition methods

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	1	2	2	2	-	1	-	-	1	2	-	3	-	1
C02	3	2	2	2	2	-	1	-	-	1	2	-	3	-	1
C03	3	1	2	2	2	-	1	-	-	1	2	-	3	-	1
C04	3	1	2	2	2	-	1	-	-	1	2	-	3	-	1
C05	3	1	2	2	2	-	1	-	-	1	2	-	3	-	1
AVG	3	1.2	2	2	2	-	1	-	-	1	2	-	3	-	1



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YEAR	IV	SEM	08	SUBJECT CODE	CE8016
SUBJECT	GROUNDWATER ENGINEERING				

The students will be able to:

C01	Understand aquifer properties and its dynamics
C02	Design an exposure and practical problems
C03	Develop a model for groundwater management.
C04	Understand the importance of artificial recharge and groundwater quality concepts
C05	Gain knowledge on conservation of groundwater.

CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	-	-	-	-	1	3	-	-	-	-	-	1	1	1
C02	2	-	-	-	-	-	2	-	-	-	-	1	1	1	1
C03	3	2	3	-	-	2	-	-	-	-	-	-	3	3	-
C04	-	-	-	2	3	-	-	2	-	-	-	-	1	1	-
C05	-	1	1	1	-	-	-	-	-	3	-	-	1	1	-
AVG	1.4	0.6	0.8	0.6	0.6	0.6	1	0.4	-	0.6	-	0.2	1.4	1.4	0.4

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YEAR	IV	SEM	08	SUBJECT CODE	CS8811
SUBJECT	PROJECT WORK				

The students will be able to:

C01	Take up any challenging practical problems and
C02	Solve by formulating proper methodology.
C03	Apply Suitable Software For The Projects
C04	Prepare The Project Reports In The Prescribed Formats
C05	Present Project Proposals Efficiently

CO-PO MAPPING

[illegible]