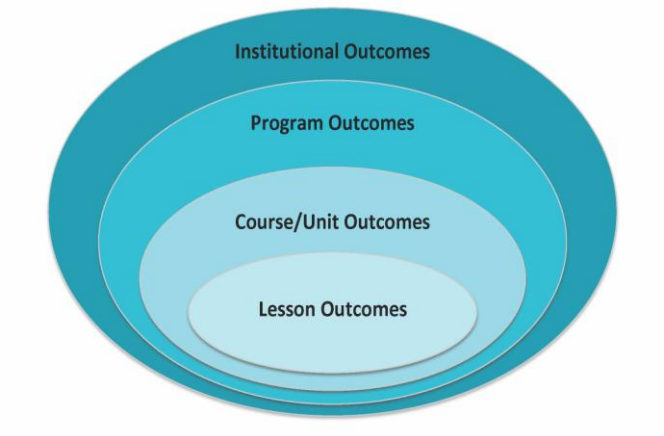
A NAAC Accredited Institution

KINGS COLLEGE OF ENGINEERING

Recognized under 2(f) & 12(B) of UGC
Approved by AICTE, New Delhi
Affiliated to Anna University, Chennai

TÜVRheinland CERT ISO 9001

2.6.1. PROGRAMME AND COURSE OUTCOME FOR ALL PROGRAMMES



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DEPARTMENT OF CIVIL ENGINEERING

2017 REGULATIONS

CO-PO-PSO MAPPING

PO-COMPETANCY PERFORMANCE INDICATORS

PROGRAMME ARTICULATION MATRIX (SEMESTERWISE)

DEPARTMENT OF CIVIL ENGINEERING
ANNA UNIVERSITY – 2017 REGULATIONS
PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

I. To prepare students for successful careers in Civil Engineering field that meets the needs of Indian and multinational companies.

II. To develop the confidence and ability among students to synthesize data and technical concepts and thereby apply it in real world problems.

III. To develop students to use modern techniques, skill and mathematical engineering tools for solving problems in Civil Engineering.

IV. To provide students with a sound foundation in mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyse engineering problems and to prepare them for graduate studies.

V. To promote students to work collaboratively on multi-disciplinary projects and make them engage in life-long learning process throughout their professional life.

PROGRAMME OUTCOMES (POs):

On successful completion of the programme,

1. Graduates will demonstrate knowledge of mathematics, science and engineering.

2. Graduates will demonstrate an ability to identify, formulate and solve engineering problems.

3. Graduate will demonstrate an ability to design and conduct experiments, analyze and interpret data.

4. Graduates will demonstrate an ability to design a system, component or process as per needs and specifications.

5. Graduates will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks.

6. Graduate will demonstrate skills to use modern engineering tools, software and equipment to analyze problems.

7. Graduates will demonstrate knowledge of professional and ethical responsibilities.

8. Graduate will be able to communicate effectively in both verbal and written form.

9. Graduate will show the understanding of impact of engineering solutions on the society and also will be aware of contemporary issues.

10. Graduate will develop confidence for self education and ability for life-long learning.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO1: Graduates will possess an ability to analyze, design, estimate, cost evaluation, management and execution of all kinds of Civil Engineering projects.

PSO2: Graduates will have an ability to create and rehabilitate a civil engineering works in multi disciplinary task.

PSO3: Graduates will have a technical solidarity, idea knowledge and wide spread exposure in Civil Engineering.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs) & PROGRAMME OUTCOMES (POs) MAPPING

PEO's	PO's									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	PO 10
I	✓	✓		✓	✓					
II		✓	✓							
III				✓			✓			
IV	✓				✓					
V						✓		✓	✓	✓

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	
YEAR 1	SEM 1	Communicative English				✓				✓		
		Engineering Mathematics – I	✓									
		Engineering Physics	✓	✓	✓	✓	✓	✓				
		Engineering Chemistry	✓	✓	✓		✓	✓	✓			
		Problem Solving and Python Programming	✓	✓			✓	✓	✓			
		Engineering Graphics	✓	✓	✓		✓	✓	✓		✓	✓
		Problem Solving and Python Programming Laboratory	✓	✓			✓	✓	✓			
		Physics and Chemistry Laboratory	✓	✓			✓	✓	✓			
	SEM 2	Technical English				✓				✓		
		Engineering Mathematics – II	✓									
		Physics for Civil Engineering	✓	✓	✓	✓	✓	✓				
		Basic Electrical and Electronics Engineering										
		Environmental Science and Engineering							✓		✓	
		Engineering Mechanics	✓	✓	✓		✓	✓	✓		✓	✓
		Engineering Practices Laboratory	✓	✓				✓	✓			
		Computer Aided Building Drawing										
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
YEAR 2	SEM 3	Transforms and Partial Differential Equations										
		Engineering Geology		✓	✓		✓		✓			✓
		Construction Materials		✓	✓		✓		✓			✓
		Strength of Materials I	✓	✓	✓	✓	✓					✓
		Fluid Mechanics	✓	✓		✓			✓	✓	✓	✓
		Surveying		✓	✓		✓		✓			✓
		Surveying Laboratory										
		Construction Materials Laboratory										

COURSE OUTCOMES (COs) & PROGRAMME OUTCOMES (POs) MAPPING

		Interpersonal Skills / Listening and Speaking										
	SEM 4	Numerical Methods										
		Construction Techniques and Practices		✓			✓		✓		✓	✓
		Strength of Materials II	✓	✓	✓	✓	✓					✓
		Applied Hydraulic Engineering	✓	✓		✓			✓	✓	✓	✓
		Concrete Technology	✓	✓		✓			✓	✓	✓	✓
		Soil Mechanics	✓	✓					✓	✓	✓	✓
		Strength of Materials Laboratory	✓	✓	✓	✓	✓					✓
		Hydraulic Engineering Laboratory	✓		✓		✓	✓	✓	✓	✓	✓
		Advanced Reading and Writing										
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
YEAR 3	SEM 5	Design of Reinforced Cement Concrete Elements	✓	✓	✓	✓	✓					✓
		Foundation Engineering		✓		✓			✓		✓	✓
		Structural Analysis I	✓	✓	✓	✓	✓				✓	✓
		Water Supply Engineering			✓	✓	✓	✓			✓	
		Open Elective- I*										
		Professional Elective I										
		Water and Waste Water Analysis Laboratory		✓		✓			✓			✓
		Soil Mechanics Laboratory			✓		✓	✓				
		Survey Camp (2 weeks–During V Semester)			✓	✓					✓	
	SEM 6	Design of Steel Structural Elements	✓	✓	✓	✓	✓					✓
		Structural Analysis II	✓	✓	✓	✓	✓				✓	✓
		Irrigation Engineering	✓	✓		✓						
		Wastewater Engineering	✓	✓		✓						

		Highway Engineering		✓	✓	✓	✓			✓		
		Professional Elective II										
		Highway Engineering Laboratory								✓		
		Irrigation and Environmental Engineering Drawing										
		Professional Communication										
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
YEAR 4	SEM 7	Estimation, Costing and Valuation Engineering	✓	✓				✓	✓			✓
		Railways, Airports, Docks and Harbour Engineering		✓		✓			✓		✓	✓
		Structural Design and Drawing	✓	✓	✓	✓		✓				✓
		Professional Elective III										
		Open Elective II*										
		Creative and Innovative Project (Activity Based - Subject Related)		✓		✓			✓			✓
		Industrial Training (4 weeks During VI semester–Summer)				✓			✓	✓		✓
	SEM 8	Professional Elective IV										
		Professional Elective V										
		Project Work		✓		✓			✓			✓

COMPETENCY – PERFORMANCE INDICATOR TABLE

PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialisation for the solution of complex engineering problems.	
Competency	**Indicators**
1.1 Demonstrate competence in mathematical modelling	1.1.1 Apply mathematical techniques such as calculus, linear algebra, and statistics to solve problems 1.1.2 Apply advanced mathematical techniques to model and solve mechanical engineering problems
1.2 Demonstrate competence in basic sciences	1.2.1 Apply laws of natural science to an engineering problem
1.3 Demonstrate competence in engineering fundamentals	1.3.1 Apply fundamental engineering concepts to solve engineering problems
1.4 Demonstrate competence in specialized engineering knowledge to the program	1.4.1 Apply CIVIL engineering concepts to solve engineering problems.
PO 2: Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	
Competency	**Indicators**
2.1 Demonstrate an ability to identify and formulate complex engineering problem	2.1.1 Articulate problem statements and identify objectives 2.1.2 Identify engineering systems, variables, and parameters to solve the problems 2.1.3 Identify the mathematical, engineering and other relevant knowledge that applies to a given problem
2.2Demonstrate an ability to formulate a solution plan and methodology for an engineering problem	2.2.1 Reframe complex problems into interconnected sub-problems 2.2.2 Identify, assemble and evaluate information and resources. 2.2.3 Identify existing processes/solution methods for solving the problem, including forming justified approximations and assumptions 2.2.4 Compare and contrast alternative solution processes to select the best process.
2.3 Demonstrate an ability to formulate and interpret a model	2.3.1 Combine scientific principles and engineering concepts to formulate model/s (mathematical or otherwise) of a system or process that is appropriate in terms of applicability and required accuracy. 2.3.2 Identify assumptions (mathematical and physical) necessary to allow modeling of a system at the level of accuracy required.

2.4 Demonstrate an ability to execute a solution process and analyze results	2.4.1 Apply engineering mathematics and computations to solve mathematical models 2.4.2 Produce and validate results through skilful use of contemporary engineering tools and models 2.4.3 Identify sources of error in the solution process, and limitations of the solution. 2.4.4 Extract desired understanding and conclusions consistent with objectives and limitations of the analysis
PO 3: 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.	
Competency	**Indicators**
3.1 Demonstrate an ability to conduct investigations of technical issues consistent with their level of knowledge and understanding	3.1.1 Define a problem, its scope and importance for purposes of investigation 3.1.2 Examine the relevant methods, tools and techniques of experiment design, system calibration, data acquisition, analysis and presentation 3.1.3 Apply appropriate instrumentation and/or software tools to make measurements of physical quantities 3.1.4 Establish a relationship between measured data and underlying physical principles.
3.2Demonstrate an ability to design experiments to solve open-ended problems	3.2.1 Design and develop an experimental approach, specify appropriate equipment and procedures 3.2.2 Understand the importance of the statistical design of experiments and choose an appropriate experimental design plan based on the study objectives
3.3 Demonstrate an ability to analyze data and reach a valid conclusion	3.3.1 Use appropriate procedures, tools and techniques to conduct experiments and collect data 3.3.2 Analyze data for trends and correlations, stating possible errors and limitations 3.3.3 Represent data (in tabular and/or graphical forms) so as to facilitate analysis and explanation of the data, and drawing of conclusions 3.3.4 Synthesize information and knowledge about the problem from the raw data to reach appropriate conclusions
PO 4: 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 public health and safety, and cultural, societal, and environmental considerations.	
Competency	**Indicators**
4.1 Demonstrate an ability to define a complex/ open-ended problem in engineering terms	4.1.1 Recognize that need analysis is key to good problem definition 4.1.2 Elicit and document, engineering requirements from stakeholders 4.1.3 Synthesize engineering requirements from a review of the state-of-the-art 4.1.4 Extract engineering requirements from relevant

	engineering Codes and Standards such as ASME, AS... BIS, ISO and ASHRAE. 4.1.5 Explore and synthesize engineering requirements considering health, safety risks, environmental, cultural and societal issues 4.1.6 Determine design objectives, functional requirements and arrive at specifications
4.2 Demonstrate an ability to generate a diverse set of alternative design solutions	4.2.1 Apply formal idea generation tools to develop multiple engineering design solutions 4.2.2 Build models/prototypes to develop a diverse set of design solutions 4.2.3 Identify suitable criteria for the evaluation of alternate design solutions
4.3 Demonstrate an ability to select an optimal design scheme for further development	4.3.1 Apply formal decision-making tools to select optimal engineering design solutions for further development 4.3.2 Consult with domain experts and stakeholders to select candidate engineering design solution for further development
4.4 Demonstrate an ability to advance an engineering design to defined end state	4.4.1 Refine a conceptual design into a detailed design within the existing constraints (of the resources) 4.4.2 Generate information through appropriate tests to improve or revise the design

PO 5: Multidisciplinary tasks: Ability to visualize and work on laboratory and multidisciplinary tasks.

Competency	Indicators
5.1 Demonstrate an ability to take up any challenging practical problems and find solution by formulating proper methodology.	5.1.1 Skills in facing and solving the field problems. 5.1.2 Concepts of developments and implementation of new techniques
5.2 Demonstrate an ability to test on materials and components of structural elements experimentally and practical knowledge on handling basic instruments	5.2.1 Testing of different materials under the action of various forces and determination of their characteristics experimentally. 5.2.2 Practical knowledge on handling instruments and have adequate knowledge to carryout the laboratory work

PO 6: 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.

Competency	Indicators
6.1 Demonstrate an ability to identify/ create modern engineering tools, techniques and resources	6.1.1 Identify modern engineering tools such as computer-aided drafting, modeling and analysis; techniques and resources for engineering activities 6.1.2 Create/adapt/modify/extend tools and techniques to solve engineering problems
6.2 Demonstrate an ability to select and apply discipline-specific tools, techniques and resources	6.2.1 Identify the strengths and limitations of tools for (i) acquiring information, (ii) modeling and simulating, (iii) monitoring system performance, and (iv) creating engineering designs.

	6.2.2 Demonstrate proficiency in using discipline-specific tools
6.3 Demonstrate an ability to evaluate the suitability and limitations of tools used to solve an engineering problem	6.3.1 Discuss limitations and validate tools, techniques and resources 6.3.2 Verify the credibility of results from tool use with reference to the accuracy and limitations, and the assumptions inherent in their use.

PO 7: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Competency	Indicators
7.1 Demonstrate an ability to recognize ethical dilemmas	7.1.1 Identify situations of unethical professional conduct and propose ethical alternatives
7.2 Demonstrate an ability to apply the Code of Ethics	7.2.1 Identify tenets of the ASME professional code of ethics 7.2.2 Examine and apply moral & ethical principles to known case studies

PO 8: Communication: Communicate effectively on complex engineering activities with the engineering community and with the 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.

Competency	Indicators
8.1 Demonstrate an ability to comprehend technical literature and document project work	8.1.1 Read, understand and interpret technical and non-technical information 8.1.2 Produce clear, well-constructed, and well-supported written engineering documents 8.1.3 Create flow in a document or presentation - a logical progression of ideas so that the main point is clear
8.2 Demonstrate competence in listening, speaking, and presentation	8.2.1 Listen to and comprehend information, instructions, and viewpoints of others 8.2.2 Deliver effective oral presentations to technical and non-technical audiences
8.3 Demonstrate the ability to integrate different modes of communication	8.3.1 Create engineering-standard figures, reports and drawings to complement writing and presentations 8.3.2 Use a variety of media effectively to convey a message in a document or a presentation

PO 9: 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.

Competency	Indicators
9.1 Demonstrate an ability to describe engineering roles in a broader context, e.g. pertaining to the environment, health, safety, legal and public welfare	9.1.1 Identify and describe various engineering roles; particularly as pertains to protection of the public and public interest at the global, regional and local level
9.2 Demonstrate an understanding of professional engineering regulations, legislation and standards	9.2.1 Interpret legislation, regulations, codes, and standards relevant to your discipline and explain its contribution to the protection of the public

PO 10: Life-long learning: Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	
Competency	**Indicators**
10.1 Demonstrate an ability to identify gaps in knowledge and a strategy to close these gaps	10.1.1 Describe the rationale for the requirement for continuing professional development 10.1.2 Identify deficiencies or gaps in knowledge and demonstrate an ability to source information to close this gap
10.2 Demonstrate an ability to identify changing trends in engineering knowledge and practice	10.2.1 Identify historic points of technological advance in engineering that required practitioners to seek education in order to stay current 10.2.2 Recognize the need and be able to clearly explain why it is vitally important to keep current regarding new developments in your field
10.3 Demonstrate an ability to identify and access sources for new information	10.3.1 Source and comprehend technical literature and other credible sources of information 10.3.2 Analyze sourced technical and popular information for feasibility, viability, sustainability, etc.

17/12/2020

HoD/CIVIL

22/12/2020

PRINCIPAL

DEPARTMENT OF CIVIL ENGINEERING
ACADEMIC YEAR 2020-21 (ODD SEM)
PROGRAMME ARTICULATION MATRIX

I SEM														
SUB	CO	PO										PSO		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
HS8151 CE	CO1	-	-	-	3	-	-	-	3	-	-	-	-	2
	CO2	-	-	-	1	-	-	-	1	-	-	2	-	-
	CO3	-	-	-	1	-	-	-	-	-	-	-	-	1
	CO4	-	-	-	3	-	-	-	2	-	-	-	2	-
MA8151 EM-I	CO1	1	-	-	-	-	-	-	-	-	-	-	-	-
	CO2	1	-	-	-	-	-	-	-	-	-	1	-	-
	CO3	1	-	-	-	-	-	-	-	-	-	-	-	-
	CO4	1	-	-	-	-	-	-	-	-	-	1	-	-
	CO5	1	-	-	-	-	-	-	-	-	-	-	-	-
	CO6	1	-	-	-	-	-	-	-	-	-	-	-	-
	CO7	1	-	-	-	-	-	-	-	-	-	-	-	-
PH8151 EP	CO1	2	2	2	2	2	2	-	-	-	-	2	1	1
	CO2	2	2	2	2	2	2	-	-	-	-	1	1	1
	CO3	2	2	2	2	2	2	-	-	-	-	1	1	1
	CO4	2	1	1	1	1	1	-	-	-	-	1	-	-
	CO5	2	2	2	1	2	1	-	-	-	-	1	1	1
CY8151 EC	CO1	2	1	1	-	1	1	1	-	-	-	1	-	-
	CO2	-	-	-	-	-	-	-	-	-	-	-	-	-
GE8151 PSPP	CO1	1	2	-	-	1	1	1	-	-	-	2	2	1
	CO2	1	1		-	1	2	-	-	-	-	2	2	
	CO3	1	2	-	-	2	2	1	-	-	-	1	1	1
	CO4	1	2	-	-	1	2	1	-	-	-	2	2	1
	CO5	1	2	-	-	1	2	1	-	-	-	2	2	1
	CO6	1	2	-	-	1	-	-	-	-	-	-	-	-
GE8152 EG	CO1	2	2	3	-	3	2	3	-	2	3	1	-	-
	CO2	1	3	2	-	3	2	2	-	2	3	-	2	-
	CO3	2	1	3	-	3	2	1	-	3	2	-	-	-
	CO4	3	3	3	-	3	2	2	-	2	3	1	-	-
	CO5	3	2	2	-	2	1	2	-	2	3	-	2	-
GE8161 PSPP LAB	CO1	1	2	-	-	1	1	1	-	-	-	2	2	1
	CO2	1	1	-	-	1	2	-	-	-	-	2	2	-
	CO3	1	2	-	-	2	2	1	-	-	-	1	1	1
	CO4	1	2	-	-	1	2	1	-	-	-	2	2	1
	CO5	1	2	-	-	1	2	1	-	-	-	2	2	1
BS8161 P&C LAB	CO1	2	1	-	-	1	2	1	-	-	-	1	1	-
	CO2	2	1	-	-	1	2	1	-	-	-	1	1	-

II SEM														
SUB	CO	PO										PSO		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
HS8251 CE	CO1	-	-	-	1	-	-	-	2	-	-	1	1	-
	CO2	-	-	-	1	-	-	-	2	-	-	-	-	-
	CO3	-	-	-	1	-	-	-	3	-	-	1	1	-
	CO4	-	-	-	1	-	-	-	3	-	-	1	1	-
MA8251 EM II	CO1	1	-	-	-	-	-	-	-	-	-	-	1	-
	CO2	2	-	-	-	-	-	-	-	-	-	-	1	-
	CO3	1	-	-	-	-	-	-	-	-	-	-	1	-
	CO4	1	-	-	-	-	-	-	-	-	-	-	1	-
	CO5	2	-	-	-	-	-	-	-	-	-	-	1	-
PH8201 P-CE	CO1	2	1	2	2	2	1	-	-	-	-	1	-	1
	CO2	2	2	2	2	2	2	-	-	-	-	1	1	1
	CO3	2	1	1	1	1	2	-	-	-	-	-	1	-
	CO4	2	1	1	2	2	1	-	-	-	-	1	-	-
	CO5	2	2	2	1	2	1	-	-	-	-	1	1	1
BE8251 BEE	CO1	3	3	2	-	-	2	-	-	-	-	3	2	1
	CO2	3	3	2	-	-	2	-	-	-	-	3	2	1
GE8291 ESE	CO1	-	-	-	-	-	-	2	1	-	-	2	1	--
	CO2	-	-	-	-	-	-	1	-	-	-	1	1	--
	CO3	-	-	-	-	-	-	1	-	-	-	1	1	--
	CO4	-	-	-	-	-	-	2	-	-	-	1	1	--
GE8292 EM	CO1	2	1	2	-	1	1	1	-	1	-	1	-	1
	CO2	2	2	1	-	1	1	-	-	-	1	1	1	1
	CO3	2	1	1	-	1	1	1	-	-	-	-	1	-
	CO4	2	1	1	-	1		1	-	-	-	-	-	-
	CO5	2	1	1	-	1	1		-	-	-	-	-	-
GE8261 EPL	CO1	2	1	-	-	-	1	1	-	-	-	-	-	-
CE8211 CAD	CO1	2	1	-	-	-	1	1	-	-	-	-	-	-

III SEM														
SUB	CO	PO										PSO		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
MA8353 TPDE	CO1	2	1	-	-	-	-	-	-	-	-	-	-	1
	CO2	2	1	-	-	1	-	-	-	-	-	-	-	1
	CO3	2	1	-	-	1	-	-	-	-	-	-	-	1
	CO4	2	1	-	-	1	-	-	-	-	-	-	-	1
	CO5	2	1	-	-	1	-	-	-	-	-	-	1	-
CE8301 SOM I	CO1	3	2	1	2	1	-	-	-	-	-	2	-	2
	CO2	2	3	2	1	1	-	-	-	-	-	2	-	2
	CO3	1	1	1	-	-	-	-	-	-	-	1	-	2
	CO4	2	1	1	1	1	-	-	-	-	-	1	-	2
	CO5	1	1	1	-	-	-	-	-	-	1	2	-	2
CE8302 FM	CO1	2	1	-	1	-	-	-	1	-	-	-	-	-
	CO2	2	1	-	-	-	-	-	-	-	-	-	-	-
	CO3	-	1	-	1	-	-	-	-	-	1	-	-	2
	CO4	1	1	-	-	-	-	1	-	2	-	-	-	1
	CO5	2	1	-	-	-	-	-	-	-	-	-	-	-
CE8351 SUR	CO1	-	1	2	-	2	-	2	-	-	-	1	-	1
	CO2	-	1	2	-	2	-	2	-	-	1	1	-	1
	CO3	-	1	2	-	2	-	2	-	-	-	1	-	1
	CO4	-	1	2	-	2	-	2	-	-	-	1	-	1
	CO5	-	1	2	-	2	-	2	-	-	1	1	1	1
CE8391 CM	CO1	-	2	-	-	1	-	1	-	-	-	1		
	CO2	-	1	1	-	2	-	-	-	-	-	2	1	
	CO3	-	2	1	-	-	-	-	-	-	1	1	2	1
	CO4	-	1	2	-	1	-	-	-	-	-	2	1	1
	CO5	-	1	1	-	-	-	-	-	-	2			2
CE8392 EG	CO1	-	1	1	-	1	-	1	-	-	1	-	1	1
	CO2	-	1	2	-	1	-	1	-	-	1	-	-	-
	CO3	-	1	1	-	1	-	1	-	-	1	-	1	-
	CO4	-	1	-	-	1	-	1	-	-	1	-	-	-
	CO5	-	2	2	-	1	-	1	-	-	1	-	2	1
CE8311 CM LAB	CO1	3	2	1	2	1	-	-	-	-	-	-	1	1
	CO2	3	2	1	2	2	-	-	-		-	-	1	2
CE8361 SUR	CO1	3	2	1	2	3	-	-	-	-	-	-	2	1
	CO2	3	2	2	2	3	-	-	-	-	-	-	2	1

IV SEM														
SUB	CO	PO										PSO		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
MA8491 NM	CO1	1	1	1	-	-	-	-	-	-	-	-	1	-
	CO2	1	1	1	-	-	-	-	-	-	-	-	1	-
	CO3	2	1	1	-	-	-	-	-	-	-	-	1	-
	CO4	1	1	1	-	-	-	-	-	-	-	-	1	-
	CO5	1	1	1	-	-	-	-	-	-	-	-	1	-
CE8401 CTP	CO1	-	1	-	-	2	-	1	-	1	2	-	1	3
	CO2	-	1	-	-	2	-	1	-	1	2	-	1	3
	CO3	-	1	-	-	3	-	1	-	1	2	-	1	3
	CO4	-	1	-	-	3	-	1	-	1	2	-	1	3
	CO5	-	1	-	-	2	-	1	-	1	2	-	1	3
CE8402 SOM II	CO1	3	2	1	2	1	-	-	-	-	1	2	-	2
	CO2	2	3	2	1	1	-	-	-	-	-	2	-	2
	CO3	2	1	1	1	-	-	-	-	-	-	1	1	2
	CO4	2	1	1	1	1	-	-	-	-	-	1	-	2
	CO5	2	1	1	1	1	-	-	-	-	1	2	-	2
CE8403 AHE	CO1	2	1	-	1	-	-	1	1	2	1	-	-	-
	CO2	2	1	-	1	-	-	1	1	-	1	1	-	1
	CO3	1	1	-	1	-	-	1	-	1	1	1	-	-
	CO4	1	1	-	1	-	-	1	1	1	-	-	-	1
	CO5	2	1	-	1	-	-	1	1	2	1	-	-	1
CE8404 CT	CO1	1	1	-	1	-	-	1	1	1	1	1	1	1
	CO2	-	1	-	1	-	-	-	1	1	-	-	1	-
	CO3	1	2	-	1	-	-	1	-	1	1	1	1	1
	CO4	1	1	-	1	-	-	1	1	-	1	2	-	1
	CO5	-	1	-	1	-	-	1	-	1	1	1	1	1
CE8491 SM	CO1	1	1	-	-	-	-	1	1	-	1	-	1	-
	CO2	1	1	-	-	-	-	1	1	1	2	1	-	1
	CO3	1	1	-	-	-	-	1	2	1	1	-	1	-
	CO4	1	1	-	-	-	-	1	1	-	1	1	1	1
	CO5	1	1	-	-	-	-	1	1	1	1	-	-	1
CE8481 SOM LAB	CO1	1	2	1	1	2	1	-	-	-	-	1	2	1
CE8461 HYE LAB	CO1	1	-	1	-	1	1	1	1	1	1	1	-	1
	CO2	1	-	2	-	1	1	1	1	1	1	1	2	1
HS8461	CO1	1	-	-	-	1	-	-	1	-	-	-	1	-
	CO2	1	-	-	-	-	-	-	-	-	1	-	1	1
	CO3	1	-	-	-	1	-	1	-	1	1	-	1	1
	CO4	1	-	-	-	-	-	1	1	-	1	-	1	1

V SEM

SUB	CO	PO										PSO		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CE8501 DRCCE	CO1	1	2	2	1	1	-	-	-	-	1	2	1	1
	CO2	1	2	2	1	1	-	-	-	-	1	2	1	1
	CO3	1	2	2	1	1	-	-	-	-	1	2	1	1
	CO4	1	2	2	1	1	-	-	-	-	1	2	1	1
	CO5	1	2	2	1	1	-	-	-	-	1	2	1	1
CE8502 SA I	CO1	3	3	2	1	1	-	-	-	1	1	1	-	1
	CO2	3	3	2	1	1	-	-	-	1	1	1	-	1
	CO3	3	3	2	1	1	-	-	-	1	1	1	-	1
	CO4	3	3	2	1	1	-	-	-	1	1	1	-	1
	CO5	3	3	2	1	1	-	-	-	1	1	1	-	1
EN8491 WSE	CO1	-	-	1	1	-	1	-	-	2	-	-	-	1
	CO2	-	-	1	1	-	-	-	-	2	-	-	-	1
	CO3	-	-	1	1	2	1	-	-	-	-	-	-	2
	CO4	-	-	1	-	1	1	-	-	-	-	-	-	2
	CO5	-	-	1	1	1	-	-	-	-	-	-	-	2
CE8591 FE	CO1	-	3	-	1	-	-	1	-	2	1	1	-	2
	CO2	-	3	-	2	-	-	1	-	1	-	1	-	2
	CO3	-	2	-	1	-	-	2	-	-	1	2	-	2
	CO4	-	1	-	2	-	-	2	-	-	-	2	-	2
	CO5	-	2	-	1	-	-	1	-	-	-	1	-	2
GI1084 GIS	CO1	-	-	1	1	-	2	-	-	-	-	1	1	1
	CO2	-	-	1	1	-	1	-	-	-	1	1	2	1
	CO3	-	-	-	-	-	-	-	-	-		2	1	1
	CO4	-	-	-	-	-	1	-	-	-	1	2	2	1
	CO5	-	-	-	1	-	1	-	-	-	-	1	2	1
OAI551 EAA	CO1	-	2	-	1	-	1	-	-	1	1	2	-	2
	CO2	-	2	-	1	-	1	-	-	1	1	2	-	2
CE8511 SM LAB	CO1	-	-	2	-	2	3	-	-	-	-	-	-	-
CE8512 WWE LAB	CO1	-	2	-	2	-	-	1	-	-	2	2	-	1
	CO2	-	2	-	3	-	-	1	-	-	2	3	2	1
	CO3	-	1	-	1	-	-	1	-	-	2	1	-	1

VI SEM														
SUB	CO	PO										PSO		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CE8601 DSS	CO1	1	2	2	1	1	-	-	-	-	1	2	1	1
	CO2	1	2	2	1	1	-	-	-	-	1	2	1	1
	CO3	1	2	2	1	1	-	-	-	-	1	2	1	1
	CO4	1	2	2	1	1	-	-	-	-	1	2	1	1
	CO5	1	2	2	1	1	-	-	-	-	1	2	1	1
CE8602 SA II	CO1	3	3	1	1	1	-	-	-	1	1	1	-	1
	CO2	3	3	1	1	1	-	-	-	1	1	1	-	1
	CO3	3	3	1	1	1	-	-	-	1	1	1	-	1
	CO4	3	3	1	1	1	-	-	-	1	1	1	-	1
	CO5	3	3	1	1	1	-	-	-	1	1	1	-	1
CE8603 IE	CO1	1	1	-	1	-	-	-	-	-	-	1	1	1
	CO2	1	1	-	1	-	-	-	-	-	-	1	2	-
	CO3	1	1	-	2	-	-	-	-	-	-	1	1	1
	CO4	1	1	-	1	-	-	-	-	-	-	-	2	1
	CO5	1	1	-	1	-	-	-	-	-	-	1	1	-
CE8604 HE	CO1	-	1	1	1	1	-	-		-	-	-	1	1
	CO2	-	1	1	1	-	-	-		-	-	1	1	1
	CO3	-	1	2	1	1	-	-		-	-	1	2	1
	CO4	-	2	1	-	1	-	-		-	-	1	1	-
	CO5	-	1	1	1	2	-	-		-	-	1	-	1
EN8592 WWE	CO1	1	1	-	1	-	-	-	-	-	-	1	1	1
	CO2	1	1	-	1	-	-	-	-	-	-	1	1	1
	CO3	1	-	-	1	-	-	-	-	-	-	1	1	2
	CO4	-	1	-	1	-	-	-	-	-	-	-	1	2
	CO5	1	1	-	1	-	-	-	-	-	-	1	1	2
CE8005 APCE	CO1	1	-	1	1	1	-	-	-	-	1	1	1	1
	CO2	1	-	1	-	1	-	-	-	1	1	1	1	1
CE8611 HE LAB	CO1	-	1	-	-	-	-	-	-	-	1	1	1	2
CE8612 IEED LAB	CO1	-	1	-	1	-	-	1	-	-	2	1	-	1

VII SEM														
SUB	CO	PO										PSO		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CE8701 ECVE	CO1	1	2	-	-	-	2	1	-	-	1	1	2	1
	CO2	1	2	-	-	-	1	1	-	-	1	1	2	1
	CO3	1	1	-	-	-	1	1	-	-	1	1	1	1
	CO4	1	1	-	-	-	1	1	-	-	1	1	1	1
	CO5	1	2	-	-	-	1	1	-	-	1	1	2	1
CE8702 RADHE	CO1	-	-	-	-	-	-	-	-	2	1	2	1	1
	CO2	-	1	1	-	-	2	-	-	-	-	1	1	1
	CO3	-	1	1	1	-	1	-	-	-	-	2	2	1
	CO4	-	1	-	1	-	1	-	-	-	-	1	2	1
	CO5	-	-	-	1	-	-	-	-	-	-	1	1	1
CE8703 SDD	CO1	1	1	2	2	-	1	-	-	-	-	1	-	1
	CO2	1	1	2	2	-	1	-	-	-	2	1	-	2
	CO3	1	1	2	2	-	1	-	-	-	1	1	-	2
	CO4	1	1	2	2	-	1	-	-	-	-	1	1	1
	CO5	1	1	2	2	-	1	-	-	-	-	1	1	1
CE8011 DPCS	CO1	2	1	1	1	1	-	-	-	1	2	1	1	1
	CO2	2	2	1	1	1	-	-	-	1	2	1	1	1
	CO3	1	2	1	1	1	-	-	-	1	2	2	1	1
	CO4	1	2	1	1	1	-	-	-	1	2	2	1	1
	CO5	1	2	1	1	1	-	-	-	1	2	2	1	1
OEN751 GBD	CO1	2	-	1	-	2	-	-	-	-	1	1	2	1
	CO2	1	-	-	2	1	-	-	-	-	-	1	2	1
	CO3	1	-	2	1	-	-	-	-	-	-	2	2	1
	CO4	1	-	-	2	1	-	-	-	-	1	2	2	1
	CO5	1	-	1	1	-	-	-	-	-	-	1	2	1

VIII SEM														
SUB	CO	PO										PSO		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
GE8076 PEE	CO1	1	-	-	1	1	-	-	-	-	1	1	1	1
	CO2	1	-	-	-	1	-	-	-	1	1	1	1	-
CE8022 PS	CO1	1	-	1	1	-	-	-	-	-	1	1	1	1
	CO2	1	-	1	-	1	-	-	-	1	1	1	1	-
CE8811 PW	CO1	-	2	-	2	-	-	2	-	-	2	1	2	2

KINGS
COLLEGE OF ENGINEERING
(NAAC Accredited Institution)
(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai)

CERT
ISO 9001

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

REGULATIONS 2017

CO-PO-PSO-PEO MAPPING

PO-COMPETENCY-PERFORMANCE INDICATORS

OBE IMPLEMENTATION – PROCESS REPORT

SEMESTERWISE PROGRAMME ARTICULATION MATRIX

ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS
B.E. COMPUTER SCIENCE AND ENGINEERING
REGULATIONS – 2017
CHOICE BASED CREDIT SYSTEM

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

1. To enable graduates to pursue higher education and research, or have a successful career in industries associated with Computer Science and Engineering, or as entrepreneurs. To ensure that graduates will have the ability and attitude to adapt to emerging technological changes.

PROGRAM OUTCOMES POs:

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 modeling 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 SPECIFIC OBJECTIVES (PSOs)

To analyze, design and develop computing solutions by applying foundational concepts of Computer Science and Engineering.

To apply software engineering principles and practices for developing quality software for scientific and business applications.

To adapt to emerging Information and Communication Technologies (ICT) to innovate ideas and solutions to existing/novel problems.

Mapping of POs/PSOs to PEOs

Contribution	1: Reasonable	2:Significant	3:Strong

	PEOs	
POs	1. Graduates will pursue higher education and research, or have a successful career in industries associated with Computer Science and Engineering, or as entrepreneurs.	2. Graduates will have the ability and attitude to adapt to emerging technological changes.
1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	3	1
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	1
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.	3	2
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.	3	2
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	2	3
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.	2	2

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.	2	1
8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	3	1
9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	3	2
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.	3	2
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.	2	2
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.	1	3

PSOs		
1. Analyze, design and develop computing solutions by applying foundational concepts of computer science and engineering.	3	1
2. Apply software engineering principles and practices for developing quality software for scientific and business applications.	3	1
3. Adapt to emerging information and communication technologies (ICT) to innovate ideas and solutions to existing/novel problems.	1	3

MAPPING OF COURSE OUTCOMES WITH PROGRAMME OUTCOMES

A broad relation between the Course Outcomes and Programme Outcomes is given in the following table

	Course Title	Programme Outcome (PO)											
		1	2	3	4	5	6	7	8	9	10	11	12
SEMESTER I	Communicative English								√	√	√		√
	Engineering Mathematics - I	√	√	√						√			
	Engineering Physics	√	√	√									
	Engineering Chemistry	√	√	√									
	Problem Solving and Python Programming	√	√	√									
	Engineering Graphics	√	√	√		√			√	√	√		√
	Problem Solving and Python Programming Laboratory	√	√	√		√			√	√	√		√
	Physics and Chemistry Laboratory	√	√	√					√	√	√		
SEMESTER II	Technical English								√	√	√		√
	Engineering Mathematics II	√	√	√						√			
	Physics for Information Science	√	√	√									
	Basic Electrical, Electronics and Measurement Engineering	√	√	√									
	Environmental Science and Engineering	√	√	√				√	√	√	√		√
	Programming in C	√	√	√					√	√	√		√
	Engineering Practices Laboratory	√	√	√	√	√	√		√	√	√		√
	C Programming Laboratory	√	√	√					√	√	√		√

PROGRAMME OUTCOME (PO)														
		COURSE TITLE	1	2	3	4	5	6	7	8	9	**10**	**11**	**12**
YEAR II	**SEMESTER III**	Discrete Mathematics	√	√	√						√			
		Digital Principles and Design	√	√	√									
		Data Structures	√	√	√									
		Object Oriented Programming	√	√	√									
		Communication Engineering	√	√	√									
		Data Structures Laboratory	√	√	√					√	√	√		√
		Object Oriented Programming Laboratory	√	√	√					√	√	√		√
		Digital Systems Laboratory	√	√	√			√		√	√	√		√
		Interpersonal Skills/Listening &Speaking								√	√	√		√
	SEMESTER IV	Probability and Queueing Theory	√	√	√						√	√		√
		Computer Architecture	√	√	√									
		Database Management Systems	√	√	√									
		Design and Analysis of Algorithms	√	√	√						√	√		√
		Operating Systems	√	√	√									
		Software Engineering	√	√	√		√	√		√	√	√		√
		Database Management Systems Laboratory	√	√	√					√	√	√		√
		Operating Systems Laboratory	√	√	√					√	√	√		√
		Advanced Reading and Writing								√	√	√		√

YEAR III	SEMESTER V	Algebra and Number Theory	√	√	√						√			
		Computer Networks	√	√	√									
		Microprocessors and Microcontrollers	√	√	√									
		Theory of Computation	√	√	√									
		Object Oriented Analysis and Design	√	√	√			√						
		Open Elective I												
		Microprocessors and Microcontrollers Laboratory	√	√	√					√	√	√		√
		Object Oriented Analysis and Design Laboratory	√	√	√		√	√		√	√	√		√
		Networks Laboratory	√	√	√					√	√	√		√
	SEMESTER VI	Internet Programming	√	√	√					√	√	√		√
		Artificial Intelligence	√	√	√									
		Mobile Computing	√	√	√									
		Compiler Design	√	√	√					√	√	√		√
		Distributed Systems	√	√	√									
		Professional Elective I												
		Internet Programming Laboratory	√	√	√		√			√	√	√		√
		Mobile Application Development Laboratory	√	√	√		√	√		√	√	√		√
		Mini Project	√	√	√	√	√	√	√	√	√	√	√	√
		Professional Communication						√				√		√
YEAR IV	SEMESTER VII	Principles of Management	√	√	√								√	
		Cryptography and Network Security	√	√	√									
		Cloud Computing	√	√	√									
		Open Elective II												

		Professional Elective II												
		Professional Elective III												
		Cloud Computing Laboratory	√	√	√		√			√	√	√		√
		Security Laboratory	√	√	√		√			√	√	√		√
	SEMESTER VIII	Professional Elective IV												
		Professional Elective V												
		Project Work	√	√	√	√	√	√	√	√	√	√	√	√

PROFESSIONAL ELECTIVES

SEM	COURSE TITLE	PROGRAMME OUTCOME (PO)											
		1	2	3	4	5	6	7	8	9	10	11	12
VI	Data Warehousing and Data Mining	√	√	√									
	Software Testing	√	√	√		√				√	√		
	Embedded Systems	√	√	√									
	Agile Methodologies	√	√	√									
	Graph Theory and Applications-	√	√	√									
	Intellectual Property Rights						√	√	√	√	√	√	√
	Digital Signal Processing	√	√	√									
VII	Big Data Analytics	√	√	√		√				√	√		
	Machine Learning Techniques	√	√	√		√				√	√		
	Computer Graphics and Multimedia	√	√	√									
	Software Project Management	√	√	√			√		√	√	√	√	√
	Internet of Things	√	√	√									
	Service Oriented Architecture	√	√	√									
	Total Quality Management	√	√	√								√	
	Multi-core Architectures and Programming	√	√	√									
	Human Computer Interaction	√	√	√									
	C# and .Net Programming	√	√	√		√				√	√		
	Wireless Adhoc and Sensor Networks	√	√	√									
	Advanced Topics on Databases	√	√	√									
	Foundation Skills in Integrated Product Development	√	√	√									
	Human Rights	√	√	√									
	Disaster Management	√	√	√				√					
VIII	Digital Image Processing	√	√	√									
	Social Network Analysis	√	√	√									
	Information Security	√	√	√					√				
	Software Defined Networks	√	√	√									
	Cyber Forensics	√	√	√					√				
	Soft Computing	√	√	√									
	Professional Ethics in Engineering						√	√	√	√	√		√
	Information Retrieval Techniques	√	√	√									
	Green Computing	√	√	√									
	GPU Architecture and Programming	√	√	√									
	Natural Language Processing	√	√	√									
	Parallel Algorithms	√	√	√									
	Speech Processing	√	√	√									
	Fundamentals of Nanoscience	√	√	√									

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
REGULATIONS 2017
PO – COMPETENCY-PERFORMANCE INDICATORS

PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialisation for the solution of complex engineering problems.	
Competency	**Indicators**
1.1 Demonstrate competence in mathematical modelling	1.1.1 Apply the knowledge of discrete structures, linear algebra, statistics and numerical techniques to solve problems 1.1.2 Apply the concepts of probability, statistics and queuing theory in modeling of computer-based system, data and network protocols.
1.2 Demonstrate competence in basic sciences	1.2.1 Apply laws of natural science to an engineering problem
1.3 Demonstrate competence in engineering fundamentals	1.3.1 Apply engineering fundamentals
1.4 Demonstrate competence in specialized engineering knowledge to the program	1.4.1 Apply theory and principles of computer science and engineering to solve an engineering problem
PO 2: Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	
Competency	**Indicators**
2.1 Demonstrate an ability to identify and formulate complex engineering problem	2.1.1 Evaluate problem statements and identifies objectives 2.1.2 Identify processes/modules/algorithms of a computer-based system and parameters to solve a problem 2.1.3 Identify mathematical algorithmic knowledge that applies to a given problem
2.2 Demonstrate an ability to formulate a solution plan and methodology for an engineering problem	2.2.1 Reframe the computer-based system into interconnected subsystems 2.2.2 Identify functionalities and computing resources. 2.2.3 Identify existing solution/methods to solve the problem, including forming justified approximations and assumptions 2.2.4 Compare and contrast alternative solution/methods to select the best methods 2.2.5 Compare and contrast alternative solution processes to select the best process.
2.3 Demonstrate an ability to formulate and interpret a model	2.3.1 Able to apply computer engineering principles to formulate modules of a system with required applicability and performance. 2.3.2 Identify design constraints for required performance criteria.
2.4 Demonstrate an ability to execute a solution process and analyze results	2.4.1 Applies engineering mathematics to implement the solution. 2.4.2 Analyze and interpret the results using contemporary tools. 2.4.3 Identify the limitations of the solution and sources/causes. 2.4.4 Arrive at conclusions with respect to the objectives.

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 public health and safety, and cultural, societal, and environmental considerations.	
Competency	**Indicators**
3.1 Demonstrate an ability to define a complex/ open-ended problem in engineering terms	3.1.1 Able to define a precise problem statement with objectives and scope. 3.1.2 Able to identify and document system requirements from stake- holders. 3.1.3 Able to review state-of-the-art literature to synthesize system requirements. 3.1.4 Able to choose appropriate quality attributes as defined by ISO/IEC/IEEE standard. 3.1.5 Explore and synthesize system requirements from larger social and professional concerns. 3.1.6 Able to develop software requirement specifications (SRS).
3.2 Demonstrate an ability to generate a diverse set of alternative design solutions	3.2.1 Able to explore design alternatives. 3.2.2 Able to produce a variety of potential design solutions suited to meet functional requirements. 3.2.3 Identify suitable non-functional requirements for evaluation of alternate design solutions.
3.3 Demonstrate an ability to select optimal design scheme for further development	3.3.1 Able to perform systematic evaluation of the degree to which several design concepts meet the criteria. 3.3.2 Consult with domain experts and stakeholders to select candidate engineering design solution for further development
3.4 Demonstrate an ability to advance an engineering design to defined end state	3.4.1 Able to refine architecture design into a detailed design within the existing constraints. 3.4.2 Able to implement and integrate the modules. 3.4.3 Able to verify the functionalities and validate the design.
PO 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.	
Competency	**Indicators**
4.1 Demonstrate an ability to conduct investigations of technical issues consistent with their level of knowledge and understanding	4.1.1 Define a problem for purposes of investigation, its scope and importance 4.1.2 Able to choose appropriate procedure/algorithm, dataset and test cases. 4.1.3 Able to choose appropriate hardware/software tools to conduct the experiment.
4.2 Demonstrate an ability to design experiments to solve open-ended problems	4.2.1 Design and develop appropriate procedures/methodologies based on the study objectives
4.3 Demonstrate an ability to analyze data and reach a valid conclusion	4.3.1 Use appropriate procedures, tools and techniques to collect and analyze data 4.3.2 Critically analyze data for trends and correlations, stating possible errors and limitations 4.3.3 Represent data (in tabular and/or graphical forms) so as to facilitate analysis and explanation of the data, and drawing of conclusions 4.3.4 Synthesize information and knowledge about the problem from the raw data to reach appropriate 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.	
Competency	**Indicators**
5.1 Demonstrate an ability to identify/create modern engineering tools, techniques and resources	5.3.1 Identify modern engineering tools, techniques and resources for engineering activities 5.3.2 Create/adapt/modify/extend tools and techniques to solve engineering problems
5.2 Demonstrate an ability to select and apply discipline-specific tools, techniques and resources	5.2.1 Identify the strengths and limitations of tools for (i) acquiring information, (ii) modeling and simulating, (iii) monitoring system performance, and (iv) creating engineering designs. 5.2.2 Demonstrate proficiency in using discipline-specific tools
5.3 Demonstrate an ability to evaluate the suitability and limitations of tools used to solve an engineering problem	5.3.1 Discuss limitations and validate tools, techniques and resources 5.3.2 Verify the credibility of results from tool use with reference to the accuracy and limitations, and the assumptions inherent in their use.
PO 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.	
Competency	**Indicators**
6.1 Demonstrate an ability to describe engineering roles in a broader context, e.g. pertaining to the environment, health, safety, legal and public welfare	6.1.1 Identify and describe various engineering roles; particularly as pertains to protection of the public and public interest at the global, regional and local level
6.2 Demonstrate an understanding of professional engineering regulations, legislation and standards	6.2.1 Interpret legislation, regulations, codes, and standards relevant to your discipline and explain its contribution to the protection of the public
PO 7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and the need for sustainable development.	
Competency	**Indicators**
7.1 Demonstrate an understanding of the impact of engineering and industrial practices on social, environmental and in economic contexts	7.1.1 Identify risks/impacts in the life-cycle of an engineering product or activity 7.1.2 Understand the relationship between the technical, socio-economic and environmental dimensions of sustainability
7.2 Demonstrate an ability to apply principles of sustainable design and development	7.2.1 Describe management techniques for sustainable development 7.2.2 Apply principles of preventive engineering and sustainable development to an engineering activity or product relevant to the discipline
PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	
Competency	**Indicators**
8.1 Demonstrate an ability to recognize ethical dilemmas	8.1.1 Identify situations of unethical professional conduct and propose ethical alternatives
8.2 Demonstrate an ability to apply the Code of Ethics	8.2.1 Identify tenets of the ASME professional code of ethics 8.2.2 Examine and apply moral & ethical principles to known case studies
PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in div teams, and in multidisciplinary settings.	

Competency	Indicators
9.1 Demonstrate an ability to form a team and define a role for each member	9.1.1 Recognize a variety of working and learning preferences; appreciate the value of diversity on a team 9.1.2 Implement the norms of practice (e.g. rules, roles, charters, agendas, etc.) of effective team work, to accomplish a goal.
9.2 Demonstrate effective individual and team operations-- communication, problem-solving, conflict resolution and leadership skills	9.2.1 Demonstrate effective communication, problem-solving, conflict resolution and leadership skills 9.2.2 Treat other team members respectfully 9.2.3 Listen to other members 9.2.4 Maintain composure in difficult situations
9.3 Demonstrate success in a team-based project	9.3.1 Present results as a team, with smooth integration of contributions from all individual efforts
PO 10: Communication: Communicate effectively on complex engineering activities with the enginee community and with the society at large, such as being able to comprehend and write effective reports design documentation, make effective presentations, and give and receive clear instructions	
Competency	**Indicators**
10.1 Demonstrate an ability to comprehend technical literature and document project work	10.1.1 Read, understand and interpret technical and non-technical information 10.1.2 Produce clear, well-constructed, and well-supported written engineering documents 10.1.3 Create flow in a document or presentation - a logical progression of ideas so that the main point is clear
10.2 Demonstrate competence in listening, speaking, and presentation	10.2.1 Listen to and comprehend information, instructions, and viewpoints of others 10.2.2 Deliver effective oral presentations to technical and non-technical audiences
10.3 Demonstrate the ability to integrate different modes of communication	10.3.1 Create engineering-standard figures, reports and drawings to complement writing and presentations 10.6.2 Use a variety of media effectively to convey a message in a document or a presentation
PO 11: Project management and finance: Demonstrate knowledge and understanding of the engineering management principles and apply these to one's work, as a member and leader in a team, to manage projects in multidisciplinary environments.	
Competency	**Indicators**
11.1 Demonstrate an ability to evaluate economic and financial performance of engineering activity	11.1.1 Describe various economic and financial costs/benefits of an engineering activity 11.1.2 Analyze different forms of financial statements to evaluate the financial status of an engineering project
11.2 Demonstrate an ability to compare and contrast the costs/benefits of alternate proposals for an engineering activity	11.2.1 Analyze and select the most appropriate proposal based on economic and financial considerations.
11.3 Demonstrate an ability to plan/manage an engineering activity within time and budget constraints	11.3.1 Identify the tasks required to complete an engineering activity, and the resources required to complete the tasks. 11.3.2 Use project management tools to schedule an engineering project, so it is completed on time and on budget.

PO 12: Life-long learning: Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	
Competency	**Indicators**
12.1 Demonstrate an ability to identify gaps in knowledge and a strategy to close these gaps	12.1.1 Describe the rationale for the requirement for continuing professional development 12.1.2 Identify deficiencies or gaps in knowledge and demonstrate an ability to source information to close this gap
12.2 Demonstrate an ability to identify changing trends in engineering knowledge and practice	12.2.1 Identify historic points of technological advance in engineering that required practitioners to seek education in order to stay current 12.2.2 Recognize the need and be able to clearly explain why it is vitally important to keep current regarding new developments in your field
12.3 Demonstrate an ability to identify and access sources for new information	12.3.1 Source and comprehend technical literature and other credible sources of information 12.3.2 Analyze sourced technical and popular information for feasibility

6/11/20
PAC INTERNAL MEMBER

6/11/2020
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COLLEGE OF ENGINEERING
(NAAC Accredited Institution)
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TUVRheinland CERT ISO 9001

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
PROGRAM ARTICULATION MATRIX
REGULATION 2017

Year / Sem	Subject Name	CO	Programme Outcome (PO)												PSO 1	PSO 2	PSO 3
			1	2	3	4	5	6	7	8	9	10	11	12			
I / I	HS8151 - Communicative English	CO1	-	-	-	-	-	-	-	-	1	2	-	3	-	-	3
		CO2	-	-	-	-	-	-	-	-	2	2	-	2	-	-	2
		CO3	-	-	-	-	-	-	-	-	2	1	-	-	-	-	-
		CO4	-	-	-	-	-	-	-	-	1	3	-	1	-	-	2
	MA8151 - Engineering Mathematics - I	CO1	2	2	1	-	-	-	-	-	-	-	-	-	2	2	-
		CO2	1	1	1	-	-	-	-	-	-	-	-	-	1	1	-
		CO3	2	1	2	-	-	-	-	-	-	-	-	-	2	2	-
		CO4	2	2	1	-	-	-	-	-	-	-	-	-	1	2	-
		CO5	2	1	2	-	-	-	-	-	-	-	-	-	1	2	-
		CO6	1	2	1	-	-	-	-	-	-	-	-	-	1	2	-
		CO7	2	2	1	-	-	-	-	-	-	-	-	-	1	2	-
	PH8151 - Engineering Physics	CO1	1	1	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO2	1	1	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO3	1	1	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO4	1	1	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO5	1	1	1	-	-	-	-	-	-	-	-	-	1	-	-
	CY8151 - Engineering Chemistry	CO1	2	1	2	-	-	-	-	-	-	-	-	-	1	1	
	GE8151 - Problem Solving & Python Programming	CO1	1	2	1	-	-	-	-	-	-	-	-	-	2	2	1
		CO2	1	1	1	-	-	-	-	-	-	-	-	-	2	2	-
		CO3	1	2	1	-	-	-	-	-	-	-	-	-	1	1	1
		CO4	1	2	2	-	-	-	-	-	-	-	-	-	2	2	1
		CO5	1	2	2	-	-	-	-	-	-	-	-	-	2	2	1
		CO6	1	2	1	-	-	-	-	-	-	-	-	-	1	1	-
	GE8152 - Engineering Graphics	CO1	2	2	3	-	2	-	-	3	2	3	-	2	1	-	2
		CO2	1	3	2	-	2	-	-	2	2	3	-	2	-	-	3
		CO3	2	1	3	-	2	-	-	1	3	2	-	3	-	-	-
		CO4	3	3	3	-	2	-	-	2	2	3	-	3	1	-	-
		CO5	3	2	2	-	1	-	-	2	2	3	-	2	-	-	2
	GE8161 - PSPP LAB	CO1	3	2	1	-	2	-	-	3	3	1	-	1	2	2	2
		CO2	2	2	2	-	1	-	-	2	2	1	-	1	2	2	1
		CO3	2	2	2	-	1	-	-	2	1	1	-	1	2	2	1
		CO4	2	2	1	-	1	-	-	2	1	1	-	1	2	1	1
		CO5	1	1	1	-	1	-	-	1	1	1	-	1	2	1	1
	BS8161 - Physics & Chemistry Lab	CO1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-

Year / Sem	Subject Name	CO	Programme Outcome (PO)												PSO 1	PSO 2	PSO 3
			1	2	3	4	5	6	7	8	9	10	11	12			
I / II	HS8251 - Technical English	CO1	-	-	-	-	-	-	-	2	1	2	-	3	-	-	1
		CO2	-	-	-	-	-	-	-	1	2	2	-	2	-	-	2
		CO3	-	-	-	-	-	-	-	2	2	1	-	1	-	-	1
		CO4	-	-	-	-	-	-	-	2	1	3	-	1	-	-	1
	MA8251 - Engineering Mathematics - II	CO1	1	1	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO2	1	2	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO3	2	2	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO4	2	2	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO5	2	2	1	-	-	-	-	-	-	-	-	-	1	-	-
	PH8252 - Physics for Information Science	CO1	1	1	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO2	1	1	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO3	2	2	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO4	2	2	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO5	2	2	1	-	-	-	-	-	-	-	-	-	1	-	-
	BE8255 - Basic Electrical, Electronics and Measurement Engineering	CO1	3	3	3	-	-	-	-	-	-	-	-	-	3	2	2
		CO2	3	3	3	-	-	-	-	-	-	-	-	-	3	2	2
		CO3	3	3	3	-	-	-	-	-	-	-	-	-	3	2	2
		CO4	3	3	3	-	-	-	-	-	-	-	-	-	3	2	2
	GE8291 - Environmentatl Science & Engineering	CO1	2	2	-	-	-	-	2	1	-	-	-	1	2	1	-
		CO2	-	2	-	-	-	-	1	-	-	-	-	-	1	1	-
		CO3	-	2	-	-	-	-	1	-	-	-	-	-	1	1	-
		CO4	-	-	-	-	-	-	2	-	-	-	-	-	1	1	-
	CS8251 - Programming in C	CO1	1	2	1	-	-	-	-	-	1	1	-	-	1	2	1
		CO2	1	2	1	-	-	-	-	1	1	1	-	-	2	2	2
		CO3	1	2	1	-	-	-	-		1	1	-	-	2	2	2
		CO4	2	2	1	-	-	-	-	-	-	1	-	-	1	2	2
		CO5	1	2	1	-	-	-	-	-	-	1	-	-	2	2	2
	GE8261 - Engineering Practices Laboratory	CO1	3	3	2	3	2	2	-	2	2	2	-	-	3	2	1
		CO2	3	3	2	2	2	2	-	2	1	1	-	2	3	2	1
		CO3	3	3	2	2	2	2	-	1	1	1	-	2	3	2	1
		CO4	3	3	2	2	2	1	-	2	2	1	-	2	3	2	1
		CO5	3	3	2	2	1	1	-	1	1	1	-	2	3	2	1
		CO6	3	3	2	2	1	1	-	1	2	1	-	2	3	2	1
		CO7	3	3	2	2	1	2	-	2	1	1	-	2	3	2	1
		CO8	3	3	2	2	2	2	-	2	3	1	-	2	3	2	1
	CS8261 - C Programming Laboratory	CO1	2	2	1	-	-	-	-	1	1	1			1	2	1
		CO2	1	2	2	-	-	-	-	1	1	1		1	2	2	1
		CO3	1	2	2	-	-	-	-	-	1	1		1	2	2	2

Year / Sem	Subject Name	CO	Programme Outcome (PO)														
			1	2	3	4	5	6	7	8	9	10	11	12	PSO 1	PSO 2	PSO 3
II / III	MA8351- Discrete Mathematics	CO1	1	2	2	-	-	-	-	-	1	-	-	-	2	-	1
		CO2	1	1	-	-	-	-	-	-	1	-	-	-	1	2	-
		CO3	2	1	-	-	-	-	-	-	1	-	-	-	1	-	-
		CO4	2	2	1	-	-	-	-	-	-	-	-	-	1	1	-
		CO5	1	1	-	-	-	-	-	-	-	-	-	-	1	-	-
	CS8351- Digital Principles and System Design	CO1	3	3	2	-	-	-	-	-	-	-	-	-	2	-	-
		CO2	3	3	3	-	-	-	-	-	-	-	-	-	3	-	-
		CO3	2	2	3	-	-	-	-	-	-	-	-	-	2	-	-
		CO4	1	2	1	-	-	-	-	-	-	-	-	-	1	-	3
	CS8391- Data Structures	CO1	1	2	1	-	-	-	-	-	-	-	-	-	2	2	1
		CO2	2	3	1	-	-	-	-	-	-	-	-	-	2	2	2
		CO3	2	3	1	-	-	-	-	-	-	-	-	-	2	2	1
	CS8392- Object Oriented Programming	CO1	1	3	1	-	-	-	-	-	-	-	-	-	3	1	1
		CO2	1	3	2	-	-	-	-	-	-	-	-	-	2	2	1
		CO3	1	3	2	-	-	-	-	-	-	-	-	-	2	2	1
		CO4	1	3	2	-	-	-	-	-	-	-	-	-	2	2	1
		CO5	1	3	2	-	-	-	-	-	-	-	-	-	2	2	1
	EC8395- Communication Engineering	CO1	3	2	2	-	-	-	-	-	-	-	-	-	2	2	3
		CO2	3	3	3	-	-	-	-	-	-	-	-	-	3	2	3
		CO3	3	3	3	-	-	-	-	-	-	-	-	-	3	2	3
		CO4	3	3	3	-	-	-	-	-	-	-	-	-	3	2	3
	CS8381- Data Structures Lab	CO1	3	3	1	-	-	-	-	-	-	-	-	-	3	1	1
		CO2	3	3	1	-	-	-	-	-	-	-	-	-	3	2	1
		CO3	3	3	1	-	-	-	-	-	-	-	-	-	3	3	1
		CO4	3	3	1	-	-	-	-	-	-	-	-	-	3	-	-
	CS8383- OOP Lab	CO1	3	2	2	-	-	-	-	3	2	2	-	2	3	1	1
		CO2	3	3	3	-	-	-	-	2	2	2	-	2	3	2	1
		CO3	3	2	2	-	-	-	-	2	2	2	-	2	3	3	2
	CS8382-Digital Systems Lab	CO1	2	2	1	-	-	-	-	-	-	-	-	-	2	-	-
		CO2	1	2	1	-	-	-	-	-	-	-	-	-	2	-	-
		CO3	1	2	1	-	-	-	-	-	-	-	-	-	2	-	-
		CO4	1	-	1	-	-	2	-	-	-	-	-	-	1	-	2
	HS8381- Interpersonal skills/ listening & speaking	CO1	-	-	-	-	-	-	-		1	1	-	2	-	-	
		CO2	-	-	-	-	-	-	-	2	3	2	-		-	-	2
		CO3	-	-	-	-	-	-	-		2	1	-	1	-	-	2
		CO4	-	-	-	-	-	-	-	1	1	2	-	1	-	-	1
II / IV	MA8402 - Probability & Queueing Theory	CO1	2	1	1	-	-	-	-	-	-	1	-	-	1	-	-
		CO2	2	1	1	-	-	-	-	-	-	1	-	-	1	-	-
		CO3	2	1	1	-	-	-	-	-	-	1	-	1	1	1	-
		CO4	2	1	1	-	-	-	-	-	-	2	-	2	1	1	-
		CO5	2	1	1	-	-	-	-	-	-	2	-	2	1	1	-
	CS8491 - Computer Architecture	CO1	1	2	2	-	-	-	-	-	-	-	-	-	2	-	-
		CO2	1	2	1	-	-	-	-	-	-	-	-	-	2	-	-
		CO3	1	2	2	-	-	-	-	-	-	-	-	-	2	-	-
		CO4	1	2	2	-	-	-	-	-	-	-	-	-	2	-	-
		CO5	1	2	2	-	-	-	-	-	-	-	-	-	2	-	-

Year / Sem	Subject Name	CO	Programme Outcome (PO)														
			1	2	3	4	5	6	7	8	9	10	11	12	PSO 1	PSO 2	PSO 3
	CS8492 - Database Management Systems	CO1	1	2	2	-	-	-	-	-	-	-	-	-	2	-	-
		CO2	1	2	1	-	-	-	-	-	-	-	-	-	2	-	-
		CO3	1	2	2	-	-	-	-	-	-	-	-	-	2	-	-
		CO4	1	2	2	-	-	-	-	-	-	-	-	-	2	-	-
		CO5	1	2	2	-	-	-	-	-	-	-	-	-	2	-	-
	CS8451 - Design & Analysis of Algorithm	CO1	2	1	1	-	-	-	-	-	1	1	-	1	2	2	-
		CO2	2	1	1	-	-	-	-	-	2	2	-	2	2	2	-
		CO3	2	2	1	-	-	-	-	-	2	1	-	1	2	2	-
		CO4	3	2	2	-	-	-	-	-	1	2	-	1	2	2	-
	CS8493 - Operating System	CO1	2	1	2	-	-	-	-	-	-	-	-	-	2	2	-
		CO2	2	1	2	-	-	-	-	-	-	-	-	-	2	2	-
		CO3	1	1	1	-	-	-	-	-	-	-	-	-	2	2	-
		CO4	1	1	1	-	-	-	-	-	-	-	-	-	1	1	-
		CO5	1	1	1	-	-	-	-	-	-	-	-	-	1	1	-
		CO6	1	1	1	-	-	-	-	-	-	-	-	-	1	1	-
	CS8494 - Software Engineering	CO1	1	2	1	-	1	1	-		1	1	-		1	2	-
		CO2	1	2	-	-	1		-			1	-		1	2	-
		CO3	1	2	-	-	1		-	1		1	-	1	1	2	-
		CO4	-	-	2	-	1		-		1	2	-	-	1	2	-
		CO5	1	2	2	-	-	-	-	-			-	-	1	2	-
		CO6	1	2		-	-	-	-	-	2	2	-	-	1	2	-
	CS8481 - DBMS Lab	CO1	3	2	2	-	-	-	-	-	-	-	-	-	2	2	-
		CO2	3	2	2	-	-	-	-	-	-	-	-	-	2	2	-
		CO3	3	2	2	-	-	-	-	-	-	-	-	-	2	2	-
		CO4	3	2	2	-	-	-	-	-	-	-	-	-	2	2	-
		CO5	3	2	2	-	-	-	-	-	-	-	-	-	2	2	-
	CS8461 - OS Lab	CO1	3	2	2	-	-	-	-	2	2	2	-	1	3	2	1
		CO2	3	2	2	-	-	-	-	2	2	2	-	1	3	2	1
		CO3	3	2	2	-	-	-	-	2	2	2	-	1	3	2	1
		CO4	3	2	2	-	-	-	-	2	2	2	-	1	3	2	1
		CO5	3	2	2	-	-	-	-	2	1	1	-	1	3	2	1
		CO6	3	2	2	-	-	-	-	2	2	2	-	1	3	2	1
	HS8461 - Advanced Reading & Writing	CO1	-	-	-	-	-	-	-	2	1	2	-	2	-	-	1
		CO2	-	-	-	-	-	-	-	1	1	2	-	1	-	-	1
		CO3	-	-	-	-	-	-	-	3	2	1	-	2	-	-	2
		CO4	-	-	-	-	-	-	-	2	1	2	-	1	-	-	1

Year / Sem	Subject Name	CO	Programme Outcome (PO)														
			1	2	3	4	5	6	7	8	9	10	11	12	PSO 1	PSO 2	PSO 3
III / V	MA8551-Algebra and Number Theory	CO1	2	1	1	-	-	-	-	-	1	-	-	-	1	-	1
		CO2	2	1	1	-	-	-	-	-	1	-	-	-	1	-	-
		CO3	2	2	2	-	-	-	-	-	2	-	-	-	1	-	2
		CO4	2	1	2	-	-	-	-	-	1	-	-	-	1	1	2
		CO5	2	2	1	-	-	-	-	-	1	-	-	-	1	1	2
	CS8591-Computer Networks	CO1	2	1	-	-	-	-	-	-	-	-	-	-	2	-	-
		CO2	2	2	-	-	-	-	-	-	-	-	-	-	2	-	-
		CO3	1	1	-	-	-	-	-	-	-	-	-	-	2	-	-
		CO4	2	3	1	-	-	-	-	-	-	-	-	-	2	1	1
		CO5	2	3	1	-	-	-	-	-	-	-	-	-	2	1	1
		CO6	1	2	1	-	-	-	-	-	-	-	-	-	2	-	-
	EC8691-Microprocessor and Microcontroller	CO1	2	2	2	-	-	-	-	-	-	-	-	-	2	2	-
		CO2	2	2	2	-	-	-	-	-	-	-	-	-	2	2	-
		CO3	2	2	2	-	-	-	-	-	-	-	-	-	2	2	-
		CO4	2	2	2	-	-	-	-	-	-	-	-	-	2	2	1
	CS8501-Theory of Computation	CO1	1	2	2	-	-	-	-	-	-	-	-	-	2	1	1
		CO2	1	2	1	-	-	-	-	-	-	-	-	-	2	1	1
		CO3	1	1	1	-	-	-	-	-	-	-	-	-	2	1	1
		CO4	1	2	1	-	-	-	-	-	-	-	-	-	2	1	1
		CO5	1	1	1	-	-	-	-	-	-	-	-	-	2	1	1
	CS8592-Object Oriented Analysis and Design	CO1	1	3	3	-	1	-	-	-	-	-	-	-	1	2	-
		CO2	1	3	3	-	1	-	-	-	-	-	-	-	3	3	-
		CO3	1	2	2	-	-	-	-	-	-		-	-	2	2	-
		CO4	1	3	3	-	1	-	-	-	-		-	-	3	3	-
		CO5	1	3	1	-	1	-	-	-	-	-	-	-	2	2	-
	OMF551-Product Design and Development	CO1	1	2	2	-	-	-	1	-	2	-	1	-	2	-	1
	EC8681-MPMC Lab	CO1	2	2	2	-	-	-	-	-	3	-	-	-	3	-	3
		CO2	2	2	2	-	-	-	-	-	3	-	-	-	2	-	2
		CO3	2	2	2	-	-	-	-	1	3	3	-	2	2	2	2
		CO4	2	2	2	-	-	-	-	-	3	3	-	2	2	2	2
		CO5	2	2	2	-	-	-	-	-	3	3	-	2	2	2	2
	CS8582 - OOAD Lab	CO1	3	2	2	-	3	-	-	-	-	-	-	-	1	3	-
		CO2	2	1	1	-	2	-	-	-	-	-	-	-	3	2	-
		CO3	3	2	2	-	3	-	-	-	-	-	-	-	2	2	-
		CO4	3	2	2	-	1	-	-	-	-	-	-	-	1	1	-
	CS8581 - Networks Lab	CO1	3	-	3	-	-	-	-	-	-	2	-	-	3	-	-
		CO2	3	2	-	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	2	-	-	-	-	-	-	-	-	-	2	-	-	3
		CO4	3	2	2	-	-	-	-		1	-	-	-	-	-	3
		CO5	3			-	-	-	-	2		-	-		3	-	

Year / Sem	Subject Name	CO	Programme Outcome (PO)													
			1	2	3	4	5	6	7	8	9	10	11	12	PSO 1	PSO 2	PSO 3
III / VI	CS8651 - Internet Programming	CO1	2	1	2	-	-	-	-	-	-	-	-	-	2	2	-
		CO2	3	2	2		-	-	-	-	-	-	-	-	1	1	-
		CO3	2	1	1	-	-	-	-	-	-	-	-	-	2	2	-
		CO4	2	1	1	-	-	-	-	-	-	-	-	-	2	2	
		CO5	2	2	2	-	-	-	-	-	-	-	-	-	2	2	
	CS8691 - Artificial Intelligence	CO1	1	2	1	-	-	-	-	-	-	-	-	-	2		1
		CO2	1	1	1	-	-	-	-	-	-	-	-	-	2		1
		CO3	1	2	1	-	-	-	-	-	-	-	-	-	2		1
		CO4	1	2	2	-	-	-	-	-	-	-	-	-	2		1
		CO5	1	2	2	-	-	-	-	-	-	-	-	-	2		1
	CS8601- Mobile Computing	CO1	2	1	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO2	2	1	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO3	2	1	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO4	2	1	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO5	2	1	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO6	3	2	2	-	-	-	-	-	-	-	-	-	1	-	-
	CS8602 - Compiler Design	CO1	1	2	1	-	-	-	-	1	1	1	-	1	2	1	1
		CO2	1	2	2	-	-	-	-	1	1	1	-	1	2	2	1
		CO3	1	2	2	-	-	-	-	1	1	1	-	1	2	2	1
		CO4	1	2	2	-	-	-	-	1	1	1	-	1	2	1	1
		CO5	1	2	2	-	-	-	-	1	1	1	-	1	2	1	1
		CO6	1	2	2	-	-	-	-	1	1	1	-	2	2	2	1
	CS8603- Distributed System	CO1	1	2	2	-	-	-	-	-	-	-	-	-	2	-	-
		CO2	1	2	1	-	-	-	-	-	-	-	-	-	2	-	-
		CO3	1	2	2	-	-	-	-	-	-		-	-	2	-	-
		CO4	1	2	2	-	-	-	-	-	-		-	-	2	-	-
		CO5	1	2	2	-	-	-	-	-	-	-	-	-	2	-	-
	IT8076 - Software Testing	CO1	1	1	1	-	1	-	-	-	1	2	-	-	1	-	-
		CO2	1	1	1	-	1	-	-	-	1	2	-	-	1	-	-
		CO3	1	1	1	-	1	-	-	-	1	2	-	-	1	-	-
		CO4	1	1	1	-	1	-	-	-	1	3	-	-	1	-	-
		CO5	1	1	1	-	2	-	-	-			-	-	-	-	1
		CO6	1	1	1	-	1	-	-	-	1	2	-	-	1		-
	CS8661 - Internet Programming Lab	CO1	3	2	2	-	-	-	-	-	-	-	-	-	2	2	-
		CO2	3	2	2	-	-	-	-	-	-	-	-	-	2	2	-
		CO3	3	2	2	-	-	-	-	-	-	-	-	-	2	2	-
		CO4	3	2	2	-	-	-	-	-	-	-	-	-	2	3	-
		CO5	3	2	2	-	-	-	-	-	-	-	-	-	2	2	-
	CS8662- Mobile Application Development Lab	CO1	1	2	2	-	2	-	-	-	-	-	-	-	1	1	-
		CO2	1	1	1	-	2	-	-	-	-	-	-	-	1	1	-
		CO3	1	2	2	-	2	-	-	-	-	-	-	-	1	1	-
		CO4	1	2	2	-	1	-	-	-	-	-	-	-	1	1	-
		CO5	1	2	2	-	2	1	-	1	2	1	-	1	1	1	1
	CS8681 - Mini Project	CO1	2	3	2	3	1	2	2	1	2	2	1	1	2	2	2

	Subject Name	CO	Programme Outcome (PO)														
			1	2	3	4	5	6	7	8	9	10	11	12	PSO 1	PSO 2	PSO 3
	HS8581- Professional Communication	CO1	-	-	-	-	-	2	-	-	-	2	-	2	-	-	1
		CO2	-	-	-	-	-	1	-	-	-	2	-	1	-	-	1
		CO3	-	-	-	-	-	3	-	-	-	1	-	2	-	-	2
		CO4	-	-	-	-	-	2	-	-	-	2	-	1	-	-	1
IV / VII	MG8591 - Principles of Management	CO1	2	2	1	-	-	-	-	-	-	-	2	-	-	1	1
	CS8792 - Cryptography and Network Security	CO1	3	2	1	-	-	-	-	-	-	-	-	-	3	2	-
		CO2	3	2	1	-	-	-	-	-	-	-	-	-	2	3	-
		CO3	3	2	1	1	-	-	-	-	-	-	-	-	2	3	-
		CO4	3	3	2	-	-	-	-	-	-	-	-	-	2	3	-
		CO5	3	3	2	-	-	-	-	-	-	-	-	-	2	2	-
	CS8791 - Cloud Computing	CO1	2	2	3	-	-	-	-	-	-	-	-	-	3	-	1
		CO2	1	2	3	-	-	-	-	-	-	-	-	-	3	-	1
		CO3	1	2	3	-	-	-	-	-	-	-	-	-	2	-	1
		CO4	-	-	3	-	-	-	-	-	-	-	-	-	2	-	1
		CO5	1	2	3	-	-	-	-	-	-	-	-	-	2	-	1
		CO6	-	1	2	-	-	-	-	-	-	-	-	-	3	-	-
	OME752 - Supply Chain Management	CO1	-	-	1	-	-	2	-	-	-	-	-	-	1	-	-
		CO2	-	2	-	-	-	2	-	1	-	-	1	-	1	-	-
		CO3	-	1	2	-	-	2	2	-	2	-	2	-	2	2	2
	IT8075- Software Project Management	CO1	2	2	2	-	-	3	-	2	1	1	1	2	1	-	-
		CO2	1	3	2	-	-	2	-	1	2	2	2	2	1	-	-
		CO3	2	3	2	-	-	2	-	-	1	1	1	1	1	-	-
		CO4	1	3	1	-	-	-	-	1	1	1	1	1	-	-	-
		CO5	1	3	2	-	-	-	-	-	2	2	2	1	-	-	-
	CS8088 - Wireless Adhoc & Sensor Network	CO1	2	2	1	-	-	-	-	-	-	-	-	-	2	-	-
		CO2	2	3	1	-	-	-	-	-	-	-	-	-	2	-	1
		CO3	1	2	1	-	-	-	-	-	-	-	-	-	-	1	-
	CS8711- Cloud Computing Lab	CO1	1	1	1	-	2	-	-	-	-	2		1	2	2	2
		CO2	1	2	2	-	3	-	-	-	-	2		1	2	2	2
		CO3	1	2	1	-	3	-	-	-	-	2		1	2	2	2
		CO4	1	2	1	-	3	-	-	2	1	2		1	2	2	2
		CO5	1	1	1	-	3	-	-	2	1	2		1	2	2	2
	IT8761 - Security Lab	CO1	2	2	2	-	2	-	-	1	1	1	-	2	2	3	-
		CO2	2	2	2	-	1	-	-	2	1	1	-	1	2	3	-
		CO3	2	2	2	-	1	-	-	2	1	1	-	1	2	3	-
		CO4	2	2	2	-	2	-	-	1	2	1	-	1	2	3	-
		CO5	2	1	1	-	2	-	-	2	1	2	-	2	2	3	-
IV / VIII	GE8076 - Professional Ethics in Engineering	CO1	-	-	-	-	-	3	3	3	3	1	-	1	-	2	
	CS8078 - Green Computing	CO1	1	2	1	-	-	-	-	-	-	-	-	-	2	2	1
		CO2	1	1	1	-	-	-	-	-	-	-	-	-	2	2	-
		CO3	1	2	1	-	-	-	-	-	-	-	-	-	1	1	1
		CO4	1	2	2	-	-	-	-	-	-	-	-	-	2	2	1

	Subject Name	CO	Programme Outcome (PO)													
			1	2	3	4	5	6	7	8	9	10	11	12	PSO 1	PSO 2	PSO 3
IV / VIII	CS8811 - Project Work	CO1	2	3	2	3	1	2	2	1	2	2	1	1	2	2	2

HOD / CSE 25/1/21

25/01/2021
PRINCIPAL

A NAAC Accredited Institution
KINGS
COLLEGE OF ENGINEERING
Recognized under 2(f) & 12(B) of UGC
Approved by AICTE, New Delhi
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

REGULATION 2017

CO-PO-PSO-PEO MAPPING

PO-COMPETENCY- PERFORMANCE INDICATORS

OBE IMPLEMENTATION - PROCESS REPORT

PROGRAMME ARTICULATION MATRIX- SEMESTER WISE

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS
B.E. ELECTRONICS AND COMMUNICATION ENGINEERING
REGULATIONS -2017

PROGRAMME EDUCATIONAL OBJECTIVES:

PEO1: To enable graduates to pursue research, or have a successful career in academia or industries associated with Electronics and Communication Engineering, or as entrepreneurs.

PEO2: To provide students with strong foundational concepts and also advanced techniques and tools in order to enable them to build solutions or systems of varying complexity.

PEO3: To prepare students to critically analyze existing literature in an area of specialization and ethically develop innovative and research oriented methodologies to solve the problems identified.

PROGRAMME OUTCOMES:

Engineering Graduates will be able to:

PO:1.Engineering knowledge:

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

PO: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.

PO: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.

PO: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.

PO:5.Modern tool usage:

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO: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.

PO: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.

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

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

PO: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.

PO: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.

PO: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 SPECIFIC OBJECTIVES (PSOs)

PSO:1. To analyze, design and develop solutions by applying foundational concepts of electronics and communication engineering.
PSO:2. To apply design principles and best practices for developing quality Products for scientific and business applications.
PSO:3. To adapt to emerging information and communication technologies (ICT) to innovate ideas and solutions to existing/novel problems.

Contribution
1: Reasonable 2: Significant 3: Strong

MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES WITH PROGRAMME OUTCOMES

A broad relation between the Programme Objectives and the Outcomes is given in the following table

PROGRAMME EDUCATIONAL OBJECTIVES	PROGRAMME OUTCOMES											
	A	B	C	D	E	F	G	H	I	J	K	L
1	3	3	2	3	2	1	1	2	1	1	3	1
2	3	3	3	3	3	1	1	1	1	1	1	2
3	3	3	3	3	3	2	2	3	1	2	2	2

MAPPING OF PROGRAM SPECIFIC OBJECTIVES WITH PROGRAMME OUTCOMES

A broad relation between the Program Specific Objectives and the Outcomes is given in the following table.

PROGRAM SPECIFIC OBJECTIVES	PROGRAMME OUTCOMES											
	A	B	C	D	E	F	G	H	I	J	K	L
1	3	3	2	3	2	1	1	1	1	1	1	2
2	3	3	3	3	3	2	2	3	1	3	3	3
3	3	3	3	3	3	3	3	2	1	1	1	3

MAPPING OF COURSE OUTCOMES WITH PROGRAMME OUTCOMES:

A broad relation between the Course Outcomes and Programme Outcomes is given in the following table.

COURSE OUTCOMES		PROGRAMME OUTCOMES											
Sem	Course Name	a	b	c	d	e	f	g	h	i	j	k	l
I	Communicative English						√	√	√	√	√	√	
	Engineering Mathematics-I	√	√	√	√							√	√
	Engineering Physics	√	√	√	√							√	√
	Engineering Chemistry	√	√	√	√							√	√
	Problem Solving and Python Programming	√	√	√	√	√						√	√
	Engineering Graphics	√									√	√	√
	Problem Solving and Python Programming Laboratory	√	√	√	√	√						√	√
	Physics and Chemistry Laboratory	√	√	√	√							√	√
II	Technical English					√	√	√	√	√	√	√	√
	Engineering Mathematics-II	√	√	√	√							√	√
	Physics for Electronics Engineering	√	√	√	√							√	√
	Basic Electrical and Instrumentation Engineering	√	√	√	√	√	√					√	√
	Circuit Analysis	√	√	√	√	√	√					√	√
	Electronic Devices	√	√	√	√	√	√					√	√
	Circuits and Devices Laboratory	√	√	√	√	√						√	√
	Engineering Practices Laboratory	√	√	√	√	√						√	√

Sem	Course Name	a	b	c	d	e	f	g	h	i	j	k	l
III	Linear Algebra and Partial Differential Equations	√	√	√	√	√						√	√
	Fundamentals of Data Structures In C	√	√	√	√	√	√					√	√
	Electronic Circuits- I	√	√	√	√	√	√					√	√
	Signals and Systems	√	√	√	√	√	√					√	√
	Digital Electronics	√	√	√	√	√	√					√	√
	Control Systems Engineering	√	√	√	√	√	√					√	√
	Fundamentals of Data Structures in C Laboratory	√	√	√	√	√	√					√	√
	Analog and Digital Circuits Laboratory	√	√	√	√	√	√					√	√
	Interpersonal Skills/Listening &Speaking						√		√	√	√	√	√
IV	Probability and Random Processes	√	√	√	√	√						√	√
	Electronic Circuits II	√	√	√	√	√	√					√	√
	Communication Theory	√	√	√	√	√	√					√	√
	Electromagnetic Fields	√	√	√	√	√	√					√	√
	Linear Integrated Circuits	√	√	√	√	√	√					√	√
	Environmental Science and Engineering	√	√		√		√	√	√			√	√
	Circuits Design and Simulation Laboratory	√	√	√	√	√	√					√	√
	Linear Integrated Circuits Laboratory	√	√	√	√	√	√					√	√
V	Digital Communication	√	√	√	√	√	√					√	√
	Discrete-Time Signal Processing	√	√	√	√	√	√					√	√
	Computer Architecture and Organization	√	√	√	√		√					√	√
	Communication Networks	√	√	√	√	√	√					√	√
	Medical Electronics –PE-1												
	Renewable Energy Source –OE-1												
	Digital Signal Processing Laboratory	√	√	√	√	√	√					√	√
	Communication Systems Laboratory	√	√	√	√	√	√					√	√
	Networks Laboratory	√	√	√	√	√	√					√	√
VI	Microprocessors and Microcontrollers	√	√	√	√	√	√					√	√
	VLSI Design	√	√	√	√	√	√					√	√
	Wireless Communication	√	√	√	√	√	√					√	√
	Principles of Management						√	√	√		√	√	√
	Transmission Lines and RF Systems	√	√	√	√	√	√					√	√
	Multimedia Compression and Communication –PE-2												
	Microprocessors and Microcontrollers Laboratory	√	√	√	√	√	√					√	√
	VLSI Design Laboratory	√	√	√	√	√	√					√	√
	Technical Seminar		√		√	√	√		√	√	√	√	√
	Professional Communication						√				√		√

Sem	Course Name	a	b	c	d	e	f	g	h	i	j	k	l
VII	Antennas & microwave Engineering	√	√	√	√	√	√					√	√
	Optical communication	√	√	√	√		√					√	√
	Embedded and real time Systems	√	√	√	√	√	√					√	√
	Ad-hoc and wireless sensor networks	√	√	√	√	√	√					√	√
	Advanced Wireless communication –PE-3												
	Transducer Engineering – OE-2												
	Embedded Laboratory	√	√	√	√	√	√					√	√
	Advanced Communication Laboratory	√	√	√	√	√	√					√	√
VIII	Electro Magnetic Interference and Compatibility –PE-4												
	Satellite Communication –PE-5												
	Project Work	√	√	√	√	√	√		√	√	√	√	√

PROGRAM OUTCOMES- COMPETENCIES -PERFORMANCE INDICATORS.

PO1: Engineering Knowledge: apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.			
Competency		**Performance Indicators**	
1.1	Demonstrate competence in mathematical modeling	1.1.1	Apply mathematical techniques such as linear algebra, differential calculus, differential equations and integral calculus to solve problems
		1.1.2	Apply concepts of Complex Variable, probability, linear algebra, vector integration and transformation techniques to model and solve electronics engineering problems.
1.2	Demonstrate competence in basic sciences	1.2.1	Apply laws of natural science to an engineering problem
1.3	Demonstrate competence in engineering fundamentals	1.3.1	Apply engineering fundamentals
1.4	Demonstrate competence in specialized engineering knowledge to the program	1.4.1	Apply electronics engineering concepts to solve engineering problems
PO2: 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.			
Competency		**Performance Indicators**	
2.1	Demonstrate an ability to identify and formulate complex engineering problem	2.1.1	Articulate problem statements and identify objectives.
		2.1.2	Identify engineering systems, variables, and parameters to solve a problem
		2.1.3	Identify the mathematical, engineering and other relevant knowledge that applies to a given problem
2.2	Demonstrate an ability to formulate a solution plan and methodology for an engineering problem	2.2.1	Reframe complex problems into interconnected sub-problems.
		2.2.2	Identify, assemble and evaluate information and resources
		2.2.3	Identify existing solution/methods for solving the problem, including forming justified approximations and assumptions
		2.2.4	Compare and contrast alternative solution/methods to select the best methods.

2.3	Demonstrate an ability to formulate and interpret a model	2.3.1	Combine scientific principles and engineering concepts to formulate model/s (mathematical or otherwise) of a system or process that is appropriate in terms of applicability and required accuracy.
		2.3.2	Identify assumptions (mathematical and physical) necessary to allow modeling of a system at the level of accuracy required.
2.4	Demonstrate an ability to execute a solution process and analyze results	2.4.1	Apply engineering mathematics to implement solution
		2.4.2	Analyze and interpret the results using contemporary tools.
		2.4.3	Identify the limitations of the solution and sources/causes of error.
		2.4.4	Arrive at conclusions with respect to the objectives.

PO3: 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.

Competency		Performance Indicators	
3.1	Demonstrate an ability to define a complex/open-ended problem in engineering terms	3.1.1	Recognize that need analysis is key to good problem definition
		3.1.2	Able to identify and document system requirements from stakeholders.
		3.1.3	Ability to review state of the art literature to synthesize requirements.
		3.1.4	Extract engineering requirements from relevant engineering codes and standards defined by ISO/IEC/IEEE.
		3.1.5	Explore and synthesize engineering requirements considering health, safety, risks, environment, cultural and societal issues
		3.1.6	Determine design, objectives, functional requirements and arrive at specifications
3.2	Demonstrate an ability to generate a diverse set of alternative design solutions	3.2.1	Ability to explore design alternatives.
		3.2.2	Build models/prototypes to develop diverse set of design solutions
		3.2.3	Identify suitable criteria for evaluation of alternate design solutions
3.3	Demonstrate an ability to select optimal design scheme for further development	3.3.1	Ability to perform systematic evaluation of the degree to which several design concepts meet the criteria.
		3.3.2	Consult with domain experts and stakeholders to select candidate engineering design solution for further development

3.4	Demonstrate an ability to advance an engineering design to defined end state	3.4.1	Refine a conceptual design into a detailed design within the existing constraints (of the resources)
		3.4.2	Generate information through appropriate tests to improve or revise design

PO4: Conduct Investigation of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

Competency		Performance Indicators	
4.1	Demonstrate an ability to conduct investigations of technical issues consistent with their level of knowledge and understanding	4.1.1	Define a problem for purpose of investigation, its scope and importance
		4.1.2	Choose appropriate methods, algorithms, hardware/software tools and techniques of experiment design, system calibration, data acquisition, analysis and presentation
		4.1.3	Apply appropriate hardware/software tools to conduct the experiment
		4.1.4	Establish a relationship between measured data and underlying physical principles
4.2	Demonstrate an ability to design experiments to solve open ended problems	4.2.1	Design and develop experimental approach, specify appropriate equipment and procedures
		4.2.2	Understand the importance of statistical design of experiments and choose an appropriate experimental design plan based on the study objectives
4.3	Demonstrate an ability to analyze data and reach a valid conclusion	4.3.1	Use appropriate procedures, tools and techniques to collect and analyze data
		4.3.2	Critically analyze data for trends and correlations, stating possible errors and limitations
		4.3.3	Represent data (in tabular and/or graphical forms) so as to facilitate analysis and explanation of the data, and drawing of conclusions
		4.3.4	Synthesize information and knowledge about the problem from the raw data to reach appropriate conclusions

PO5: Modern Tools Usage: create, select and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

Competency		Performance Indicators	
5.1	Demonstrate an ability to identify/create modern engineering tools, techniques and resources	5.1.1	Identify modern engineering tools techniques and resources for engineering activities
		5.1.2	Create/adapt/modify/extend tools and techniques to solve engineering problems

5.2	Demonstrate an ability to select and apply discipline specific tools, techniques and resources	5.2.1	Identify the strengths and limitations of tools for (i) acquiring information (ii) modeling and simulating (iii) monitoring system performance, and (iv) creating engineering designs
		5.2.2	Demonstrate proficiency in using discipline specific tools
5.3	Demonstrate an ability to evaluate the suitability and limitations of tools used to solve an engineering problem	5.3.1	Discuss limitations and validate tools, techniques and resources
		5.3.2	Verify the credibility of results from tool use with reference to the accuracy and limitations, and the assumptions inherent in their use.

PO6: 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.

Competency		Performance Indicators	
6.1	Demonstrate an ability to describe engineering roles in a broader context, e.g. pertaining to the environment, health, safety, legal and public welfare	6.1.1	Identify and describe various engineering roles; particularly as pertains to protection of the public and public interest at global, regional and local level.
6.2	Demonstrate an understanding of professional engineering regulations, legislation and standards	6.2.1	Interpret legislation, regulations, codes, and standards relevant to professional engineering practice and explain its contribution to the protection of the public.

PO7: Environment & Sustainability: understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Competency		Performance Indicators	
7.1	Demonstrate an understanding of the impact of engineering and industrial practices on social, environmental and in economic contexts	7.1.1	Identify risks/impacts in the life-cycle of an engineering product or activity
		7.1.2	Understand the relationship between the technical, socioeconomic and environmental dimensions of sustainability
7.2	Demonstrate an ability to apply principles of sustainable design and development	7.2.1	Describe management techniques for sustainable development
		7.2.2	Apply principles of preventive engineering and sustainable development to an engineering activity or product relevant to the discipline

PO8: Ethics: apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

Competency		Performance Indicators	
8.1	Demonstrate an ability to recognize ethical dilemmas	8.1.1	Identify situations of unethical professional conduct and propose ethical alternatives
8.2	Demonstrate an ability to apply the code of ethics	8.2.1	Identify tenets of code of ethics given by the professional bodies like IEEE.
		8.2.2	Examine and apply moral & ethical principles to known case studies

PO9: Individual & Team work: function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.

Competency		Performance Indicators	
9.1	Demonstrate an ability to form a team and define a role for each member	9.1.1	Recognize a variety of working and learning preferences; appreciate the value of diversity on a team
		9.1.2	Implement the norms of practice (e.g. rules, roles, charters, agendas etc.) of effective team work, to accomplish a goal
9.2	Demonstrate effective individual and team operations--- communication, problem solving, conflict resolution and leadership skills	9.2.1	Demonstrate effective communication, problem solving, conflict resolution and leadership skills
		9.2.2	Treat other team members respectfully
		9.2.3	Listen to other members
		9.2.4	Maintain composure in difficult situations
9.3	Demonstrate success in a team based project	9.3.1	Present results as a team, with smooth integration of contributions from all individual efforts

PO10: 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.

Competency		Performance Indicators	
10.1	Demonstrate an ability to comprehend technical literature and document project work	10.1.1	Read, understand and interpret technical and non-technical information
		10.1.2	Produce clear, well-constructed, and well-supported written engineering documents
		10.1.3	Create flow in a document or presentation- a logical progression of ideas so that the main point is clear
10.2	Demonstrate competence in listening, speaking and presentation	10.2.1	Listen to and comprehend information, instructions, and viewpoints of others
		10.2.2	Deliver effective oral presentations to technical and nontechnical audiences
10.3	Demonstrate the ability to integrate different modes of communication	10.3.1	Create engineering-standard figures, reports and drawings to complement writing and presentations
		10.3.2	Use a variety of media effectively to convey a message in a document or a presentation

PO11: Project management & 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.

Competency		Performance Indicators	
11.1	Demonstrate an ability to evaluate the economic and financial performance of an engineering activity	11.1.1	Describe various economic and financial costs/benefits of an engineering activity
		11.1.2	Analyze different forms of financial statements to evaluate the financial status of an engineering project

11.2	Demonstrate an ability to compare and contrast the costs/benefits of alternate proposals for an engineering activity	11.2.1	Analyze and select the most appropriate proposal based on economic and financial considerations
11.3	Demonstrate an ability to plan/manage an engineering activity within time and budget constraints	11.3.1	Identify the tasks required to complete an engineering activity and the resources required to complete the tasks
		11.3.2	Use project management tools to schedule an engineering project so it is completed on time and on budget
PO12: 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.			
Competency		**Performance Indicators**	
12.1	Demonstrate an ability to identify gaps in knowledge and a strategy to close these gaps	12.1.1	Describe the rationale for requirement for continuing professional development
		12.1.2	Identify deficiencies or gaps in knowledge and demonstrate an ability to source information to close this gap
12.2		12.2.1	Identify historic points of technological advance in engineering that required
	Demonstrate an ability to identify changing trends in engineering knowledge and practice		practitioners to seek education in order to stay current
		12.2.2	Recognize the need and be able to clearly explain why it is vitally important to keep current regarding new developments in your field.
12.3	Demonstrate an ability to identify and access sources for new information	12.3.1	Source and comprehend technical literature and other credible sources of information
		12.3..2	Analyze sourced technical and popular information for feasibility, viability, sustainability etc.

18/12/2020
IQAC Member

18/12/2020
HOD/ECE

18/12/2020
PRINCIPAL

PROGRAMME ARTICULATION MATRIX

SEM	COURSE	COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
			PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
I SEM	HS8151	CO:1	-	-	-	-		1	2	-	2	2	1	-	2	-	2
		CO:2	-	-	-	-	-	2	2	-	-	2	3	-	2	-	3
		CO:3	-	-	-	-	-	2	1	-	3	1	2	-	-	1	2
		CO:4	-	-	-	-	-	3	2	-	1	1	3	-	3	2	-
	MA8151	CO:1	1	1	-	-	-	-	-	-	-	-	-	1	1	-	-
		CO:2	2	2	1	1	-	-	-	-	-	-	1	2	1	-	-
		CO:3	2	2	1	2	-	-	-	-	-	-	1	2	1	1	-
		CO:4	2	2	1	1	-	-	-	-	-	-	-	2	1	1	1
		CO:5	2	1	-	1	-	-	-	-	-	-	-	2	1	1	1
		CO:6	2	2	1	2	-	-	-	-	-	-	-	1	1	-	-
		CO:7	2	2	2	1	-	-	-	-	-	-	1	2	2	1	1
	PH8151	CO:1	2	1	1	1	-	-	-	-	-	-	1	1	1	1	-
		CO:2	2	2	2	2	-	-	-	-	-	-	1	1	2	2	-
		CO:3	2	2	2	2	-	-	-	-	-	-	1	1	2	2	-
		CO:4	1	1			-	-	-	-	-	-	-	-	-	-	-
		CO:5	2	1	1	1	-	-	-	-	-	-	1	1	1	1	-
	CY8151	CO:1	2	2	1	1	-	-	-	-	-	-	1	1	1	-	-
		CO:2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GE8151	CO:1	1	2	1	1	-	-	-	-	-	-	-	1	2	2	1
		CO:2	1	1	1	1	-	-	-	-	-	-	-	1	2	2	-
		CO:3	1	2	1	1	-	-	-	-	-	-	-	1	1	1	1
		CO:4	1	2	2	1	1	-	-	-	-	-	-	1	2	2	1
		CO:5	1	2	2	1	1	-	-	-	-	-	-	1	2	2	1
		CO:6	1	2	1	1	1	-	-	-	-	-	-	1	1	1	-
	GE8152	CO:1	2	-	-	-	-	-	-	-	-	3	2	-	1	-	1
		CO:2	1	-	-	-	-	-	-	-	-	3	2	-	-	2	1
		CO:3	2	-	-	-	-	-	-	-	-	2	3	-	-	-	1
		CO:4	3	-	-	-	-	-	-	-	-	3	2	-	1	-	1
		CO:5	3	-	-	-	-	-	-	-	-	3	2	-	-	2	1
	GE8161	CO:1	3	2	1	1	2	-	-	-	-	-	-	1	2	2	1
		CO:2	2	2	2	1	1	-	-	-	-	-	-	1	2	2	1
		CO:3	2	2	2	1	1	-	-	-	-	-	-	1	1	1	1
		CO:4	2	2	1	1	1	-	-	-	-	-	-	1	2	2	1
		CO:5	1	1	1	1	1	-	-	-	-	-	-	1	2	2	1
	BS8161	CO:1	2	1	1	1	-	-	-	-	-	-	1	1	1	1	-
		CO:2	2	1	1	1	-	-	-	-	-	-	1	1	1	1	-

SEM	COURSE	COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
			PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
II SEM	HS8251	CO:1	-	-	-	-		2	2	-	2	2	1	-	2	-	2
		CO:2	-	-	-	-	-	2	2	-	-	2	3	-	2	-	3
		CO:3	-	-	-	-	-	2	1	-	3	1	2	-	-	1	2
		CO:4	-	-	-	-	-	3	2	-	1	1	3	-	3	2	-
	MA8251	CO:1	1	1	1	1	-	-	-	-	-	-	1	1	1	1	-
		CO:2	1	1	1	-	-	-	-	-	-	-	-	1	1	-	-
		CO:3	1	1	1	-	-	-	-	-	-	-	1	1	1	1	-
		CO:4	2	2	1	-	-	-	-	-	-	-	-	1	1	-	-
		CO:5	1	1	1	-	-	-	-	-	-	-	1	1	1	1	-
	PH8253	CO:1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO:2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO:3	2	2	1	1	-	-	-	-	-	-	-	-	1	1	-
		CO:4	2	1	-	-	-	-	-	-	-	-	-	-	1	1	-
		CO:5	2	1	-	-	-	-	-	-	-	-	-	-	1	1	-
	BE8254	CO:1	3	3	2	1	2	2	-	-	-	-	1	1	2	2	1
		CO:2	3	3	2	1	2	2	-	-	-	-	1	1	2	2	1
		CO:3	3	3	2	1	2	2	-	-	-	-	1	1	2	2	1
	EC8251	CO:1	3	3	3	2	2	2	-	-	-		2	2	3	2	3
		CO:2	3	3	3	2	2	2	-	-	-		2	2	3	2	3
	EC8252	CO:1	2	2	2	2	2	2	-	-	-	-	-	-	2	2	1
		CO:2	2	3	3	2	2	2	-	-	-	-	-	-	2	2	-
		CO:3	2	2	2	2	2	1	-	-	-	-	-	-	2	2	-
	EC8261	CO:1	2	2	2	2	3	2	-	-	-	-	-	-	2	2	1
		CO:2	2	3	3	2	2	2	-	-	-	-	-	-	2	3	-
		CO:3	2	3	3	3	2	1	-	-	-	-	-	-	2	2	-
	GE8261	CO:1	3	3	2	3	2	-	-	-	-	-	1	1	3	2	1
		CO:2	3	3	2	3	2	-	-	-	-	-	1	1	3	2	1
		CO:3	3	3	2	3	2	-	-	-	-	-	1	1	3	2	1
		CO:4	3	3	2	3	2	-	-	-	-	-	1	1	3	2	1

SEM	COURSE	COs	PROGRAM OUTCOMEs – (POs)												PSOs		
			PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
III SEM	MA8352	CO:1	2	2	1	-	-	-	-	-	-	-	-	1	1	-	-
		CO:2	2	2	1	-	-	-	-	-	-	-	-	1	1	-	-
		CO:3	2	3	1	1	1	-	-	-	-	-	1	2	2	1	-
		CO:4	2	3	2	1	-	-	-	-	-	-	1	2	2	2	-
	EC8393	CO:1	1	3	1	2	1	2	-	-	-	-	1	1	1	2	2
		CO:2	1	3	2	2	1	2	-	-	-	-	1	1	1	2	2
		CO:3	1	3	1	2	1	2	-	-	-	-	1	1	1	2	2
		CO:4	1	3	2	2	3	2	-	-	-	-	1	1	2	2	2
		CO:5	1	2	1	2	1	2	-	-	-	-	1	1	2	2	2
	EC8351	CO:1	3	3	2	2	-	-	-	-	-	-	-	-	3	-	-
		CO:2	3	3	3	2	-	-	-	-	-	-	-	-	3	-	-
		CO:3	2	2	3	3	-	-	-	-	-	-	-	-	2	-	-
		CO:4	1	2	1	2	3	-	-	-	-	-	-	-	3	3	3
	EC8352	CO:1	3	3	1	1	2	-	-	-	-	-	-	-	3	-	1
		CO:2	3	3	1	1	2	-	-	-	-	-	-	-	3	-	1
		CO:3	3	3	1	2	2	2	-	-	-	-	1	-	3	-	1
		CO:4	3	3	1	2	2	2	-	-	-	-	1	1	3	-	1
	EC8392	CO:1	2	2	1	1	-	2	-	-	-	-	-	-	2	-	-
		CO:2	2	2	2	2	1	2	-	-	-	-	-	-	2	2	-
		CO:3	2	2	2	2	1	2	-	-	-	-	-	-	2	2	-
		CO:4	2	2	2	2	2	2	-	-	-	-	2	2	2	2	2
		CO:5	2	2	2	2	2	2	-	-	-	-	2	2	2	2	2
	EC8391	CO:1	3	3	2	2	2	1	-	-	-	-	1	1	3	3	-
		CO:2	3	3	3	3	3	2	-	-	-	-	1	1	3	3	-
		CO:3	3	3	3	3	3	2	-	-	-	-	1	1	3	3	-
		CO:4	3	3	3	3	3	2	-	-	-	-	1	1	3	3	-
		CO:5	3	3	3	3	2	2	-	-	-	-	1	1	3	3	2
	EC8381	CO:1	1	1	1	2	1	2	-	-	-	-	1	1	1	2	2
		CO:2	1	2	1	2	1	2	-	-	-	-	1	1	1	2	2
		CO:3	1	2	1	2	1	2	-	-	-	-	1	1	1	2	2
		CO:4	1	2	2	2	1	2	-	-	-	-	1	1	1	2	2
	EC8361	CO:1	3	3	2	-	3	-	-	-	-	-	-	-	3	3	3
		CO:2	3	3	2	-	3	-	-	-	-	-	-	-	3	-	-
		CO:3	3	3	3	-	3	-	-	-	-	-	-	-	3	-	-
		CO:4	3	3	3	-	3	-	-	-	-	-	-	-	3	-	-
		CO:5	3	3	2	-	3	-	-	-	-	-	-	-	-	-	-
		CO:6	3	3	2	3	3	-	-	-	-	-	-	-	3	2	-
		CO:7	3	3	2	2	3	-	-	-	-	-	-	-	3	-	3
	HS 8381	CO:1	-	-	-	-	-	1	-	1	2	2	1	2	2	1	2
		CO:2	-	-	-	-	-	2	-	-	2	2	3	1	2	-	3
		CO:3	-	-	-	-	-	3	-	-	1	1	2	3	-	2	2
		CO:4	-	-	-	-	-	3	-	1	2	1	2	2	2	2	-

SEM	COURSE	COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
			PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
IV SEM	MA8451	CO:1	1	1	1	1	-	-	-	-	-	-	-	-	1	-	-
		CO:2	1	1	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO:3	1	1	1	-	-	-	-	-	-	-	-	-	1	1	-
		CO:4	2	2	1	-	-	-	-	-	-	-	-	1	1	1	-
		CO:5	1	1	1	-	-	-	-	-	-	-	-	1	1	1	-
	EC8452	CO:1	3	3	3	3	3	3	-	-	-	-	3	3	3	3	3
		CO:2	3	3	3	3	3	3	-	-	-	-	3	3	3	3	3
		CO:3	3	3	3	3	3	3	-	-	-	-	3	3	3	3	3
		CO:4	3	3	3	3	3	3	-	-	-	-	3	3	3	3	3
		CO:5	3	3	3	3	3	3	-	-	-	-	3	3	3	3	3
	EC8491	CO:1	2	3	1	1	-	-	-	-	-	-	-	-	2	-	-
		CO:2	2	2	1	2	1	2	-	-	-	-	2	1	2	-	1
		CO:3	2	2	1	2	1	2	-	-	-	-	2	1	2	2	2
		CO:4	2	2	1	2	1	2	-	-	-	-	2	1	2	-	1
		CO:5	2	2	1	2	1	2	-	-	-	-	2	1	2	-	2
	EC8451	CO:1	2	2	1	2	1	2	-	-	-	-	2	1	2	-	2
		CO:2	3	3	1	2	2	2	-	-	-	-	-	-	2	2	-
		CO:3	3	3	3	1	3	2	-	-	-	-	-	-	2	2	-
		CO:4	2	1	1	-	-	1	-	-	-	-	-	-	2	2	-
	EC8453	CO:1	2	2	2	1	-	-	-	-	-	-	-	-	3	3	1
		CO:2	2	2	2	1	-	-	-	-	-	-	-	-	2	2	-
		CO:3	2	2	2	1	-	-	-	-	-	-	-	-	2	3	-
		CO:4	2	2	2	-	-	-	-	-	-	-	-	-	2	2	-
		CO:5	2	2	2	-	-	-	-	-	-	-	-	-	2	2	-
	GE8291	CO:1	2	2	-	2	-	1	3	2	-	-	1	1	1	2	1
		CO:2	2	2	-	3	-	1	3	2	-	-	1	1	1	2	1
		CO:3	2	2	-	3	-	1	3	2	-	-	1	1	2	1	2
		CO:4	1	2	-	2	-	1	3	2	-	-	1	1	1	1	2
	EC8461	CO:1	2	3	1	1	-	-	-	-	-	-	-	-	2	-	-
		CO:2	2	2	1	2	1	2	-	-	-	-	2	1	2	-	1
		CO:3	2	2	1	2	1	2	-	-	-	-	2	1	2	2	2
	EC8462	CO:1	2	1	2	1	2	1	-	-	-	-	1	1	2	2	1
		CO:2	2	1	2	1	2	1	-	-	-	-	1	1	2	2	1
		CO:3	2	1	2	1	1	2	-	-	-	-	1	1	2	2	1
		CO:4	2	1	2	1	1	2	-	-	-	-	1	1	2	2	1
		CO:5	2	1	2	1	1	2	-	-	-	-	1	1	2	2	1

SEM	COURSE	COs	PROGRAM OUTCOMEs – (POs)												PSOs		
			PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
V SEM	EC8501	CO:1	2	1	1	2	2	-	-	-	-	-	-	-	3	-	-
		CO:2	2	2	1	2	1	-	-	-	-	-	-	-	3	-	-
		CO:3	2	1	1	2	2	-	-	-	-	-	-	-	2	-	-
		CO:4	2	1	2	2	2	-	-	-	-	-	-	-	3	-	3
		CO:5	2	1	2	2	2	2	-	-	-	-	2	1	3	-	-
	EC8553	CO:1	2	2	2	2	2	-	-	-	-	-	-	-	3	2	-
		CO:2	2	2	2	2	2	-	-	-	-	-	-	-	3	3	-
		CO:3	2	2	2	2	2	-	-	-	-	-	-	-	2	1	-
		CO:4	2	1	1	1	2	2	-	-	-	-	2	2	1	-	3
		CO:5	2	1	1	1	2	2	-	-	-	-	2	2	1	-	3
	EC8552	CO:1	2	1	1	2	-	2	-	-	-	-	-	2	2	2	-
		CO:2	2	2	1	2	-	-	-	-	-	-	-	-	3	3	3
		CO:3	2	1	1	2	-	-	-	-	-	-	1	2	3	2	-
		CO:4	2	1	1	2	-	-	-	-	-	-	1	2	2	-	-
		CO:5	1	1	1	2	-	-	-	-	-	-	-	-	2	-	-
	EC8551	CO:1	2	1	1	1	-	-	-	-	-	-	-	-	3	2	-
		CO:2	-	-	-	1	1	-	-	-	-	-	-	-	3	2	-
		CO:3	-	1	-	-	1	-	-	-	-	-	-	-	-	2	3
		CO:4	-	-	-	-	1	-	-	-	-	-	-	1	-	3	3
	EC8073	CO:1	1	-	-	-	2	-	-	2	-	-	2	2	3	2	3
		CO:2	-	2	2	-	2	2	2	-	-	-	2	2	3	2	3
		CO:3	1	-	-	2	-	2	2	2	-	2	2	2	1	2	3
		CO:4	1	-	-	-	-	2	2	2	-	2	2	2	1	2	3
		CO:5	1	2	2	-	-	2	2	-	-	2	2	2	1	2	3
	OR0551	CO:1	3	3	-	-	-	2	1	-	-	-	-	-	1	-	-
		CO:2	2	2	1	-	-	-	-	-	-	-	-	-	-	2	-
		CO:3	-	-	-	3	3	-	-	-	-	-	-	-	-	-	2
		CO:4	3	-	2	-	-	2	3	-	-	-	-	-	2	-	-
		CO:5	3	2	2	-	-	2	3	-	-	-	-	-	-	-	2
	EC8562	CO:1	3	3	2	-	2	-	-	-	-	-	2	2	3	3	-
		CO:2	3	3	2	-	2	-	-	-	-	-	2	2	3	3	-
		CO:3	3	3	2	-	2	-	-	-	-	-	2	2	3	2	2
		CO:4	3	-	2	-	2	-	-	-	-	-	2	2	3	2	-
		CO:5	3	-	2	-	2	-	-	-	-	-	2	2	3	2	-
	EC8561	CO:1	3	2	2	2	3	2	-	-	-	-	2	2	2	2	2
		CO:2	3	3	2	3	3	2	-	-	-	-	2	2	3	2	2
		CO:3	3	3	2	3	3	2	-	-	-	-	2	2	3	2	2
		CO:4	3	3	3	3	3	2	-	-	-	-	2	2	3	2	2
	EC8563	CO:1	1	2	2	1	1	1	-	-	-	-	1	1	2	1	1
		CO:2	1	2	2	1	1	1	-	-	-	-	1	1	2	1	1
		CO:3	1	2	2	1	1	1	-	-	-	-	1	1	2	1	2
		CO:4	1	2	2	1	1	1	-	-	-	-	1	1	2	1	1
		CO:5	1	2	2	1	1	1	-	-	-	-	1	1	2	1	1

SEM	COURSE	COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
			PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
VI SEM	EC8691	CO:1	3	2	2	2	2	1	-	-	-	-	1	1	3	2	1
		CO:2	3	2	2	2	2	1	-	-	-	-	1	1	3	2	1
		CO:3	3	2	2	2	2	1	-	-	-	-	1	1	3	2	1
		CO:4	3	2	2	2	2	1	-	-	-	-	1	1	3	2	1
	EC8095	CO:1	2	1	1	1	1	1	-	-	-	-	-	-	2	1	1
		CO:2	1	1	2	1	1	1	-	-	-	-	-	-	2	1	1
		CO:3	1	1	2	1	1	1	-	-	-	-	-	-	2	1	1
		CO:4	2	1	1	2	1	1	-	-	-	-	-	-	2	1	1
		CO:5	1	1	1	2	1	1	1	-	-	-	-	-	2	1	2
	EC8652	CO:1	2	1	1	-	-	-	-	-	-	-	-	-	2	2	2
		CO:2	1	1	1	-	-	-	-	-	-	-	-	-	3	3	3
		CO:3	2	1	1	-	-	-	-	-	-	-	-	-	3	2	3
	MG8591	CO:1	-	-	-	-	-	2	2	3	-	2	2	2	1	2	2
		CO:2	-	-	-	-	-	2	2	3	-	2	3	2	1	2	2
		CO:3	-	-	-	-	-	2	2	3	-	1	3	2	1	2	2
		CO:4	-	-	-	-	-	2	2	3	-	1	3	2	1	2	2
		CO:5	-		-	-	-	2	2	3	-	1	3	2	1	2	2
	EC8651	CO:1	3	3	3	3	3	3	-	-	-	-	3	3	3	3	3
		CO:2	2	3	2	2	2	2	-	-	-	-	2	2	2	2	2
		CO:3	3	3	3	3	3	2	-	-	-	-	3	3	2	2	3
		CO:4	3	3	3	3	3	2	-	-	-	-	2	3	3	3	3
		CO:5	2	2	2	2	3	2	-	-	-	-	2	2	2	2	2
	EC8002	CO:1	3	2	3	-	-	-	-	-	-	-	-	-	3	1	-
		CO:2	3	3	3	3	3	-	-	-	-	-	-	-	2	3	-
		CO:3	3	2	3	-	-	-	-	-	-	-	-	-	2	1	-
		CO:4	3	2	3	-	-	-	-	-	-	-	-	-	2	1	2
	EC8681	CO:1	2	1	2	2	2	2	-	-	-	-	1	1	2	1	1
		CO:2	2	1	2	2	2	2	-	-	-	-	1	1	2	1	1
		CO:3	2	1	2	2	2	2	-		-	-	1	1	2	1	1
		CO:4	2	1	2	2	2	2	-	-	-	-	1	1	2	1	1
		CO:5	2	1	2	2	2	2	-	-	-	-	1	1	2	1	1
	EC8661	CO:1	2	1	1	1	1	-	-	-	1	-	2	1	2	2	1
		CO:2	1	1	1	1	1	-	-	-	1	-	2	-	2	1	1
		CO:3	2	1	1	1	1	-	-	-	1	-	2	-	2	1	1
		CO:4	2	1	1	1	1	-	-	-	1	-	2	1	2	2	1
	EC8611	CO:1	-	2	-	1	1	1	-	2	2	1	1	1	2	1	1
		CO:2	-	2	-	1	1	1	-	2	2	1	1	1	2	1	1
		CO:3	-	2	-	1	1	1	-	2	2	1	1	1	2	1	1
		CO:4	-	2	-	1	1	1	-	2	2	1	1		2	1	1

SEM	COURSE	COs	PROGRAM OUTCOMEs – (POs)												PSOs		
			PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
VII SEM	EC8701	CO:1	3	2	2	2	3	2	-	-	-	-	2	2	2	2	2
		CO:2	3	3	2	3	3	2	-	-	-	-	2	2	3	2	2
		CO:3	3	3	2	3	3	2	-	-	-	-	2	2	3	2	2
	EC8751	CO:1	2	2	1	-	-	-	-	-	-	-	-	-	2	-	2
		CO:2	2	1	2	1	-	-	-	-	-	-	-	-	2	-	-
		CO:3	2	1	1	-	-	-	-	-	-	-	-	-	2	2	-
		CO:4	2	2	1	2	1	-	-	-	-	-	-	-	3	2	3
		CO:5	2	2	1	1	1	-	-	-	-	-	2	2	2	1	3
	EC8791	CO:1	2	1	2	2	2	-	-	-	-	-	-	-	2	2	2
		CO:2	2	1	2	2	-	1	-	-	-	-	-	-	2	2	-
		CO:3	2	1	2	2	2	2	-	-	-	-	-	-	2	2	1
		CO:4	1	1	2	2	2	2	-	-	-	-	-	-	2	2	2
	EC 8702	CO:1	2	1	1	1	1	-	-	-	-	-	-	1	3	-	-
		CO:2	2	1	2	1	1	-	-	-	-	-	1	-	1	3	3
		CO:3	2	1	1	1	1	-	-	-	-	-	-	-	1	3	3
		CO:4	2	1	1	1	1	1	-	-	-	-	2	2	1	3	3
		CO:5	-	1	1	1	1	-	-	-	-	-	2	2	1	2	3
	EC 8092	CO:1	2	1	1	-	-	-	-	-	-	-	-	-	2	2	2
		CO:2	1	1	1	-	-	-	-	-	-	-	-	-	3	3	3
		CO:3	2	1	1	-	-	-	-	-	-	-	-	-	3	2	3
	OIC751	CO:1	3	3	2	3	3	2	1	-	-	-	2	2	3	3	-
	EC8711	CO:1	1	1	1	-	-	-	-	-	-	-	-	-	3	3	3
		CO:2	1	2	1	1	-	1	-	-	-	-	-	-	3	3	3
		CO:3	1	-	2	1	-	1	-	-	-	-	-	-	3	3	3
		CO:4	1	1	1	1	-	-	-	-	-	-	-	-	3	3	3
		CO:5	1	1	1	1	1	1	-	-	-	-	-	-	3	3	3
		CO:6	1	1	1	1	1	1	-	-	-	-	1	1	3	3	3
	EC8761	CO:1	3	3	2	-	2	-	-	-	-	-	2	2	3	3	-
		CO:2	3	3	2	-	2	-	-	-	-	-	2	2	3	3	-
		CO:3	3	3	2	-	2	-	-	-	-	-	2	2	3	2	2
		CO:4	3	-	2	-	2	-	-	-	-	-	2	2	3	2	-

SEM	COURSE	COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
			PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
VIII SEM	EC8072	CO:1	2	1	1	2	2	2	-	-	-	-	-	-	2	-	-
		CO:2	2	1	1	2	2	2	-	-	-	-	-	1	2	2	2
		CO:3	-	-	1	1	-	-	-	-	-	-	-	1	2	2	-
	EC8094	CO:1	3	-	2	-	2	2	2	1	-	-	1	1	-	-	-
		CO:2	2	3	3	-	-	-	3	-	2	-	2	3	-	-	-
		CO:3	2	3	1	-	-	-	2	-	-	-	1	2	-	-	-
		CO:4	2	-	-	-	2	3	2	-	-	-	-	2	-	-	-
	EC8811	CO:1	2	2	3	2	3	2	2	2	2	2	3	3	2	2	2

22/01/2021.

IQAC Member

22/01/2021

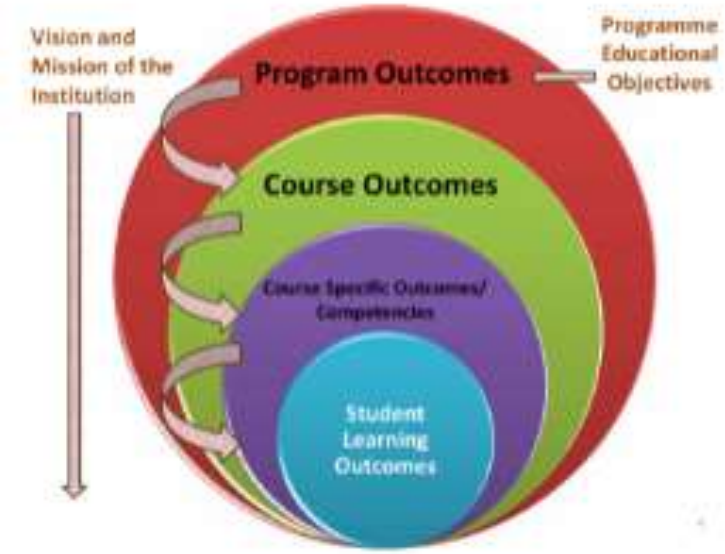
HOD/ECE

22/01/2021

PRINCIPAL

Department of Electrical and Electronics Engineering

2.6.1 – Program Outcome and Course Outcome



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Department of Electrical & Electronics Engineering

AU –REGULATIONS

PEO

1. Have successful technical and professional careers in their chosen fields such as circuit theory, Field theory, control theory and computational platforms.

2. Engross in life long process of learning to keep themselves abreast of new developments in the field of Electronics and their applications in power engineering.

PO

The graduates will have the ability to

1. Apply the Mathematical knowledge and the basics of Science and Engineering to solve the problems pertaining to Electrical and Electronics Engineering.
2. Identify and formulate Electrical and Electronics Engineering problems from research literature and be ability to analyze the problem using first principles of Mathematics and Engineering Sciences.
3. Come out with solutions for the complex problems and to design system components or process that fulfill the particular needs taking into account public health and safety and the social, cultural and environmental issues.
4. Draw well-founded conclusions applying the knowledge acquired from research and research methods including design of experiments, analysis and interpretation of data and synthesis of information and to arrive at significant conclusion.
5. Form, select and apply relevant techniques, resources and Engineering and IT tools for Engineering activities like electronic prototyping, modeling and control of systems and also being conscious of the limitations.
6. Understand the role and responsibility of the Professional Electrical and Electronics Engineer and to assess societal, health, safety issues based on the reasoning received from the contextual knowledge.
7. Be aware of the impact of professional Engineering solutions in societal and environmental contexts and exhibit the knowledge and the need for Sustainable Development.
8. Apply the principles of Professional Ethics to adhere to the norms of the engineering practice and to discharge ethical responsibilities.
9. Function actively and efficiently as an individual or a member/leader of different teams and multidisciplinary projects.
10. Communicate efficiently the engineering facts with a wide range of engineering community and others, to understand and prepare reports and design documents; to make effective presentations and to frame and follow instructions.

11. Demonstrate the acquisition of the body of engineering knowledge and insight and Management Principles and to apply them as member / leader in teams and multidisciplinary environments.
12. Recognize the need for self and life-long learning, keeping pace with technological challenges in the broadest sense

PSO

1. To analyze, design and develop prototype models by applying foundational concepts of Electrical and Electronics Engineering.
2. To apply Electrical circuit principles and Electronics design practices for developing quality products for scientific and commercial applications.
3. To adapt to emerging Information and Communication Technologies (ICT) to innovate ideas and solutions to existing/novel problems.

PO WITH PEO MAPPING

PEO/PO	1	2	3	4	5	6	7	8	9	10	11	12
1	√	√	√	√	√	√	√					√
2	√	√	√	√	√	√		√		√		

PSO WITH PEO MAPPING

PEO/PSO	1	2	3
1	√	√	√
2	√	√	√

MAPPING OF CO WITH PO

	Course	1	2	3	4	5	6	7	8	9	10	11	12
Semester-I	Communicative English									√	√		√
	Engineering Mathematics - I	√	√			√							√
	Engineering Physics	√	√	√		√		√					√
	Engineering Chemistry	√	√	√		√							√
	Problem Solving and Python Programming	√	√	√	√	√							√
	Engineering Graphics			√	√								
	Problem Solving and Python Programming Laboratory	√		√	√	√	√				√		√
	Physics and Chemistry Laboratory	√	√										

	Course	1	2	3	4	5	6	7	8	9	10	11	12
Semester-II	Technical English									√	√		√
	Engineering Mathematics - II	√	√	√		√							√
	Physics For Electronics Engineering	√	√	√		√		√					√
	Basic Civil and Mechanical Engineering				√		√						
	Circuit Theory	√	√	√	√	√							√
	Environmental Science and Engineering	√	√			√	√	√	√				√
	Engineering Practices Laboratory	√		√	√	√	√				√		

	Electric Circuits Lab	√		√	√	√	√				√		√

	Course	1	2	3	4	5	6	7	8	9	10	11	12
Semester-III	Transforms and Partial Differential Equations	√	√			√							√
	Digital Logic Circuits					√							
	Electromagnetic Theory	√	√	√	√	√					√		√
	Electrical Machines - I	√	√	√	√	√					√		
	Electron Devices and Circuits	√	√	√	√	√							√
	Power Plant Engineering			√	√	√		√	√	√			
	Electronics Laboratory	√			√	√						√	√
	Electrical Machines Laboratory - I	√			√	√						√	√

	Course	1	2	3	4	5	6	7	8	9	10	11	12
Semester-IV	Numerical Methods	√	√	√									√
	Electrical Machines - II	√	√	√	√	√		√					√
	Transmission and Distribution	√	√	√	√	√		√					√
	Measurements and Instrumentation	√	√	√	√	√							√
	Linear Integrated Circuits and Applications	√	√	√		√							
	Control Systems	√	√	√	√	√							√
	Electrical Machines Lab II	√	√	√	√	√							√
	Linear and Digital Integrated Circuits Laboratory	√		√	√						√	√	√
	Technical Seminar									√	√	√	

	Course	1	2	3	4	5	6	7	8	9	10	11	12
Semester-V	Power System Analysis	√	√	√	√	√		√					√
	Microprocessors and Microcontrollers	√		√		√			√	√		√	√
	Power Electronics	√	√	√	√	√		√					
	Digital Signal Processing	√	√	√	√	√		√					√
	Object Oriented Programming			√	√	√							√
	Basics of Biomedical Instrumentation	√	√	√	√	√	√						
	Control and Instrumentation Laboratory			√	√	√	√			√	√		
	Professional Communication									√	√	√	
	Object Oriented Programming Laboratory			√	√	√							√

	Course	1	2	3	4	5	6	7	8	9	10	11	12
Semester-VI	Solid State Drives	√	√	√	√	√		√					
	Protection and Switchgear	√	√	√	√	√		√					√
	Embedded Systems												
	Design of Electrical Apparatus	√		√	√	√		√					
	Special Electrical Machines	√		√	√	√			√				
	Power Electronics and Drives Laboratory	√		√	√						√	√	√

	Microprocessors and Microcontrollers Laboratory	√		√	√						√	√	√
	Mini Project	√		√	√						√	√	√

	Course	1	2	3	4	5	6	7	8	9	10	11	12
Semester-VII	High Voltage Engineering	√	√	√	√	√		√					√
	Power System Operation and Control	√	√	√	√	√		√					√
	Renewable Energy Systems	√	√	√	√	√		√					√
	Introduction to C Programming												
	Disaster management	√		√		√	√					√	√
	Power System Transient		√		√	√							
	Power System Simulation Laboratory	√		√	√						√	√	√
	Renewable Energy Systems Laboratory	√		√	√						√	√	√

	Course	1	2	3	4	5	6	7	8	9	10	11	12
Semester-VIII	Electric Energy Generation, Utilization and Conservation	√	√	√	√	√		√					√
	Microcontroller Based System Design	√	√	√					√	√			√
	Project Work	√	√	√	√	√	√	√	√	√	√	√	√

COMPETENCY – PERFORMANCE INDICATOR TABLE

PO1: Engineering Knowledge: Apply the Mathematical knowledge and the basics of Science and Engineering to solve the problems pertaining to Electrical and Electronics Engineering.			
Competency		**Performance Indicators**	
1.1	Demonstrate competence in mathematical modeling	1.1.1	Apply mathematical techniques such as linear algebra, differential calculus, differential equations and integral calculus to solve problems
		1.1.2	Apply concepts of Complex Variable, probability, linear algebra, vector integration and transformation techniques to model and solve electronics engineering problems.
1.2	Demonstrate competence in basic sciences	1.2.1	Apply laws of natural science to an engineering problem
1.3	Demonstrate competence in engineering fundamentals	1.3.1	Apply engineering fundamentals
1.4	Demonstrate competence in specialized engineering knowledge to the program	1.4.1	Apply electrical engineering concepts to solve engineering problems
PO2: Problem Analysis: Identify and formulate Electrical and Electronics Engineering problems from research literature and be ability to analyze the problem using first principles of Mathematics and Engineering Sciences			
Competency		**Performance Indicators**	
2.1	Demonstrate an ability to identify and formulate complex	2.1.1	Articulate problem statements and identify objectives.

	engineering problem	2.1.2	Identify engineering systems, variables, and parameters to solve a problem
		2.1.3	Identify the mathematical, engineering and other relevant knowledge that applies to a given problem
2.2	Demonstrate an ability to formulate a solution plan and methodology for an engineering problem	2.2.1	Reframe complex problems into interconnected sub-problems.
		2.2.2	Identify, assemble and evaluate information and resources
		2.2.3	Identify existing solution/methods for solving the problem, including forming justified approximations and assumptions
		2.2.4	Compare and contrast alternative solution/methods to select the best methods.

2.3	Demonstrate an ability to formulate and interpret a model	2.3.1	Combine scientific principles and engineering concepts to formulate model/s (mathematical or otherwise) of a system or process that is appropriate in terms of applicability and required accuracy.
		2.3.2	Identify assumptions (mathematical and physical) necessary to allow modeling of a system at the level of accuracy required.
2.4	Demonstrate an ability to execute a solution process and analyze results	2.4.1	Apply engineering mathematics to implement solution
		2.4.2	Analyze and interpret the results using contemporary tools.
		2.4.3	Identify the limitations of the solution and sources/causes of error.
		2.4.4	Arrive at conclusions with respect to the objectives.

PO3: 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.

Competency		Performance Indicators	
3.1	Demonstrate an ability to define a complex/open-ended problem in engineering terms	3.1.1	Recognize that need analysis is key to good problem definition
		3.1.2	Able to identify and document system requirements from stakeholders.
		3.1.3	Ability to review state of the art literature to synthesize requirements.
		3.1.4	Extract engineering requirements from relevant engineering codes and standards defined by ISO/IEC/IEEE.

		3.1.5	Explore and synthesize engineering requirements considering health, safety, risks, environment, cultural and societal issues
		3.1.6	Determine design, objectives, functional requirements and arrive at specifications
3.2	Demonstrate an ability to generate a diverse set of alternative design solutions	3.2.1	Ability to explore design alternatives.
		3.2.2	Build models/prototypes to develop diverse set of design solutions
		3.2.3	Identify suitable criteria for evaluation of alternate design solutions
3.3	Demonstrate an ability to select optimal design scheme for further development	3.3.1	Ability to perform systematic evaluation of the degree to which several design concepts meet the criteria.
		3.3.2	Consult with domain experts and stakeholders to select candidate engineering design solution for further development
3.4	Demonstrate an ability to advance an engineering design to defined end state	3.4.1	Refine a conceptual design into a detailed design within the existing constraints (of the resources)
		3.4.2	Generate information through appropriate tests to improve or revise design

PO4: Conduct Investigation of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

Competency		Performance Indicators	
4.1	Demonstrate an ability to conduct investigations of technical issues consistent with their level of knowledge and understanding	4.1.1	Define a problem for purpose of investigation, its scope and importance
		4.1.2	Choose appropriate methods, algorithms, hardware/software tools and techniques of experiment design, system calibration, data acquisition, analysis and presentation
		4.1.3	Apply appropriate hardware/software tools to conduct the experiment
		4.1.4	Establish a relationship between measured data and underlying physical principles
4.2	Demonstrate an ability to design experiments to solve open ended problems	4.2.1	Design and develop experimental approach, specify appropriate equipment and procedures
		4.2.2	Understand the importance of statistical design of experiments and choose an appropriate experimental design plan based on the study objectives
4.3	Demonstrate an ability to analyze data and reach a valid conclusion	4.3.1	Use appropriate procedures, toolsand techniques to collect and analyzedata

		4.3.2	Critically analyze data for trends and correlations, stating possible errors and limitations
		4.3.3	Represent data (in tabular and/or graphical forms) so as to facilitate analysis and explanation of the data, and drawing of conclusions
		4.3.4	Synthesize information and knowledge about the problem from the raw data to reach appropriate conclusions

PO5: Modern Tools Usage: create, select and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

Competency		Performance Indicators	
5.1	Demonstrate an ability to identify/create modern engineering tools, techniques and resources	5.1.1	Identify modern engineering tools techniques and resources for engineering activities
		5.1.2	Create/adapt/modify/extend tools and techniques to solve engineering problems
5.2	Demonstrate an ability to select and apply discipline specific tools, techniques and resources	5.2.1	Identify the strengths and limitations of tools for (i) acquiring information (ii) modeling and simulating (iii) monitoring system performance, and (iv) creating engineering designs
		5.2.2	Demonstrate proficiency in using discipline specific tools
5.3	Demonstrate an ability to evaluate the suitability and limitations of tools used to solve an engineering problem	5.3.1	Discuss limitations and validate tools, techniques and resources
		5.3.2	Verify the credibility of results from tool use with reference to the accuracy and limitations, and the assumptions inherent in their use.

PO6: 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.

Competency		Performance Indicators	
6.1	Demonstrate an ability to describe engineering roles in a broader context, e.g. pertaining to the environment, health, safety, legal and public welfare	6.1.1	Identify and describe various engineering roles; particularly as pertains to protection of the public and public interest at global, regional and local level.
6.2	Demonstrate an understanding of professional engineering regulations, legislation and standards	6.2.1	Interpret legislation, regulations, codes, and standards relevant to professional engineering practice and explain its contribution to the protection of the public.

PO7: Environment & Sustainability: understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Competency		Performance Indicators	
7.1	Demonstrate an understanding of the impact of engineering and industrial practices on social, environmental and in economic contexts	7.1.1	Identify risks/impacts in the life-cycle of an engineering product or activity
		7.1.2	Understand the relationship between the technical, socioeconomic and environmental dimensions of sustainability
7.2	Demonstrate an ability toapply principles of sustainable design anddevelopment	7.2.1	Describe management techniques for sustainable development
		7.2.2	Apply principles of preventive engineering and sustainable development to anengineering activity or product relevant to thediscipline

PO8: Ethics: apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

Competency		Performance Indicators	
8.1	Demonstrate an ability to recognize ethical dilemmas	8.1.1	Identify situations of unethical professional conduct and propose ethical alternatives
8.2	Demonstrate an ability to apply the code of ethics	8.2.1	Identify tenets of code of ethics given by the professional bodies like IEEE.
		8.2.2	Examine and apply moral & ethical principles to known case studies

PO9: Individual & Team work: function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.

Competency		Performance Indicators	
9.1	Demonstrate an ability to form a team and define a role for each member	9.1.1	Recognize a variety of working and learning preferences; appreciate the value of diversity on a team
		9.1.2	Implement the norms of practice (e.g. rules, roles, charters, agendas etc.) of effective team work, to accomplish a goal
9.2	Demonstrate effective individual and team operations--- communication, problem solving, conflict resolution and leadership skills	9.2.1	Demonstrate effective communication, problem solving, conflict resolution and leadership skills
		9.2.2	Treat other team members respectfully
		9.2.3	Listen to other members
		9.2.4	Maintain composure in difficult situations
9.3	Demonstrate success in a team based project	9.3.1	Present results as a team, with smooth integration of contributions from all individual efforts

PO10: 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.

Competency		Performance Indicators	
10.1	Demonstrate an ability to comprehend technical literature and document project work	10.1.1	Read, understand and interpret technical and non-technical information
		10.1.2	Produce clear, well-constructed, and well-supported written engineering documents
		10.1.3	Create flow in a document or presentation- a logical progression of ideas so that the main point is clear
10.2	Demonstrate competence in listening, speaking and presentation	10.2.1	Listen to and comprehend information, instructions, and viewpoints of others
		10.2.2	Deliver effective oral presentations to technical and nontechnical audiences
10.3	Demonstrate the ability to integrate different modes of communication	10.3.1	Create engineering-standard figures, reports and drawings to complement writing and presentations
		10.3.2	Use a variety of media effectively to convey a message in a document or a presentation

PO11: Project management & 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.

Competency		Performance Indicators	
11.1	Demonstrate an ability to evaluate the economic and financial performance of an engineering activity	11.1.1	Describe various economic and financial costs/benefits of an engineering activity
		11.1.2	Analyze different forms of financial statements to evaluate the financial status of an engineering project
11.2	Demonstrate an ability to compare and contrast the costs/benefits of alternate proposals for an engineering activity	11.2.1	Analyze and select the most appropriate proposal based on economic and financial considerations
11.3	Demonstrate an ability to plan/manage an engineering activity within time and budget constraints	11.3.1	Identify the tasks required to complete an engineering activity and the resources required to complete the tasks
		11.3.2	Use project management tools to schedule an engineering project so it is completed on time and on budget

PO12: 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.

Competency		Performance Indicators	
12.1	Demonstrate an ability to identify gaps in knowledge and a strategy	12.1.1	Describe the rationale for requirement for continuing professional development

	to close these gaps	12.1.2	Identify deficiencies or gaps in knowledge and demonstrate an ability to source information to close this gap
12.2		12.2.1	Identify historic points of technological advance in engineering that required
	Demonstrate an ability to identify changing trends in engineering knowledge and practice		practitioners to seek education in order to stay current
		12.2.2	Recognize the need and be able to clearly explain why it is vitally important to keep current regarding new developments in your field.
12.3	Demonstrate an ability to identify and access sources for new information	12.3.1	Source and comprehend technical literature and other credible sources of information
		12.3..2	Analyze sourced technical and popular information for feasibility, viability, sustainability etc.

COURSE ARTICULATION MATRIX

SEMESTER-I

HS8151 - Communicative English

COs	PROGRAM OUTCOMEs – (PO's)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	-	-	-	-	-	-	-	-	2	1	-	2	-	-	1
CO:2	-	-	-	-	-	-	-	-	1	2	-	1	-	-	1
CO:3	-	-	-	-	-	-	-	-	2	2	-	2	-	-	2
CO:4	-	-	-	-	-	-	-	-	1	1	-	1	-	-	1

MA8151 - Engineering Mathematics-I

COs	PROGRAM OUTCOMEs – (PO's)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	1	1	1	-	-	-	-	-	-	-		-	1	-	-
CO:2	1	2	1	-	-	-	-	-	-	-	-	-	1	-	-
CO:3	1	2	1	-	-	-	-	-	-	-	-	-	1	-	-
CO:4	1	2	1	-	-	-	-	-	-	-	-	-	1	-	-
CO:5	1	1	1	-	-	-	-	-	-	-	-	-	1	-	-

PH8151 - Engineering Physics

COs	PROGRAM OUTCOMEs – (PO's)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-
CO:2	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-
CO:3	2	1	1	-	-	-	-	-	-	-	-	-	2	-	-
CO:4	2	1	1	-	-	-	-	-	-	-	-	-	2	-	-
CO:5	2	1	1	-	-	-	-	-	-	-	-	-	2	-	-

CY8151 - Engineering Chemistry

COs	PROGRAM OUTCOMEs – (PO's)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2	1	-	-	2	2	1	2	-	-	-	2	1	1	-
CO:2	1	1	-	-	1	1	1	1	-	-	-	1	1	1	-
CO:3	1	1	-	-	1	1	1	1	-	-	-	1	1	1	-
CO:4	1	1	-	-	1	1	1	1	-	-	-	1	1	1	-

GE8151 - Problem Solving and Python Programming

COs	PROGRAM OUTCOMEs – (PO's)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2	1	-	1	2							1	-		1
CO:2	1	1	-	1	1							1	1		1
CO:3	1	1	-	1	1							1	-		1
CO:4	1	1	-	1	1							1	-		1
CO:5	2	1	1	1	1							1	1		1
CO:6	2	1	1	1	-							1	1		1

GE8152 - Engineering Graphics

COs	PROGRAM OUTCOMEs – (PO's)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1			1	1											
CO:2			1	1											
CO:3			1	1											
CO:4			1	1											
CO:5			1	1											

GE8161 - Problem Solving and Python Programming Laboratory

COs	PROGRAM OUTCOMEs – (PO's)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2	1	1	1	1							1			1
CO:2	2	-	1	1	1							1			1
CO:3	1	1	1	1	1							1			-
CO:4	2	1	1	1	1							1			-
CO:5	1	2	1	1	1							1			1

BS8161 - Physics and Chemistry Laboratory

COs	PROGRAM OUTCOMEs – (PO's)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	1	2											1	1	1
CO:2	1	1											1	1	1
CO:3	1	1											-	1	1

SEMESTER-II

HS8251 - Technical English

COs	PROGRAM OUTCOMEs – (PO's)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	-	-	-	-	-	-	-	-	2	1	-	2	-	-	1
CO:2	-	-	-	-	-	-	-	-	1	2	-	1	-	-	1
CO:3	-	-	-	-	-	-	-	-	2	2	-	2	-	-	2
CO:4	-	-	-	-	-	-	-	-	1	1	-	1	-	-	1

MA8251 - Engineering Mathematics-II

COs	PROGRAM OUTCOMEs – (PO's)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	1	1	1	-	-	-	-	-	-	-		-	1	-	-
CO:2	1	2	1	-	-	-	-	-	-	-	-	-	1	-	-
CO:3	1	2	1	-	-	-	-	-	-	-	-	-	1	-	-
CO:4	1	2	1	-	-	-	-	-	-	-	-	-	1	-	-
CO:5	1	1	1	-	-	-	-	-	-	-	-	-	1	-	-

PH8253 - Physics for Electronics Engineering

COs	PROGRAM OUTCOMEs - (PO's)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2	1	1												
CO:2	2	1	1												
CO:3	2	1	1										2		
CO:4	2	1	1										2		
CO:5	2	1	1										2		

BE8252 - Basic Civil and Mechanical Engineering

COs	PROGRAM OUTCOMEs - (PO's)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1				3		2							1		2
CO:2				3		2									1
CO:3				3		2									
CO:4				3		2							1		
CO:5				2		1									2

EE8251 - Circuit Theory

COs	PROGRAM OUTCOMEs - (PO's)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2	2	2	1	1	1	1	-	-	-	1	1	2	1	1
CO:2	2	2	1	1	1	1	1	-	-	-	1	1	2	1	1
CO:3	1	2	2	1	1	1	1	-	-	-	1	1	1	1	1

GE8291 - Environmental Science and Engineering

COs	PROGRAM OUTCOMEs - (PO's)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2	1	-	-	2	2	1	2	-	-	-	2	1	1	-
CO:2	1	1	-	-	1	1	1	1	-	-	-	1	1	1	-
CO:3	1	1	-	-	1	1	1	1	-	-	-	1	1	1	-
CO:4	1	1	-	-	1	1	1	1	-	-	-	1	1	1	-

GE8261 - Engineering Practices

COs	PROGRAM OUTCOMEs – (PO's)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2	1	-	-	2	2	1	2	-	-	-	2	1	1	-
CO:2	1	1	-	-	1	1	1	1	-	-	-	1	1	1	-
CO:3	1	1	-	-	1	1	1	1	-	-	-	1	1	1	-
CO:4	1	1	-	-	1	1	1	1	-	-	-	1	1	1	-

EE8261 - Electric Circuits Laboratory

COs	PROGRAM OUTCOMEs – (PO's)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2		1	1	2	2	1	2	-	1	-	2	1	1	-
CO:2	1		1	1	1	1	1	1	-	1	-	1	1	1	-
CO:3	1		1	1	1	1	1	1	-	1	-	1	1	1	-

SEMESTER-III

MA8353 - Transforms and Partial Differential Equations

COs	PROGRAM OUTCOMEs – (PO's)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2	1			-							-	1	1	-
CO:2	2	1			1							-	1	1	-
CO:3	2	1			1							-	1	1	1
CO:4	2	1			1							-	1	2	1
CO:5	2	1			1							1	-	1	2

EE8351 - Digital Logic Circuits

COs	PROGRAM OUTCOMEs – (PO's)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	1	3	3	2	-	-	-	-	-	-	-	-	3	2	-
CO:2	1	-	-	-	3	-	-	-	-	-	-	-	2	-	3
CO:3	3	2	1	-	-	-	-	-	-	-	-	-	3	-	-
CO:4	3	3	3	2	-	-	-	-	-	-	-	-	2	3	-
CO:5	3	3	3	2	-	-	-	-	-	-	-	-	3	1	2
CO:6	-	-	2	-	3	-	-	-	-	-	-	-	2	2	3

EE8391 - Electromagnetic Theory

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2	2	1	2	1					1		1	2	1	2
CO:2	2	2	2	2	2					1		1	2	2	1
CO:3	2	2	2	2	2					1		1	2	2	1
CO:4	2	2	1	2	1					1		1	2	2	1
CO:5	2	2	1	2	2					1		1	2	2	1
CO:6	2	2	2	1	2					1		1	2	2	1

EE8301 - Electrical Machines – I

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO 1	2	2	1	1	1					2			3	3	2
CO 2	1	2	1	2	1					2			3	1	2
CO 3	2	2	2	2	1					2			3	1	2
CO 4	2	1	1	1	1					2			3	2	1
CO 5	2	1	1	1	1					2			3	2	1

EC8353 - Electron Devices and Circuits

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO 1	2	2											2		
CO 2	2	2	1	1									2	2	
CO 3	1	2	2	2									2	2	
CO 4	1	2	2	2									2	2	
CO 5	1	1	2	2									1	2	

ME8792 - Power Plant Engineering

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO 1			2	2	1		1	1	1				2	1	1
CO 2			2	2	1		1	2	1				2	1	1
CO 3			2	2	1		1	1	1				2	1	1
CO 4			2	1	2		2	2	1				2	1	1
CO 5			2	1	2		2	2	1				2	1	1

EC8311 - Electronics Laboratory

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO 1	1			1	1						1	1	1	1	1

EE8311 - Electrical Machines Laboratory – I

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	1			1	1						1	1	1	1	1
CO:2	2			1	1						1	1	1	1	1
CO:3	1			2	1						1	1	1	1	1

SEMESTER –IV

MA8491- Numerical Methods

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2	2	1									1			1
CO:2	1	2	1									1			1
CO:3	1	1	1									1			1
CO:4	2	1	1									1			1
CO:5	1	2	1									1			1

EE8401 - Electrical Machines – II

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	1	2	1	1	1		2					1	1		1
CO:2	1	2	1	1	1		1					1	1	1	1
CO:3	1	1	1	1	1		1					1	1	1	1
CO:4	1	1	1	1	1		1					1	1	1	1
CO:5	1	1	1	1	1		1					1	1	1	1
CO:6	1	2	2	1	1		1					1	1		1

EE8402 - Transmission and Distribution

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	1	1	2	2	2	-	1	-	-	-	-	2	1	1	1
CO:2	2	1	1	2	2	-	1	-	-	-	-	1	1	1	1
CO:3	2	2	2	2	1	-	1	-	-	-	-	2	1	1	1
CO:4	1	2	1	1	1	-	1	-	-	-	-	1	1	1	1
CO:5	1	2	1	1	1	-	1	-	-	-	-	1	1	1	1
CO:6	1	2	2	2	1	-	2	-	-	-	-	1	1	1	1

EE8403 - Measurements and Instrumentation

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	1	1	2	2	2	-	-	-	-	-	-	2	1	1	1
CO:2	2	1	1	2	2	-	-	-	-	-	-	1	1	1	1
CO:3	2	2	2	2	1	-	-	-	-	-	-	2	1	1	1
CO:4	1	2	1	1	1	-	-	-	-	-	-	1	1	1	1
CO:5	1	2	1	1	1	-	-	-	-	-	-	1	1	1	1
CO:6	1	2	2	2	1	-	-	-	-	-	-	1	1	1	1

EE8451 - Linear Integrated Circuits and Applications

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	1	1	1		1							2	1		1
CO:2	1	1	2		1							1	1		1
CO:3	1	1	1		1							2	1		1
CO:4	2	1	1		1							1	1		1
CO:5	1	1	1		1							1	1		1
CO:6	1	1	1		1							1	1		1

IC8451 – Control Systems

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	1	1	1	1	1							2	1	1	1
CO:2	1	1	2	1	1							1	1	1	1
CO:3	1	1	1	1	1							2	1	1	1
CO:4	2	1	1	1	1							1	1	1	1
CO:5	1	1	1	1	1							1	1	1	1
CO:6	1	1	1	1	1							1	1	1	1

EE8411 - Electrical Machines Laboratory – II

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2	1	1	1	1							2	1	1	1
CO:2	1	2	2	1	1							1	1	1	1
CO:3	1	2	1	1	1							2	1	1	1
CO:4	2	1	1	1	1							1	1	1	1
CO:5	1	1	1	1	1							1	1	1	1

EE8461 - Linear and Digital Integrated Circuits Laboratory

COs	PROGRAM OUTCOMEs - (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2		1	1						1	1	2	1	1	1
CO:2	1		2	1						1	1	1	1	1	1
CO:3	1		1	1						1	1	2	1	1	1
CO:4	2		1	1						1	1	1	1	1	1
CO:5	1		1	1						1	1	1	1	1	1

EE8412 - Technical Seminar

COs	PROGRAM OUTCOMEs - (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1									1	1	1		1		1
CO:2									1	1	1		1		1
CO:3									1	1	1		1		1

SEMESTER –V

EE8501 - Power System Analysis

COs	PROGRAM OUTCOMEs - (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	3	3	2	2	1		1					1	2	1	
CO:2	3	3	3	2	1	1	1					2	2	2	
CO:3	3	3	3	2	1	1	1					2	2	1	1
CO:4	3	3	3	2	1	1	1					2	3	1	1
CO:5	3	3	2	2	1	1	2					1	2	1	

EE8551 - Microprocessors and Microcontrollers

COs	PROGRAM OUTCOMEs - (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2		2		2				1			1	1	1	1
CO:2	1		1		1				1				1	1	1
CO:3	1		1		1				1				1	1	1
CO:4	1		1		1				1				1	1	1
CO:5	2		2		2				1				1	1	1
CO:6	1		2		2				2			1	1	2	1

EE8552 - Power Electronics

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2	2	1	1	2		1						2	1	1
CO:2	2	2	1	1	2		1						2	1	1
CO:3	2	2	1	1	2		1						2	1	1
CO:4	2	2	1	1	2		1						2	1	1
CO:5	2	2	1	1	2		1						2	1	1

EE8591 - Digital Signal Processing

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2	2	2	1									1	1	1
CO:2	2	1	2	2									1	1	1
CO:3	2	2	1	1									1	1	1
CO:4	1	1	1	1									1	1	1
CO:5	2	1	1	1									1	1	1
CO:6			2	2	2								1	1	1

CS8392 - Object Oriented Programming

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO1	PSO2	PSO3
CO:1			2	2	1							1			
CO:2			2	2	1							1			
CO:3			2	1	1							1			
CO:4			2	2	1							1			
CO:5			2	2	1							1			

OMD551 - Basics of Biomedical Instrumentation

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1				2		1							2	1	1
CO:2				2		2							2	1	1
CO:3	1	1	1	2	2	2									
CO:4			1	1	1	2							2	1	1
CO:5			2	1	1	2							2	1	1

EE8511 - Control and Instrumentation Laboratory

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
CO:1			2			1			1	1			2	2	1
CO:2			1			2			1	1			2	2	1
CO:3				2	1	1			1	1			2	2	1
CO:4				1	2	1			1	1			1	2	1
CO:5			1		1	2			1	1			1	2	1
CO:6			1	1	1	2			1	1			1	2	1

HS8581 - Professional Communication

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO -4	PO-5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO-12	PSO -1	PSO-2	PSO-3
CO:1									1	1	1				1
CO:2									1	1	1				1
CO:3									1	1	1				1
CO:4									1	1	1				1

CS8383 - Object Oriented Programming Laboratory

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO -4	PO-5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO-12	PSO -1	PSO-2	PSO-3
CO:1			2	2	3							1	2	1	1
CO:2			2	2	3							1	2	1	1
CO:3			2	3	3							1	2	1	1

SEMESTER VI

EE8601 - Solid State Drives

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
CO:1	1	1	1	1	1		1						1	1	
CO:2	2	1	2	1	1		2						1	1	
CO:3	1	1	1	1	1		1						1	1	
CO:4	1	1	1	1	1		2						1	1	
CO:5	1	1	1	1	1		1						1	1	
CO:6	1	1	1	1	2		1						1	1	

EE8602 - Protection and Switchgear

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
CO:1	1	1	1	1	1		1					1	1	1	1
CO:2	2	1	2	1	1		2					1	1	1	1
CO:3	1	1	1	1	1		1					1	1	1	1
CO:4	1	1	1	1	1		2					1	1	1	1
CO:5	1	1	1	1	1		1					1	1	1	1
CO:6	1	1	1	1	2		1					1	1	1	1

EE8691 - Embedded Systems

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
CO:1	1	1	1	1								1	1	1	1
CO:2	1	1	1	1								1	1	1	1
CO:3	1	1	1	1								1	1	1	1
CO:4	1	1	1	1								1	1	1	1
CO:5	1	1	1	1								1	1	1	1
CO:6	1	1	1	1								1	1	1	1

EE8002 - Design of Electrical Apparatus

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
CO:1	1		1	1	2		1						1	1	1
CO:2	1		1	1	1		1						1	1	1
CO:3	1		1	1	1		1						1	1	1
CO:4	1		1	1	1		1						1	1	1
CO:5	1		1	1	1		1						1	1	1
CO:6	1		1	1	1		1						1	1	1

EE8005 - Special Electrical Machines

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
CO:1	1		1	1	1			1					1	1	1
CO:2	1		1	1	1			1					1	1	1
CO:3	1		1	2	1			1					1	1	1
CO:4	1		1	1	1			1					1	1	1
CO:5	1		1	1	2			1					1	1	1
CO:6	1		1	1	1			1					1	1	1
CO:7	1		1	1	1			1					1		1

EE8661 - Power Electronics and Drives Laboratory

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
CO:1	1		1							1	1	1	1	1	1
CO:2	1		1							1	1	1	1	1	1
CO:3	1		1							1	2	1	1	1	1
CO:4	1		1							1	1	1	1	1	1
CO:5	1		1							1	1	2	1	1	1
CO:6	1		1							1	1	1	1	1	1

EE8681 - Microprocessors and Microcontrollers Laboratory

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
CO:1	1		1							1	1	1	1	1	1
CO:2	1		1							1	1	1	1	1	1
CO:3	1		1							1	1	1	1	1	1
CO:4	1		1							1	1	1	1	1	1
CO:5	1		1							1	1	1	1	1	1
CO:6	1		1							1	1	1	1	1	1

EE8611 - Mini Project

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
CO:1	1		1							1	1	1	1	1	1
CO:2	1		2							1	1	1	1	1	1
CO:3	1		1							1	2	1	1	1	1

SEMESTER VII

EE8701 - High Voltage Engineering

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO -2	PO-3	PO-4	PO-5	PO -6	PO-7	PO -8	PO -9	PO -10	PO -11	PO-12	PSO -1	PSO -2	PSO -3
CO:1	2	2	1	2	1		1					2	2	2	
CO:2	1	2	2	2	1		2					1			
CO:3	1	2	2	1	2		1					2	2	2	
CO:4	2	1	1	2	2		1					2	2	2	
CO:5	2	2	1	2	2		1					1	2	2	

EE8702 - Power System Operation and Control

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2				1		1					1		1	
CO:2	3	3	2	2	1		2					2	2	1	2
CO:3					2		1					1	-	1	2
CO:4	2	2	1	1	2		1					1	1	1	2
CO:5	1	1	1	1	2		1					1	1	1	2
CO:6			1		2		2					2	1	1	3

EE8703 - Renewable Energy Systems

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
CO:	1	1	1	1	2		2					2		1	1
CO:	1	1	1	1	2		2					2		1	1
CO:	1	1	1	1	2		1					1		1	1
CO:	1	1	1	1	2		2					1		1	1
CO:	1	1	1	1	2		2					2			
CO:	1	1	1	1	2		2					2			

OCS752 - Introduction to C Programming

COs	PROGRAM OUTCOMEs - (Pos)												PSOs		
	PO -1	PO -2	PO -3	PO -4	PO -5	PO-6	PO -7	PO -8	PO-9	PO-10	PO-11	PO-12	PSO -1	PSO -2	PSO 3
CO:1	2	2	1					1	2	2		2	2	2	2
CO:2	2	2	1					2	2	2		2	2	2	2
CO:3	2	2	1					1	2	2		2	2	2	2
CO:4	2	2	1					2	2	2		2	2	3	2
CO:5	2	2	1					1	2	2		2	2	2	2

GE8071 - Disaster management

COs	PROGRAM OUTCOMEs - (Pos)												PSOs		
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
CO:1			3			2						1	3	2	2
CO:2			1			2						2	1	1	1
CO:3			1			1						2	1	1	1

EE8010 - Power System Transient

COs	PROGRAM OUTCOMEs - (Pos)												PSOs		
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
CO:1		2		1	1								1	1	
CO:2		2		1	1								1	1	
CO:3		2		1	1								1	1	
CO:4		2		1	1								1	1	
CO:5		2		1	1								1	1	
CO:6		2		1	1								1	1	

EE8711 - Power System Simulation Laboratory

COs	PROGRAM OUTCOMEs - (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2		2	2						2	2	2	2	2	2
CO:2	2		2	2						2	2	2	2	2	1
CO:3	1		1	1						1	1	1	2	2	2
CO:4	1		1	1						1	1	1	2	2	2
CO:5	1		1	1						1	1	1	2	2	1
CO:6	1		1	1						1	1	1	2	2	1

EE8712 - Renewable Energy Systems Laboratory

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	1		2	2						1	2	2	1	2	1
CO:2	2		2	2						2	2	2	2	2	1
CO:3	2		2	2						2	1	2	2	2	2
CO:4	2		2	2						2	2	1	2	2	2
CO:5	1		1	2						2	2	2	2	1	1
CO:6	2		1	2						1	2	1	2	2	1

SEMESTER VIII

EE8015 - Electric Energy Generation, Utilization and Conservation

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	1	1	2	2	1							2	1	2	1
CO:2	2	1	2	2	1							2	2	2	1
CO:3	2	1	2	2	1							2	2	2	2
CO:4	2	1	2	2	1							1	2	2	2
CO:5	1	1	1	2	1							2	2	1	1
CO:6	2	1	1	2	1							1	2	2	1

EE8018 - Microcontroller Based System Design

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	2	2	2					1	1			1	1	1	2
CO:2	1	1	1					1	1				1	1	1
CO:3	1	1	1					1	1				1	1	1
CO:4	2	1	1					1	1				1	1	1
CO:5	2	1	1					1	1			1	1	1	1
CO:6	1	1	1					1	1				1	1	1

EE8811- Project Work

COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO:1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CO:2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CO:3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Program Articulation Matrix

SEM	COURSE	COs	PROGRAM OUTCOMEs – (Pos)											PSOs		
			PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
I	HS8151	CO:1	-	-	-	-	-	-	-	-	2	1	-	2	-	-	1
		CO:2	-	-	-	-	-	-	-	-	1	2	-	1	-	-	1
		CO:3	-	-	-	-	-	-	-	-	2	2	-	2	-	-	2
		CO:4	-	-	-	-	-	-	-	-	1	1	-	1	-	-	1
	MA8151	CO:1	1	1	1	-	-	-	-	-	-	-		-	1	-	-
		CO:2	1	2	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO:3	1	2	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO:4	1	2	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO:5	1	1	1	-	-	-	-	-	-	-	-	-	1	-	-
	PH8151	CO:1	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-
		CO:2	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-
		CO:3	2	1	1	-	-	-	-	-	-	-	-	-	2	-	-
		CO:4	2	1	1	-	-	-	-	-	-	-	-	-	2	-	-
		CO:5	2	1	1	-	-	-	-	-	-	-	-	-	2	-	-
	CY8151	CO:1	2	1	-	-	2	2	1	2	-	-	-	2	1	1	-
		CO:2	1	1	-	-	1	1	1	1	-	-	-	1	1	1	-
		CO:3	1	1	-	-	1	1	1	1	-	-	-	1	1	1	-
		CO:4	1	1	-	-	1	1	1	1	-	-	-	1	1	1	-
	GE8151	CO:1	2	1	-	1	2							1	-		1
		CO:2	1	1	-	1	1							1	1		1
		CO:3	1	1	-	1	1							1	-		1
		CO:4	1	1	-	1	1							1	-		1
		CO:5	2	1	1	1	1							1	1		1
		CO:6	2	1	1	1	-							1	1		1
	GE8152	CO:1			1	1											
		CO:2			1	1											
		CO:3			1	1											
		CO:4			1	1											
		CO:5			1	1											

	GE8161	CO:1	2	1	1	1	1							1			1
		CO:2	2	-	1	1	1							1			1
		CO:3	1	1	1	1	1							1			-
		CO:4	2	1	1	1	1							1			-
		CO:5	1	2	1	1	1							1			1
	BS8161	CO:1	1	2											1	1	1
		CO:2	1	1											1	1	1
		CO:3	1	1											-	1	1

SEM	COURSE	COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
			PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
II	HS8251	CO:1	-	-	-	-	-	-	-	-	2	1	-	2	-	-	1
		CO:2	-	-	-	-	-	-	-	-	1	2	-	1	-	-	1
		CO:3	-	-	-	-	-	-	-	-	2	2	-	2	-	-	2
		CO:4	-	-	-	-	-	-	-	-	1	1	-	1	-	-	1
	MA8251	CO:1	1	1	1	-	-	-	-	-	-	-		-	1	-	-
		CO:2	1	2	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO:3	1	2	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO:4	1	2	1	-	-	-	-	-	-	-	-	-	1	-	-
		CO:5	1	1	1	-	-	-	-	-	-	-	-	-	1	-	-
	PH8253	C0:1	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-
		C0:2	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-
		C0:3	2	1	1	-	-	-	-	-	-	-	-	-	2	-	-
		C0:4	2	1	1	-	-	-	-	-	-	-	-	-	2	-	-
		CO:5	2	1	1	-	-	-	-	-	-	-	-	-	2	-	-
	BE8252	C0:1	-	-	-	3	-	2	-	-	-	-	-	-	1	-	2
		C0:2	-	-	-	3	-	2	-	-	-	-	-	-	-	-	3
		C0:3	-	-	-	3	-	2	-	-	-	-	-	-	-	-	-
		C0:4	-	-	-	3	-	2	-	-	-	-	-	-	1	-	-
		CO:5	-	-	-	2	-	1	-	-	-	-	-	-	-	-	2
	EE8251	C0:1	2	2	2	1	1	1	1	-	-	-	1	1	2	1	1
		C0:2	2	2	1	1	1	1	1	-	-	-	1	1	2	1	1

		CO:3	1	2	2	1	1	1	1	-	-	-	1	1	1	1	1
	GE8291	CO:1	2	1	-	-	2	2	1	2	-	-	-	2	1	1	-
		CO:2	1	1	-	-	1	1	1	1	-	-	-	1	1	1	-
		CO:3	1	1	-	-	1	1	1	1	-	-	-	1	1	1	-
		CO:4	1	1	-	-	1	1	1	1	-	-	-	1	1	1	-
	GE8261	CO:1	2	1	-	-	2	2	1	2	-	-	-	2	1	1	-
		CO:2	1	1	-	-	1	1	1	1	-	-	-	1	1	1	-
		CO:3	1	1	-	-	1	1	1	1	-	-	-	1	1	1	-
		CO:4	1	1	-	-	1	1	1	1	-	-	-	1	1	1	-
	EE8261	CO:1	2		1	1	2	2	1	2	-	1	-	2	1	1	-
		CO:2	1		1	1	1	1	1	1	-	1	-	1	1	1	-
		CO:3	1		1	1	1	1	1	1	-	1	-	1	1	1	-

SEM	COURSE	COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
			PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
III	MA8353	CO:1	2	1			-							-	1	1	-
		CO:2	2	1			1							-	1	1	-
		CO:3	2	1			1							-	1	1	1
		CO:4	2	1			1							-	1	2	1
		CO:5	2	1			1							1	-	1	2
	EE8351	CO:1	1	3	3	2									3	2	-
		CO:2	1				3								2		3
		CO:3	3	2	1										3		
		CO:4	3	3	3	2									2	3	
		CO:5	3	3	3	2									3	1	2
		CO:6			2		3								2	2	3
	EE8391	CO:1	2	2	1	2	1					1		1	2	1	2
		CO:2	2	2	2	2	2					1		1	2	2	1
		CO:3	2	2	2	2	2					1		1	2	2	1
		CO:4	2	2	1	2	1					1		1	2	2	1
		CO:5	2	2	1	2	2					1		1	2	2	1
		CO:6	2	2	2	1	2					1		1	2	2	1

	EE8301	CO:1	2	2	1	1	1					2			3	3	2
		CO:2	1	2	1	2	1					2			3	1	2
		CO:3	2	2	2	2	1					2			3	1	2
		CO:4	2	1	1	1	1					2			3	2	1
		CO:5	2	1	1	1	1					2			3	2	1
	EC8353	CO:1	2	2											2	-	-
		CO:2	2	2	1	1									2	2	-
		CO:3	1	2	2	2									2	2	-
		CO:4	1	2	2	2									2	2	-
		CO:5	1	1	2	2									1	2	-
	ME8792	CO:1			2	2	1		1	1	1				2	1	1
		CO:2			2	2	1		1	2	1				2	1	1
		CO:3			2	2	1		1	1	1				2	1	1
		CO:4			2	1	2		2	2	1				2	1	1
		CO:5			2	1	2		2	2	1				2	1	1
	EC8311	CO:1	1			1	1						1	1	1	1	1
	EE8311	CO:1	2	1	1	1	2					1			1	1	
		CO:2	2	1	1	1	1					1			1	1	
		CO:3	2	2	1	1	1					1			1	1	

SEM	COURSE	COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
			PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
IV	MA8491	CO:1	2	2	1									1			1
		CO:2	1	2	1									1			1
		CO:3	1	1	1									1			1
		CO:4	2	1	1									1			1
		CO:5	1	2	1									1			1
	EE8401	CO:1	1	2	1	1	1		2					1	1		1
		CO:2	1	2	1	1	1		1					1	1	1	1
		CO:3	1	1	1	1	1		1					1	1	1	1
		CO:4	1	1	1	1	1		1					1	1	1	1
		CO:5	1	1	1	1	1		1					1	1	1	1

		CO:6	1	2	2	1	1		1					1	1		1
	EE8402	CO:1	1	1	2	2	2	-	1	-	-	-	-	2	1	1	1
		CO:2	2	1	1	2	2	-	1	-	-	-	-	1	1	1	1
		CO:3	2	2	2	2	1	-	1	-	-	-	-	2	1	1	1
		CO:4	1	2	1	1	1	-	1	-	-	-	-	1	1	1	1
		CO:5	1	2	1	1	1	-	1	-	-	-	-	1	1	1	1
		CO:6	1	2	2	2	1	-	2	-	-	-	-	1	1	1	1
	EE8403	CO:1	1	1	2	2	2	-	-	-	-	-	-	2	1	1	1
		CO:2	2	1	1	2	2	-	-	-	-	-	-	1	1	1	1
		CO:3	2	2	2	2	1	-	-	-	-	-	-	2	1	1	1
		CO:4	1	2	1	1	1	-	-	-	-	-	-	1	1	1	1
		CO:5	1	2	1	1	1	-	-	-	-	-	-	1	1	1	1
		CO:6	1	2	2	2	1	-	-	-	-	-	-	1	1	1	1
	EE8451	CO:1	1	1	1		1							2	1		1
		CO:2	1	1	2		1							1	1		1
		CO:3	1	1	1		1							2	1		1
		CO:4	2	1	1		1							1	1		1
		CO:5	1	1	1		1							1	1		1
		CO:6	1	1	1		1							1	1		1
	IC8451	CO:1	1	1	1	1	1							2	1	1	1
		CO:2	1	1	2	1	1							1	1	1	1
		CO:3	1	1	1	1	1							2	1	1	1
		CO:4	2	1	1	1	1							1	1	1	1
		CO:5	1	1	1	1	1							1	1	1	1
		CO:6	1	1	1	1	1							1	1	1	1
	EE8411	CO:1	2	1	1	1	1							2	1	1	1
		CO:2	1	2	2	1	1							1	1	1	1
		CO:3	1	2	1	1	1							2	1	1	1
		CO:4	2	1	1	1	1							1	1	1	1
		CO:5	1	1	1	1	1							1	1	1	1
	EE8461	CO:1	2		1	1						1	1	2	1	1	1
		CO:2	1		2	1						1	1	1	1	1	1

		CO:3	1		1	1						1	1	2	1	1	1
		CO:4	2		1	1						1	1	1	1	1	1
		CO:5	1		1	1						1	1	1	1	1	1
	EE8412	CO:1									1	1	1		1		1
		CO:2									1	1	1		1		1
		CO:3									1	1	1		1		1

SEM	COURSE	COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
			PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
V	EE8501	CO:1	3	3	2	2	1		1					1	2	1	
		CO:2	3	3	3	2	1	1	1					2	2	2	
		CO:3	3	3	3	2	1	1	1					2	2	1	1
		CO:4	3	3	3	2	1	1	1					2	3	1	1
		CO:5	3	3	2	2	1	1	2					1	2	1	
	EE8551	CO:1	2		2		2				1			1	1	1	1
		CO:2	1		1		1				1				1	1	1
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		CO:4	1		1		1				1				1	1	1
		CO:5	2		2		2				1				1	1	1
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		CO:4	1	1	1	1									1	1	
		CO:5	2	1	1	1									1	1	
		CO6			2	2	2										

	CS8392	CO:1				2	2	1										1	1	1	1					
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		CO:2					2		2										2	1	1					
		CO:3	1	1	1	2	2	2																		
		CO:4				1	1	1	2										2	1	1					
		CO:5				2	1	1	2										2	1	1					
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		CO:2				1			1			1	1						2	2	1					
		CO:3					3	1	1			1	1						2	2	1					
		CO:4					1	3	1			1	1						1	2	1					
		CO:5				1		1	2			1	1						1	2	1					
		CO6				1	1	1	2			1	1						1	2	1					
	HS8581	CO:1										1	1	1							1					
		CO:2										1	1	1							1					
		CO:3										1	1	1							1					
		CO4										1	1	1							1					
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		CO:2				2	2	3										1	2	1	1					
		CO:3				2	3	3										1	2	1	1					

SEM	COURSE	COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
			PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -S	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
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		CO:3	1	1	1	1	1		1						1	1	
		CO:4	1	1	1	1	1		2						1	1	
		CO:5	1	1	1	1	1		1						1	1	
		CO:6	1	1	1	1	2		1						1	1	

	EE8602	CO:1	1	1	1	1	1		1					1	1	1	1	
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		CO:4	1	1	1	1	1		2					1	1	1	1	
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		CO:3	1	1	1	1								1	1	1	1	
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		CO:3	1		1	2	1			1					1	1	1	
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		CO:3	1		1							1	2	1	1	1	1

SEM	COURSE	COs	PROGRAM OUTCOMEs – (Pos)												PSOs		
			PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
VII	EE8701	CO:1	2	2	1	2	1		1					2	2	2	
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		CO:3	1	2	2	1	2		1					2	2	2	
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		CO:5	2	2	1	2	2		1					1	2	2	
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		CO:2	3	3	2	2	1		2					2	2	1	2
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		CO:4	2	2	1	1	2		1					1	1	1	2
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		CO:4	1	1	1	1	2		2					1		1	1
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		CO:6	1	1	1	1	2		2					2			
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		CO:4	2	2	1					2	2	2		2	2	3	2

		CO:5	2	2	1					1	2	2		2	2	2	2
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		CO:3			1			1						2	1	1	1
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		CO:4	2		2	2						2	2	1	2	2	2
		CO:5	1		1	2						2	2	2	2	1	1
		CO:6	2		1	2						1	2	1	2	2	1

SEM	COURSE	COs	PROGRAM OUTCOMEs – (Pos)											PSOs		
			PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3
VIII	EE8015	CO:1	1	1	2	2	1							2	1	2	1
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		CO:3	2	1	2	2	1							2	2	2	2
		CO:4	2	1	2	2	1							1	2	2	2
		CO:5	1	1	1	2	1							2	2	1	1
		CO:6	2	1	1	2	1							1	2	2	1
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		CO:3	1	1	1					1	1				1	1	1
		CO:4	2	1	1					1	1				1	1	1
		CO:5	2	1	1					1	1			1	1	1	1
		CO:6	1	1	1					1	1				1	1	1
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		CO:3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

21/12/2020

Pedagogy Member / IQAC Member

21/12/20

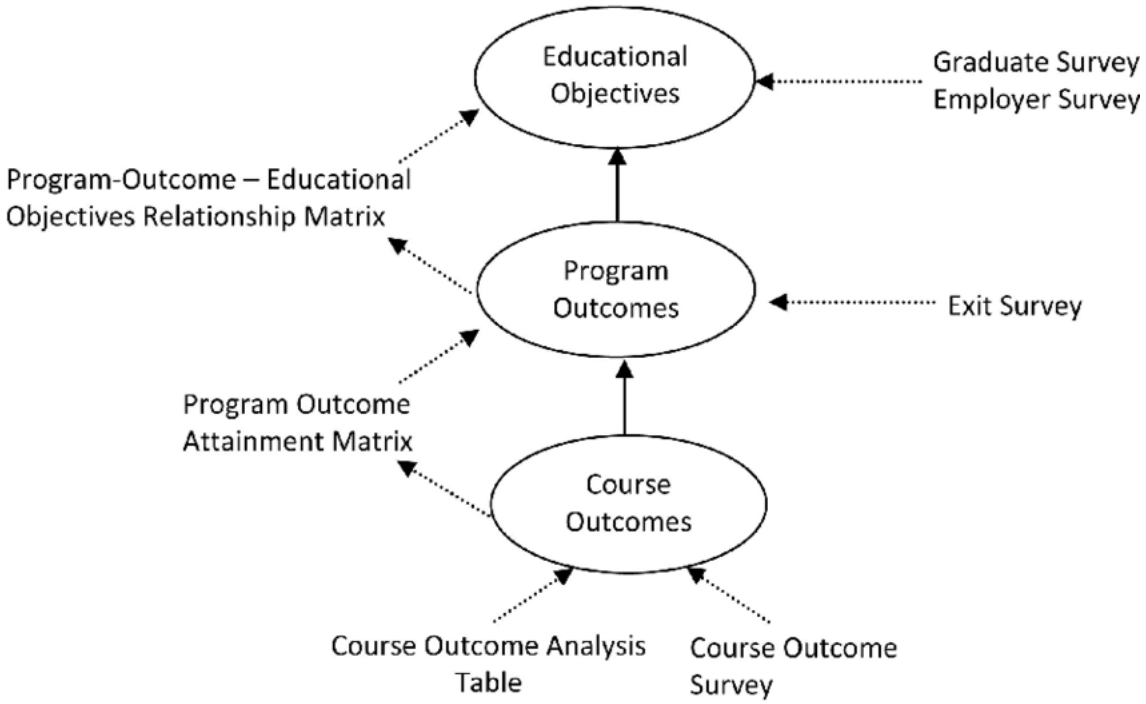
HOD /EEE

21/12/2020

Principal

Department of Mechanical Engineering

2.6.1 – Program Outcome and Course Outcome



Department of Mechanical Engineering

PROGRAMME EDUCATIONAL OBJECTIVES (PEO):

Bachelor of Mechanical Engineering curriculum is designed to impart Knowledge, Skill and Attitude on the graduates to,

1. Have a successful career in Mechanical Engineering and allied industries.
2. Have expertise in the areas of Design, Thermal, Materials and Manufacturing.
3. Contribute towards technological development through academic research and industrial practices.
4. Practice their profession with good communication, leadership, ethics and social responsibility.
5. Graduates will adapt to evolving technologies through life-long learning.

PROGRAMME OUTCOMES (PO):

1. An ability to apply knowledge of mathematics and engineering sciences to develop mathematical models for industrial problems.
2. An ability to identify, formulates, and solve complex engineering problems. with high degree of competence.
3. An ability to design and conduct experiments, as well as to analyze and interpret data obtained through those experiments.
4. An ability to design mechanical systems, component, or a process to meet desired needs within the realistic constraints such as environmental, social, political and economic sustainability.
5. An ability to use modern tools, software and equipment to analyze multidisciplinary problems.
6. An ability to demonstrate on professional and ethical responsibilities.
7. An ability to communicate, write reports and express research findings in a scientific community.
8. An ability to adapt quickly to the global changes and contemporary practices.
9. An ability to engage in life-long learning.

PROGRAM SPECIFIC OBJECTIVES (PSO):

1. To analyze, design and develop solutions by applying foundational concepts of Mechanical Engineering.
2. To apply design principles and best practices for developing quality products for real life mechanical engineering problems.
3. To adapt to emerging Information and Communication Technologies (ICT) to innovate ideas and solutions to existing/novel mechanical problems.

ANNA UNIVERSITY, CHENNAI

AFFILIATED INSTITUTIONS

B.E. MECHANICAL ENGINEERING

REGULATIONS – 2017

CHOICE BASED CREDIT SYSTEM

PROGRAMME EDUCATIONAL OBJECTIVES:

Bachelor of Mechanical Engineering curriculum is designed to impart Knowledge, Skill and Attitude on the graduates to

1. Have a successful career in Mechanical Engineering and allied industries.
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PROGRAMME OUTCOMES

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8. An ability to adapt quickly to the global changes and contemporary practices.
9. An ability to engage in life-long learning.

PEO / PO Mapping

Programme Educational Objectives	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
I	✓	✓	✓	✓	✓	✓	✓	✓	✓
II	✓	✓	✓		✓			✓	
III		✓		✓	✓	✓		✓	
IV					✓	✓	✓		✓
V		✓	✓	✓	✓				✓

		COURSE TITLE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
YEAR 1	SEM 1	Communicative English							✓		
		Engineering Mathematics I	✓	✓	✓						✓
		Engineering Physics	✓	✓	✓						✓
		Engineering Chemistry				✓					
		Problem Solving and Python Programming					✓				
		Engineering Graphics		✓	✓				✓		
		Problem Solving and Python Programming Laboratory			✓		✓				
		Physics and Chemistry Laboratory			✓						
		COURSE TITLE	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
	SEM 2	Technical English							✓		
		Engineering Mathematics II	✓	✓	✓				✓		✓
		Materials Science				✓				✓	
		Basic Electrical, Electronics and Instrumentation Engineering				✓				✓	
		Environmental Science and Engineering				✓					
		Engineering Mechanics	✓	✓					✓	✓	✓
		Engineering Practices Laboratory			✓						
		Basic Electrical, Electronics and Instrumentation Engineering			✓						
		COURSE TITLE	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
YEAR 2	SEM 3	Transforms and Partial Differential Equations	✓	✓	✓					✓	✓
		Engineering Thermodynamics	✓	✓	✓				✓	✓	
		Fluid Mechanics and Machinery	✓	✓	✓						
		Manufacturing Technology - I			✓	✓	✓	✓		✓	✓
		Electrical Drives and Controls									
		Manufacturing Technology Laboratory - I			✓	✓	✓	✓		✓	✓
		Computer Aided Machine Drawing			✓	✓	✓	✓		✓	✓
		Electrical Engineering Laboratory			✓						
		Interpersonal Skills / Listening & Speaking			✓						
		COURSE TITLE	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
	SEM 4	Statistics and Numerical Methods	✓	✓							
		Kinematics of Machinery	✓	✓	✓		✓				
		Manufacturing Technology– II	✓		✓	✓	✓			✓	✓
		Engineering Metallurgy							✓		

		Strength of Materials for Mechanical Engineers	✓	✓	✓	✓					
		Thermal Engineering- I	✓	✓			✓				
		Manufacturing Technology Laboratory–II			✓						
		Strength of Materials and Fluid Mechanics Machinery Laboratory			✓						
		Advanced Reading and Writing						✓			✓
		COURSE TITLE	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
YEAR 3	SEM 5	Thermal Engineering- II	✓	✓			✓			✓	
		Design of Machine Elements		✓		✓			✓	✓	✓
		Metrology and Measurements	✓		✓	✓			✓	✓	
		Dynamics of Machines	✓	✓	✓		✓		✓		✓
		Kinematics and Dynamics Laboratory	✓	✓	✓	✓					
		Thermal Engineering Laboratory	✓	✓	✓						
		Metrology and Measurements Laboratory	✓	✓	✓	✓			✓		
		COURSE TITLE	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
	SEM 6	Design of Transmission Systems		✓		✓			✓		✓
		Computer Aided Design and Manufacturing		✓	✓		✓				
		Heat and Mass Transfer	✓	✓	✓	✓				✓	✓
		Finite Element Analysis	✓	✓		✓					✓
		Hydraulics and Pneumatics	✓	✓		✓				✓	
		C.A.D. / C.A.M. Laboratory		✓	✓			✓			
		Design and Fabrication Project						✓	✓		✓
		Professional Communication				✓	✓	✓	✓		✓
		COURSE TITLE	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
YEAR 4	SEM 7	Power Plant Engineering	✓	✓	✓	✓				✓	
		Mechatronics	✓	✓	✓		✓			✓	✓
		Process Planning and Cost Estimation		✓		✓					
		Simulation and Analysis Laboratory	✓				✓		✓		
		Mechatronics Laboratory	✓	✓	✓		✓			✓	✓
		Technical Seminar						✓			
	SEM 8	Project Work	✓	✓	✓			✓	✓		
		Principles of Management						✓			✓

PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialisation for the solution of complex engineering problems.	
Competency	**Indicators**
1.1 Demonstrate competence in mathematical modelling	1.1.1 Apply mathematical techniques such as calculus, linear algebra, and statistics to solve problems 1.1.2 Apply advanced mathematical techniques to model and solve mechanical engineering problems
1.2 Demonstrate competence in basic sciences	1.2.1 Apply laws of natural science to an engineering problem
1.3 Demonstrate competence in engineering fundamentals	1.3.1 Apply fundamental engineering concepts to solve engineering problems
1.4 Demonstrate competence in specialized engineering knowledge to the program	1.4.1 Apply Mechanical engineering concepts to solve engineering problems.
PO 2: Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	
Competency	**Indicators**
2.1 Demonstrate an ability to identify and formulate complex engineering problem	2.1.1 Articulate problem statements and identify objectives 2.1.2 Identify engineering systems, variables, and parameters to solve the problems 2.1.3 Identify the mathematical, engineering and other relevant knowledge that applies to a given problem
2.2Demonstrate an ability to formulate a solution plan and methodology for an engineering problem	2.2.1 Reframe complex problems into interconnected sub-problems 2.2.2 Identify, assemble and evaluate information and resources. 2.2.3 Identify existing processes/solution methods for solving the problem, including forming justified approximations and assumptions 2.2.4 Compare and contrast alternative solution processes to select the best process.
2.3 Demonstrate an ability to formulate and interpret a model	2.3.1 Combine scientific principles and engineering concepts to formulate model/s (mathematical or otherwise) of a system or process that is appropriate in terms of applicability and required accuracy. 2.3.2 Identify assumptions (mathematical and physical) necessary to allow modeling of a system at the level of accuracy required.
2.4 Demonstrate an ability to execute a solution process and analyze results	2.4.1 Apply engineering mathematics and computations to solve mathematical models 2.4.2 Produce and validate results through skilful use of contemporary engineering tools and models

	2.4.3 Identify sources of error in the solution process, and limitations of the solution. 2.4.4 Extract desired understanding and conclusions consistent with objectives and limitations of the analysis
PO 3: 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.	
Competency	**Indicators**
3.1 Demonstrate an ability to conduct investigations of technical issues consistent with their level of knowledge and understanding	3.1.1 Define a problem, its scope and importance for purposes of investigation 3.1.2 Examine the relevant methods, tools and techniques of experiment design, system calibration, data acquisition, analysis and presentation 3.1.3 Apply appropriate instrumentation and/or software tools to make measurements of physical quantities 3.1.4 Establish a relationship between measured data and underlying physical principles.
3.2Demonstrate an ability to design experiments to solve open-ended problems	3.2.1 Design and develop an experimental approach, specify appropriate equipment and procedures 3.2.2 Understand the importance of the statistical design of experiments and choose an appropriate experimental design plan based on the study objectives
3.3 Demonstrate an ability to analyze data and reach a valid conclusion	3.3.1 Use appropriate procedures, tools and techniques to conduct experiments and collect data 3.3.2 Analyze data for trends and correlations, stating possible errors and limitations 3.3.3 Represent data (in tabular and/or graphical forms) so as to facilitate analysis and explanation of the data, and drawing of conclusions 3.3.4 Synthesize information and knowledge about the problem from the raw data to reach appropriate conclusions
PO 4: 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 public health and safety, and cultural, societal, and environmental considerations.	
Competency	**Indicators**
4.1 Demonstrate an ability to define a complex/ open-ended problem in engineering terms	4.1.1 Recognize that need analysis is key to good problem definition 4.1.2 Elicit and document, engineering requirements from stakeholders 4.1.3 Synthesize engineering requirements from a review of the state-of-the-art 4.1.4 Extract engineering requirements from relevant engineering Codes and Standards such as ASME, ASTM, BIS, ISO and ASHRAE. 4.1.5 Explore and synthesize engineering requirements considering health, safety risks, environmental, cultural and societal issues 4.1.6 Determine design objectives, functional

	requirements and arrive at specifications
4.2 Demonstrate an ability to generate a diverse set of alternative design solutions	4.2.1 Apply formal idea generation tools to develop multiple engineering design solutions 4.2.2 Build models/prototypes to develop a diverse set of design solutions 4.2.3 Identify suitable criteria for the evaluation of alternate design solutions
4.3 Demonstrate an ability to select an optimal design scheme for further development	4.3.1 Apply formal decision-making tools to select optimal engineering design solutions for further development 4.3.2 Consult with domain experts and stakeholders to select candidate engineering design solution for further development
4.4 Demonstrate an ability to advance an engineering design to defined end state	4.4.1 Refine a conceptual design into a detailed design within the existing constraints (of the resources) 4.4.2 Generate information through appropriate tests to improve or revise the design
4.5 Demonstrate an understanding of the impact of engineering and industrial practices on social, environmental and in economic contexts	4.5.1 Identify risks/impacts in the life-cycle of an engineering product or activity 4.5.2 Understand the relationship between the technical, socio-economic and environmental dimensions of sustainability
4.6 Demonstrate an ability to apply principles of sustainable design and development	4.6.1 Describe management techniques for sustainable development 4.6.2 Apply principles of preventive engineering and sustainable development to an engineering activity or product relevant to the discipline
PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	
Competency	**Indicators**
5.1 Demonstrate an ability to identify/ create modern engineering tools, techniques and resources	5.1.1 Identify modern engineering tools such as computer-aided drafting, modeling and analysis; techniques and resources for engineering activities 5.1.2 Create/adapt/modify/extend tools and techniques to solve engineering problems
5.2 Demonstrate an ability to select and apply discipline-specific tools, techniques and resources	5.2.1 Identify the strengths and limitations of tools for (i) acquiring information, (ii) modeling and simulating, (iii) monitoring system performance, and (iv) creating engineering designs. 5.2.2 Demonstrate proficiency in using discipline-specific tools
5.3 Demonstrate an ability to evaluate the suitability and limitations of tools used to solve an engineering problem	5.3.1 Discuss limitations and validate tools, techniques and resources 5.3.2 Verify the credibility of results from tool use with reference to the accuracy and limitations, and the assumptions inherent in their use.
PO 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.	
Competency	**Indicators**

6.1 Demonstrate an ability to describe engineering roles in a broader context, e.g. pertaining to the environment, health, safety, legal and public welfare	6.1.1 Identify and describe various engineering roles; particularly as pertains to protection of the public and public interest at the global, regional and local level
6.2 Demonstrate an understanding of professional engineering regulations, legislation and standards	6.2.1 Interpret legislation, regulations, codes, and standards relevant to your discipline and explain its contribution to the protection of the public
6.3 Demonstrate an ability to recognize ethical dilemmas	6.3.1 Identify situations of unethical professional conduct and propose ethical alternatives
6.4 Demonstrate an ability to apply the Code of Ethics	6.4.1 Identify tenets of the ASME professional code of ethics. 6.4.2 Examine and apply moral & ethical principles to known case studies.
6.5 Demonstrate an ability to form a team and define a role for each member	6.5.1 Recognize a variety of working and learning preferences; appreciate the value of diversity on a team 6.5.2 Implement the norms of practice (e.g. rules, roles, charters, agendas, etc.) of effective team work, to accomplish a goal.
6.6 Demonstrate effective individual and team operations-- communication, problem-solving, conflict resolution and leadership skills	6.6.1 Demonstrate effective communication, problem-solving, conflict resolution and leadership skills 6.6.2 Treat other team members respectfully 6.6.3 Listen to other members 6.6.4 Maintain composure in difficult situations
6.7 Demonstrate success in a team-based project	9.3.1 Present results as a team, with smooth integration of contributions from all individual efforts
PO 7: Communication: Communicate effectively on complex engineering activities with the engineering community and with the 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	
Competency	**Indicators**
7.1 Demonstrate an ability to comprehend technical literature and document project work	7.1.1 Read, understand and interpret technical and non-technical information 7.1.2 Produce clear, well-constructed, and well-supported written engineering documents 7.1.3 Create flow in a document or presentation - a logical progression of ideas so that the main point is clear
7.2 Demonstrate competence in listening, speaking, and presentation	7.2.1 Listen to and comprehend information, instructions, and viewpoints of others 7.2.2 Deliver effective oral presentations to technical and non-technical audiences
7.3 Demonstrate the ability to integrate different modes of communication	7.3.1 Create engineering-standard figures, reports and drawings to complement writing and presentations 7.3.2 Use a variety of media effectively to convey a message in a document or a presentation
PO 8: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	
Competency	**Indicators**
8.1 Demonstrate an ability to evaluate the economic and financial performance of an engineering activity	8.1.1 Describe various economic and financial costs/benefits of an engineering activity 8.1.2 Analyze different forms of financial statements to

	evaluate the financial status of an engineering project
8.2 Demonstrate an ability to compare and contrast the costs/benefits of alternate proposals for an engineering activity	8.2.1 Analyze and select the most appropriate proposal based on economic and financial considerations.
8.3 Demonstrate an ability to plan/manage an engineering activity within time and budget constraints	8.3.1 Identify the tasks required to complete an engineering activity, and the resources required to complete the tasks. 8.3.2 Use project management tools to schedule an engineering project, so it is completed on time and on budget.
PO 9: Life-long learning: Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	
Competency	**Indicators**
9.1 Demonstrate an ability to identify gaps in knowledge and a strategy to close these gaps	9.1.1 Describe the rationale for the requirement for continuing professional development 9.1.2 Identify deficiencies or gaps in knowledge and demonstrate an ability to source information to close this gap
9.2 Demonstrate an ability to identify changing trends in engineering knowledge and practice	9.2.1 Identify historic points of technological advance in engineering that required practitioners to seek education in order to stay current 9.2.2 Recognize the need and be able to clearly explain why it is vitally important to keep current regarding new developments in your field
9.3 Demonstrate an ability to identify and access sources for new information	9.3.1 Source and comprehend technical literature and other credible sources of information 9.3.2 Analyze sourced technical and popular information for feasibility, viability, sustainability, etc.

10/8/2020 — **Dept IQAC member**

10/8/20 — **HOD**

10/8/2020 — **Principal**

KINGS COLLEGE OF ENGINEERING
DEPARTMENT OF MECHANICAL ENGINEERING
PROGRAMME ARTICULATION MATRIX
COURSE: BE (MECHANICAL ENGG)

SEM	SUBJ CODE	CO	Program Outcome – (PO)									Program Specific Outcome (PSO)		
			PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PSO-1	PSO-2	PSO-3
I	HS8151	CO1	-	-	-	-	-	-	1	-	-	2	-	3
		CO2	-	-	-	-	-	-	2	-	-	-	-	3
		CO3	-	-	-	-	-	-	1	-	-	1	-	2
		CO4	-	-	-	-	-	-	2	-	-	1	3	-
		CO5	-	-	-	-	-	-	1	-	-	-	-	-
	MA8151	CO1	2	1	-	-	-	-	-	-	-	1	1	-
		CO2	2	1	-	-	-	-	-	-	-	1	-	-
		CO3	1	2	-	-	-	-	-	-	1	1	-	-
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		CO7	1	2	1	-	-	-	-	-	-	1	-	-
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		CO5	2	1	1	-	-	-	-	-	1	1	1	-
	CY8151	CO1	-	-	-	2	-	-	-	-	-	1	1	-
	GE8151	CO1	-	-	-	-	1	-	-	-	-	-	-	-
		CO2	-	-	-	-	2	-	-	-	-	-	-	-
		CO3	-	-	-	-	2	-	-	-	-	-	-	-
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		CO3	-	-	2	-	1	-	-	-	-	-	-	-	-
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		CO2	-	-	2	-	-	-	-	-	-	-	1	-	-
		CO3	-	-	-	-	-	-	-	-	-	-	-	-	-
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III		CO:5	3	2	1	-	-	-	-	-	-	3	2	-

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	CO:5	2	1	1	-	-	-	3	1	-	-	1	1
ME8361	CO:1	-	-	1	1	1	2	-	-	1	-	2	-
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IV

ME8491	CO:1	-	-	-	-	-	-	2	-	-	1	2	-
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	CO:4	-	-	-	-	-	-	2	-	-	3	2	-
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		CO:3	-	2	2	-	1	-	-	-	-	2	2	-
		CO:4	-	2	1	-	1	-	-	-	-	2	2	-
		CO:5	-	2	1	-	2	-	-	-	-	2	2	2

VI	ME8693	CO:1	2	2	3	2	-	-	-	1	3	2	2	1
		CO:2	3	1	2	1	-	-	-	2	2	1	1	-
		CO:3	2	2	3	2	-	-	-	3	3	1	-	-
		CO:4	1	2	2	2	-	-	-	2	2	2	1	1
		CO:5	2	3	3	3	-	-	-	3	2	3	2	2
	ME8692	CO:1	2	3	-	3	-	-	-	-	3	2	-	-
		CO:2	2	3	-	3	-	-	-	-	3	2	2	-
		CO:3	2	3	-	3	-	-	-	-	3	2	-	-
		CO:4	2	3	-	3	-	-	-	-	3	2	-	-
		CO:5	2	3	-	3	-	-	-	-	3	2	2	-
	ME8694	CO:1	3	1	-	1	-	-	-	1	-	2	2	-
		CO:2	2	1	-	2	-	-	-	1	-	2	2	-
		CO:3	2	1	-	2	-	-	-	1	-	2	2	-
		CO:4	2	2	-	2	-	-	-	1	-	2	2	-
		CO:5	3	1	-	1	-	-	-	1	-	2	2	-
	ME8091	CO:1	1	1	1	1	-	-	-	-	1	2	-	1
		CO:2	2	1	2	1	-	-	-	-	1	2	1	2
		CO:3	2	1	1	1	-	-	-	-	-	1	-	1
		CO:4	1	1	2	2	-	-	-	-	-	2	-	1
		CO:5	2	2	2	1	-	-	-	-	2	2	1	2
	ME8681	CO:1	-	2	2	-	-	2	-	-	-	2	1	-
		CO:2	-	2	2	-	-	2	-	-	-	2	1	-
	ME8682	CO:1	-	-	-	-	-	3	1	-	1	1	2	-
		CO:2	-	-	-	-	-	2	1	-	1	1	2	-
	HS8581	CO:1	-	-	-	1	2	1	2	-	1	2	-	1
		CO:2	-	-	-	2	2	1	2	-	1	2	-	1
		CO:3	-	-	-	1	2	1	1	-	1	1	-	1
		CO:4	-	-	-	2	3	1	2	-	1	1	1	2
	ME8792	CO:1	2	1	2	1	-	-	-	1	-	2	-	1
		CO:2	2	1	2	2	-	-	-	1	-	2	-	1
		CO:3	2	1	1	1	-	-	-	1	-	1	-	1
		CO:4	3	1	2	2	-	-	-	1	-	1	1	2
		CO:5	3	2	2	1	-	-	-	1	-	2	1	2

VII	ME8793	CO:1	-	2	-	2	-	-	-	-	-	3	-	3
		CO:2	-	2	-	2	-	-	-	-	-	-	2	-
		CO:3	-	3	-	2	-	-	-	-	-	2	1	-
		CO:4	-	3	-	2	-	-	-	-	-	2	-	2
		CO:5	-	2	-	2	-	-	-	-	-	2	2	-
	ME8791	CO:1	2	2	2	-	1	-	-	1	1	2	1	-
		CO:2	1	2	2	-	2	-	-	1	1	-	2	-
		CO:3	1	2	2	-	2	-	-	1	1	2	1	-
		CO:4	2	2	3	-	2	-	-	2	1	3	3	2
		CO:5	2	1	3	-	1	-	-	2	2	3	3	2
	OIE751	CO:1	2	1	2	1	-	-	-	1	-	2	-	1
		CO:2	2	1	2	2	-	-	-	1	-	2	-	1
		CO:3	2	1	1	1	-	-	-	1	-	1	-	1
		CO:4	3	1	2	2	-	-	-	1	-	1	1	2
		CO:5	3	2	2	1	-	-	-	1	-	2	1	2
	ME8097	CO:1	2	2	3	2	-	-	-	1	3	2	2	1
		CO:2	3	1	2	1	-	-	-	2	2	1	1	-
		CO:3	2	2	3	2	-	-	-	3	3	1	-	-
		CO:4	1	2	2	2	-	-	-	2	2	2	1	1
		CO:5	2	3	3	3	-	-	-	3	2	3	2	2
	GE8077 TQM	CO:1	-	-	-	3	2	3	-	1		-	1	3
	ME8711	CO:1	3	-	-	-	3	-	-	-	-	3	3	2
		CO:2	2	-	-	-	2	-	-	-	-	1	1	2
		CO:3	1	-	-	-	3	-	-	-	-	2	2	1
	ME8781	CO:1	2	2	2	-	3	-	-	1	2	3	3	1
		CO:2	3	3	2	1	3	-	-	1	2	3	3	1
	ME8712	CO:1	-	-	-	-	-	3	-	-	0	3	3	1
VIII	MG8591	CO:1	-	1	2	-	1	-	-	-	-	1	2	1
		CO:2	-	1	1	-	2	-	-	-	-	2	1	1
		CO:3	-	2	1	-	2	-	-	-	-	1	1	2
		CO:4	-	1	2	-	2	-	-	-	-	1	2	1
		CO:5	-	1	2	-	1	-	-	-	-	2	2	1
	ME8094	CO:1	2	2	2	-	1	-	-	1	1	2	1	-
	ME8811	CO:1	2	1	2	-	-	1	1	-	-	2	-	1

21/12/20
DEPT IQAC MEMBER

T. Pinthuny 21/12/20
HOD

J. Prabhu 21/12/2020
PRINCIPAL