IMS Engineering College, Ghaziabad

Department of Civil Engineering

2020-21

IMS Engineering College, Ghaziabad

Course Outcomes (CO) mapping with

Programme Outcomes (PO)

and

Programme Specific Outcomes (PSO)

Institute Vision and Mission

Vision

Our vision is to impart vibrant innovative and global education and to make IMS the world leader in terms of excellence of education, research and to serve the nation in the 21st century.

Mission

- To develop IMSEC as a centre of excellence in technical and management education.

- To inculcate in its students, the qualities of leadership, professionalism, corporate understanding & executive competence.

- To imbibe & enhance human values, ethics & morals in our students.

- To transform students into globally competent professionals.

Department Vision and Mission

Vision

Our vision is to provide excellent education that creates the new opportunities for students to meet the current and future challenges of technological development in civil engineering.

Mission

- To provide students with a sound civil engineering education for a successful career.

- To impart quality education to the students and enhance their domain knowledge as well as soft skills to make them globally competitive civil engineers.

- Respond effectively to the needs of the industry with changing technology scenario.

- Encouraging culture of continuous teaching and learning process by adopting latest technology and methodology.

- To develop the professional ethics and human values for the welfare of society.

Program Outcomes

Engineering Graduates will be able to:

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of

technological change.

Program Educational Objectives

1. To prepare students for successful career in industry that meet the needs of Indian and multinational companies.
2. To provide students with a sound foundation in the mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyze engineering problems and to pursue higher studies.
3. To develop creative ability among students by utilizing their technical competence in design, manufacturing and product development.
4. To promote awareness in students for life-long learning and to introduce them about professional issues of civil engineering including ethics, global economy and emerging technologies.
5. To foster important job related skills such as improved oral and written communications and experience of working as a team.

Program Specific Outcomes (PSO)

1. Graduates shall have an ability to apply fundamental knowledge of mathematics, applied science, engineering and management for the solution of civil engineering problems.
2. Graduates shall have an ability to enhance their technical and professional skills to utilize their knowledge in specification, fabrication, testing and operation of basic civil systems/processes.
3. Graduates shall have an ability to apply learned principles to the design, analysis, development and implementation of advanced civil systems.

B. Tech (Civil Engineering)

3rd Semester

S.No	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KOE031-38/KAS303	Engineering Science Course/Maths III	3	1	0	30	20	50		100		150	4
2	KAS301/ KVE301	Technical Communication/ Universal Human Values	2	1	0	30	20	50		100		150	3
			3	0	0								
3	KCE301	Engg. Mechanics	3	1	0	30	20	50		100		150	4
4	KCE302	Surveying and Geomatics	3	1	0	30	20	50		100		150	4
5	KCE303	Fluid Mechanics	3	0	0	30	20	50		100		150	3
6	KCE351	Building Planning & Drawing Lab	0	0	2				25		25	50	1
7	KCE352	Surveying and Geomatics Lab	0	0	2				25		25	50	1
8	KCE353	Fluid Mechanics Lab	0	0	2				25		25	50	1
9	KCE354	Mini Project or Internship Assessment*	0	0	2			50				50	1
10	KNC301/ KNC302	Computer System Security/ Python Programming	2	0	2	15	10	25		50			0
11		MOOCs (Essential for Hons. Degree)											
		Total										950	22

*The Mini Project or Internship (3-4 weeks) conducted during summer break after II semester and will be assessed during III semester.

Sub Code	**KAS303**
Sub. Name	Maths III

	COURSE OUTCOMES	Bloom's Level
CO1	The students will be able to get the idea of Laplace transform of functions and their application	
CO2	The students will be able to get the idea of Fourier transform of functions and their applications	
CO3	The students will be able to get the basic ideas of logic and Group and uses	
CO4	The students will be able to get the idea s of sets, relation, function and counting techniques	
CO5	The students will be able to get the idea of lattices, Boolean algebra, Tables and Karnaugh maps.	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	2	1	1	2	1	1	1	2
CO2	3	2	3	2	2	1	1	1	1	1	1	1
CO3	2	2	3	2	2	1	1	1	1	2	1	1
CO4	2	3	1	2	2	1	1	1	1	1	1	2
CO5	3	3	2	2	2	1	1	1	1	1	1	1
Avg	2.60	2.60	2.40	2.00	2.00	1.00	1.00	1.20	1.00	1.20	1.00	1.40

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	2	2	3
CO3	2	2	3
CO4	2	3	3
CO5	3	3	2
Avg	2.40	2.60	2.60

Sub Code	KVE-301
Sub. Name	Universal Human Values

	COURSE OUTCOMES	Bloom's Level
CO1	The student will be able to understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society	
CO2	The student will be able to distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body.	
CO3	The student will be able to understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society	
CO4	The student will be able to understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.	
CO5	The student will be able to distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1	2	1	1	1	1
CO2	3	2	3	2	2	1	2	1	1	1	1	2
CO3	2	3	2	2	2	2	1	1	1	1	1	1
CO4	2	3	3	2	2	1	2	1	1	1	1	2
CO5	1	3	2	2	2	2	1	1	1	1	1	1
Avg	2.20	2.80	2.40	2.00	2.00	1.40	1.40	1.20	1.00	1.00	1.00	1.40

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	2	3	3
CO3	2	2	3
CO4	3	2	2
CO5	3	3	2
Avg	2.60	2.60	2.40

Sub Code	KCE-301
Sub. Name	Engg. Mechanics

	COURSE OUTCOMES	Bloom's Level
CO1	Students will be able to use scalar and vector analytical techniques for analyzing forces in statically determinate structures	
CO2	Students will be able to apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems	
CO3	Students will be able to apply basic knowledge of mathematics and physics to solve real-world problems	
CO4	Students will be able to understand basic dynamics concepts – force, momentum, work and energy	
CO5	Students will be able to understand and be able to apply Newton's laws of motion	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	3	2	1	1	2	1	1	1	1
CO2	2	3	2	2	2	2	1	1	1	2	1	2
CO3	2	1	2	3	2	1	1	1	1	1	1	1
CO4	3	3	3	2	2	1	2	1	1	1	1	2
CO5	2	3	3	2	2	1	1	1	1	1	1	1
Avg	2.20	2.60	2.40	2.40	2.00	1.20	1.20	1.20	1.00	1.20	1.00	1.40

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CO-PSO Matrix			
COs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	1	2	3
CO3	2	3	3
CO4	3	2	3
CO5	3	3	2
Avg	2.40	2.60	2.60

Sub Code	KCE-302
Sub. Name	Surveying and Geomatics

	COURSE OUTCOMES	Bloom's Level
CO1	The student will be able to describe the function of surveying and work with survey instruments, take observations, and prepare plan, profile, and cross-section and perform calculations.	
CO2	The student will be able to calculate, design and layout horizontal and vertical curves.	
CO3	The student will be able to operate a total station and GPS to measure distance, angles, and to calculate differences in elevation. Reduce data for application in a geographic information system	
CO4	The student will be able to relate and apply principles of photogrammetry for surveying	
CO5	The student will be able to apply principles of Remote Sensing and Digital Image Processing for Civil Engineering problems.	

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CO-PO Matrix												
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1	2	1	1	1	1
CO2	3	3	3	2	2	2	1	1	1	1	1	2
CO3	2	3	2	2	2	1	1	1	1	1	1	1
CO4	3	3	3	2	2	2	1	1	1	1	1	1
CO5	2	2	2	2	2	1	1	1	1	1	1	1
Avg	2.60	2.80	2.40	2.00	2.00	1.40	1.00	1.20	1.00	1.00	1.00	1.20

CO-PSO Matrix			
COs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	3	2	3
CO3	3	2	3
CO4	2	3	3
CO5	3	3	2
Avg	2.80	2.60	2.60

Sub Code	KCE-303
Sub. Name	Fluid Mechanics

	COURSE OUTCOMES	Bloom's Level
CO1	The student will be able to understand the broad principles of fluid statics, kinematics and dynamics	
CO2	The student will be able to understand definitions of the basic terms used in fluid mechanics	
CO3	The student will be able to understand classifications of fluid flow	
CO4	The student will be able to apply the continuity, momentum and energy principles	
CO5	The student will be able to apply dimensional analysis	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	2	1	1	2	1	1	1	1
CO2	3	2	3	2	3	1	1	1	1	2	2	2
CO3	2	2	2	2	2	1	1	1	1	1	1	1
CO4	3	3	3	2	3	1	1	1	1	2	1	2
CO5	3	2	2	2	2	1	1	1	1	1	1	1
Avg	2.80	2.40	2.60	2.00	2.40	1.00	1.00	1.20	1.00	1.40	1.20	1.40

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	2	3	3
CO3	2	3	3
CO4	2	3	3
CO5	3	3	2
Avg	2.40	3.00	2.60

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Sub Code	KNC-301
Sub. Name	Computer System Security

	COURSE OUTCOMES	Bloom's Level
CO1	The student will be able to discover software bugs that pose cyber security threats and to explain how to fix the bugs to mitigate such threats	
CO2	The student will be able to discover cyber attack scenarios to web browsers and web servers and to explain how to mitigate such threats	
CO3	The student will be able to discover and explain mobile software bugs posing cyber security threats, explain and recreate exploits, and to explain mitigation techniques.	
CO4	The student will be able to articulate the urgent need for cyber security in critical computer systems, networks, and world wide web, and to explain various threat scenarios	
CO5	The student will be able to articulate the well known cyber attack incidents, explain the attack scenarios, and explain mitigation techniques	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	2	2	1	2	2	1	1	1	1
CO2	2	3	3	2	2	1	1	1	1	1	1	2
CO3	2	2	2	2	2	1	2	1	1	1	2	1
CO4	3	3	3	2	2	1	1	1	1	1	1	2
CO5	2	2	2	2	2	1	1	1	1	1	1	1
Avg	2.20	2.40	2.60	2.00	2.00	1.00	1.40	1.20	1.00	1.00	1.20	1.40

CO-PSO Matrix

Cos	PSO1	PSO2	PSO3
CO1	2	3	2
CO2	2	2	3
CO3	2	2	3
CO4	2	3	3
CO5	3	3	1
Avg	2.20	2.60	2.40

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B. Tech (Civil Engineering)

4th Semester

S.No	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
		SEMESTER - IV											
1	KAS403/ KOE041-48	Maths III/ Engg. Science Course	3	1	0	30	20	50		100		150	4
2	KVE401/ KAS401	Universal Human Values/Technical Communication	3	0	0	30	20	50		100		150	3
			2	1	0								
3	KCE401	Materials, Testing & Construction Practices	3	0	0	30	20	50		100		150	3
4	KCE402	Introduction to Solid Mechanics	3	1	0	30	20	50		100		150	4
5	KCE403	Hydraulic Engineering and Machines	3	1	0	30	20	50		100		150	4
6	KCE451	Material Testing Lab	0	0	2				25		25	50	1
7	KCE452	Solid Mechanics Lab	0	0	2				25		25	50	1
8	KCE453	Hydraulics & Hydraulic Machine Lab	0	0	2				25		25	50	1
9	KNC402/ KNC401	Python Programming/Computer System Security	2	0	0	15	10	25		50			0
10		MOOCs (Essential for Hons. Degree)											
		Total										900	21

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Sub Code	KAS403
Sub. Name	Maths III

Course Outcomes

CO1	The students will learn the idea of Laplace transform of functions and their application
CO2	The students will learn the idea of Fourier transform of functions and their applications
CO3	The students will learn the basic ideas of logic and Group and uses
CO4	The students will learn the idea s of sets, relation, function and counting techniques.
CO5	The students will learn the idea of lattices, Boolean algebra, Tables and Karnaugh maps.

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	1							1
CO2	3	2	2	2	1							1
CO3	2	2	2	2	1							1
CO4	2	2	3	2	1							1
CO5	2	3	3	3	1							1
Avg	2.20	2.20	2.40	2.20	1.00	#DIV/0!	#DIV/0!	#DIV/0!	#####	#####	#####	1.00

CO-PSO Matrix			
COs	PSO1	PSO2	PSO3
CO1	3	1	
CO2	3	2	
CO3	2	1	
CO4	2	2	
CO5	3	1	
Avg	2.60	1.40	#DIV/0!

Sub Code	KVE-401
Sub. Name	Universal Human Values

	Course Outcomes
CO1	Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society
CO2	Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body.
CO3	Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society
CO4	Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.
CO5	Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

CO-PO Matrix												
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						3	3	3	2		1	2
CO2						3	2	2	2		1	1
CO3						2	3	3	2			
CO4						3	2	2	2		1	1
CO5						2	3	3	2			
Avg	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	2.60	2.60	2.60	2.00	#####	1.00	1.33

CO-PSO Matrix			
COs	PSO1	PSO2	PSO3
CO1	1		1
CO2			1
CO3	1		1
CO4			1
CO5	1		1
Avg	1.00	#DIV/0!	1.00

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Sub Code	KCE401
Sub. Name	Materials, Testing & Construction Practices
Course Outcomes	
CO1	student will be able to- Identify various building materials and to understand their basic properties.
CO2	student will be able to-Understand the use of non-conventional civil engineering materials
CO3	student will be able to-Study suitable type of flooring and roofing in the construction process.
CO4	student will be able to-Characterize the concept of plastering, pointing and various other building services
CO5	student will be able to-Exemplify the various fire protection, sound and thermal insulation techniques, maintenance and repair of buildings

CO-PO Matrix													
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2		2							1
CO2	2	3	3	2	2							
CO3	2			3								1
CO4	1	3	3	2	2							1
CO5	2	2	3		2							
Avg	1.80	2.75	2.75	2.33	2.00	#DIV/0!	#DIV/0!	#DIV/0!	#####	#####	#####	1.00

CO-PSO Matrix		
COs	PSO1	PSO2	PSO3
CO1	3		3
CO2	2	3	
CO3		2	3
CO4	2	2	2
CO5	2	1	2
Avg	2.25	2.00	2.50

Sub Code	KCE402
Sub. Name	INTRODUCTION TO SOLID MECHANICS

Course Outcomes	
CO1	student will be able to Describe the concepts and principles of stresses and strains
CO2	student will be able to Analyze solid mechanics problems using classical methods and energy methods
CO3	student will be able to Analyze structural members subjected to combined stresses
CO4	student will be able to Calculate the deflections at any point on a beam subjected to a combination of loads
CO5	student will be able to Understand the behavior of columns, springs and cylinders against loads.

CO-PO Matrix												
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	2		2							1
CO2	3	3	3	2	2							
CO3	2			3								2
CO4	2	1	3	3	3							1
CO5	2	2	3	2	2							
Avg	2.20	1.75	2.75	2.50	2.25	#DIV/0!	#DIV/0!	#DIV/0!	#####	#####	#####	1.33

CO-PSO Matrix			
COs	PSO1	PSO2	PSO3
CO1	3		3
CO2	1	1	
CO3		2	3
CO4	3	3	3
CO5	2	2	2
Avg	2.25	2.00	2.75

Sub Code	KCE403
Sub. Name	HYDRAULIC ENGINEERING & MACHINES

	Course Outcomes
CO1	student will be able to- Apply their knowledge of fluid mechanics in addressing problems in open channel
CO2	student will be able to-Solve problems in uniform, gradually and rapidly varied flows in steady state conditions.
CO3	student will be able to-Have knowledge in hydraulic machineries like pumps and turbines.

CO-PO Matrix												
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	2	1							1
CO2	2	3	3	3	1							1
CO3	3	2		2	2							1
Avg	2.33	2.33	3.00	2.33	1.33	#DIV/0!	#DIV/0!	#DIV/0!	#####	#####	#####	1.00

CO-PSO Matrix		
COs	PSO1	PSO2	PSO3
CO1	3	2	1
CO2	3	2	1
CO3	3		2
Avg	3.00	2.00	1.33

Sub Code	KCE451
Sub. Name	Material Testing Lab

	Course Outcomes
CO1	Develop knowledge of material science and behaviour of various building materials used in construction
CO2	Identify the construction materials required for the assigned work
CO3	Provide procedural knowledge of the simple testing methods of cement, lime and concrete etc.
CO4	Identify, formulate and solve engineering problems of structural elements subjected to flexure.
CO5	Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials.

CO-PO Matrix												
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	1	2							1
CO2	2	2	3	2	2							
CO3	2	1	1	3								1
CO4	1	3	3	2	2							1
CO5	2	2	3	1	2							1
Avg	1.80	2.20	2.40	1.80	2.00	#DIV/0!	#DIV/0!	#DIV/0!	#####	#####	#####	1.00

CO-PSO Matrix		
COs	PSO1	PSO2	PSO3
CO1	3	1	3
CO2	2	3	
CO3	1	2	3
CO4	2	2	2
CO5	2	1	2
Avg	2.00	1.80	2.50

IMS Engineering College, Ghaziabad

Sub Code	KCE452
Sub. Name	Solid Mechanics Lab

	Course Outcomes
CO1	Analyze and correlate stress, strain and elastic deformation of an engineering material.
CO2	Predict the engineering property and behavior of material under different loading and support conditions under static loading conditions.
CO3	Analyze and predict the engineering property and behavior of material under impact loading conditions
CO4	Analyze and correlate the elastic constants and deformation under flexural loading and torsion.

CO-PO Matrix												
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	2							
CO2	2			3								2
CO3	2	1	3	3	3							1
CO4	2	2	3	2	2							
Avg	2.25	2.00	3.00	2.50	2.33	#DIV/0!	#DIV/0!	#DIV/0!	#####	#####	#####	1.50

CO-PSO Matrix		
COs	PSO1	PSO2	PSO3
CO1	1	1	
CO2		2	3
CO3	3	3	3
CO4	2	2	2
Avg	2.00	2.00	2.67

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Sub Code	KCE453
Sub. Name	Hydraulics & Hydraulic Machine Lab

	Course Outcomes
CO1	To identify the behaviour of analytical models introduced in lecture to the actual behaviour of real fluid flows.
CO2	To explain the standard measurement techniques of fluid mechanics and their applications.
CO3	To illustrate the students with the components and working principles of Pumps.
CO4	To illustrate the students with the components and working principles of of Turbines, Pumps, and other miscellaneous hydraulics machines.
CO5	To analyze the laboratory measurements and to document the results in an appropriate format.

CO-PO Matrix												
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	2	2							1
CO2	1	2	2	1	2							2
CO3	2	2	3	2	1							1
CO4	2	3	3	3	1							1
CO5	3	2		2	2							1
Avg	2.00	2.40	2.75	2.00	1.60	#DIV/0!	#DIV/0!	#DIV/0!	#####	#####	#####	1.20

CO-PSO Matrix			
COs	PSO1	PSO2	PSO3
CO1	2	2	2
CO2	3	2	2
CO3	3	2	1
CO4	3	2	1
CO5	3		2
Avg	2.80	2.00	1.60

IMS Engineering College, Ghaziabad

Sub Code	KNC 401
Sub. Name	Computer System Security
Course Outcomes	
CO1	To discover software bugs that pose cyber security threats and to explain how to fix the bugs to mitigate such threats
CO2	To discover cyber attack scenarios to web browsers and web servers and to explain how to mitigate such threats
CO3	To discover and explain mobile software bugs posing cyber security threats explain and recreate exploits, and to explain mitigation techniques.
CO4	To articulate the urgent need for cyber security in critical computer systems, networks, and world wide web, and to explain various threat scenarios
CO5	To articulate the well known cyber attack incidents, explain the attack scenarios, and explain mitigation techniques.

CO-PO Matrix												
Course Outcome	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	2	1	2	1	2							1
CO2	3	3	3	2	2							
CO3	2	1	1	3	1							2
CO4	2	1	3	3	3							1
CO5	2	2	3	2	2							1
Avg	2.20	1.60	2.40	2.20	2.00	#DIV/0!	#DIV/0!	#DIV/0!	#####	#####	#####	1.25

CO-PSO Matrix			
COs	**PSO1**	**PSO2**	**PSO3**
CO1	3	1	3
CO2	1	1	2
CO3	2	2	3
CO4	3	3	3
CO5	2	2	2
Avg	2.20	1.80	2.60

B. Tech (Civil Engineering)

5th Semester

FIFTH SEMESTER   **CIVIL ENGINEERING**   **SESSION 2020-21**

S.No	Subject Code	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KCE 501	Geotechnical Engineering	3	1	0	30	20	50		100		150	4
2	KCE 502	Structural Analysis	3	1	0	30	20	50		100		150	4
3	KCE 503	Quantity Estimation and Construction Management	3	1	0	30	20	50		100		150	4
4		Departmental Elective-I	3	0	0	30	20	50		100		150	3
	KCE 051	Concrete Technology											
	KCE 052	Modern Construction Materials											
	KCE 053	Open Channel Flow											
	KCE 054	Engineering Geology											
5		Departmental Elective-II	3	0	0	30	20	50		100		150	3
	KCE-055	Engineering Hydrology											
	KCE-056	Sensor and Instrumentation Technologies for Civil Engineering Applications											
	KCE-057	Air and Noise Pollution Control											
	KCE-058	GIS and Advance Remote Sensing											
6	KCE-551	CAD Lab	0	0	2				25		25	50	1
7	KCE-552	Geotechnical Engineering Lab	0	0	2				25		25	50	1
8	KCE-553	Quantity Estimation and Management Lab	0	0	2				25		25	50	1
9	KCE-554	Mini Project or Internship Assessment*	0	0	2				50			50	1
10		Constitution of India/Essence of Indian Traditional Knowledge	2	0	0								
11		MOOCs (Essential for Hons. Degree)											
		Total	17	3	8							950	22

* The Mini Project or Internship (4 weeks) conducted during semester break after IV semester and will be assessed during V semester.

NOTE:

1. Regular classroom interaction with industry experts is to be ensured in all theory courses (minimum two expert talks from relevant Industry).
2. Working on experiments using virtual labs is to be ensured in lab courses.
3. Student's visit to Industry/Industry Expert's project site must be arranged as & when possible.

IMS Engineering College, Ghaziabad

Sub Code	KCE 501
Sub. Name	GEOTECHNICAL ENGINEERING

	COURSE OUTCOMES	Bloom's Level
CO1	Classify the soil and determine its Index properties.	
CO2	Evaluate permeability and seepage properties of soil.	
CO3	Interpret the compaction and consolidation characteristics & effective stress concept of soil.	
CO4	Determine the vertical and shear stress under different loading conditions and explain the phenomenon of soil liquefaction.	
CO5	Interpret the earth pressure and related slope failures.	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	2	2	1	2	2	2	3
CO2	3	3	3	2	2	2	2	1	2	1	2	3
CO3	3	3	3	3	2	1	1	2	2	1	1	2
CO4	3	3	3	2	3	2	1	2	1	2	1	1
CO5	3	2	3	3	2	2	1	2	1	1	1	1
Avg	3	2.8	3	2.6	2.2	1.8	1.4	1.6	1.6	1.4	1.00	2

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	3	2	3
CO3	3	3	3
CO4	2	3	3
CO5	3	2	2
Avg	2.8	2.6	2.60

Sub Code	KCE502
Sub. Name	STRUCTURAL ANALYSIS

	COURSE OUTCOMES	Bloom's Level
CO1	Explain type of structures and method for their analysis.	
CO2	Analyze different types of trusses for member forces.	
CO3	Compute slope and deflection in determinate structures using different methods.	
CO4	Apply the concept of influence lines and moving loads to compute bending moment and shear force at different sections.	
CO5	Analyze determinate arches for different loading conditions.	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	3	2	1	1	2	1	1	2
CO2	3	2	3	3	2	2	1	2	1	2	1	1
CO3	3	3	2	3	2	2	1	1	2	2	2	1
CO4	3	2	3	3	2	1	2	1	1	1	2	1
CO5	3	3	2	3	2	1	1	2	1	1	1	2
Avg	3	2.60	2.6	2.8	2.2	1.6	1.2	1.4	1.4	1.4	1.4	1.40

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	3	3	3
CO3	3	2	3
CO4	3	3	3
CO5	3	3	2
Avg	3	2.8	2.60

Sub Code	KCE 503
Sub. Name	QUANTITY ESTIMATION AND CONSTRUCTION MANAGEMENT

	COURSE OUTCOMES	Bloom's Level
CO1	Understand the importance of units of measurement and preliminary estimate for administrative approval of projects.	
CO2	Understand the contracts and tender documents in construction projects.	
CO3	Analyze and assess the quantity of materials required for civil engineering works as per specifications.	
CO4	Evaluate and estimate the cost of expenditure and prepare a detailed rate analysis report.	
CO5	Analyze and choose cost effective approach for civil engineering projects.	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	3	2	2	1	2	1	1	1	2
CO2	3	2	3	3	2	1	2	1	1	2	1	2
CO3	3	3	2	2	2	1	2	1	2	2	1	3
CO4	3	3	3	2	2	2	1	1	1	1	2	2
CO5	3	2	3	2	1	1	1	2	1	1	1	2
Avg	3	2.60	2.6	2.4	1.8	1.4	1.4	1.4	1.2	1.4	1.2	2.2

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	3	2	3
CO3	2	3	3
CO4	3	3	3
CO5	3	2	2
Avg	2.8	2.6	2.60

Sub Code	KCE 051
Sub. Name	CONCRETE TECHNOLOGY

	COURSE OUTCOMES	Bloom's Level
CO1	Understand the properties of constituent material of concrete.	
CO2	Apply admixtures to enhance the properties of concrete.	
CO3	Evaluate the strength and durability parameters of concrete.	
CO4	Design the concrete mix for various strengths using difference methods	
CO5	Use advanced concrete types in construction industry.	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	3	2	1	1	2	2	1	2	2
CO2	2	3	3	2	1	1	2	1	1	2	1	2
CO3	3	3	3	2	2	1	2	1	2	1	2	1
CO4	3	3	2	2	2	1	1	2	1	1	1	2
CO5	3	2	3	2	1	2	1	1	1	1	1	2
Avg	2.8	2.8	2.6	2.2	1.6	1.2	1.4	1.4	1.4	1.2	1.4	1.8

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	3	2	3
CO3	2	3	2
CO4	3	3	2
CO5	3	2	2
Avg	2.8	2.6	2.4

Sub Code	KCE055
Sub. Name	ENGINEERING HYDROLOGY

	COURSE OUTCOMES	Bloom's Level
CO1	Understand the basic concept of hydrological cycle and its various phases.	
CO2	Understand the concept of runoff and apply the knowledge to construct the hydrograph.	
CO3	Apply the various methods to assess the flood.	
CO4	Assess the quality of various forms of water and their aquifer properties.	
CO5	Understand the well hydraulics and apply ground water modelling techniques.	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1	2	1	1	1	2
CO2	3	3	3	2	2	1	1	1	2	1	1	2
CO3	3	2	3	2	2	1	1	1	1	1	1	3
CO4	3	3	2	2	2	1	1	1	2	1	1	2
CO5	3	3	2	2	2	1	2	1	1	1	1	2
Avg	3	2.8	2.40	2.00	2.00	1.00	1.2	1.20	1.4	1.00	1.00	2.2

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	2	2	3
CO3	2	3	2
CO4	3	2	3
CO5	3	2	3
Avg	2.6	2.4	2.60

Sub Code	KCE552
Sub. Name	GEOTECHNICAL ENGINEERING LAB

	COURSE OUTCOMES	Bloom's Level
CO1	Determine index properties of soils	
CO2	Classify soils	
CO3	Determine engineering properties of soils	
CO4	Apply the concept of MDD and OMC to control compaction in the field.	
CO5	Analyze various soil parameters and prepare soil report.	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	1	1	2	1	1	1	2
CO2	2	3	2	2	2	1	1	2	1	1	1	2
CO3	2	2	3	2	2	1	1	1	1	2	1	2
CO4	3	2	3	2	2	1	1	2	1	1	1	1
CO5	3	2	3	2	2	1	1	2	1	1	1	2
Avg	2.60	2.4	2.6	2.00	1.8	1.00	1.00	1.8	1.00	1.2	1.00	1.8

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	2	2	2
CO3	3	2	3
CO4	3	2	2
CO5	2	3	2
Avg	2.6	2.2	2.4

Sub Code	KCE-553
Sub. Name	QUANTITY ESTIMATION AND MANAGEMENT LAB

	COURSE OUTCOMES	Bloom's Level
CO1	Study of DSR, CPWD specifications and NBC.	
CO2	Estimation of quantities for any one of the following: Building/ Septic tank/Water supply pipe line/road/bridge.	
CO3	Preparation of Bill of Quantities (BOQ) for above project.	
CO4	Practice on open source project management software / MS Project/Primavera software for same problem.	
CO5	Study of any full set of tender documents (Institute shall provide the set from ongoing/ completed tenders).	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1	2	1	1	1	3
CO2	3	2	3	2	2	1	1	1	2	1	1	2
CO3	2	2	3	2	2	1	1	2	1	2	1	2
CO4	3	2	3	2	3	1	1	1	2	1	1	2
CO5	3	3	2	2	2	1	1	2	1	1	1	2
Avg	2.8	2.4	2.6	2.00	2.2	1.00	1.00	1.6	1.4	1.2	1.00	2.2

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	2	2	2
CO3	3	2	3
CO4	2	3	2
CO5	3	2	2
Avg	2.6	2.4	2.2

Sub Code	KCE-551
Sub. Name	CAD LAB

	COURSE OUTCOMES	Bloom's Level
CO1	Understand computer aided drafting and different coordinate system	
CO2	Drawing of Regular shapes using Editor Mode and Exercise on Draw tools and Modify tools	
CO3	Drawing of building components like walls, lintels, Doors, and Windows. Using CAD software	
CO4	Drawing a plan of Building and dimensioning. Developing a 3-D plan from a given 2-D plan	
CO5	Developing sections and elevations for given a) Single storied buildings b) multi storied buildings	

					CO-PO Matrix							
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1	2	1	1	1	1
CO2	3	3	3	2	2	1	1	1	1	1	1	2
CO3	2	2	2	2	2	1	1	1	1	1	1	1
CO4	3	3	3	2	2	1	1	1	1	1	1	2
CO5	2	2	2	2	2	1	1	1	1	1	1	1
Avg	2.60	2.60	2.40	2.00	2.00	1.00	1.00	1.20	1.00	1.00	1.00	1.40

	CO-PSO Matrix		
COs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	2	2	3
CO3	2	3	2
CO4	2	2	3
CO5	3	3	2
Avg	2.40	2.6	2.4

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Sub Code	KNC501
Sub. Name	Constitution of India, Law and Engineering

	COURSE OUTCOMES	Bloom's Level
CO1	Identify and explore the basic features and modalities about Indian constitution.	
CO2	Differentiate and relate the functioning of Indian parliamentary system at the center and state level.	
CO3	Differentiate different aspects of Indian Legal System and its related bodies.	
CO4	Discover and apply different laws and regulations related to engineering practices.	
CO5	. Correlate role of engineers with different organizations and governance models	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						2		2	1	1	2	2
CO2						2		1	1	1	2	2
CO3						2	1	1	1	1	1	2
CO4						3	2	2	1	2	1	2
CO5						3	2	2	1	2	1	2
Avg						2.4	1	1.6	1	1.4	1.4	2

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	1	1	1
CO3	1	1	1
CO4	1	2	1
CO5	1	2	1
Avg	1	1.4	1

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B. Tech (Civil Engineering)

Evaluation Scheme

S.No	Subject Code	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KCE 601	Design of Concrete Structures	3	1	0	30	20	50		100		150	4
2	KCE 602	Transportation Engineering	3	1	0	30	20	50		100		150	4
3	KCE 603	Environmental Engineering	3	1	0	30	20	50		100		150	4
4		Departmental Elective-III	3	0	0	30	20	50		100		150	3
	KCE 061	Advance Structural Analysis											
	KCE 062	River Engineering											
	KCE 063	Repair and Rehabilitation of Structures											
	KCE 064	Foundation Engineering											
5		Open Elective-I	3	0	0	30	20	50		100		150	3
6	KCE 651	Transportation Engineering Lab	0	0	2				25		25	50	1
7	KCE 652	Environmental Engineering Lab	0	0	2				25		25	50	1
8	KCE 653	Structural Detailing Lab	0	0	2				25		25	50	1
9	NC*	Essence of Indian Traditional Knowledge/Constitution of India	2	0	0	15	10	25		50			
10		MOOCs (Essential for Hons. Degree)											
		Total	17	3	6							900	21

Sub Code	KCE-601
Sub. Name	Design of Concrete Structures

	COURSE OUTCOMES	Bloom's Level
CO-1	Analyse and Design RCC beams for flexure by IS methods.	
CO-2	Analyse and Design RCC beams for shear by IS methods.	
CO-3	Analyse and Design RCC slabs and staircase by IS methods.	
CO-4	Design the RCC compression members by IS methods.	
CO-5	Design various types of footings and cantilever retaining wall	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1	2	1	1	1	1
CO2	3	3	3	2	2	1	1	1	1	1	1	2
CO3	2	2	2	2	2	1	1	1	1	1	1	1
CO4	3	3	3	2	2	1	1	1	1	1	1	2
CO5	2	2	2	2	2	1	1	1	1	1	1	1
Avg	2.60	2.60	2.40	2.00	2.00	1.00	1.00	1.20	1.00	1.00	1.00	1.40

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	1	3	3
CO3	3	3	3
CO4	2	3	3
CO5	3	3	2
Avg	2.50	3.00	2.60

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Sub Code	KCE-602
Sub. Name	Transportation Engineering

	COURSE OUTCOMES	Bloom's Level
CO-1	Understand the role of Transportation Engineering and History of Transportation Development	
CO-2	Understand the geometric design of Highways	
CO-3	Understand Traffic Characteristic, analysis factors affecting traffic design and Traffic Signal Design	
CO-4	Application of different Highway materials and their selection in highway for any specific location	
CO-5	Apply different highway construction methods for appropriate site conditions	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1	2	1	1	1	1
CO2	3	3	3	2	2	1	1	1	1	1	1	2
CO3	2	2	2	2	2	1	1	1	1	1	1	1
CO4	3	3	3	2	2	1	1	1	1	1	1	2
CO5	2	2	2	2	2	1	1	1	1	1	1	1
Avg	2.60	2.60	2.40	2.00	2.00	1.00	1.00	1.20	1.00	1.00	1.00	1.40

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	2	3	2
CO2	1	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	2
Avg	2.5	3.00	2.60

IMS Engineering College, Ghaziabad

Sub Code	KCE-603
Sub. Name	Environmental Engineering

COURSE OUTCOMES		Bloom's Level
CO-1	Assess water demand and optimal size of water mains.	
CO-2	Layout the distribution system & assess the capacity of reservoir.	
CO-3	Investigate physical, chemical & biological parameter of water.	
CO-4	Design treatment units for water and waste water.	
CO-5	Apply emerging technologies for treatment of waste water.	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1	2	1	1	1	1
CO2	3	3	3	2	2	1	1	1	1	1	1	2
CO3	2	2	2	2	2	1	1	1	1	1	1	1
CO4	3	3	3	2	2	1	1	1	1	1	1	2
CO5	2	2	2	2	2	1	1	1	1	1	1	1
Avg	2.60	2.60	2.40	2.00	2.00	1.00	1.00	1.20	1.00	1.00	1.00	1.40

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	1	3	3
CO3	3	3	3
CO4	2	3	3
CO5	3	3	2
Avg	2.50	3.00	2.60

Sub Code	KCE-062
Sub. Name	River Engineering

	COURSE OUTCOMES	Bloom's Level
CO-1	Explain river morphology and its classification.	
CO-2	Explain hydraulic geometry and behaviour of river.	
CO-3	Explain socio-cultural influences and ethics of stream restorations.	
CO-4	Analyse flow and sediment transport in rivers and channels.	
CO-5	Design guide band, embankments and flood protection systems.	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1	2	1	1	1	1
CO2	3	3	3	2	2	1	1	1	1	1	1	2
CO3	2	2	2	2	2	1	1	1	1	1	1	1
CO4	3	3	3	2	2	1	1	1	1	1	1	2
CO5	2	2	2	2	2	1	1	1	1	1	1	1
Avg	2.60	2.60	2.40	2.00	2.00	1.00	1.00	1.20	1.00	1.00	1.00	1.40

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	1	3	3
CO3	3	3	3
CO4	2	3	3
CO5	3	3	2
Avg	2.50	3.00	2.60

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Sub Code	KCE-651
Sub. Name	Transportation Engineering Lab

	COURSE OUTCOMES	Bloom's Level
CO-1	To Determine the Crushing Value, Impact Value, Flakiness Index and Elongation Index, Los Angeles Abrasion Value and Stripping Value of Coarse Aggregates	
CO-2	To determine the penetration Value, Softening Point, Ductility Value of Bitumen	
CO-3	To determine the Softening Point of Bituminous material	
CO-4	To determine the Ductility Value of Bituminous material	
CO-5	To determine the Flash and Fire Point and stripping value of Bituminous material	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1	2	1	1	1	1
CO2	3	3	3	2	2	1	1	1	1	1	1	2
CO3	2	2	2	2	2	1	1	1	1	1	1	1
CO4	3	3	3	2	2	1	1	1	1	1	1	2
CO5	2	2	2	2	2	1	1	1	1	1	1	1
Avg	2.60	2.60	2.40	2.00	2.00	1.00	1.00	1.20	1.00	1.00	1.00	1.40

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	1	3	3
CO3	3	3	3
CO4	2	3	3
CO5	3	3	2
Avg	2.4	3.00	2.60

IMS Engineering College, Ghaziabad

Sub Code	KCE-652
Sub. Name	Environmental Engineering Lab

	COURSE OUTCOMES	Bloom's Level
CO-1	Build knowledge about the crystal structure and classification of materials.	
CO-2	Understand methods of determining mechanical properties and their suitability for applications.	
CO-3	Classify cast irons and study their applications	
CO-4	Select suitable heat-treatment process to achieve desired properties of metals and alloys	
CO-5	Appraise the applications of advanced materials technology in their daily life	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1	2	1	1	1	1
CO2	3	3	3	2	2	1	1	1	1	1	1	2
CO3	2	2	2	2	2	1	1	1	1	1	1	1
CO4	3	3	3	2	2	1	1	1	1	1	1	2
CO5	2	2	2	2	2	1	1	1	1	1	1	1
Avg	2.60	2.60	2.40	2.00	2.00	1.00	1.00	1.20	1.00	1.00	1.00	1.40

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	1	3	3
CO3	2	3	3
CO4	3	3	2
CO5	3	2	2
Avg	2.50	2.80	2.50

Sub Code	KCE-653
Sub. Name	Structural Detailing Lab

	COURSE OUTCOMES	Bloom's Level
CO-1	To verify Maxwell's Reciprocal theorem	
CO-2	Horizontal thrust in a three-hinged arch and to draw influence line diagrams for Horizontal Thrust end Bending moment.	
CO-3	Classify cast irons and study their applications	
CO-4	To find horizontal thrust in a two hinged arch and to draw influence line diagrams for horizontal Thrust and bending moment	
CO-5	Study of SP34/IS13920/IS456:2000 for detailing of structural elements.	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1	2	1	1	1	1
CO2	3	3	3	2	2	1	1	1	1	1	1	2
CO3	2	2	2	2	2	1	1	1	1	1	1	1
CO4	3	3	3	2	2	1	1	1	1	1	1	2
CO5	2	2	2	2	2	1	1	1	1	1	1	1
Avg	2.60	2.60	2.40	2.00	2.00	1.00	1.00	1.20	1.00	1.00	1.00	1.40

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	1	3	3
CO3	3	3	3
CO4	2	3	3
CO5	3	3	2
Avg	2.50	3.00	2.60

B. Tech (Civil Engineering)

SEVENTH SEMESTER   **CIVIL ENGINEERING**   **SESSION 2019-20**

S. No.	Subject Code	Subject Name	Department	L-T-P	Th/Lab Marks ESE	Sessional CT	Sessional TA	Total	Credit
1		Open Elective Course-1	Other Deptt.	3---0---0	70	20	10	100	3
2	RCE071	**Elective -3** Geology and Soil Mechanics	Core Deptt.	3---0---0	70	20	10	100	3
	RCE072	Rural Development Engineering							
	RCE073	Structural Health Monitoring & Rehabilitation							
	RCE074	River Engineering							
3	RCE075	**Elective -4** Computational Fluid Dynamics	Core Deptt.	3---1---0	70	20	10	100	4
	RCE076	Railways, Airport & Water Ways							
	RCE077	Air & Noise Pollution Control							
	RCE078	Ground Improvement Techniques							
4	RCE701	Design of Structure-III	Core Deptt.	3---1---0	70	20	10	100	4
5	RCE702	Water Resources	Core Deptt.	3---0---0	70	20	10	100	3
6	RCE751	Non Destructive Testing Laboratory	Core Deptt.	0--0---2	50		50	100	1
7	RCE752	Mini Project	Core Deptt.	0---0---2	50		50	100	1
8	RCE753	Industrial Training	Core Deptt.	0---0---3			100	100	2
9	RCE754	Project-1	Core Deptt.	0---0---6			200	200	3
	TOTAL				450	100		1000	24

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Sub Code	RCE-074
Sub. Name	River Engineering

	COURSE OUTCOMES	Bloom's Level
CO1	Students should be able to explain river morphology and its classification.	
CO2	Students should be able to explain hydraulic geometry and behavior of river.	
CO3	Students should be able to explain socio-cultural influences and ethics of stream restorations.	
CO4	Students should be able to Analyze flow and sediment transport in rivers and channels.	
CO5	Students should be able to Design guide band, embankments and flood protection systems.	

CO-PO Matrix												
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	3	2	1	1	2	1	1	1	1
CO2	2	2	2	2	2	1	1	1	1	1	1	1
CO3	3	3	2	2	2	1	1	2	1	1	1	1
CO4	3	2	3	2	2	1	1	1	1	1	1	2
CO5	3	2	2	2	2	1	1	1	1	1	1	1
Avg	2.6	2.4	2.2	2.2	2	1	1	1.4	1	1	1	1.2

CO-PSO Matrix			
COs	PSO1	PSO2	PSO3
CO1	3	2	3
CO2	2	3	2
CO3	2	2	3
CO4	2	2	2
CO5	2	3	3
Avg	2.2	2.4	2.6

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Sub Code	RCE-076
Sub. Name	Railways, Airport and Water Ways

	COURSE OUTCOMES	Bloom's Level
CO1	Students should be able to Understand the history and development, role of railways, railway planning and development based on essential criteria's.	
CO2	Students should be able to explain Track Geometrics, Turnouts and Crossings of railway Stations.	
CO3	Students should be able to explain Signal and Interlocking of Urban Railways	
CO4	Students should be able to Design and plan airport layout, design facilities required for runway, taxiway and impart knowledge about visual aids.	
CO5	Students should be able to Design and planning of harbour and other costal structures.	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	1	1	1	1	2	1	1	1
CO2	2	2	3	2	1	2	1	1	1	1	1	1
CO3	2	3	2	3	1	1	1	1	1	1	1	2
CO4	2	2	3	2	1	1	1	1	2	1	1	2
CO5	2	3	2	2	1	1	1	1	1	1	1	1
Avg	2.2	2.4	2.6	2.2	1	1.2	1	1	1.4	1	1	1.4

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	2	2	3
CO2	3	1	2
CO3	2	2	2
CO4	3	2	2
CO5	2	2	3
Avg	2.4	1.8	2.4

Sub Code	RCE-701
Sub. Name	Design of Structure-III

	COURSE OUTCOMES	Bloom's Level
CO1	Students should be able to Learn the design philosophies of steel structures	
CO2	Students should be able to Design riveted, bolted, pinned and welded connections for steel structures.	
CO3	Students should be able to Design of tension steel members.	
CO4	Students should be able to Design of compression steel members	
CO5	Students should be able to Design of various types of steel beams and plate girders.	

CO-PO Matrix												
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	2	1	1	1	1	1	1	1
CO2	2	2	3	2	2	1	1	2	1	1	1	1
CO3	2	3	2	3	3	1	1	1	1	1	1	2
CO4	2	2	3	2	2	1	1	1	1	1	1	2
CO5	2	3	2	2	2	1	1	1	1	1	1	1
Avg	2.2	2.4	2.6	2.2	2.2	1	1	1.2	1	1	1	1.4

CO-PSO Matrix			
COs	PSO1	PSO2	PSO3
CO1	2	2	3
CO2	3	2	2
CO3	2	3	2
CO4	3	2	2
CO5	2	3	3
Avg	2.4	2.4	2.4

Sub Code	RCE-702
Sub. Name	Water Resources Engineering

	COURSE OUTCOMES	Bloom's Level
CO1	Students should be able to explain Various components of hydrologic cycle that affect the movement of water in the earth.	
CO2	Students should be able to explain Various Stream flow measurements technique	
CO3	Students should be able to explain the basic requirements of irrigation and various irrigation techniques, requirements of the crops	
CO4	Students should be able to Analyse Distribution systems for canal irrigation and the basics of design of unlined and lined irrigation canals design	
CO5	Students should be able to explain Basic components of river Training works.	

CO-PO Matrix												
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1	1	1	1	1	1
CO2	2	2	3	2	2	1	1	2	1	1	1	1
CO3	2	3	2	3	2	1	1	2	1	1	1	2
CO4	3	2	3	2	3	1	1	1	1	1	1	1
CO5	2	3	2	2	2	1	1	1	1	1	1	1
Avg	2.4	2.6	2.4	2.2	2.2	1	1	1.4	1	1	1	1.2

CO-PSO Matrix			
COs	PSO1	PSO2	PSO3
CO1	3	2	3
CO2	2	2	2
CO3	2	2	2
CO4	3	2	2
CO5	2	3	3
Avg	2.4	2.2	2.4

IMS Engineering College, Ghaziabad

Sub Code	RCE-751
Sub. Name	Non Destructive Testing Laboratory

	COURSE OUTCOMES	Bloom's Level
CO1	Students should be able to List and define different defects that occur in welding shown through Non-Destructive Examination/Destructive Testing.	
CO2	Students should be able to identify the types of equipment used for each Non-Destructive and Destructive Examination.	
CO3	Students should be able to explain the purpose of the Equipment, Application, and standard techniques required to perform major non-destructive and destructive examinations of welds.	
CO4	Students should be able to go to specific Code, Standard, or Specification related to each testing method.	
CO5	Students should be able to have the knowledge and essential skills to identify strengths and weaknesses in materials used in fabrication	

CO-PO Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	3	2	1	1	2	1	1	1	1
CO2	2	2	2	2	2	1	1	1	1	1	1	1
CO3	3	3	2	2	2	1	1	2	1	1	1	1
CO4	3	2	3	2	2	1	1	1	1	1	1	2
CO5	3	2	2	2	2	1	1	1	1	1	1	1
Avg	2.6	2.4	2.2	2.2	2	1	1	1.4	1	1	1	1.2

CO-PSO Matrix

COs	PSO1	PSO2	PSO3
CO1	3	2	3
CO2	2	3	2
CO3	2	2	3
CO4	2	2	2
CO5	2	3	3
Avg	2.2	2.4	2.6

B. Tech (Civil Engineering)

EIGHTH SEMESTER　　　　**CIVIL ENGINEERING**　　　　**SESSION 2019-20**

S No.	Subject Code	Subject Name	Teaching Deptt.	L-T-P	Th/Lab Marks	Sessional		Total	Credit
					ESE	CT	TA		
1		Open Elective Course -2	Other Deptt.	3---0---0	70	20	10	100	3
2	RCE081 RCE082 RCE083 RCE084	**Elective -5** Finite Element Method Structural Dynamics Advanced Concrete Design Solid Waste Management	Core Deptt.	3---1---0	70	20	10	100	4
3	RCE085 RCE086 RCE087 RCE088	**Elective -6** Engineering Hydrology and Ground Water Management Urban Transportation System & Planning Probability Methods in Civil Engineering Earthquake Resistant Design of Structure	Core Deptt.	3---0---0	70	20	10	100	3
4	RCE851	Seminar	Core Deptt.	0 ---0---3			100	100	2
5	RCE852	Project-2	Core Deptt.	0---0---12	350		250	600	12
	TOTAL				560	60	380	1000	24

The required identification and distribution of electives through NPTEL has been made as given below.

Sem	Departmental Elective	Name of Elective through NPTEL
VIII	5	RCE082 Structural Dynamics
	6	RCE087 Probability Methods in Civil Engineering

Sub Code	RCE084
Sub. Name	Solid Waste Management

	COURSE OUTCOMES	Bloom's Level
CO1	Students should be able to understand effect of Solid waste on Public health its ecological impacts.	
CO2	Students should be able to Engineering system for on-site handling and processing of solid waste: separators, size reduction equipment etc.	
CO3	Students should be able to learn about Landfilling: Site selection criteria, landfill layout, and fill sections.	
CO4	Students should be able to Identify the use of Composting & types of composting.	
CO5	Students should be able to learn Hazardous wastes: risk assessment, Environmental legislation, Characterization and site assessment, Waste minimization and resource recovery.	

CO-PO Matrix												
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1	2	1	2	1	1
CO2	1	2	3	2	2	1	1	1	1	1	1	2
CO3	2	3	3	2	2	2	1	1	1	1	1	1
CO4	1	2	3	1	2	1	1	1	1	1	1	2
CO5	2	2	2	2	2	1	1	1	1	1	1	1
Avg	1.8	2.4	2.6	1.8	2	1.2	1	1.2	1	1.2	1	1.4

CO-PSO Matrix			
COs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	2	2	2
CO3	3	3	3
CO4	2	2	3
CO5	3	3	3
Avg	2.6	2.6	2.8

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Sub Code	RCE085
Sub. Name	Engineering Hydrology & Groundwater Management

	COURSE OUTCOMES	Bloom's Level
CO1	Students will be able to understand hydrologic cycle, water budget equations, world water balance.	
CO2	Students would be able to understand about hydrograph, Factors affecting flood hydrographs.	
CO3	Students should be able to learn to calculate flood through Rational method, empirical formulae and statistical analysis.	
CO4	Students should be able to Identify the use groundwater its properties and Occurrence of ground water.	
CO5	Students should be able to learn about Ground Water quality, contamination of groundwater and its Control.	

CO-PO Matrix												
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	3	2	2	1	1	2	1	2	1	1
CO2	1	2	2	2	3	2	1	1	1	1	1	2
CO3	2	2	3	2	2	1	1	2	1	1	1	1
CO4	3	2	2	1	2	1	1	1	1	1	2	2
CO5	2	3	2	2	2	1	1	1	1	1	1	1
Avg	2	2	2.4	1.8	2.2	1.2	1	1.4	1	1.2	1.2	1.4

CO-PSO Matrix			
COs	PSO1	PSO2	PSO3
CO1	1	2	3
CO2	2	3	2
CO3	2	3	2
CO4	3	2	3
CO5	3	2	3
Avg	2.2	2.4	2.6

Sub Code	RCE086
Sub. Name	Renewable Energy

	COURSE OUTCOMES	Bloom's Level
CO1	Students would be able to understand Various non-conventional energy resources.	
CO2	Students should be able to understand the concept of solar Thermal Energy.	
CO3	Students will be able to learn about geothermal energy and Magneto-hydrodynamics (MHD).	
CO4	Students should be able to Identify the use of Wind power and its sources, site selection, criterion.	
CO5	Students should be able to learn about bio-mass.	

CO-PO Matrix												
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	3	2	2	1	1	2	1	1	1	1
CO2	1	3	2	2	3	2	2	1	1	1	1	2
CO3	3	3	3	2	2	1	1	2	2	1	1	1
CO4	3	2	2	1	2	1	1	1	1	1	2	2
CO5	2	3	2	2	2	1	1	1	1	1	1	1
Avg	2.2	2.4	2.4	1.8	2.2	1.2	1.2	1.4	1.2	1	1.2	1.4

CO-PSO Matrix			
COs	PSO1	PSO2	PSO3
CO1	1	2	2
CO2	2	1	3
CO3	3	2	3
CO4	3	3	1
CO5	3	2	3
Avg	2.4	2	2.4