Enable | Enlighten | Enrich
KARPAGAM
ACADEMY OF HIGHER EDUCATION
(Deemed to be University)
(Established Under Section 3 of UGC Act, 1956)

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This is to certify that the enclosed pages (1 to 93) consists details of attainment of Programme Outcomes, Programme Specific Outcomes and Course Outcomes.

REGISTRAR
Karpagam Academy of Higher Education
(Deemed to be University Under Section 3 of UGC Act 1956)
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Coimbatore - 641 021.

KARPAGAM ACADEMY OF HIGHER EDUCATION
CBE-21

KARPAGAM ACADEMY OF HIGHER EDUCATION

CO, PSO and PO Attainment for the Academic Year 2019-2020

Department of Automobile Engineering

19BEAE101 Mathematics - I

COs

1	Analyse the characteristics of a linear system with Eigenvalues and Eigenvectors.
2	Evaluate the functions to get the surface area and volume using multiple integral.
3	Use the tool of power series for learning advanced engineering mathematics.
4	Calculate grad, div and curl in Cartesian and other simple coordinate systems
5	Analyse the differential equations using Fourier series analysis.

COs, POs and PSOs Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

19BEAE141 ENGINEERING PHYSICS

CO

1	Describe the basics of properties of matter and its applications.
2	Express the concepts of sound, ultrasonic and their applications.
3	Illustrate the thermal properties of materials and advanced physics concepts of quantum theory.
4	Identify the basics of light, laser, fibre optics and their applications.
5	Explain the basics of crystals and their structures.

COs, POs and PSOs Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

19BEAE142 BASIC ELECTRICAL ENGINEERING

COs

1.	Analyse the basic electric and magnetic circuits.
2.	Explain the working principle of electrical machines and power converters.
3.	List the components of low-voltage electrical installations.

COs, POs and PSOs Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

19BEAE111 ENGINEERING GRAPHICS AND DESIGN

COs

1	Recognise the conventions and apply dimensioning concepts while drafting simple objects.
2	Draw freehand sketching of multiple views from pictorial views of objects.
3	Draw the orthographic projection of points, line and plane surfaces.
4	Draw the orthographic projection of solids.
5	Draw the isometric projection of the given objects

COs, POs and PSOs Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

19BEAE201 MATHEMATICS – II

COs

1	Apply integration to compute multiple integrals, area, volume, integrals in polar and Cartesian coordinates.
2	Analyse first order differential equations utilizing the standard techniques for separable, exact, linear, Bernoulli cases.
3	Evaluate analytic functions using the Cauchy-Riemann equations.
4	Solve complex integrals using the Cauchy integral formula and the residue theorem.
5	Explain the fundamentals and basic concepts in vector calculus, ODE and complex functions.

COs, POs and PSOs Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

19BEAE202 ENGLISH

COs

1	Use the English language for communication: verbal and non-verbal.
2	Express comprehension and acquisition of speaking and writing ability.
3	Demonstrate word power: lexical, grammatical and communication competence.
4	Compose business letters and other forms of technical writing.

5	Demonstrate oral communication in formal contexts.

COs, POs and PSOs Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

19BEAE241 CHEMISTRY – I

COs

1	Appreciate quantum theory of chemical systems
2	Appreciate aliphatic chemistry
3	Describe the concepts of stereochemistry
4	Write simple mechanisms
5	To synthesis of organic molecules
6	Integrate the chemical principles in the projects undertaken in field of engineering and technology

COs, POs and PSOs Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

19BEAE242 PROGRAMMING FOR PROBLEM SOLVING

COs

1	formulate simple algorithms for arithmetic and logical problems
2	translate the algorithms to programs (in C language)
3	test and execute the programs and correct syntax and logical errors
4	implement conditional branching, iteration and recursion
5	decompose a problem into functions and synthesize a complete program using divide and conquer approach
6	use arrays, pointers and structures to formulate algorithms and programs
7	apply programming to solve matrix addition and multiplication problems and searching and sorting problems
8	To apply programming to solve simple numerical method problems, namely root finding of function, differentiation of function and simple integration

COs, POs and PSOs Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
7	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
8	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

19BEAE211 WORKSHOP/MANUFACTURING PRACTICE LABORATORY

COs

1	Fabricate simple components using carpentry and welding equipment/tools.
2	Make fitting joints and household pipeline connections using suitable tools.
3	Prepare green sand mould using suitable tools.

COs, POs and PSOs Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

19BEAE251 CONSTITUTION OF INDIA

CO

1	Explain the functions of the Indian government.
2	State and abide by the rules of the Indian constitution.
3	Distinguish different culture among the people

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

18BEAE301 MATHEMATICS – III

CO

1	Apply the fundamental concepts of partial differential equations and the various solution procedures for solving the first order non-linear partial differential equations.
2	Appreciate the physical significance of Fourier series techniques in solving one- and two- dimensional heat flow problems and one-dimensional wave equations.
3	Apply the basic concepts of probability and standard distribution.
4	Analyze the basic concepts of one and two-dimensional random variables and apply in engineering applications.
5	Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.

COs, POs and PSOs Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

18BEAE302 ENGINEERING MECHANICS

CO

1	Determine the resultant force and moment for a given system of forces.
2	Analyse the plane trusses having different types of supports and determine the forces in each member.
3	Identify the location of centroid, centre of gravity and calculate the moment of inertia for different sections.
4	Apply the equations of motion of particles to calculate displacement, velocity and acceleration.
5	Determine the friction and its effects by using the laws of friction.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

18BEAE303 APPLIED THERMODYNAMICS

CO

1	Apply the first law of thermodynamics to closed and open systems.
2	Solve the problems related to cycles and cyclic devices using the second law of thermodynamics.

3	Determine the thermodynamic properties of pure substances and its phase change processes.
4	Evaluate the air standard performance of heat engines.
5	Solve the psychrometric problems in various applications.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

18BEAE304 AUTOMOTIVE ENGINES

CO

1	Differentiate the construction and operation of two-stroke and four-stroke engines.
2	Name and explain various components of the fuel feed system.
3	Discuss the combustion process and combustion chambers.
4	List and describe the different methods of supercharging and turbocharging.
5	Explain the importance of cooling and lubrication systems.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

18BEAE305 ENGINEERING METROLOGY AND MEASUREMENTS

CO

1	Explain the basic concept of measurement and characteristics of measuring instruments.
2	Practice the appropriate linear and angular dimensions using precision measuring instruments.
3	Examine the major terminologies for the gear and screw thread measurement.
4	Explain the suitable type of instrument used to measure the mechanical parameters.
5	Apply the advanced techniques in metrology to calculate the geometric dimensions.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

18BEAE306 BIOLOGY FOR ENGINEERS

CO

1	Summarise the cell structures and their functions.
2	Explain the biomolecules functions.
3	Classify the communicable and non-communicable human diseases.
4	Illustrate the different organ function tests.
5	Tell the applications of biology in environmental applications.
6	Describe the concept of biomechanics.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

18BEAE311 AUTOMOTIVE ENGINE COMPONENTS AND MEASUREMENTS LABORATORY

CO

1	Identify and assemble the components of an engine.
2	Explain the function of various components of an engine.
3	Practice the appropriate linear and angular dimensions using precision measuring instruments.
4	Examine the major terminologies for the gear and screw thread.
5	Explain the suitable type of instrument used to measure the mechanical parameters.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

18BEAE312 COMPUTER AIDED MACHINE DRAWING LABORATORY

CO

1	Sketch the detailed drawing of various components.
2	Create the assembly drawing of various components.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

18BEAE313 THERMAL ENGINEERING LABORATORY

CO

1	Measure the flash point, fire point and viscosity of given sample.

2	Draw the port timing diagram of two-stroke and valve timing diagram of four-stroke internal combustion engines.
3	Evaluate the performance of internal combustion engine and reciprocating air compressor.
4	Calculate the coefficient of performance of a refrigeration system.
5	Estimate the thermal conductivity of material, heat transfer from surface and emissivity of a grey surface.
6	Calculate the effectiveness of a heat exchanger.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

18BEAE351 SOFT SKILLS

CO

1	Demonstrate the adequate soft skills required for the workplace.
2	Express the views in group discussions with confidence.
3	Demonstrate the appropriate interview skills.
4	Manage time effectively.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

18BEAE401 FLUID MECHANICS AND HEAT TRANSFER

CO

1	Estimate the flow properties and pressure head using fundamental laws of fluid mechanics.
2	Evaluate the discharge and loss of energy in flow through pipes.
3	Analyse the performance of hydraulic pumps and turbines for a given application.
4	Apply the heat conduction equation to compute the rate of heat transfer in simple and composite systems.
5	Determine the rate of heat transfer in convection and radiation modes.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

18BEAE402 STRENGTH OF MATERIALS

CO

1.	Evaluate the stresses and strains in simple and composite structures subjected to axial loads.
2.	Examine the shear force, bending moment and shear stress of various beams under different loading conditions.
3.	Examine the stresses induced in the shaft and closed coil helical springs subjected to torsion.
4.	Evaluate the slope and deflection of beams and buckling loads of columns with different boundary conditions.
5.	Examine the stresses in two-dimensional systems and thin cylinders.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

18BEAE403 THEORY OF MACHINES

CO

1	Identify the simple mechanisms based on a given application, and find velocity and acceleration of simple mechanisms.
2	Estimate the amount of power transmitted by a friction drive.
3	Calculate the speed ratio of various types of the gear train and construct the cam profile for the various types of follower motion.
4	Estimate the balancing mass for rotating and reciprocating masses by using the force and couple polygon.
5	Evaluate the natural frequency of a single degree of freedom system subjected to free and forced vibrations

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**

18BEAE404 ENGINEERING MATERIALS AND METALLURGY

CO

1	Explain the phase diagrams of different engineering materials.
2	Recognise the properties and applications of various metals and alloys.
3	Identify the appropriate heat treatment processes for the given applications.
4	Test the mechanical properties of the given materials for real-time applications.
5	Identify the appropriate composites for applications in the automotive industry.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

18BEAE441 AUTOMOTIVE CHASSIS AND TRANSMISSION

CO

1	Discuss the types of frame, front axle and steering system.
2	Sketch and explain the different types of clutches and gearboxes.
3	Describe the components in driveline, final drive and rear axle.
4	Identify the types of suspension systems, wheels and tyres.
5	Explain the construction and working principle of different types of brakes.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

18BEAE442 AUTOMOTIVE ELECTRICAL AND ELECTRONICS SYSTEMS

CO

1	Sketch and explain the working principle of battery and ignition system.
2	Discuss working of the starting system and charging system.
3	Illustrate the automobile wiring system.
4	Identify the sensors and actuators used in the automobile.
5	Explain the electronic engine management system.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

18BEAE411 FLUID MECHANICS AND STRENGTH OF MATERIALS LABORATORY

CO

1	Calculate the rate of fluid flow and coefficient of discharge in fluid flow devices.
2	Measure the losses associated in a pipe flow.
3	Evaluate the performance of non-positive and positive displacement pumps.
4	Measure the tensile and shear strength of materials.
5	Evaluate the hardness and impact strength of materials.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

18BEAE451 COURSE ORIENTED PROJECT – I

CO

1	Identify a problem and develop the solutions.
2	Apply technical ideas, strategies and methodologies.
3	Prepare report and present oral demonstrations.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2

1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

17BEAE501 DESIGN OF MACHINE ELEMENTS

CO

1	To familiarize the various steps involved in the Design Process
2	To understand the principles involved in evaluating the shape and dimensions of a component to satisfy functional and strength requirements.
3	To learn to use standard practices and standard data
4	To learn to use catalogues and standard machine components
5	To familiarize the various steps involved in the Design Process

CO ,PO and PSO Matrices for the course

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PS01**	**PSO2**
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

17BEAE502 IC ENGINE DESIGN

CO

1	Differentiate among different internal combustion engine designs.
2	Recognize and understand reasons for differences among operating characteristics of different engine types and designs.
3	Given an engine design specification, predict performance and fuel economy trends with good accuracy.
4	Based on an in-depth analysis of the combustion process, predict concentrations of primary exhaust pollutants.

CO ,PO and PSO Matrices for the course

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PS01**	**PSO2**

1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

17BEAE503 VEHICLE DYNAMICS

CO

1	Students will be able to understand the concepts of Mechanical vibrating systems, suspension and tyre related vibrations and Stability of Vehicles
2	perform calculations in design operation
3	Behavior of the vehicle in different road conditions
4	apply the concepts to determine the performance efficiency

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

17BEAE504 MANUFACTURING TECHNOLOGY

CO

1	To understand the concept and basic mechanics of metal cutting, working of standard machine tools such as lathe, shaping and allied machines, milling, drilling and allied machines, grinding and allied machines and broaching
2	To understand the surface finishing processes
3	To understand the basic concepts of computer numerical control (CNC) machine tool and CNC programming.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

17BEAE505AMECHATRONICS

CO

1	At the end of the course the student will be able to understand the Pneumatic and hydraulic system, PLC, robotics, transducers, sensors and fundamentals of mechatronics.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

17BEAE505B INTELLIGENT VEHICLE TECHNOLOGY

CO

1	To enable the students to understand the intelligent vehicle technologies.
2	To enable the students to gain knowledge on all recent technologies in automobile.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

17BEAE512 DYNAMICS AND MECHATRONICS LABORATORY

CO

1	To make the students to know how the measuring devices are used for dynamic testing.
2	To understand the interdisciplinary applications of Electronics, Electrical, mechanical and Computer Systems for the control of Mechanical and Electronic Systems.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

17BEAE601 AUTOMOTIVE CHASSIS DESIGN

CO

1	The student will be able to understand the fundamental principles involved in vehicle design.
2	The complete design exercise and arrive at important dimensions of chassis components.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

16BEAE602 INDUSTRIAL ENGINEERING AND OPERATIONS RESEARCH

CO

1	Select suitable production planning methodologies, production system and plant layout for the industry.
2	Execute an effective work study and ergonomics for better productivity.
3	Formulate and select a suitable method to solve the linear programming problem.
4	Solve different transportation and assignment based models.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

16BEAE603 VEHICLE BODY ENGINEERING AND SAFETY

CO

1	The students will be able to know Car body details, Bus body, Commercial Vehicle details, Vehicle aerodynamics, Body material and mechanisms.
2	Calculation of each parts of the vehicle

3	Possible safety measures

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

17BEAE604 PRODUCTION PROCESS FOR AUTOMOTIVE COMPONENTS

CO

1	To provide knowledge about the various production Processes for Automotive Components.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

17BEAE605 HYBRID VEHICLE TECHNOLOGY

CO

1	This course introduces the fundamental concepts, principles, analysis and design of hybrid, electric and fuel cell vehicles.
2	To understand working of different configurations of electric vehicles, and its components, hybrid vehicle configuration and performance analysis.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

17BEAE611 AUTOMOBILE VEHICLE MAINTENANCE AND RE-CONDITIONING LABORATORY

CO

1	To impart the fundamental knowledge in the automobile component maintenance and vehicle maintenance.
2	To make the student to study and understand about the reconditioning of engine and setting caster, camber, and toe -in, toe -out.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

17BEAE612 MANUFACTURING PROCESSES LABORATORY

17BEAE604 PRODUCTION PROCESS FOR AUTOMOTIVE COMPONENTS

CO

1	To understand various manufacturing processes and to make the students to have a hands- on various machines like lathe, Shaper, Slotter, Milling, Gear hobbing, grinding machines.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

16BECC701 PROFESSIONAL ETHICS & PRINCIPLES OF MANAGEMENT AND ENTREPRENEURSHIP DEVELOPMENT

CO

1	Explain the human values.
2	Implement the importance of ethics and professionalism.
3	Practice the process of management's four functions.
4	Understand the entrepreneurial characteristics.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

16BEAE702 FINITE ELEMENT ANALYSIS

CO

1	To understand the principles involved in discretization and finite element approach
2	To learn to form stiffness matrices and force vectors for simple elements

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

16BEAE711 AUTO SCANNING AND VEHICLE TESTING LABORATORY

CO

1	To enable the students to gain practical knowledge on computerized equipments used in the service section of an automobile

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

16BEAE712 COMPUTER AIDED DESIGN ANALYSIS LABORATORY

CO

1	To enable the students to gain knowledge on the analysis tool like ANSYS

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

16BEAE801 TOTAL QUALITY MANAGEMENT

CO

1	Use the concepts, dimension of quality and philosophies of TQM.

2	Apply the principles of TQM and its strategies in industries.
3	Apply the statistical quality tools and seven management tools.
4	Choose suitable TQM tools for continuous improvement.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

16BEAE891 PROJECT WORK PHASE-II AND VIVA- VOCE

CO

1	Demonstrate sound technical knowledge of the project topic.
2	Apply the knowledge of mathematics, science and engineering to solve complex engineering problems.
3	Identify, formulate and analyse problems and justify solutions using scientific knowledge.
4	Design and conduct experiments, as well as analyse and interpret data.
5	Execute the project based on the design developed during phase - I.

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

DEPARTMENT OF CHEMICAL ENGINEERING

Correlation level 1,2, and 3 are defined as follows

1. **Slight (low)**
2. **Moderate (Medium)**
3. **Substantial (High)**

19BTCE101 Mathematics-I

CO

1	In rank, consistency and its inverse in Engineering fields
2	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices and the students will be able to use matrix algebra techniques for practical applications
3	To recognize scalar and vector functions. Evaluate Gradient, Divergence and Curl of a point function depending upon its nature, identifying Solenoidal and Irrotational Vector fields and to use vector identities connecting these quantities in problem solving
4	To Calculate and establish identities connecting line, surface and volume integrals in simple coordinate systems and to Use Greens theorem to simplify calculations of integrals and prove simple results
5	To solve differential equations using Fourier series analysis which plays a vital role in engineering applications
6	To analyse and evaluate the basic concepts of mathematics like matrix opreations, vectors, Fourier series etc in their specific fields

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

19BTCE102 Physics

CO

1	knowledge of Bragg's Law, interference, diffraction and its applications

2	understand the principles of lasers, types of lasers and itsapplications and also gain the knowledge of fiber optics
3	remember the basic concepts of electromagnetism, maxwell equations polarization,etc
4	gain the knowledge of dielectrics & magnetic propertiesofmaterials
5	analyze about the some of the basic laws and concepts of quantum mechanics, uncertainty principle and scanning electron microscope
6	have adequate knowledge on the basic concepts of physics and its applications

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

19BTCE103 English

CO

1	Use English language for communication: verbal & non –verbal
2	Enrich comprehension and acquisition of speaking & writing ability
3	Gain confidence in using English language in real life situations
4	Improve word power: lexical, grammatical and communication competence
5	To guide the students to write business letters and other forms of technical writing
6	To enable students to prepare for oral communication in formal contexts

CO ,PO and PSO Matrices for the above course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

19BTCE104 Chemistry-I

CO

1	Appreciate quantum theory of chemical systems
2	Appreciate aliphatic chemistry
3	Describe the concepts of stereochemistry
4	Write simple mechanisms
5	To synthesis of organic molecules
6	Integrate the chemical principles in the projects undertaken in field of engineering and technology

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

19BTCE105 Engineering Graphics

CO

1	Students will be able to read drawing and can understand different views

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

19BTCE201 Mathematics-II

CO

1	able to solve equations using Laplace and Fourier transform

2	To solve first order differential equations utilizing the standard techniques for separable, exact, linear, Bernoulli cases
3	To evaluate second order ordinary differential equations in various methods
4	To apply various techniques in solving differential equations and to understand the method of finding the series solution of Bessel's and Legendre's differential equations
5	Better understanding in problems related to heat condition, communication systems, electro optics and electromagnetic theory using the techniques will be learnt in this course
6	The Learners can equip themselves in the transform techniques and solve ODEs and PDEs

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

19BTCE202 Chemistry –II

CO

1	To apply the various unit process
2	Extend the principles of reaction meachanisms
3	To apply the knowledge on chemical reactions
4	To prepare soaps
5	To analyses the effect of pigments
6	Integrate the chemical principles in the projects undertaken in field of engineering and technology

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2

1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

19BTCE203 Electrical And Electronics Engineering

CO

1	understand and analyze basic electric and magnetic circuits
2	study the working principles of transformer and Measuring Instruments
3	understand the basic concepts of Digital Circuits

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

19BTCE204 Thermodynamics-I

CO

1	Understand the fundamental concepts of thermodynamics
2	Apply mass and energy balances for open systems
3	Evaluate the properties of non-ideal gases
4	Solve problems involving liquefaction, refrigeration and different power cycles

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

19BTCE211 Programming for problem solving

CO

1	formulate simple algorithms for arithmetic and logical problems
2	translate the algorithms to programs (in C language)
3	test and execute the programs and correct syntax and logical errors
4	implement conditional branching, iteration and recursion
5	decompose a problem into functions and synthesize a complete program using divide and conquer approach
6	use arrays, pointers and structures to formulate algorithms and programs
7	apply programming to solve matrix addition and multiplication problems and searching and sorting problems
8	To apply programming to solve simple numerical method problems, namely root finding of function, differentiation of function and simple integration

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
7	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
8	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

19BTCE212 Chemistry Lab

CO

1	Identifying simple organic compounds
2	Use different analytical instruments
3	Identify reaction rate parameters

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

18BTCE301 Heat Power Engineering

CO

1	Determine the efficiency and output of a modern Rankine cycle steam power plant from given data, including superheat, reheat, regeneration, and irreversibility's
2	Calculate the heat rate, fan power consumption, flame temperature and combustion air requirements of conventional steam generators (boilers)
3	Calculate the performance of gas turbines with reheat and regeneration, and discuss the performance of combined cycle power plants
4	Calculate the performance of I.C Engine with different efficiency and discuss the all other performance parameters of I.C Engine
5	Analyse performance of various refrigeration cycles and air conditioning systems
6	Describe construction, working of various types of reciprocating and rotary Compressors with performance calculations of positive displacement compressor

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

18BTCE302 Fluid Mechanics

CO

1	Ability to apply the basic concepts of fluid mechanics and to solve dimensional analysis problems

2	Ability to solve problems related to mass, momentum and energy balances in fluid flow
3	Ability to demonstrate the applications of flow statics, fluid flow phenomena
4	Ability to design fluid flow reactors and solve problems on fluid flow measurements
5	Ability to estimate the pump efficiency, head developed and pressure drop

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

18BTCE303 Chemical Process Calculations

CO

1	Apply the principles of dimensional homogeneity to convert one form of unit to other equivalent forms in CGS, FPS. MKS and SI unit systems and apply fundamental gas laws to solve ideal gas problems
2	Calculate the composition of a mixture in terms of mole fractions from a given composition expressed in terms of mass fractions or vice versa
3	Compute the concentration, degree of saturation and dew point of vapor -gas mixture at the given temperature and pressure using humidity chart
4	Formulate steady state material balance for the unit operations such as distillation, evaporation, mixing, extraction, drying and crystallization processes with recycle, by-pass and purge
5	Practice the combined steady state material and Energy balance for simple processes like distillation, evaporation and combustion

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

18BTCE304 Mechanical operations

CO

1	Calculate the Particle size, shape and surface area by both differential, cumulative analysis and compute the power requirement for particle size reduction screen effectiveness by sieve analysis
2	Compute the pressure due to storage of particles and formulate the method of transportation and fine particle recovery
3	Estimate the power required by mixers using power number and Reynolds number
4	Determine the terminal settling velocity, settling time and calculate the thickener area
5	Calculate the pressure drop in filters, filter medium resistance and cake resistance

CO ,PO and PSO Matrices for the course

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PS01**	**PSO2**
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

18BTCE305 Thermodynamics II

CO

1	Ability to apply fundamental concepts of thermodynamics to engineering applications
2	Ability of application of thermodynamics to phase equilibria and reaction equilibria
3	Applies thermodynamics to conversion devices
4	Applied to design the chemical engineering equipments in processes
5	Capability to determine thermodynamic efficiency of various energy related processes
6	Ability to estimate thermodynamic properties of substances in gas and liquid states

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

18BTCE311 Engineering Workshop

CO

1	To provide exposure to the students with hands on experience on various basic engineering practices in civil, Mechanical, Electrical and Electronics Engineering

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

18BTCE401 Heat Transfer

CO

1	Understands the concepts of heat transfer
2	Able to understand heat transfer in parallel & counter current flow
3	Analyzes the performance of heat exchange equipments & evaporators
4	Able to understand effect of heat transfer in boiling and evaporators
5	study components subjected to thermal loading
6	Understands mechanisms of conduction, convection and radiation

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

18BTCE402 Mass Transfer I

CO

1	To learn about the diffusional mass transfer
2	To understand interphase and different analogies of mass transfer
3	To understand the mechanism of crystallization and absorption
4	To understand operation of drying
5	Design and operation of the equipments can be understood
6	To study recent developments in mass transfer operation

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

18BTCE403 Chemical Process Industries

CO

1	Identifies the contemporary technologies in water treatment and label the process economics in salt and sulphur based industries
2	Desing the production methodology of oil industries and analyse the efficiency of the products
3	Analyze and formulate the chemical processes and economics involved in the carbohydrate industries
4	Describe the flow sheets of manufacture process of pulp based, leather industries and engineering problems faced in the industries

5	Evaluate the surface coating & cement industry processes to justify their appropriate production techniques and their handling processes

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

18BTCE404 Materials Technology

CO

1	Comprehend the criterion for selection of materials for chemical process industries
2	Outline the properties and applications of smart materials and nano and bio materials
3	Apply the knowledge about various materials used in chemical process industries
4	Select materials for high temperature and Sour service and gain knowledge of modern engineering materials
5	Be able to qualitatively derive a material's Young's modulus from a potential energy curve
6	Be able to describe a polymer's elastic behavior above and below the glass transition

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

18BTCE405 Engineering Economics and Financial Management

CO

1	to analyse the financial management, stock exchanges
2	To know the fundamentals of cost analysis and economics
3	To learn about the basics of economics and cost analysis related to engineering so as to take economically sound decisions
4	To make the students to understand capital market, break-even point analysis and depreciation

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

18BTCE406 Environmental Studies

CO

1	Recognize the importance of natural resources
2	Associate themselves with the various ecosystems
3	Describe the importance of biodiversity
4	Identify and minimize the difference pollutions
5	Prioritize and analyses the social issues
6	Integrate the environmental principles in the projects undertaken in field of engineering and technology

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

18BTCE411 Numerical Methods in Chemical Engineering

CO

1	To solve chemical engineering problems involving Linear and non-linear equations
2	Hands-on experience will be provided to apply these computer programs to solve problems in different areas of chemical engineering e.g. fluid flow, heat and mass transfer, chemical reaction engineering etc
3	To acquire skills in handling situations involving linear/ non-linear algebraic equations, ordinary /partial differential equations
4	To solving actual chemical engineering problems through computer programming and coding
5	To solve ordinary and partial differential equations using programming languages like C and softwares like MATLAB
6	Student will understand procedure oriented MATLAB concepts. Student will be capable of writing C and MATLAB programs efficiently

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

18BTCE412 Unit operations lab I

CO

1	Ability to operate all the fluid flow measuring devices and able to calculate their coefficients
2	Ability to operate different fluid flow machineries and able to test their performance characteristics

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

17BTCE501 Chemical Reaction Engineering I

CO

1	gain knowledge on the selection of the reactor for the reaction and its design
2	apply the principles of reaction kinetics and formulate rate equations and analyze the batch reactor data
3	understand the ideal reactor concepts and to develop the performance equation to workout conversion and space time
4	perform RTD analysis in non-ideal flow reactors and calculation of conversion

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

17BTCE502 Mass Transfer I

CO

1	understand diffusional operations and theories of mass transfer
2	understand the concept of interphase mass transfer
3	understand the concept gas-liquid mass transfer operations like humidification
4	apply the knowledge gained in mass transfer to perform simple calculations in drying
5	apply the knowledge gained in mass transfer to perform simple calculations in crystallization process

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2

1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

17BTCE503 Chemical Process plant safety and hazard analysis

CO

1	demonstrate the awareness of plant safety standards, codes and MSDS in handling and storage of chemicals
2	exhibit the skill in classifying chemical, fire, explosion hazards and to understand the occupational diseases
3	investigate safety in operations and process by undergoing HAZOP and HAZAN studies
4	analyze the accident causes, costs, prevention techniques, accident proneness and case studies
5	examine the legal aspects related to safety and emergency studies to know the basic rules and requirements which govern the chemical industries

CO ,PO and PSO Matrices for the course

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PS01**	**PSO2**
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

17BTCE504 Instrumental methods of analysis

CO

1	comprehend the principles of electromagnetic radiation and classification of instrumental method

2	grasp the principles and applications of UV, Visible, IR Spectroscopy and Photometric titrations
3	appreciate the importance of AAS and NMR spectroscopy in chemical analysis
4	gain knowledge about thermo gravimetric instruments and their application
5	understand the principles and applications of chromatographic methods

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**

17BTCE511 Heat Transfer Laboratory

CO

1	determine Stefan Boltzmann constant at different temperatures
2	assess the heat transfer coefficient for natural and forced convection systems, double pipe heat
3	exchanger / shell and tube heat exchanger and condensers
4	develop temperature profile in unsteady state heat transfer system
5	evaluate the convective and radiative heat transfer coefficients using radiation experiment
6	appraise the fin efficiency and estimate the steam economy in an evaporator

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
6	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

17BTCE512 Process Equipment Design and Drawing I

CO

1	design machine elements and Piping system/presentation of PFD and PID
2	apply the skill in thermal design of heat transfer equipments like shell and tube and double pipe heat exchangers
3	perform the process design of evaporators
4	apply the skill in design of equipments like crystallizer and centrifuge
5	understand the concepts involved in design of pressure vessel, storage vessel and tall columns

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

17BTCE513 Chemical reaction Engineering Laboratory

CO

1	determine the order and rate constant of the rate equations for Batch/ Mixed / Plug flow reactor
2	estimate the conversion in Batch/Semi-batch/Mixed/Plug flow reactors
3	determine the effect of temperature on rate of reaction to validate Arrhenius equation
4	evaluate the performance of combined Mixed and Plug flow reactor system
5	conduct residence time distribution studies to develop C, E & F- curve for Mixed/Plug flow reactor/Packed-bed reactor

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2

1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

17BTCE601 Chemical Reaction Engineering II

CO

1	understand the ideal reactor concepts and heterogeneous reactors
2	understand the basics of catalysis and industrial catalytic reactors such as gas-solid reactors

CO ,PO and PSO Matrices for the course

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PS01**	**PSO2**
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

17BTCE602 Mass Transfer II

CO

1	understand absorption and distillation operations and select methods of separation of mixtures based on mass transfer concepts
2	design a distillation tower
3	perform calculations in adsorption operation
4	apply the ternary equilibrium diagram concepts to determine the number of stages required for separation of liquid-liquid and solid -liquid mixtures

CO ,PO and PSO Matrices for the course

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PS01**	**PSO2**
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

17BTCE603 Process Dynamics control and Instrumentation

CO

1	understand the prerequisites of control strategies to design different process control systems
2	evaluate the suitable controllers for different chemical process
3	familiarize the closed loop response of control loops and characteristics of control valves
4	analyze and assess the control systems unto stability
5	know the tuning procedures and advanced control techniques

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
5	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

17BTCE604 Process Economics for Chemical Engineers

CO

1	Gain knowledge on cost and asset accounting, time value of money, profitability, alternative investments, and minimum attractive rate of return, sensitivity and risk analysis

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

17BTCE611 Mass Transfer Lab

CO

1	determine diffusivity and mass transfer co-efficient of a given system
2	generate vapour liquid equilibrium data and liquid equilibrium data for different systems

3	evaluate the performance and determine the design Parameters of Simple /Packed / Steam/distillation units
4	appraise the performance of a simple leaching process

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

17BTCE612 Process Equipment Design and Drawing II

CO

1	apply the skill in thermal design of heat transfer equipments like condensers and reboilers
2	estimate the design parameters of reactors
3	perform the process design of distillation column
4	apply the skill in design of absorption column

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

16BTCC701 Professional ethics,Principles of management and entrepreneurship development

CO

1	Develop managerial skills
2	Cultivate engineering ethics with oneself
3	Develop stress managing attitude and entrepreneurship

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

16BTCE702 Transport Phenomena

CO

1	apply the shell momentum balances and velocity distribution in laminar flow
2	Understand equation of continuity and motion
3	establish the shell energy balances and temperature distributions in solids and apply the equations of change to solve heat transfer problems
4	determine the shell mass balance and concentration distributions in systems involving diffusion and reactions

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
4	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**3**

16BTCE711 Computational Methods in Chemical Engineering Laboratory

CO

1	The current rapid development of these combinatorial methods promises solutions to more complex problems, including the creation of new biosynthetic pathways
2	Computational methods are also developing quickly
3	The approaches will allow us to generate the efficient, effective catalysts needed by the pharmaceutical, food and chemicals industries and should open up new opportunities for producing energy and chemicals from renewable resources

CO ,PO and PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

2	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
3	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

16BTCE712 Process Control laboratory

CO

1	Students would have knowledge on the development and use of right type of control dynamics for process control under different operative conditions

CO ,PO and PSO Matrices for the course

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PS01**	**PSO2**
1	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Department of Computer Science and Engineering

PO-CO MAPPING for year 2015-2019

Course Code	Course Title	PO 1	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO8	PO9	PO10	PO1 1	PO1 2
101	Communicative English – I												
102	Engineering Mathematics – I												
103	Engineering Physics												
104	Engineering Chemistry												
105	Computer Fundamentals and C Programming												
106	Engineering Physics and Chemistry Laboratory												
107	Computer Practice and Programming Laboratory												
108	Engineering Graphics												
109	Communicative English – II												
110	Engineering Mathematics – II												
111	Materials Science												
112	Environmental Studies												
113	Advanced Computer Programming												
114	Electron Devices												
115	Engineering Practice Laboratory												
116	Advanced Computer Programming Laboratory												
201	Discrete Structures	3	3	2.3	2	1.5	2	1				1	
202	Data Structures	3	3	2.66	2	1.8	1					2.8	3
203	Digital Principles and System Design	3	2.83	2.66	2	2	1					3	2.66
204	Object Oriented Programming with Java	3	3	3	2.83	2.83						2.33	2.83
205	Basics of Electrical Engineering	2.6	2.16	1.6	1.2	1.33				2	1.5		1.5
206	Object Oriented Programming with Java Lab	3	3	3	2.83	2.83						2.33	2.8
207	Digital Electronics Lab	3	2.7	2.3	1.8	2				1.75		2	2

208	Data Structures Lab	3	2.8	2.8	2.5	2						3	3
209	Database Management Systems	3	3	2.8	2.25	2	1	1				2.66	2.83
210	Computer Architecture	3	2.8	2	2	2					1		2.5
211	System Software	3	3	2.7	2.6	2.33						2.5	2.16
212	Advanced Java Programming	3	3	3	3	3				3		2	2.83
213	Design and Analysis of Algorithms	3	3	3	2.66	2.6				2.3		2	2.5
214	Advanced Java Programming Lab	3	3	3	3	2.3				3		2.7	2.5
215	Scientific Computing Lab	3	2.7	2.3	1.8	2				1.75		2	2
216	Database Management Systems Lab	3	3	3	2.8	3				3		2.6	2.7
301	Operating Systems	3	2.8	2.3	2	1.5				1.5		1.75	2
302	Microprocessors & Micro controllers	3	3	3	1.8	1						1.6	1.8
303	Computer Networks	3	2.7	2.3	1.8	2				1.8		2	2
304	Formal Languages and Automata	3	3	2.8	2.2	1.7				1.7		2	2
305	Department Elective I	3	3	2.8	2.5	1.4				1.7		2.25	2.8
306	Computer Networks Lab	3	2.7	2.5	1.8	2				1.5		2.25	2.3
307	Microprocessors & Micro controllers Lab	3	3	3	2	2	2			2		3	3
308	Operating Systems Lab	3	3	3	2.3	1.5				2		2	3
309	Engineering Economics and Financial Management	3	3	3	3		1.5	2.25	2	1.7			1.2
310	Software Engineering	3	3	3	2.3	1.8		1.4	2	2.2	3	2.2	2.8
311	Compiler Design	3	3	3	2.2	2	2			2	2	2	3
312	Graphics and Multimedia	3	2.3	2.3	3	2.2				3		2.2	3
313	Department Elective II	3	3	3	2.2	2.5				1.75		1.8	2.7
314	Department Elective III	3	3	3	2	1.3	2	1.5		1.3			1.7
315	Graphics and Multimedia Lab	3	3	3	1.8	1						1.6	1.8
316	Case Tools Lab	3	3	3	2	2				2	2.5	2.2	2.2
401	Professional Ethics	3	3	2	2		2.2	2.2	2	2			3

402	Web Technology	3	3	2.5	2.3	2	3	3	3	2		1.8	2
403	Open Source Software	3	3	2.7	2	2.75				2.75		2.6	2.7
404	Department Elective IV	3	3	3	2	2	2	3		2		2	2.3
405	Open Elective	3	2	2	2	2	2			2	2.3		1.7
406	Open Source Software Lab	3	3	2.7	2	2.75				2.8		2.6	2.7
407	Web Technology Lab	3	3	2.7	2	2				1.5		2	2
408	Mobile Application Development Lab	3	2.7	2.7	2.7	1.8		2		2		3	2.8
409	Department Elective V	3	2	2	1.6	1				2			2
410	Department Elective VI	3	2.7	2.8	2.25	2				2		1.7	1.8
411	Department Elective VII	3	3	2.3	1	1.5				2		2	2
412	Project Work	3	3	3	3	3	2	2	3	3	3	3	3

Department of Computer Science and Engineering
PO-CO MAPPING for year 2015-2019

C201/Discrete Structures, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C201.1	3	3	2	1	1							
C201.2	3	3	3	3	2	2	1				3	
C201.3	3	3	2	2								
C201.4	3	3	2									
C201.5		3	3	2	2	2	1					
C201.6	3	3	2	2	1							
Average	3	3	2.33	2	1.5	2	1				1	

C202/ Data Structures, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C202.1	3	3	2	2								
C202.2	3	3	2	2	1	1					2	3
C202.3	3	3	3	2	2	1					3	3
C202.4	3	3	3	2	2	1					3	3
C202.5	3	3	3	2	2	1					3	3
C202.6	3	3	3	2	2	1					3	3
Average	3	3	2.66	2	1.8	1					2.8	3

C203/ Digital Principles and System Design, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C203.1	3	2	1	1							2	3
C203.2	3	3	3	2	2						2	3
C203.3	3	3	3	2	2						3	2
C203.4	3	3	3	3							3	3
C203.5	3	3	3	2	2						2	2
C203.6	3	3	3	2	2	1					3	3
Average	3	2.83	2.66	2	2	1					3	2.66

C204 Object-Oriented Programming with Java, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C204.1	3	2	2	2								
C204.2	3	3			2							3
C204.3	3	3	3	3	2	3			2	1	3	3
C204.4	3	3	2	2								1
C204.5	3	3	3	1	1							2
C204.6	3	3	3	2	2	3			2	1	3	3

Average	3	3	3	2.83	2.83						2.33	2.83

C205 Basics of Electrical Engineering, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C205.1	3	3	2	1								
C205.2	2	2	1	1						1		1
C205.3	2	2		2	2					2		
C205.4		2	2									
C205.5	3	2	2	1	1				2			2
C205.6	3	2	1	1	1							
Average	2.6	2.16	1.6	1.2	1.33				2	1.5		1.5

C206 Object-Oriented Programming with Java, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C206.1	3	3	3	3	3							3
C206.2	3	3	3	3	3						2	3
C206.3	3	3	3	2	2						2	2
C206.4		3		3	3							3
C206.5	3	3	3	3	3						3	3
C206.6	3	3	3	3	3							3
Average	3	3	3	2.83	2.83						2.33	2.8

C207 Digital Electronics Lab, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C207.1	3	3	1	1							2	1
C207.2	3	2	2	2							2	2
C207.3	3	3	3	3	3				2		2	3
C207.4	3	3	3	2	2				2		3	3
C207.5	3	3	3		2				2		2	2
C207.6	3	2	2	1	1				1		1	1
Average	3	2.7	2.3	1.8	2				1.75		2	2

C208 Data Structures Lab, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C208.1	3	2	2		2							3
C208.2	3	3	3	2	2							3
C208.3	3	3	3	2	2							3
C208.4	3	3	3									3
C208.5	3	3	3	3	2						3	3

C208.6	3	3	3	3							3	3
Average	3	2.83	2.83	2.5	2						3	3

C209 Database Management Systems, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C209.1	3	3	3	2								3
C209.2	3	3	3	2								3
C209.3	3	3	3	3	2						3	3
C209.4	3	3	2	2	2						2	2
C209.5	3	3	3				2				3	3
C209.6	3	3	3			3						3
Average	3	3	2.83	2.25	2	1	1				2.66	2.83

C210 Computer Architecture, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C210.1	3	2	2	2								2
C210.2	3	3										
C210.3	3	3										
C210.4	3	3			2					2		3
C210.5	3	3		2	2							3
C210.6	3	3	2	2	2							2
Average	3	2.83	2	2	2					1		2.5

C211 System Software, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C211.1	3	3										2
C211.2	3	3	3	2								2
C211.3	3	3	3	3	2						2	2
C211.4	3	3	3	3	2						3	3
C211.5	3	3	2	2								1
C211.6	3	3		3	3							3
Average	3	3	2.75	2.6	2.33						2.5	2.16

C212 Advanced Java Programming, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C212.1	3	3	3	3	3				3		2	3
C212.2	3	3	3	3	3				3		2	3
C212.3	3	3	3	3	3				3		2	3

C212.4	3	3	3	3	3				3		2	3
C212.5	3	3	3		3							2
C212.6	3	3	3	3	3				3		2	3
Average	3	3	3	3	3				3		2	2.83

C213 Design and Analysis of Algorithms, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C213.1	3	3	3	2					2		2	2
C213.2	3	3	3	2	2				2		2	3
C213.3		3		3	2				2		2	2
C213.4	3	3	3	3	3				3		2	3
C213.5	3	3	3	3	3				3		2	3
C213.6	3	3	3	3	3				2		2	2
Average	3	3	3	2.66	2.6				2.33		2	2.5

C214 Advanced Java Programming Laboratory, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C214.1	3	3	3		3							3
C214.2	3	3	3	3	3						2	2
C214.3	3	3	3	3	2				3		3	3
C214.4	3	3	3		2				3		3	3
C214.5	3	3	3		2							2
C214.6	3	3	3		2							2
Average	3	3	3	3	2.3				3		2.7	2.5

C215 Scientific Computing Lab, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C215.1	3	3	1	1							2	1
C215.2	3	2	2	2							2	2
C215.3	3	3	3	3	3				2		2	3
C215.4	3	3	3	2	2				2		3	3
C215.5	3	3	3		2				2		2	2
C215.6	3	2	2	1	1				1		1	1
Average	3	2.7	2.3	1.8	2				1.75		2	2

C216 Database Management Systems Lab, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C216.1	3	3	3	2								2

C216.2	3	3	3	3	3				3		3	3
C216.3	3	3	3	3							3	3
C216.4	3	3	3		3						2	2
C216.5	3	3	3	3	3				3		2	3
C216.6	3	3	3	3	3				3		3	3
Average	3	3	3	2.8	3				3		2.6	2.7

C301 Operating Systems, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C301.1	3	3	2		1							2
C301.2	3	3	2		2							2
C301.3	3	3	3	2	2				2		2	2
C301.4	3	3	3	3	2				2		2	2
C301.5	3	3	2	2	1				1		1	2
C301.6	3	2	2	1	1				1		2	2
Average	3	2.8	2.3	2	1.5				1.5		1.75	2

C302 Microprocessors and Microcontrollers, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C302.1	3	3	3								1	1
C302.2	3	3	3	2	1						2	2
C302.3	3	3	3	1	1						1	2
C302.4	3	3	3	2	1						2	2
C302.5	3	3	3	2	1						2	2
C302.6	3	3	3	2	1						2	2
Average	3	3	3	1.8	1						1.6	1.8

C303 Computer Networks, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C303.1	3	3	1	1							2	1
C303.2	3	2	2	2							2	2
C303.3	3	3	3	3	3				2		2	3
C303.4	3	3	3	2	2				2		3	3
C303.5	3	3	3		2				2		2	2
C303.6	3	2	2	1	1				1		1	1
Average	3	2.7	2.3	1.8	2				1.75		2	2

C304 Formal Languages and Automata Theory, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C304.1	3	3	3	2	1						1	2
C304.2	3	3	2	2	1						2	2
C304.3	3	3	3	3	2						2	2
C304.4	3	3	3	2	2				2		2	2
C304.5	3	3	3	2	2				1		3	2
C304.6	3	3	3	2	2				2		2	2
Average	3	3	2.8	2.2	1.7				1.7		2	2

C305 Advanced Data Structures, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C305.1	3	3	3	3	2	2			2		3	3
C305.2		3	3	3	1				2		2	3
C305.3	3	3	3	3	2	1			1		2	3
C305.4	3	3	3	3	1				2		2	2
C305.5	3	3	3	2								3
C305.6	3	3	2	1	1							3
Average	3	3	2.8	2.5	1.4				1.75		2.25	2.8

C306 Computer Networks Lab, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C306.1	3	3	3	1	1				1			2
C306.2	3	3	3	1					1			2
C306.3	3	3	3	3					2		2	3
C306.4	3	2	2	2					1		2	2
C306.5	3	2	1	1					1		2	2
C306.6	3	3	3	3	3				3		3	3
Average	3	2.7	2.5	1.8	2				1.5		2.25	2.3

C307 Microprocessor and Microcontroller Laboratory, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C307.1	3	3	3	2	2				2		3	3
C307.2	3	3	3	2	2				2		3	3
C307.3	3	3	3	2	2				2		3	3
C307.4	3	3	3	2	2				2		3	3
C307.5	3	3	3	2	2	2			2		3	3
C307.6	3	3	3	2	2				2		3	3
Average	3	3	3	2	2	2			2		3	3

C308 Operating Systems Lab, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C308.1	3	3	3	2	1						2	3
C308.2	3	3	3	2	2				2		2	3
C308.3	3	3	3	2	2				2		2	3
C308.4	3	3	3	3	1				1		2	3
C308.5	3	3	3	3	2				3		2	3
C308.6	3	3	3	2	1						2	3
Average	3	3	3	2.3	1.5				2		2	3

C309 Engineering Economics and Financial Management, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C309.1	3	3				1			2			1
C309.2	3	3				1			1			1
C309.3	3	3				2	2	2	1			1
C309.4	3	3	3	3			2		2			1
C309.5	3	3	3				2		2			1
C309.6	3	3	3			2	3		2			2
Average	3	3	3	3		1.5	2.25	2	1.7			1.2

C310 Software Engineering, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C310.1	3	3	3		2		1		2		2	3
C310.2	3	3	3	3	2		1	2	3	3	3	3
C310.3	3	3	3		2		1		2		2	3
C310.4	3	3	3	1	1				2		2	2
C310.5	3	3	3	3	2		2	2	2		2	3
C310.6	3	3	3		2		2		2		2	3
Average	3	3	3	2.3	1.8		1.4	2	2.2	3	2.2	2.8

C311 Compiler Design, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C311.1	3	3	3	3	2				2		2	3
C311.2	3	3	3	2					2		2	3
C311.3	3	3	3	2					2		2	3
C311.4	3	3	3	2					2		2	3
C311.5	3	3	3	1	1				2	2	2	3

C311.6	3	3	3	3	3	2			2	2	2	3
Average	3	3	3	2.2	2	2			2	2	2	3

C312 Graphics and Multimedia, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C312.1	3	3	3									3
C312.2	3	2	2		2						2	3
C312.3	3	2	2		2						2	3
C312.4	3	2	2		2						2	3
C312.5	3	2	2		2						2	3
C312.6	3	3	3	3	3				3		3	3
Average	3	2.3	2.3	3	2.2				3		2.2	3

C313 DATA WAREHOUSING AND MINING , Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C313.1	3	3	3								1	3
C313.2	3	3	3	2							2	3
C313.3	3	3	3	3	3				2		2	2
C313.4	3	3	3	3	3				3		3	3
C313.5	3	3	3	2	2				1		1	2
C313.6	3	3	3	1	2				1		2	3
Average	3	3	3	2.2	2.5				1.75		1.8	2.7

C314 Network Security, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C314.1	3	3	3		2							3
C314.2	3	3	3	2	1				2			2
C314.3	3	3	3	1	1				1			1
C314.4	3	3	3	2	2	2	2		1			2
C314.5	3	3	3	3	1							1
C314.6	3	3	3	2	1		1		1			1
Average	3	3	3	2	1.3	2	1.5		1.25			1.7

C315 Graphics and Multimedia Lab, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C315.1	3	3	3								1	1

C315.2	3	3	3	2	1						2	2
C315.3	3	3	3	1	1						1	2
C315.4	3	3	3	2	1						2	2
C315.5	3	3	3	2	1						2	2
C315.6	3	3	3	2	1						2	2
Average	3	3	3	1.8	1						1.6	1.8

C316 Case tools lab, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C316.1	3	3	3		2				2		2	2
C316.2	3	3	3		2				2		2	2
C316.3	3	3	3	2	2				2	2	2	2
C316.4	3	3	3	2	2				2	2	2	2
C316.5	3	3	3	2	2				2	3	2	2
C316.6	3	3	3	2	2				2	3	3	3
Average	3	3	3	2	2				2	2.5	2.2	2.2

C401 Professional Ethics, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C401.1	3	3				2	2	2	2			3
C401.2	3	3				2	2	2	2			3
C401.3	3	3	2			2	2	2	2			3
C401.4	3	3	2	2								3
C401.5	3	3	2			2	2	2	2			3
C401.6	3	3	2			3	3	2	-			3
Average	3	3	2	2		2.2	2.2	2	2			3

C402 Web Technology, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C402.1	3	3	3		2						1	2
C402.2	3	3	2	1	2							2
C402.3	3	3	2		2				2		2	2
C402.4	3	3	2		2				2		2	2
C402.5	3	3	3	3	2				2		2	2
C402.6	3	3	3	3	2	3	3	3	2		2	2
Average	3	3	2.5	2.3	2	3	3	3	2		1.8	2

C403 Open Source Software, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C403.1	3	3	2	2								3
C403.2	3	3	2	2							2	2
C403.3	3	3	3		3				3		3	3
C403.4	3	3	3		2				2		2	2
C403.5	3	3	3		3				3		3	3
C403.6	3	3	3		3				3		3	3
Average				2	2.75				2.75		2.6	2.7

C404 CONSUMER ELECTRONICS, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C404.1	3	2	1	1								2
C404.2	3	3		3								3
C404.3	3	3		3								3
C404.4	3	3		3								3
C404.5	3	2	2	1								2
C404.6	3	2	2						2			2
Average	3	2.5	1.7	2.2					2			2.5

C405 Software Testing, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C405.1	3	3	3	2					2		2	2
C405.2	3	3	3	2					2		2	2
C405.3	3	3	3	2					2		2	2
C405.4	3	3	3	2					2		2	2
C405.5	3	3	3	2		2	3		2		2	3
C405.6	3	3	3	2	2				2		2	3
Average	3	3	3	2	2	2	3		2		2	2.3

C406 Technical Writing, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C406.1	3					2			2	3		3
C406.2	3	2	2							2		1
C406.3	3	2	2		2					2		1
C406.4	3	2	2	2						2		1
C406.5	3					2			2	3		3
C406.6	3	2	2	2						2		1

Average	3	2	2	2	2	2			2	2.3		1.7

C407 Open Source Software Lab, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C407.1	3	3	2	2								3
C407.2	3	3	2	2							2	2
C407.3	3	3	3		3				3		3	3
C407.4	3	3	3		2				2		2	2
C407.5	3	3	3		3				3		3	3
C407.6	3	3	3		3				3		3	3
Average	3	3	2.7	2	2.75				2.75		2.6	2.7

C408 Web Technology Lab, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C408.1	3	3	2	1					2			2
C408.2	3	3	2	1					2			2
C408.3	3	3	3	2	2				1		2	2
C408.4	3	3	3	2	2				1		2	2
C408.5	3	3	3	2	2				1		2	2
C408.6	3	3	3	2	2				2		2	2
Average	3	3	2.7	2	2				1.5		2	2

C409 Mobile Application Development Lab, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C409.1	3	1	1	1	1				2			2
C409.2	3	3	3	3	2				2		3	3
C409.3	3	3	3	3	2				2		3	3
C409.4	3	3	3	3	2				2		3	3
C409.5	3	3	3	3	2				2		3	3
C409.6	3	3	3	3	2		2		2		3	3
Average	3	2.7	2.7	2.7	1.8		2		2		3	2.8

C410 INFORMATION STORAGE AND MANAGEMENT, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C410.1	3	2	2	2								2
C410.2	3	2	2	1	1							2
C410.3	3	2	2	1	1							2
C410.4	3	2	2	2	1				2			2
C410.5	3	2	2	2	1							2

C410.6	3	2	2	2	1				2			2
Average	3	2	2	1.6	1				2			2

C411 Mobile and Pervasive Computing, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C411.1	3	2										2
C411.2	3	3	2	2								2
C411.3	3	3	3	3	2				2		2	2
C411.4	3	3	3	3	2				2		2	2
C411.5	3	3	3	1							1	1
C411.6	3	2										2
Average	3	2.7	2.75	2.25	2				2		1.7	1.8

C412 Wireless Sensor Network, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C412.1	3	3	1	1	1							2
C412.2	3	3	3		2				2		2	2
C412.3	3	3	3	1								2
C412.4	3	3	3		2				2		2	2
C412.5	3	3	3	1								2
C412.6	3	3	1	1	1							2
Average	3	3	2.3	1	1.5				2		2	2

C413 Project Work, Batch 2015-2019

COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C413.1	3	3	3		3				3	3	3	3
C413.2	3	3	3	3	3				3		3	3
C413.3	3	3	3	3	3	2	2		3		3	3
C413.4	3	3	3	3	3			3	3		3	3
C413.5	3	3	3	3	3				3	3	3	3
C413.6	3	3	3	3	3			3	3		3	3
Average	3	3	3	3	3	2	2	3	3	3	3	3

DEPARTMENT OF MECHANICAL ENGINEERING

CO, PO & PSO Attainment for Academic Year: 2019-2020

ODD SEMESTER

Semester I

Subject / Code: 19BEME101 - MATHEMATICS I

CO	Statement
CO101.1	To apply differential and integral calculus to notions of curvature and to improper integrals.
CO101.2	Apart from some other applications they will have a basic understanding of Beta and Gamma functions.
CO101.3	The tool of power series and Fourier series for learning advanced Engineering Mathematics.
CO101.4	To deal with functions of several variables that are essential in most branches of engineering.
CO101.5	The essential tool of matrices and linear algebra in a comprehensive manner.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO101.1	3	2		2						1			3	1	
CO101.2	3	2		2						1			3	1	
CO101.3	3	2		1						1			3	1	
CO101.4	3	2		1						1			3	1	
CO101.5	3	1		1						1			3	1	

Subject / Code: 19BEME102 / ELECTRO MAGENTISM

CO	Statement
CO102.1	Formulate potential problems within electrostatics, magneto statics
CO102.2	Formulate stationary current distributions in linear, isotropic media
CO102.3	Acquire knowledge on properties of matter, quantum physics
CO102.4	Understand the basics of vacuum science
CO102.5	Understand the process of production and measurement.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO102.1	3	2	1		1					1	2	2	3		

CO102.2	3	2	1							1	2		3		
CO102.3	3	1			2						1	2	3		
CO102.4	3	2	1		1					1	1		3		
CO102.5	3	2			1					1		2	3		

Subject / Code: 19BEME103 / BASIC ELECTRICAL ENGINEERING

CO	Statement
CO103.1	To understand and analyse basic electric and magnetic circuits.
CO103.2	To study the working principles of electrical machines and power converters.
CO103.3	To introduce the components of low-voltage electrical installations.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO103.1		3	2	2	1					1	1	1	3		1
CO103.2		3	2	1	1					1	2	2	3		1
CO103.3		3	2	1						1	1	1	3		1

Subject / Code: 19BEME111/ENGINEERING GRAPHICS I

CO	Statement
CO111.1	Introduction to engineering design and its place in society
CO111.2	Exposure to the visual aspects of engineering design and engineering graphics standards
CO111.3	Exposure to engineering communication

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO103.1	2	3	2	1	2					1			3		
CO103.2	2	3	2	1	2					1			3		
CO103.3	2	3	2	1	2					1			3		

Semester III

Subject / Code: 18BEME301 / MATHEMATICS III

CO	Statement
CO301.1	The fundamental concepts of partial differential equations and the various solution procedures for solving the first order non-linear partial differential equations.
CO301.2	Appreciate the physical significance of Fourier series techniques in solving one- and two-dimensional heat flow problems and one-dimensional wave equations.
CO301.3	Understand the basic concepts of one knowledge of the concepts of probability and have knowledge of standard distribution which can describe real life phenomenon.
CO301.4	Understand the basic concepts of one- and two-dimensional random variables and apply in engineering applications.
CO301.5	They can also formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data
CO301.6	Apply the concept of testing of hypothesis for small and large samples in real life problems.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO301.1	3	3	2	1	1					1			3		
CO301.2	3	3	2	2	1					1	2		3		
CO301.3	3	3	2	1	1						2	1	3		
CO301.4	3	3	1	1									3		
CO301.5	3	2	1	2					1				3		
CO301.6	3	3	1	2						1					

Subject / Code: 18BEME302 / BIOLOGY FOR ENGINEERS

CO	Statement
CO302.1	Summarize the cell structures and its functions
CO302.2	Explain the Biomolecules functions
CO302.3	Classify the communicable and non-communicable human diseases
CO302.4	Illustrate the different organ function tests
CO302.5	Tell the applications of biology in environmental applications
CO302.6	Describe the concept of biomechanics

CO, PO & PSO Matrices for the course

CO	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
CO302.1	1	2							2	2	2		3		
CO302.2	1	2							2	1	2	1	3		
CO302.3	1	2							2	1	2	1	3		
CO302.4	1	2							2	1	2		3		
CO302.5	1	2							2	1	3	2	3		
CO302.6	1	1							2		2	1	3		

Subject / Code: 18BEME303 / ENGINEERING MECHANICS

CO	Statement
CO303.1	Draw free body diagrams and determine the resultant of forces and/or moments.
CO303.2	Determine the centroid and second moment of area of sections.
CO303.3	Apply laws of mechanics to determine efficiency of simple machines with consideration of friction.
CO303.4	Analyze statically determinate planar frames.
CO303.5	Analyze the motion and calculate trajectory characteristics.
CO303.6	Apply Newton's laws and conservation laws to elastic collisions and motion of rigid bodies.

CO, PO & PSO Matrices for the course

CO	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
CO302.1	3	3	2			2							1		
CO302.2	3	3	2			2							1		
CO302.3	3	3	2			2							1		
CO302.4	3	3	2			2							1		
CO302.5	3	3	2			2							1		
CO302.6	3	3	2			2							1		

Subject / Code: 18BEME304 / THERMODYNAMICS

CO	Statement
CO304.1	Understand the first law and able to differentiate closed and open system, also able to apply first law to both types of systems
CO304.2	Define the physical description of second law and its application to heat engine, refrigerator and heat pump.
CO304.3	Also understand the concepts of entropy and able to find out the entropy generated in a thermodynamic system
CO304.4	Understand the properties of pure substance and ideal gas concepts
CO304.5	Describe the importance of availability concept and able to apply the thermodynamic relations in applications.
CO304.6	Understand the psychrometric properties and various processes to create human comfort at various physical conditions.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO304.1	3	2	2	1								1	2		
CO304.2	3	3	2	1								1	2		
CO304.3	3	2	2	1								1	2		
CO304.4	3	2	2	1								1	2		
CO304.5	3	3	2	1								1	2		
CO304.6	3	3	3	1								1	2		

Subject / Code: 18BEME341 / BASIC ELECTRONICS ENGINEERING

CO	Statement
CO341.1	Understand the principles of semiconductor devices and their applications.
CO341.2	Understand the concept of voltage regulators
CO341.3	Design an application using Operational amplifier.
CO341.4	Understand the working of timing circuits and oscillators.
CO341.5	Understand logic gates, flip flop as a building block of digital systems.
CO341.6	Learn the basics of Electronic communication system.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO341.1		3	2	2	1					1	1	1	3		1
CO341.2		3	2	1	1					1	2	2	3		1
CO341.3		3	2	1						1	1	1	3		1
CO341.4		3	2	2	1					1	1	1	3		1
CO341.5		3	2	1	1					1	2	2	3		1
CO341.6		3	2	1						1	1	1	3		1

SEMESTER V

Subject / Code: 17BEME501 / HEAT POWER ENGINEERING

CO	Statement
CO501.1	Analyze the performance of various gas power cycles and IC engines.
CO501.2	Understand the working principles of different types of steam generators, mountings and accessories.
CO501.3	Understand the shape of blades, work output of typical turbine stages with its velocity diagram.
CO501.4	Show the difference in working principle and performance of reciprocating and rotary compressors.
CO501.5	Perform the cooling and heating load calculations for a specified application.
CO501.6	Apply the basic thermodynamic concepts in various engineering applications.

CO, PO & PSO Matrices for the course

CO	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
CO501.1	3	3	1			3							3		
CO501.2	3	3	2			3							3		
CO501.3	3	3	3			3						1	3		
CO501.4	3	3	2			3							3		
CO501.5	3	3	3			3						1	3		
CO501.6	3	3	3			3						1	3		

Subject / Code: 17BEME502 / DESIGN OF MACHINE ELEMENTS

CO	Statement
CO502.1	Determine various types of stresses induced in different machine members.
CO502.2	Design shaft and couplings for effective transmission of power.
CO502.3	Select the type of welded joints and fasteners required for various industrial applications.
CO502.4	Design springs and flywheels for various engineering applications.
CO502.5	Design bearings and levers for engineering applications.
CO502.6	Implement design procedure for designing a machine.

CO, PO & PSO Matrices for the course

CO	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
CO502.1	3	3	3	2		3		1				2	2	2	
CO502.2	3	3	3	3		3		1				2	3	2	
CO502.3	3	3	3	2		3		1				2	3	3	
CO502.4	3	3	3	3		3		1				2	3	2	
CO502.5	3	3	3	3		3		1				2	3	2	
CO502.6	3	3	3	3		3		1				2	3		

Subject / Code: 17BEME503 / DYNAMICS OF MACHINERY

CO	Statement
CO503.1	Analyze the static and dynamic forces in various mechanisms.
CO503.2	Determine the rotating masses in dynamic balancing.
CO503.3	Calculate free and forced vibration for practical applications.
CO503.4	Analyze torsional vibrations in mechanical components.
CO503.5	Understand the principles in mechanisms used for speed control and stability control.
CO503.6	Select the type of governors and gyroscopes for different applications.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO503.1	3	3	3			1							3		
CO503.2	3	3	3			1							3		
CO503.3	3	3	3			1							3		
CO503.4	3	3	3			1							3		
CO503.5	3	3	3			1							3		
CO503.6	2	2	2			2							3		

Subject / Code: 17BEME5E04 / HYDRAULICS AND PNUEMATICS POWER CONTROL

CO	Statement
CO5E04.1	Recognize symbols and fundamentals in fluid power generation and distribution.
CO5E04.2	Identify power source for hydraulic systems.
CO5E04.3	Select appropriate components used in various hydraulic systems.
CO5E04.4	Design hydraulic circuits for given applications
CO5E04.5	Distinguish the components used in pneumatic circuits.
CO5E04.6	Create the logic circuits for controlling electro-hydraulic/ pneumatic systems.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3

CO5E 04.1	1	2	3										3		
CO5E 04.2	1	2	3										3		
CO5E 04.3		2	3	1									3		
CO5E 04.4	1	2	3	3	2								3		
CO5E 04.5	1	2	3	1									3		
CO5E 04.6	1	2	3	1									3		

Subject / Code: 17BEME5E06 / RENEWABLE ENRRGY SOURCES

CO	Statement
CO5E06.1	Determine the impacts of harnessing different renewable energy.
CO5E06.2	Analyze and design solar cells so as to improve its performance.
CO5E06.3	Explain energy generation techniques in wind mills, tide and geo thermal power plant.
CO5E06.4	Understand the technique of harvesting energy from bio mass and bio wastes
CO5E06.5	Perform economic analysis for OTEC power plants.
CO5E06.6	Get basic knowledge on fuel cells, solar cells, thermionic generators etc.

CO, PO & PSO Matrices for the course

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO5E 06.1	3	3	1			3							3		
CO5E 06.2	3	3	2			3				1			3		
CO5E 06.3	3	3	3			3						1	3		
CO5E 06.4	3	3	2			3		2		1			3		
CO5E 06.5	3	3	3			3						1	3		
CO5E 06.6	3	3	3			3		1				1	3		

Subject / Code: 17BEME511/SCIENTIFIC COMPUTING LABORATORY

CO	Statement
CO511.1	To introduce the scientific computing, covering some important aspects of solving algebraic equations, IVP, BVP.
CO511.2	To implement the methods using the spread sheet in Excel

CO, PO & PSO Matrices for the course

CO	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
CO511.1	3	2	3	2					1				3		
CO511.2	3	2	3	2					1				3		

Subject / Code: 17BEME512/ DYNAMICS AND METROLOGY LABORATORY

CO	Statement
CO512.1	To supplement the principles learnt in kinematics and Dynamics of Machinery.
CO512.2	To understand how certain measuring devices are used for dynamic testing.

CO, PO & PSO Matrices for the course

CO	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
CO512.1	1	2	3										3		
CO512.2	1	2	3										3		

Subject / Code: 17BEME513/ THERMAL ENGINEERING LABORATORY I

CO	Statement
CO513.1	To study the value timing-V diagram and performance of IC Engines
CO513.2	To Study the characteristics of fuels/Lubricates used in IC Engines
CO513.3	To study the Performance of steam generator/ turbine

CO, PO & PSO Matrices for the course

CO	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
CO513.1	1	2			2		1				1	3			2
CO513.2	1	2		2					2			3			
CO513.3	2	3								1		3			1

SEMESTER VII

Subject / Code: 16BECC701 / PROFESSIONAL ETHICS, PRINCIPLES OF MANAGEMENT AND ENTREPRENEURSHIP DEVELOPMENT

CO	Statement
CO701.1	Explain the human values.
CO701.2	Implement the importance of ethics and professionalism.
CO701.3	Practice the process of management's four functions.

CO701.4	Understand the entrepreneurial characteristics.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO701.1						3		3	2		1		1		
CO701.2						2		2	2		1		2		
CO701.3						2		2	2	1	1		2		
CO701.4						2		2	2	1	1		2		

Subject / Code: 16BEME702 / MECHATRONIC SYSTEMS

CO	Statement
CO702.1	Implement the concepts of sensors and transducers.
CO702.2	Design the actuation systems.
CO702.3	Understand the architecture of microprocessors.
CO702.4	Create the PLC program using ladder logic.
CO702.5	Design mechatronic system.
CO702.6	Develop the controller model for electrical, mechanical and thermal systems.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO702.1	3	3	3		2	3							3		3
CO702.2	3	3	3		3	3							3		3
CO702.3	3	3	3		2	3							3		3
CO702.4	3	3	3		3	3							3		3
CO702.5	3	3	3		3	3							3		3
CO702.6	3	3	3		3	3							3		3

Subject / Code: 16BEME7E02 / ADDITIVE MANUFACTURING

CO	Statement
CO7E02.1	Understand the need for additive manufacturing technology
CO7E02.2	Explain the process involved in Additive manufacturing technology
CO7E02.3	Get knowledge on software's used in additive manufacturing technology

CO7E02.4	Describe the working of SLS and other techniques
CO7E02.5	Apply the additive manufacturing technology in medical field
CO7E02.6	Applications of additive manufacturing technology in bio stream.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO7E02.1	3	2	2	1		1						1	2		
CO7E02.2	2	2	2			1							2		
CO7E02.3	2	2	2		2	1							2		
CO7E02.4	2	2	2		2	1							2		
CO7E02.5	2	2	2			1							2		
CO7E02.6	2	2	2	1	2	1						2	3		

Subject / Code: 16BEME7E03 / COMPOSITE MATERIALS

CO	Statement
CO7E03.1	Select the various types of composite matrix required for an application.
CO7E03.2	Choose appropriate manufacturing process for polymer matrix composite.
CO7E03.3	opt appropriate manufacturing process for metal matrix composite.
CO7E03.4	Use the concepts of ceramic composites and its production techniques.
CO7E03.5	Identify the type of carbon-carbon composite for different industrial application.
CO7E03.6	Explain the various advances in composites

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO7E03.1	3	3	3	1	1		1						3		
CO7E03.2	3	3	3	1	1		1					1	3		
CO7E03.3	3	3	3	1	1		1						3		
CO7E03.4	3	3	3	1	1		1					1	3		
CO7E03.5	3	3	3	1	1		1					1	3		
CO7E03.6	3	3	3	2	2		3						3		

Subject / Code: 16BEME7E04 / REFRIGERATION AND AIR CONDITIONING

CO	Statement
CO7E04.1	Calculate COP of various refrigeration cycles.
CO7E04.2	Choose appropriate refrigerants for various applications.
CO7E04.3	Identify the use of unconventional refrigerant system for industrial application.
CO7E04.4	Calculate the properties of air using psychrometric chart.
CO7E04.5	Calculate cooling load for a given system
CO7E04.6	Select the appropriate air conditioning system for industrial and domestic applications.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO7E04.1	3	3	3	1		1						1	2		
CO7E04.2	3	3	3	1		1						1	3		
CO7E04.3	3	3	3	1		1						1	3		
CO7E04.4	3	3	3	1		1						1	3		
CO7E04.5	3	3	3	1		1						1	3		
CO7E04.6	3	3	3	2		1						1	3		

Subject / Code: 16BEAEOE02 / BASICS OF TWO AND THREE WHEELERS

CO	Statement
COE02.1	Understand the constructional details
COE02.2	Understand the operating characteristics
COE02.3	Understand the design aspects of Two and Three wheelers

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
COE02.1		2	2	2								1	2		
COE02.2		2	1			2							3		1
COE02.3		2	3		2							1	3		

Subject / Code: 16BTAROE01 / NON-DESTRUCTIVE TESTING

CO	Statement
COE01.1	Understand the codes, standards and specifications related to NDT
COE01.2	Classify the destructive and non-destructive tests and state their applications

COE01.3	Develop NDT techniques for various products.
COE01.4	Acquire skills needed for selection of appropriate NDT technique(s) for new inspection jobs
COE01.5	Acquire sound knowledge of established NDE techniques and basic familiarity of emerging NDE techniques.
COE01.6	Make use of standards application area of NDET

CO, PO & PSO Matrices for the course

CO	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
COE 01.1		3	2										3		
COE 01.2		3										1	3		
COE 01.3	1	3	2		3								3		
COE 01.4	1	3			2								3		
COE 01.5		3	1		2							1	3		
COE 01.6		3	1		2		3					1	3		

Subject / Code: 16BEME711 / CAE / CAM LABORATORY

CO	Statement
CO711.1	To give exposure to software tools needed to analyze engineering problems.
CO711.2	To expose the students to different applications of simulation and analysis tools.
CO711.3	To study the features of CNC Machine Tool.
CO711.4	To expose students to modern control systems (Fanuc, Siemens etc.,)
CO711.5	To know the application of various CNC machines like CNC lathe, CNC Vertical Machining centre

CO, PO & PSO Matrices for the course

CO	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
CO711.1		2	2	3							1		3		
CO711.2			2	2								1	3	2	
CO711.3			3		2	2					2		3	2	
CO711.4			2	2	1						1	1	3	2	
CO711.5			2		2						1	1	3	2	

Subject / Code: 16BEME791/PROJECT WORK - PHASE I

CO	Statement
CO791.1	To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same.
CO791.2	To train the students in preparing project reports and to face reviews and viva voce examination.

CO, PO & PSO Matrices for the course

CO	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
CO791.1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO791.2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

EVEN SEMESTER

SEMESTER II

Subject / Code: 19BEME201/Mathematics-II (Calculus Ordinary Differential Equations and Complex variable)

CO	Statement
CO201.1	The mathematical tools needed in evaluating multiple integrals and their usage.
CO201.2	The effective mathematical tools for the solutions of differential equations that model physical processes.
CO201.3	The tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering Problems.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO201.1	3	2	3		1								3		
CO201.2	3	1	2	2	2								3		
CO201.3	3	1	2	2	1								3		

Subject / Code: 19BEME202 / English

CO	Statement
CO202.1	Use English language for communication: verbal & non –verbal.
CO202.2	Enrich comprehension and acquisition of speaking & writing ability.
CO202.3	Gain confidence in using English language in real life situations.
CO202.4	Improve word power: lexical, grammatical and communication competence.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO202.1											3	3	1		3
CO202.2											3	2	1		3
CO202.3											3	2	1		3
CO202.4											3	2	1		3

Subject / Code: 19BEME241/Chemistry I

CO	Statement
CO241.1	Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.

CO241.2	Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
CO241.3	Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
CO241.4	Rationalise bulk properties and processes using thermodynamic considerations.
CO241.5	List major chemical reactions that are used in the synthesis of molecules.

CO, PO & PSO Matrices for the course

CO	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
CO241.1	3	2	1		1					1	2	2	3		
CO241.2	3	2	1							1	2		3		
CO241.3	3	1			2						1	2	3		
CO241.4	3	2	1		1					1	1		3		
CO241.5	3	2			1					1		2	3		

Subject / Code: 19BEME242/PROGRAMMING FOR PROBLEM SOLVING

CO	Statement
CO242.1	To formulate simple algorithms for arithmetic and logical problems
CO242.2	To translate the algorithms to programs (in C language)
CO242.3	To test and execute the programs and correct syntax and logical errors
CO242.4	To implement conditional branching, iteration and recursion
CO242.5	To decompose a problem into functions and synthesize a complete program using divide and conquer approach
CO242.6	To use arrays, pointers and structures to formulate algorithms and programs

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO242.1	1	1		2	3									3	
CO242.2	1	2			3									3	
CO242.3	2	1		1	3									3	
CO242.4	1	2		2	3									3	
CO242.5	1	1		2	3									3	
CO242.6	1	1			3									3	

Subject / Code: 19BEME211/WORKSHOP/MANUFACTURING PRACTICES

CO	Statement
CO211.1	The students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.
CO211.2	Students will be able to fabricate components with their own hands.
CO211.3	They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
CO211.4	By assembling different components, they will be able to produce small devices of their interest.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO211.1	1	1	3	2	3				1		1		3		
CO211.2	1	2	3		3				1		1		3		

CO211.3	2	1	2	1	3				1				3		
CO211.4	1	2	3	2	3				1				3		

Subject / Code: 19BEME212/ENGINEERING GRAPHICS-II

CO	Statement
CO212.1	Introduction to engineering design and its place in society
CO212.2	Exposure to the visual aspects of engineering design and engineering graphics standards
CO212.3	Exposure to solid modeling, computer-aided geometric design, creating working drawings and engineering communication

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO212.1	2	3	2	1	2					1			3		
CO212.2	2	3	2	1	2					1			3		
CO212.3	2	3	2	1	2					1			3		

SEMESTER IV

Subject / Code: 18BEME401/INSTRUMENTATION AND CONTROL SYSTEMS

CO	Statement
CO401.1	Understand the measurement systems, their accuracy & range.
CO401.2	Measure the quantities like displacement, temperature, pressure
CO401.3	Measure the quantities like level, flow and speed
CO401.4	Measure the quantities like strain, humidity and force
CO401.5	Measure the quantities like torque and power
CO401.6	Classify the various control methods and its application and do system models and perform response analysis

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO401.1	1	1	1	2	3				1				3		
CO401.2	1	2	1	1	3						1		3		

CO401.3	1	1	2	1	3								3		
CO401.4	1	2	1	2	3					1			3		
CO401.5	1	1	2	2	3						1		3		
CO401.6	1	1	1	1	3				1				3		

Subject / Code: 18BEME402/ENVIRONMENTAL STUDIES

CO	Statement
CO402.1	Master core concepts and methods from ecological and physical sciences and their application in environmental problem solving.
CO402.2	Master core concepts and methods from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.
CO402.3	Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
CO402.4	Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.
CO402.5	Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.
CO402.6	Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.
CO402.7	Demonstrate proficiency in quantitative methods, qualitative analysis, critical thinking, and written and oral communication needed to conduct high-level work as interdisciplinary scholars and / or practitioners.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO402.1									3	3	1	1			1
CO402.2									3	3			2		
CO402.3									3	3	1	2			1
CO402.4									3	2	1		3		2
CO402.5									3	2	1	1	3		
CO402.6									3	2		2	1		1
CO402.7									3	2	1	2	1		1

Subject / Code: 18BEME441/ENGINEERING MATERIALS AND METALLURGY

CO	Statement
CO441.1	Identify the metallurgical aspects of metals.
CO441.2	Identify suitable heat treatment processes for various applications.
CO441.3	Select appropriate ferrous and non-ferrous materials for various applications.
CO441.4	Identify and select suitable non-metallic materials.
CO441.5	Identify suitable strengthening mechanisms for Non-ferrous alloys.
CO441.6	Work with non-destructive testing methods.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO401.1		2	2	2									3		
CO401.2		2		2								1	3		
CO401.3		2	1						2				3		
CO401.4		2	2	1								1	3		
CO401.5		2	1	2					1				3		
CO401.6		2	2						1			1	3		

Subject / Code: 18BEME442/APPLIED THERMODYNAMICS

CO	Statement
CO442.1	Calculate the efficiency of various gas power cycles.
CO442.2	Calculate the performance characteristics of engines.
CO442.3	Analyze combustion mechanism in IC engines.
CO442.4	Evaluate the characteristic of steam turbines and nozzles.
CO442.5	Evaluate the performance characteristics of compressors.
CO442.6	Identify and utilize the concepts of refrigeration and air conditioning in engineering applications

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO442.1	3	3	1			3							3		

CO442.2	3	3	2			3							3		
CO442.3	3	3	3			3						1	3		
CO442.4	3	3	2			3							3		
CO442.5	3	3	3			3						1	3		
CO442.6	3	3	3			3						1	3		

Subject / Code: 18BEME443/STRENGTH OF MATERIALS

CO	Statement
CO443.1	Determine stress and strain on deformation of solids.
CO443.2	Draw the shear force and bending moment diagram for various types of beams.
CO443.3	Compute safe working stresses and load carrying capacity of beams.
CO443.4	Estimate the deflection in beams and columns in engineering applications.
CO443.5	Determine principal stresses and analyze thin cylinders and shells subjected to pressure forces.
CO443.6	Analyze the effect of torsion on shafts and springs.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO443.1	3	3	3	2		2						1	2	1	
CO443.2	3	3	3	2		2						1	2	1	
CO443.3	3	3	3	2		2						1	2	1	
CO443.4	3	3	3	2		2						1	2	1	
CO443.5	3	3	3	1		1						1	2	1	
CO443.6	3	3	3	2		2						1	2	1	

Subject / Code: 18BEME444/FLUID MECHANICS AND FLUID MACHINES

CO	Statement
CO444.1	Determine fluid properties to solve engineering problems.
CO444.2	Understand the flow characteristics of fluids and its mathematical relations.
CO444.3	Identify fluid behaviors and perform dimensional analysis for fluid flow.
CO444.4	Characterize the fluid flow in a fixed boundary.
CO444.5	Draw velocity vector diagram for hydraulic machines.

CO444.6	Investigate performances of hydraulic machines.

CO, PO & PSO Matrices for the course

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO444.1	3	3	3	2		1						1	2		
CO444.2	3	3	3	2		1						1	2		
CO444.3	3	3	3	2		1						1	2		
CO444.4	3	3	3	2		1						1	2		
CO444.5	3	3	3	2		1						1	2		
CO444.6	3	3	3	2		1						1	2		

SEMESTER VI

Subject / Code: 17BEME601/OPERATIONS RESEARCH

CO	Statement
CO601.1	Formulate and solve engineering and managerial situations as LPP.
CO601.2	Solve Engineering and Managerial situations in Transportation.
CO601.3	Give Engineering and Managerial solutions in Assignment and scheduling problems.
CO601.4	Manage inventory in industry.
CO601.5	Select better sequence to perform operation among various alternatives.
CO601.6	Apply the various tools in various sections of industries like marketing, material handling etc.

CO, PO & PSO Matrices for the course

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO601.1	2	2			3	3					2	1	3		
CO601.2	2	2			3	3					3	1	3		
CO601.3	2	2			3	3					3	1	3		
CO601.4	2	2			3	3					3	1	3		
CO601.5	2	2			3	3					3	1	3		
CO601.6	1	1			3	3					2	1	3		

Subject / Code: 17BEME602/DESIGN OF TRANSMISSION SYSTEM

CO	Statement
CO602.1	Design the power transmission components like belts, pulleys, ropes, chains and sprockets.
CO602.2	Design spurs and parallel axis helical gears.
CO602.3	Estimate the dimensions for bevel and worm gears.
CO602.4	Practice the design procedures of gear boxes for industrial applications.
CO602.5	Design clutches and brakes for engineering applications.
CO602.6	Design a mechanical system

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO602.1	3	3	3	1		1		1				1	3		
CO602.2	3	3	3	1		1		1				1	3		
CO602.3	3	3	3	1		1		1				1	3		
CO602.4	3	3	3	1		1		1				1	3		
CO602.5	3	3	3	1		1		1				1	3		
CO602.6	3	3	3	2		2		1				1	3		

Subject / Code: 17BEME603/HEAT AND MASS TRANSFER

CO	Statement
CO603.1	Determine the rate of heat transfer for conduction.
CO603.2	Evaluate heat transfer coefficients for natural and forced convection for different fluid flows.
CO603.3	Analyze performance of heat exchanger.
CO603.4	Estimate the radiation heat transfer between the surfaces.
CO603.5	Calculate the coefficient of mass transfer.
CO603.6	Solve complex problems where heat and mass transfer takes place

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO603.1	3	3	3	1		1						1	2		

CO603.2	3	3	3	1		1						1	3		
CO603.3	3	3	3	1		1						1	3		
CO603.4	3	3	3	1		1						1	3		
CO603.5	3	3	3	1		1						1	3		
CO603.6	3	3	3	2		1						1	3		

Subject / Code: 17BEME604/Economics for Engineers

CO	Statement
CO604.1	Understand the fundamental economic concepts applicable to engineering
CO604.2	Learn the techniques of incorporating inflation factor in economic decision making.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO604.1	1	1	1	2	3				1				3		
CO604.2	1	2	1	1	3						1		3		

Subject / Code: 17BEME6E01/POWER PLANT ENGINEERING

CO	Statement
CO6E01.1	Select the accessories and layout required for a steam power plant depending upon the requirements.
CO6E01.2	Compute performance of steam power plant.
CO6E01.3	Explain the working of nuclear and hydel power plant.
CO6E01.4	Compute performance of gas turbine power plant.
CO6E01.5	Calculate the economics of the power plant.
CO6E01.6	Apply appropriate type of renewable energy technologies depending upon the application and availability.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO401.1	3	3	3	1	1		1						3		
CO401.2	3	3	3	1	1		1					1	3		

CO401.3	3	3	3	1	1		1						3		
CO401.4	3	3	3	1	1		1					1	3		
CO401.5	3	3	3	1	1		1					1	3		
CO401.6	3	3	3	2	2		3						3		

Subject / Code: 17BEME6E02/ADVANCED MANUFACTURING PROCESSES

CO	Statement
CO6E02.1	Understand the concepts and processing parameters of powder metallurgy process
CO6E02.2	Different kinds of metal joining processes.
CO6E02.3	Explain various sheet metal making processes
CO6E02.4	Summarize various hot working and cold working methods of metals
CO6E02.5	Describe the constructional and operational features of modern machining process
CO6E02.6	Understand the importance of rapid prototyping in the product development

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO6E02.1	3	2	2	1									1	3	
CO6E02.2	3	2	2	1									1	3	
CO6E02.3	3	2	2	1									1	3	
CO6E02.4	3	2	2	1									1	3	
CO6E02.5	3	2	2	1									1	3	
CO6E02.6	3	2	2	2	1		1						1	3	

Subject / Code: 17BEME6E05/DESIGN FOR MANUFACTURE AND ASSEMBLY

CO	Statement
CO6E05.1	Understand the importance of DFMA in industrial scenario
CO6E05.2	Implement the tolerances analysis.
CO6E05.3	Identify different types of tolerance allocation methods.
CO6E05.4	Practice the geometric dimensioning and tolerance concepts.
CO6E05.5	Prepare tolerance chart.
CO6E05.6	Implement DFM concepts in practice.

CO, PO & PSO Matrices for the course

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO40 1.1	1	1	1	2	3				1				3		
CO40 1.2	1	2	1	1	3						1		3		
CO40 1.3	1	1	2	1	3								3		
CO40 1.4	1	2	1	2	3					1			3		
CO40 1.5	1	1	2	2	3						1		3		
CO40 1.6	1	1	1	1	3				1				3		

Subject / Code: 17BEME6E07/ADVANCED I C ENGINES

CO	Statement
CO6E07.1	Explain the construction and operation of internal combustion engine.
CO6E07.2	Identify parts, terminology and fuel supply system of internal combustion engine.
CO6E07.3	Recognize the component used in cooling and lubrication systems of IC engines.
CO6E07.4	Describe the function of combustion, knocking and super charging of internal combustion engines.
CO6E07.5	Implement strategies for pollution control.
CO6E07.6	Know about the recent trends associated with IC engines

CO, PO & PSO Matrices for the course

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO6E 07.1	3	3	3	1	1		1						3		
CO6E 07.2	3	3	3	1	1		1					1	3		
CO6E 07.3	3	3	3	1	1		1						3		
CO6E 07.4	3	3	3	1	1		1					1	3		
CO6E 07.5	3	3	3	1	1		1					1	3		
CO6E 07.6	3	3	3	2	2		3						3		

Subject / Code: 17BEME611/COMPUTER AIDED DESIGN AND SIMULATION LABORATORY

CO	Statement
CO611.1	Use computer and CAD software's for modeling of mechanical components
CO611.2	Use various options in SolidWorks for modeling of given components
CO611.3	Create assembly of components
CO611.4	Prepare manufacturing drawings from the models created
CO611.5	Use MAT Lab for simulating different systems like hydraulic and pneumatic circuits
CO611.6	Use mat lab for performing various mathematical operations

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO401.1		1		2	3								2	3	
CO401.2		1		2	3								2	3	
CO401.3		1		2	3							1	2	3	
CO401.4		1		1	3									3	
CO401.5		1		2	3							1		3	
CO401.6		1		1	3							1		3	

Subject / Code: 17BEME612/THERMAL ENGINEERING LABORATORY II

CO	Statement
CO612.1	Ability to conduct experiment on IC engine to study the characteristic and performance of IC engines
CO612.2	Ability to conduct experiment on steam to study the characteristic and performance of steam operated equipments

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO612.1	1	1	1	2	3				1				3		
CO612.2	1	2	1	1	3						1		3		

Subject / Code: 17BEME613/MINI PROJECT

CO	Statement
CO613.1	opportunity to the student to get hands on training in the fabrication of one or more components of a complete working model, which is designed by them.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO401.1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

SMESTER VIII

Subject / Code: 16BEME801/TOTAL QUALITY MANAGEMENT

CO	Statement
CO801.1	Understand the essentiality of quality.
CO801.2	Summarize various TQM principles.
CO801.3	Understand the various TQM principles.
CO801.4	Understand the techniques for quality management.
CO801.5	Implement standard quality systems in industries.
CO801.6	Apply various techniques to improve the quality in industries.

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO801.1						3		3	2		1		1		

CO801.2						2		2	2		1		2		
CO801.3						2		2	2	1	1		2		
CO801.4						2		2	2	1	1		2		
CO801.5						3		3	3		1		3		
CO801.6						3		3	3		1		3		

Subject / Code: 16BEME8E01/QUALITY CONTROL AND RELIABILITY ENGINEERING

CO	Statement
CO8E01.1	Summarize the concept of Quality
CO8E01.2	Apply Process control for variables
CO8E01.3	Apply the process control for attributes
CO8E01.4	Explain the concept of sampling and to solve problems
CO8E01.5	Explain the concept of Life testing
CO8E01.6	Explain the concept Reliability and techniques involved

CO, PO & PSO Matrices for the course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO8E01.1	1	1	1	2	3				1				3		
CO8E01.2	1	2	1	1	3						1		3		
CO8E01.3	1	1	2	1	3								3		
CO8E01.4	1	2	1	2	3					1			3		
CO8E01.5	1	1	2	2	3						1		3		
CO8E01.6	1	1	1	1	3				1				3		

Subject / Code: 16BEME8E02/PRODUCTION PLANNING AND CONTROL

CO	Statement
CO8E02.1	Indicate the need for planning and control in various aspects.
CO8E02.2	Understand various work study methodologies.
CO8E02.3	Construct product and process plan.
CO8E02.4	Prepare a production schedule based on different facets.

CO8E02.5	Estimate the level of inventory
CO8E02.6	Understand the recent advancements in production planning and control.

CO, PO & PSO Matrices for the course

CO	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
CO8E 02.1	2	2						1	2	1	3		2		
CO8E 02.2	2	2	1					1	2		3		1		
CO8E 02.3	2	2	2		1			1	2	3	3		3		1
CO8E 02.4	2	2	2		1			1	2	3	3		3		1
CO8E 02.5	2	2	2		1			1		1	3		3		1
CO8E 02.6	2	2	2					1	2	3	3		3		1

Subject / Code: 16BEME8E03/COGENERATION AND WASTE HEAT RECOVERY SYSTEMS

CO	Statement
CO8E03.1	Understand the various methods of cogeneration.
CO8E03.2	Apply knowledge of thermodynamics, heat transfer, and fluid Mechanics principles to design and analysis of this emerging technology.
CO8E03.3	Have thorough understanding, operational issues and challenges cogeneration technologies.
CO8E03.4	Understand the impact of this technology in waste heat recovery systems
CO8E03.5	Get the knowledge over various systems involved in waste heat recovery process
CO8E03.6	Begin a career as an engineer in an organization economic analysis

CO, PO & PSO Matrices for the course

CO	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
CO8E 01.1	3	3	1			3				1			3		
CO8E 01.2	3	3	2			3							3		
CO8E 01.3	3	3	3			3				1		1	3		
CO8E 01.4	3	3	2			3				1			3		
CO8E 01.5	3	3	3			3				1		1	3		
CO8E 01.6	3	3	3			3		3				1	3		

Subject / Code: 16BEME891/PROJECT WORK - PHASE II AND VIVA – VOCE

CO	Statement
CO891.1	To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same.
CO891.2	To train the students in preparing project reports and to face reviews and viva voce examination.

CO, PO & PSO Matrices for the course

CO	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
CO891.1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO891.2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3