COURSE CODE WITH COURSE NAME: **U20HS101 -COMMUNICATIVE ENGLISH**

Course code	Course Outcome
	On Successful completion of the course, Student will be able to,
CO101.1	Speak clearly, effortlessly, confidently and appropriately. (K3)
CO101.2	Write coherently with acceptable accuracy, organizing ideas logically. (K1)
CO101.3	Comprehend different discourses and genres of texts. (K1)
CO101.4	Read and comprehend different discourses and genres of texts. (K1)
CO101.5	Read and infer, analyze, predict, interpret and draw conclusions any printed text.(K1)
CO101.6	Write definitions, descriptions, narrations and essays on various topics

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO101.1								2	3	3		2			
CO101.2								2	2	2		2			
CO101.3								2	2	3		3			
CO101.4								2	2	3		2			
CO101.5								2	2	2		3			
CO101.6								2	2	3		3			
SUM								12	13	16		15			
AVG								2	2.16	2.6		2.5			

COURSE CODE WITH COURSE NAME: **U20MA101-ENGINEERING MATHEMATICS**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO102.1	Use the matrix algebra methods for solving practical problems.(K3)
CO102.2	Apply differential calculus tools in solving various application problems. (K3)
CO102.3	Use differential calculus ideas on several variable functions. (K3)
CO102.4	Apply multiple integral ideas in solving areas, volumes and other practical problems. (K3)
CO102.5	Solve the ordinary differential equations using different techniques for that model
CO102.6	Use the matrix methods for solving practical problems. (K3)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO102.1	3	3	3	1	1							3			
CO102.2	3	3	3	1	1							3			
CO102.3	3	3	2	2	1							3			
CO102.4	3	2	2	1	1							3			
CO102.5	3	3	3	1	1							3			
CO102.6	2	2	2	1	1							2			
SUM	17	16	15	7	6							17			
AVG	2.8	2.6	2.5	1.16	1							2.8			

COURSE CODE WITH COURSE NAME: **U20PH101-ENGINEERING PHYSICS - I**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO103.1	Distinguish the different crystal systems, structural determination and synthesis of crystals. (K2)
CO103.2	Assess the elastic behaviour of the materials and bending behaviour of beam. (K5)
CO103.3	Acquire knowledge of NDT and applications of ultrasonic. (K1)
CO103.4	Know the development of modern physics and its applications. (K1)
CO103.5	Recognize the uses of laser. (K1)
CO103.6	Understand the concept of light propagation through optical fibre and its uses in various fields. (K2)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO103.1	3	1	1	3	3							2			
CO103.2	3	3	1	3	2							2			
CO103.3	3	2	1	3	2							2			
CO103.4	3	1	3	1	3							2			
CO103.5	3	2	2	3	3							3			
CO103.6	2	3	3	2	2							1			
SUM	17	12	12	15	15							12			
AVG	2.8	2	2	2.5	2.5							2			

COURSE CODE WITH COURSE NAME: **U20CY101-ENGINEERING CHEMISTRY**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO104.1	Demonstrate the General Structure, Classification, properties, techniques and of application Polymers. (K5)
CO104.2	Explain the Industrial applications of surface chemistry and catalyst, types of catalyst. (K2)
CO104.3	Understand the laws of thermodynamics and second law-based derivations of importance in engineering disciplines. (K2)
CO104.4	Relate the concepts of important photo physical and photochemical processes and spectroscopy. (K2)
CO104.5	Understand of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance in industries. (K2)
CO104.6	Differentiate the different kinds of alloys based on chemical composition. (K2)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO104.1	3	1	1	2	3	3						2			
CO104.2	3	2	2	2	3	2						2			
CO104.3	3	2	2	2	1	1						3			
CO104.4	3	2	2	1	3	2						1			
CO104.5	3	1	2	3	3	3						1			
CO104.6	2	2	3	2	2	2						2			
SUM	17	10	14	12	15	13						11			
AVG	2.8	1.6	2.3	2	2.5	2.16						1.83			

COURSE CODE WITH COURSE NAME: **U20GE101 -C - PROGRAMMING**

Course code	*Course Outcome* *On Successful completion of the course, Student will be able to,*
CO105.1	Explain the syntax for C programming (K2)
CO105.2	Understand the programs in _C‘ for real world situation (K2)
CO105.3	Apply the concept of functions and pointers. (K3)
CO105.4	Understand the programs with structure using _C‘ language. (K2)
CO105.5	Compare the applications using sequential and random-access file processing. (K2)
CO105.6	Extend to read and write data from/to files in _C‘Programs. (K2)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO105.1	2	1			2			2	1	2		2			
CO105.2	2	1			2			2	2	2		2			
CO105.3	3	2			3			1	1	2		2			
CO105.4	2	1			2			2	2	2		2			
CO105.5	2	1			2			2	1	2		2			
CO105.6	2	1			2			2	1	2		2			
SUM	13	7			13			11	8	12		12			
AVG	2.16	1.16			2.16			1.8	1.3	2		2			

COURSE CODE WITH COURSE NAME: **U20GE102-ENGINEERING GRAPHICS**

Course code	*Course Outcome* *On Successful completion of the course, Student will be able to,*
CO106.1	Discuss about conics and orthographic views of engineering components. (K2)
CO106.2	Draw the projection of points, lines and planes. (K1)
CO106.3	Classify solids and projection of solids at different positions. (K3)
CO106.4	Show sectioned view of solids and development of surface. (K3)
CO106.5	Draw isometric projection and perspective views of an object/solid. (K1)
CO106.6	Apply the concept of drawing in practical applications. (K3)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO106.1	2	1			2					2					
CO106.2	1	1			2					1					
CO106.3	3	2			2					3					
CO106.4	3	2			2					3					
CO106.5	1	1			2					1					
CO106.6	3	2			2					3					
SUM	13	9			12					13					
AVG	2.16	1.5			2					2.16					

COURSE CODE WITH COURSE NAME: **U20BS101-PHYSICS AND CHEMISTRY LABORATORY**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO107.1	Understand the functioning of various physics laboratory equipment. (K2)
CO107.2	Observe and tabulate experimental data. (K1)
CO107.3	Solve problems individually and collaboratively. (K3)
CO107.4	Estimate the amount of the given acids using pH titrations (K2)
CO107.5	Determine the amount of iron content in the given substance using potentiometric titration (K4)
CO107.6	Determine the amount of chloride content in the given water sample. (K4)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO107.1	2	2									3				
CO107.2	2	2									2				
CO107.3	3	3									3				
CO107.4	3	2									2				
CO107.5	3	3									2				
CO107.6	3	3									2				
SUM	16	15									14				
AVG	2.6	2.5									2.3				

COURSE CODE WITH COURSE NAME: **U20GE103- C - PROGRAMMING LABORATORY**

Course code	*Course Outcome* *On Successful completion of the course, Student will be able to,*
CO108.1	Develop C programs for simple applications of array and string (K2)
CO108.2	Apply the concept of conditional statement and looping statement in C programs (K2)
CO108.3	Develop the C programs with function and recursive function (K3)
CO108.4	Apply the concept of pointers and structures (K2)
CO108.5	Apply the concept of sequential file processing (K2)
CO108.6	Apply the concept of random-access file processing (K2)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO108.1	3	2	1	1	3			2	3	2		3			
CO108.2	3	2	1	1	3			2	3	2		3			
CO108.3	3	2	1	1	3			2	3	2		3			
CO108.4	3	2	1	1	3			2	3	2		3			
CO108.5	3	2	1	1	3			2	3	2		3			
CO108.6	3	2	1	1	3			2	3	2		3			
SUM	18	12	6	6	18			12	18	12		18			
AVG	3	2	1	1	3			2	3	2		3			

COURSE CODE WITH COURSE NAME: **U20HS201 -FUNCTIONAL ENGLISH**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO109.1	Use academic and technical vocabulary in relevant contexts, Construct meaningful and grammatically correct sentence (K3)
CO109.2	Acquire language and content, read fast and understand texts (K1)
CO109.3	Use oral presentation skills in all professional contexts. (K3)
CO109.4	Demonstrate and understanding of the nature and importance of technical communication, Draft various types of technical and business documents like, reports, proposals and business letters (K3)
CO109.5	Compose documents like job application, book review etc (K6)
CO109.6	Express their thoughts effectively in both oral and written medium of communication (K2)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO109.1						2		2	2	2		2			
CO109.2						2		2	2	3		2			
CO109.3						2		2	3	2		2			
CO109.4						2		2	2	3		3			
CO109.5						1		2	2	3		2			
CO109.6						1		2	2	3		2			
SUM						10		12	13	16		13			
AVG						1.6		2	2.16	2.6		2.16			

COURSE CODE WITH COURSE NAME: **U20MA201-ADVANCED CALCULUS AND ORDINARY DIFFERENTIAL EQUATIONS**

Course code	*Course Outcome* *On Successful completion of the course, Student will be able to,*
CO110.1	Evaluate the effective mathematical tools to obtain the solutions of first and second order differential equations that model physical processes (K5)
CO110.2	Express Gradient, divergence and curl of a vector point function and related identities. Evaluation of line, surface and volume integrals using Gauss, Stokes and Green‘s theorems and their verification (K2)
CO110.3	Apply the tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems (K2)
CO110.4	Express Analytic functions, conformal mapping and complex integration (K2)
CO110.5	Solve Laplace transform and inverse transform of simple functions, properties, various related theorems and application to solve the differential equations with constant coefficients. (K3)
CO110.6	Understand the Cauchy integral theorem and formula (K2)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO110.1	3	3	2	1			2								
CO110.2	3	1	2	2			2								
CO110.3	2	1	1	2			1								
CO110.4	3	2	3	2			2								
CO110.5	2	3	1	1			2								
CO110.6	2	2	2	1			2								
SUM	15	12	11	9			11								
AVG	2.5	2	1.8	1.5			1.8								

COURSE CODE WITH COURSE NAME: **U20PH201- ENGINEERING PHYSICS - II**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO111.1	Interpret the properties of electromagnetic radiations and its effect on human. (K2)
CO111.2	Apply the principles and understand the production of radioactive nuclides. (K3)
CO111.3	Explain the interaction of radiation with matter. (K2)
CO111.4	Identify and analyze the radiation quantities and its effects. (K3)
CO111.5	Demonstrate the knowledge on the properties of sound and its application in medicine. (K5)
CO111.6	Apply the principles and understand the process of physics in medical field. (K2)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO111.1	2	2	2	2		2		1		2		2	2	2	2
CO111.2	1	2	2	1		2		1		2		2	2	2	2
CO111.3	2	2	2	2		1		1		1		2	2	2	2
CO111.4	2	2	2	1		1		2		2		2	2	2	2
CO111.5	3	2	2	1		1		1		2		2	2	2	2
CO111.6	2	1	2	2		2		1		2		2	2	2	2
SUM	12	11	12	9		9		7		11		12	12	12	12
AVG	2	1.8	2	1.5		1.5		1.16		1.8		2	2	2	2

COURSE CODE WITH COURSE NAME: **U20GE201-PYTHON PROGRAMMING**

Course code	*Course Outcome* *On Successful completion of the course, Student will be able to,*
CO112.1	Explain the logical solutions through Flowcharts, Algorithms and Pseudo code (K2)
CO112.2	Explain the concept of expressions & statements (K3)
CO112.3	Construct the conditional statement to obtain the programmatic solution. (K3)
CO112.4	Develop the compound data using Python lists, tuples, and dictionaries (K3)
CO112.5	Construct the errors and exceptions. (K3)
CO112.6	Understand the concept of read and write file. (K2)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO112.1	2	1			2	1		2	2		2	2			
CO112.2	2	1			2	2		3	2		2	2			
CO112.3	2	1			2	2		3	1		2	2			
CO112.4	3	2			2	2		2	1		2	2			
CO112.5	3	2			1	1		2	2		2	2			
CO112.6	2	1			2	2		3	2		2	2			
SUM	14	8			11	10		15	10		12	12			
AVG	2.3	1.3			1.8	1.6		2.5	1.6		2	2			

COURSE CODE WITH COURSE NAME**: U20EE201- CIRCUIT THEORY**

Course code	*Course Outcome* *On Successful completion of the course, Student will be able to,*
CO113.1	Analyse the basic electrical circuits.(K3)
CO113.2	Understand and apply various circuit theorems.(K2)
CO113.3	Analyse various Resonance circuits.(K3)
CO113.4	Analyse transient response and know the concepts of coupled circuits.(K3)
CO113.5	Verify various two port networks.(K5)
CO113.6	Explain three phase 3-wire and 4-wire circuits with star and delta connected loads.(K2)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO112.1	3	3	2	2	2							2	1		1
CO112.2	3	3	2	2	2							2	1		1
CO112.3	3	2	1	2	2							2	1		1
CO112.4	3	3	1	1	2							2	1		1
CO112.5	2	3	1	2	2							2	1		1
CO112.6	2	3	1	1	1							2	1		1
SUM	16	17	8	10	11							12	6		6
AVG	2.6	2.8	1.3	1.6	1.8							2	1		1

COURSE CODE WITH COURSE NAME: **U20HS202-ENVIRONMENTAL SCIENCE AND ENGINEERING**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO114.1	Analyse of nature and the facts about environment(K4)
CO114.2	Find and implementing scientific, technological, economic and political solutions to environmental problems(K1)
CO114.3	Study the interrelationship between living organism and environment(K1)
CO114.4	Explain the importance of environment by assessing its impact on the human world envisions the surrounding environment, its functions and its value (K2)
CO114.5	Describe the dynamic processes and understand the features of the earth‘s interior and surface (K2)
CO114.6	Study the integrated themes and biodiversity, natural resources, pollution control and waste management(K1)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO114.1	2	3	2	3		2	2	3	1			2			
CO114.2	2	3	2	2		2	2	2	2			2			
CO114.3	2	2	3	1		2	2	3	2			2			
CO114.4	1	3	3	1		2	2	3	3			2			
CO114.5	2	3	2	1		2	2	2	1			2			
CO114.6	3	3	1	1		2	2	1	2			2			
SUM	12	17	13	9		12	12	14	11			12			
AVG	2	2.8	2.16	1.5		2	2	2.3	1.83			2			

COURSE CODE WITH COURSE NAME: **U20GE203 -ENGINEERING PRACTICES LABORATORY**

Course code	*Course Outcome* *On Successful completion of the course, Student will be able to,*
CO115.1	Identify Tools and Techniques used for Sheet Metal Fabrication.(K3)
CO115.2	Use welding equipment to join the structures.(K3)
CO115.3	Demonstrate Plumbing requirements of domestic buildings.(K5)
CO115.4	Apply the skills of basic electrical engineering for house wiring practice. (K3)
CO115.5	Measure various electrical quantities. (K5)
CO115.6	Explain the working of electronic components and its utilization.(K2)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO115.1	1	2	1	2	2		1								
CO115.2	3	2	1	1	2		1								
CO115.3	3	2	1	1	1		1								
CO115.4	3	2	1	1	3		1								
CO115.5	3	2	1	1	3		1								
CO115.6	2	1	2	2	2		1								
SUM	15	11	7	8	13		6								
AVG	2.5	1.8	1.16	1.3	2.16		1								

COURSE CODE WITH COURSE NAME: **U20GE204- PYTHON PROGRAMMING LABORATORY**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO117.1	Explain the logical solutions through Flowcharts, Algorithms and Pseudo code.(K2)
CO117.2	Explain the concept of expressions & statements.(K2)
CO117.3	Construct the conditional statement to obtain the programmatic solution.(K3)
CO117.4	Develop the compound data using Python lists, tuples, and dictionaries.(K4)
CO117.5	Construct the errors and exceptions.(K3)
CO117.6	Understand the concept of read and write file.(K2)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO117.1	2	1	2	2	1						2	2			
CO117.2	2	1	1	1	2						2	2			
CO117.3	2	1	2	1	2						2	2			
CO117.4	3	2	1	1	1						2	2			
CO117.5	3	2	1	1	1						2	2			
CO117.6	2	1	2	1	2						2	2			
SUM	14	8	9	7	9						12	12			
AVG	2.3	1.3	1.5	1.16	1.5						2	2			

COURSE CODE WITH COURSE NAME: **U20EE202-ELECTRIC CIRCUITS LABORATORY**

Course code	*Course Outcome* *On Successful completion of the course, Student will be able to,*
CO116.1	Demonstrate practical experience with verification of Kirchhoff's voltage and current laws.(K3)
CO116.2	Understand and apply circuit theorems and concepts in engineering applications.(K2)
CO116.3	Explain the time constant and frequency response of series RLC circuits.(K2)
CO116.4	Implement and Simulate the series and parallel resonant circuits.(K3)
CO116.5	Understand the parameters of two port network and Simulate the low pass and high pass passive filters.(K2)
CO116.6	Solve multiple theorems given.(K3)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO116.1	2	2	1	1					2		2	2	2		1
CO116.2	3	2	3	1					1		1	2	2		1
CO116.3	3	1	3	1					2		2	2	1		2
CO116.4	2	2	1	1					1		1	2	1		2
CO116.5	2	2	1	1					2		1	2	1		2
CO116.6	2	1	2	1					2		2	2	1		2
SUM	14	10	11	6					10		9	12	8		10
AVG	2.3	1.6	1.8	1					1.6		1.5	2	1.3		1.6

COURSE CODE WITH COURSE NAME: **U20MA301-TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO201.1	Understand how to solve the given standard partial differential equations. (K2)
CO201.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.(K3)
CO201.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.(K3)
CO201.4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.(K2)
CO201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.(K3)
CO201.6	Use Fourier and Z-transform methods in real-world applications, such as signal processing, heat transfer, and mechanical vibrations.(K3)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO201.1	3	3	2	2	2							2	2		
CO201.2	3	3	3	3	2							2	2		
CO201.3	3	3	3	3	2							2	2		
CO201.4	3	3	3	3	3							3	2		
CO201.5	3	3	2	3	3							3	2		
CO201.6	3	3	3	3	3							3	2		
SUM	18	18	16	17	15							15	12		
AVG	3	3	2.66	2.83	2.5							2.5	2		

COURSE CODE WITH COURSE NAME: **U20EE301-Electrical Machines-I**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO202.1	Analyse the magnetic-circuits.(K4)
CO202.2	Acquire the knowledge in constructional details of transformers.(K2)
CO202.3	Understand the concepts of electromechanical energy conversion.(K2)
CO202.4	Explain working principles of DC Generator.(K2)
CO202.5	Describe the working principles of DC Motor and various losses taking place in D.C. Machines.(K2)
CO202.6	Evaluate the efficiency and testing methods for DC machines and its applications (K3)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO202.1	3	3	2	2	2					1		3	1	1	2
CO202.2	3	3	2	2	2					1		2	2	1	2
CO202.3	3	3	3	2	2					1		3	1	1	2
CO202.4	3	3	3	3	2				1	1		3	1	1	2
CO202.5	3	3	3	3	2				1	1		2	1	1	2
CO202.6	3	3	3	3	3				2	1		3	1	1	2
SUM	18	18	16	15	13				4	6		16	7	6	12
AVG	3	3	2.6	2.5	2.16				1.3	1		2.6	1.16	1	2

COURSE CODE WITH COURSE NAME: **U20EE302-Electromagnetic Field Theory**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO203.1	Understand the basic mathematical concepts related to electromagnetic vector fields.(K2)
CO203.2	Describe the basic concepts about electrostatic fields, electrical potential, energy density and their applications.(K2)
CO203.3	Acquire the knowledge in magneto static fields, magnetic flux density, vector potential and its applications.(K2)
CO203.4	Explain the different methods of EMF generation and Maxwell's equations (K2)
CO203.5	Understand the basic concepts of electromagnetic waves and characterizing parameters (k2)
CO203.6	Demonstrate the analysis of electrical equipment and systems.(k3)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO203.1	3	2	1	1						1		2	2	1	2
CO203.2	3	2	2	1						1		2	2	1	2
CO203.3	3	2	2	1	1				1	1		2	1	1	2
CO203.4	3	2	2	2	1				1	1		3	2	1	2
CO203.5	3	2	2	2	1					1		3	2	1	2
CO203.6	3	2	3	2	2					1		3	2	1	2
SUM	18	12	12	9	5				2	6		15	11	6	12
AVG	3	2	2	1.5	0.83				1	1		2.5	1.83	1	2

COURSE CODE WITH COURSE NAME: **U20EE303-Electronic Devices and Circuits**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO204.1	Explain the structure and working operation of basic electronic devices.(K2)
CO204.2	Identify and differentiate both active and passive elements (K3)
CO204.3	Analyse the characteristics of different electronic devices such as diodes and transistors (K4)
CO204.4	Choose and adapt the required components to construct an amplifier circuit.(K2)
CO204.5	Understand the design and analysis of oscillators (K2)
CO204.6	Develop and troubleshoot electronic circuits for specific applications.(K3)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO204.1	3	1	1	1	1							2	2	2	2
CO204.2	3	2	1	1	1							2	2	2	2
CO204.3	3	1	2	1	2							2	2	2	2
CO204.4	3	1	1	1	1				1			2	2	2	2
CO204.5	3	2	3	1	2				1			2	2	2	2
CO204.6	3	1	2	1	2				1			2	2	2	2
SUM	18	8	10	6	9				3			12	12	12	12
AVG	3	1.3	1.6	1	1.5				1			2	2	2	2

COURSE CODE WITH COURSE NAME: **U20EE304-Network Analysis and Synthesis**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO205.1	Understand graph theory concepts and solve circuit theory problems (K2)
CO205.2	Apply the concept of complex frequency in studying network functions and analyse two port network parameters using various models.(K3)
CO205.3	Formulate mathematical models for RL, RC, RLC, circuit (K3)
CO205.4	Identify the given function for positive realness and synthesize reactive one port RC and RL network using Foster and Cauer methods.(K3)
CO205.5	Design various types of filters.(K3)
CO205.6	Analyse various electrical networks in steady & transient states (K4)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO205.1	3	3	2	2	2					1		2	3	3	2
CO205.2	3	2	2	2	2					1		2	2	2	2
CO205.3	3	2	2	2	2				1	1		2	2	2	2
CO205.4	3	2	3	1	2				1	1		2	3	2	2
CO205.5	3	1	3	2	2					1		2	3	3	2
CO205.6	3	3	2	2	2					1		2	3	2	2
SUM	18	13	14	11	12				2	6		12	16	14	12
AVG	3	2.16	2.33	1.8	2				1	1		2	2.66	2.33	2

COURSE CODE WITH COURSE NAME: **U20EE305-Digital Logic Circuits**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO206.1	Design combinational and sequential Circuits.(K3)
CO206.2	Understand various memory devices (K2)
CO206.3	Explain various number systems and simplify the logical expressions using Boolean functions (K2)
CO206.4	Design various synchronous and asynchronous circuits.(K3)
CO206.5	Analyse asynchronous and Synchronous sequential circuits(K4)
CO206.6	Understand Programmable Logic Devices.(K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO206.1	3	2	3	1	2				1			2	2	2	2
CO206.2	2	2	2	1	3				1			2	2	2	1
CO206.3	3	2	3	1	3				1			2	2	2	2
CO206.4	3	2	3	1	2				1			2	2	2	2
CO206.5	2	2	2	1	1				1			2	1	2	1
CO206.6	3	2	2	1	3				1			2	2	2	2
SUM	16	12	15	6	14				6			12	11	12	10
AVG	2.6	2	2.5	1	2.3				1			2	1.8	2	1.6

COURSE CODE WITH COURSE NAME: **U20EE306-Electronics Laboratory**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO207.1	Understand and analyse electronic circuits**.**(K2)
CO207.2	Explain the characteristics of semiconducting devices (K2)
CO207.3	Use Cathode Ray Oscilloscope for various measurements (K3)
CO207.4	Analyse active and passive filters (K4)
CO207.5	Demonstrate the light activated relay circuit (K3)
CO207.6	Verify transistors and its configurations (K3)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO207.1	3	3	1	1	2				2			2	2	2	2
CO207.2	3	3	1	1	1				2			2	2	2	2
CO207.3	2	2	1	1	2				2			2	2	2	2
CO207.4	3	2	1	1	2				2			2	2	2	2
CO207.5	3	1	1	1	1				2			2	2	2	2
CO207.6	3	1	1	1	1				2			2	2	2	2
SUM	17	12	6	2	9				12			12	12	12	12
AVG	2.8	2	1	1	1.5				2			2	2	2	2

COURSE CODE WITH COURSE NAME: **U20EE307-Electrical Machines-I Laboratory**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO208.1	Understand and analyse DC Generator (K2)
CO208.2	Explain and analyse various DC Motor (K2)
CO208.3	Understand and analyse various test of single phase Transformers**.**(K2)
CO208.4	Describe about three phase transformer.(K2)
CO208.5	Study of DC starters.(K2)
CO208.6	Analyse various losses of single phase transformer.(K4)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO208.1	3	3	2	1	1				2			2	1	1	2
CO208.2	3	3	2	1	1				2			2	1	1	2
CO208.3	3	3	2	1	1				2			2	1	1	2
CO208.4	3	3	2	1	1				2			2	1	1	2
CO208.5	3	3	2	1	1				2			2	1	1	2
CO208.6	3	3	2	1	1				2			2	1	1	2
SUM	18	18	12	6	6				12			12	6	6	12
AVG	3	3	2	1	1				2			2	1	1	2

COURSE CODE WITH COURSE NAME: **-U20MA405-Statistics and Numerical Methods**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO209.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.(K3)
CO209.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.(K3)
CO209.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.(K3)
CO209.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.(K2)
CO209.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.(K3)
CO209.6	Apply numerical solutions of different types of methods.(K3)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO209.1	2	1	1	1							1	2			
CO209.2	2	1	1	1							1	2			
CO209.3	2	2	1	1							1	2			
CO209.4	2	2	1	1							1	2			
CO209.5	2	2	1	1							1	2			
CO209.6	2	1	1	1							1	2			
SUM	12	6	6	6							6	12			
AVG	2	1	1	1							1	2			

COURSE CODE WITH COURSE NAME: **-U20EE401-Electrical Machines – II**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO210.1	Explain the construction and working principle of Synchronous Generator (K2)
CO210.2	Understand MMF curves and armature windings.(K2)
CO210.3	Describe the construction and working principle of Synchronous motor (K2)
CO210.4	Explain the construction and working principle of Three phase Induction Motor (K2)
CO210.5	Demonstrate the construction and working principle of Special Machines (K3)
CO210.6	Predetermine the performance characteristics of Synchronous Machines.(K4)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO210.1	3	3	2	3	3				2	1	1	2	3	3	1
CO210.2	3	3	2	3	3				2	1	1	2	3	3	1
CO210.3	3	3	2	3	3				2	1	1	2	3	3	1
CO210.4	3	3	2	3	3				2	1	1	2	3	3	1
CO210.5	3	3	2	3	3				2	1	1	2	3	3	1
CO210.6	3	3	1	1	2				2	1	1	2	2	1	1
SUM	18	18	11	16	17				12	6	6	12	17	16	6
AVG	3	3	1.83	2.66	2.83				2	1	1	2	2.83	2.66	1

COURSE CODE WITH COURSE NAME: **-U20EC301-Signals and Systems**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO211.1	Explain the properties of signals & systems.(K2)
CO211.2	Analyze Continuous Time and Discrete Time signal.(K4)
CO211.3	Apply Fourier transform, Laplace transform and Z transform in signal analysis.(K3)
CO211.4	Analyze continuous time Linear Time Invariant systems using Fourier and Laplace Transforms.(K4)
CO211.5	Analyze discrete time Linear Time Invariant systems using Z transform.(K4)
CO211.6	Analysis of recursive and non-recursive systems (K4)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO211.1	2	2	1	1					1			1	2	2	
CO211.2	2	2	1	1					1			1	3	2	
CO211.3	2	3	2	1					1			1	2	2	
CO211.4	2	3	2	1					1			1	2	2	
CO211.5	2	3	2	1					1			1	2	2	
CO211.6	2	3	2	1					1			1	2	2	
SUM	12	16	9	6					6			6	13	12	
AVG	2	2.66	1.5	1					1			1	2.16	2	

COURSE CODE WITH COURSE NAME: **-U20EE402-Measurements and Instrumentation**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO211.1	Acquire knowledge on Basic functional elements of instrumentation (K2)
CO211.2	Understand the concepts of Fundamentals of electrical and electronic instruments (K2)
CO211.3	Compare between various measurement techniques (K3)
CO211.4	Explain about various storage and display devices (K2)
CO211.5	Describe the concepts Various transducers and the data acquisition systems.(K2)
CO211.6	Understand various DC and AC bridges.(K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO211.1	3	2	3	2	3					1		2	1	2	1
CO211.2	3	2	3	2	2					1		2	1	2	1
CO211.3	3	3	2	1	3					1		2	1	2	1
CO211.4	3	3	2	2	3				1	1			1	2	1
CO211.5	3	2	3	2	3				1	1		3	1	2	1
CO211.6	3	2	3	2	3				1	1			1	2	1
SUM	18	14	16	11	17				3	6		9	6	12	6
AVG	3	2.33	2.66	1.83	2.83				1	1		2.25	1	2	1

COURSE CODE WITH COURSE NAME: **-U20EE403-Transmission and Distribution**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO213.1	Explain the importance and the functioning of transmission line parameters.(K2)
CO213.2	Understand the concepts of Lines, Insulators and acquire knowledge on the performance of Transmission lines.(K2)
CO213.3	Describe the importance of distribution of the electric power in power system (K2)
CO213.4	Acquire knowledge on Underground Cabilitys (K2)
CO213.5	Demonstrate the different components used in Transmission and Distribution levels of power system and modelling of these components.(K3)
CO213.6	Understand trends in Transmission and Distribution (K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO213.1	3	2	2	3	2		2	1		1		3	2	3	1
CO213.2	3	2	2	3	2		2	1		1		3	3	2	1
CO213.3	3	2	2	3	2		2	1		1		3	3	2	1
CO213.4	3	2	2	3	2		2	1		1		3	3	2	1
CO213.5	3	2	3	3	2		2	1		1		3	3	2	1
CO213.6	3	2	3	3	2		2	1		1		3	3	2	1
SUM	18	12	14	18	12		12	6		6		18	17	13	6
AVG	3	2	2.33	3	2		2	1		1		3	2.83	2.16	1

COURSE CODE WITH COURSE NAME: **-U20EE404-Linear Integrated Circuits and Applications**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO214.1	Explain IC fabrication procedure (K2)
CO214.2	Analyse the characteristics of Op-Amp and Applications of Op-amp (K4)
CO214.3	Understand the importance of Signal analysis using Op-amp based circuits.(K2)
CO214.4	Describe the functional blocks and the applications of special ICs like Timers, PLL circuits, regulator Circuits.(K3)
CO214.5	Understand and analyse, linear integrated circuits their Fabrication and Application (K2)
CO214.6	Design active filters and oscillator's (K3)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO214.1	2	2	1	2	2					1		1			
CO214.2	2	2	2	2	1					1		1			
CO214.3	2	3	2	2	2					1		1			
CO214.4	2	2	1	2	2				1	1		1			
CO214.5	2	2	1	2	1				1	1		1			
CO214.6	2	3	2	2	2				1	1		1			
SUM	12	14	9	12	10				3	6		6			
AVG	2	2.33	1.5	2	1.66				1	1		1			

COURSE CODE WITH COURSE NAME: **-U20EE405-Electrical Machines Laboratory - II**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO215.1	Understand and analyse EMF and MMF methods (K2)
CO215.2	Analyse the characteristics of V-curves and inverted V-curves (K4)
CO215.3	Describe the importance of Synchronous machines (K2)
CO215.4	Explain the importance of Induction Machines (K2)
CO215.5	Identify the separation of losses (K3)
CO215.6	Demonstrate various AC starters used in AC Machines

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO215.1	3	3	2	3	2				2			2	2	1	1
CO215.2	3	2	2	2	2				2			2	2	1	1
CO215.3	3	2	3	3	2				2			2	2	1	1
CO215.4	3	3	3	2	2				2			2	3	1	1
CO215.5	3	3	3	2	2				2			2	3	1	1
CO215.6	3	3	3	2	2				2			2	2	1	1
SUM	18	16	16	14	12				12			12	14	6	6
AVG	3	2.6	2.6	2.3	2				2			2	2.3	1	1

COURSE CODE WITH COURSE NAME: **-U20EE406-Linear and Digital Integrated Circuits Laboratory**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO216.1	Understand and implement Boolean Functions.(K2)
CO216.2	Demonstrate the importance of code conversion (K3)
CO216.3	Design and implement 4-bit shift registers (K3)
CO216.4	Explain various applications of operational amplifier (K2)
CO216.5	Design and implement counters using specific counter IC.(K3)
CO216.6	Solve combinational and sequential circuits.(K3)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO216.1	3	2	2	2						2	2	2			3
CO216.2	3	2	2	2						2	2	3			3
CO216.3	3	1	2	2						2	3	3			3
CO216.4	3	1	2	2						2	2	2			3
CO216.5	3	2	2	2						2	3	2			3
CO216.6	3	2	2	2						2	3	2			3
SUM	18	10	12	12						12	15	14			18
AVG	3	1.66	2	2						2	2.5	2.33			3

III YEAR

COURSE CODE WITH COURSE NAME: **-U20EE501-POWER SYSTEM ANALYSIS**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO301.1	Explain the power system under steady state operating condition (K2)
CO301.2	Understand and apply iterative techniques for power flow analysis (K2)
CO301.3	Model and carry out short circuit studies on power system (K3)
CO301.4	Analyze symmetrical faults in power system (K4)
CO301.5	Model and analyze unsymmetrical faults in power system (K3)
CO301.6	Describe the stability problems in power system (K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO301.1	3	3	2	2	2		2					3	2	3	3
CO301.2	3	3	2	2	2		2					3	2	3	3
CO301.3	3	3	2	3	2		2		1			3	2	2	3
CO301.4	3	3	3	3	2		2		1			3	2	3	3
CO301.5	3	3	3	2	2		2					3	2	2	3
CO301.6	3	3	3	3	2		2					3	2	2	3
SUM	18	18	15	15	12		12		2			18	12	15	18
AVG	3	3	2.5	2.5	2		2		1			3	2	2.5	3

COURSE CODE WITH COURSE NAME: **- U20EE502-CONTROL SYSTEMS**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO302.1	Develop various representations of system based on the knowledge of Mathematics, Science and Engineering fundamentals.(K3)
CO302.2	Explain about time domain and frequency domain analysis of various models of linear system (K2)
CO302.3	Demonstrate interpret characteristics of the system to develop mathematical model (K2)
CO302.4	Design appropriate compensator for the given specifications (K3)
CO302.5	Develop solutions for complex control problem (K3)
CO302.6	Understand use of PID controller in closed loop system (K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO302.1	3	3	3	3	3			1				3	2	3
CO302.2	3	3	3	3	3			1				3	2	3
CO302.3	3	3	3	3	3			1	1			3	2	3
CO302.4	3	3	3	3	3			1	1			3	2	3
CO302.5	3	3	3	2	3			1				3	2	3
CO302.6	3	3	3	3	3			1				3	2	3
SUM	18	18	18	17	18			6	2			18	12	18
AVG	3	3	3	2.83	3			1	1			3	2	3

COURSE CODE WITH COURSE NAME: **U20EE503-POWER ELECTRONICS**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO303.1	Understand the concept of AC-DC converters (K2)
CO303.2	Explain the concept of DC-DC converters (K2)
CO303.3	Describe about DC-AC Inverters (K2)
CO303.4	Analyse of AC-AC converters (K3)
CO303.5	Choose the converters for real time applications (K4)
CO303.6	Explain the Characteristics of power semiconducting devices (K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO303.1	2	2	3	3	2		3					2	3	2
CO303.2	2	2	3	3	2		2					2	3	2
CO303.3	2	2	3	3	2		2					2	3	2
CO303.4	2	2	3	3	2		2		1			2	3	2
CO303.5	2	2	1	3	2		2		1			2	2	1
CO303.6	2	2	3	3	2		2		1			2	3	2
SUM	12	12	16	18	12		12		3			12	17	11
AVG	2	2	2.66	3	2		2		1			2	2.83	1.83

COURSE CODE WITH COURSE NAME**: U20EE504-INTERNET OF THINGS BASED SYSTEM DESIGN**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO304.1	Explain physical, logical design and components of IoT (K2)
CO304.2	Understand the real time use of machine to machine and Internet of Things (K2)
CO304.3	Describe about Arduino microcontroller for Internet of Things (K2)
CO304.4	Write Internet of Things Programming (K2)
CO304.5	Understand Internet of Things real time applications.(K2)
CO304.6	Explain about industrial automation of Internet of Things (K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO304.1	2	2	2	2	2							2		2
CO304.2	2	2	1	2	1							2		2
CO304.3	2	2	2	2	2				1			2		2
CO304.4	2	2	3	2	2	1			1			2		2
CO304.5	2	2	2	2	2	1			1			2		2
CO304.6	2	3	3	2	2	1						2		2
SUM	12	12	13	12	11	3			3			12		12
AVG	2	2	2.16	2	1.8	1			1			2		2

COURSE CODE WITH COURSE NAME**: U20EE505-MICROPROCESSORS AND MICROCONTROLLERS**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO305.1	Describe different types of Addressing modes & instruction sets of 8085 & 8051(K2)
CO305.2	Explain the Interrupt structure 8085 & 8051(K2)
CO305.3	Understand the importance of Interfacing (K2)
CO305.4	Explain the architecture of Microprocessor and Microcontroller (K2)
CO305.5	Write the assembly language programme using Microprocessor and Microcontroller (K3)
CO305.6	Explain various applications of Microcontroller (K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO305.1	2	1	3	2	2			3			2	3	2	2
CO305.2	2	2	2	1	2			2			2	3	2	2
CO305.3	2	2	2	1	2			2			2	3	3	2
CO305.4	2	1	3	2	2			3			2	3	2	2
CO305.5	2	1	3	2	2			3			3	3	2	2
CO305.6	2	2	2	2	2			3			3	3	2	2
SUM	12	9	15	10	12			16			14	18	13	12
AVG	2	1.5	2.5	1.66	2			2.66			2.33	3	2.16	2

COURSE CODE WITH COURSE NAME**: U20OFT02-INTRODUCTION TO FUNADAMENTAL OF NANO SCIENCE**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO306.1	Classify various Nano-materials.(K4)
CO306.2	Develop nanoparticles using different methods.(K3)
CO306.3	Explain nanomaterial's and its purpose (K2)
CO306.4	Develop knowledge in characteristics nanomaterial's (K2)
CO306.5	Adapt nanotechnology in Electrical applications (K3)
CO306.6	Explain various properties of Nano-materials (K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO306.1	2	1	1	2	1							2			
CO306.2	2	2	1	2	1							2			
CO306.3	2	1	1	2	1							2			
CO306.4	2	1	2	2	1							2			
CO306.5	2	2	2	1	1							2			
CO306.6	2	2	2	1	1							2			
SUM	12	9	9	10	6							12			
AVG	2	1.5	1.5	1.66	1							2			

COURSE CODE WITH COURSE NAME: **U20EE506-CONTROL AND INSTRUMENTATION LABORATORY**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO307.1	Understand control theory and apply them to electrical engineering problems.(K2)
CO307.2	Analyze the various types of converters.(K4)
CO307.3	Understand the basic concepts of bridge networks.(K2)
CO307.4	Basics of signal conditioning circuits (K2)
CO307.5	Design compensators and study the simulation packages (K3)
CO307.6	Explain various types of sensors and Transducers (K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO307.1	2	1	3	3	2	3			2	2		2	2	2	2
CO307.2	2	1	3	2	2	3			2	3		2	2	2	2
CO307.3	1	2	3	2	2	3			3	2		2	2	2	2
CO307.4	2	2	3	2	2	3			3	2		2	2	2	2
CO307.5	2	2	3	2	2	3			2	2		2	2	2	2
CO307.6	2	1	3	2	2	2			2	2		2	2	2	2
SUM	11	9	18	13	12	17			14	13		12	12	12	12
AVG	1.83	1.5	3	2.16	2	2.83			2.33	2.16		2	2	2	2

COURSE CODE WITH COURSE NAME: **U20EE507-MICROPROCESSOR AND MICROCONTROLLER LABORATORY**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO308.1	Understand and apply computing platform and software for engineering problems (K2)
CO308.2	Write programming logics for code conversion (K3)
CO308.3	Acquire knowledge on A/D and D/A. (K2)
CO308.4	Understand basics of serial communication and basics of software simulators (K2).
CO308.5	Understand and impart knowledge in DC and AC motor interfacing (K2)
CO308.6	Write programming logics for Traffic light controller (K3)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO308.1	3	1	2	2						2	2	2	2		
CO308.2	3	2	2	3						2	3	2	2		
CO308.3	3	2	2	3						2	3	2	2		
CO308.4	3	1	2	2						2	3	2	2		
CO308.5	3	1	3	2						2	3	2	1		
CO308.6	3	2	3	2						2	3	2	1		
SUM	18	9	14	14						12	17	12	10		
AVG	3	1.5	2.33	2.33						2	2.83	2	1.66		

COURSE CODE WITH COURSE NAME: **U20EE601-EMBEDDED SYSTEMS**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO309.1	Understand and analyse embedded systems and basics of Real time operating system (K2)
CO309.2	Suggest an embedded system for a given application (K3)
CO309.3	Operate various Embedded Development Strategies (K3)
CO309.4	Study about the bus Communication in processors.(K2)
CO309.5	Apply various processor scheduling algorithms.(K3)
CO309.6	Describe various embedded networking (K2)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO309.1	3	2	2	2	2							3			1
CO309.2	3	3	3	2	2	1			1	2	2	2			1
CO309.3	3	2	3	2	3						2	2			
CO309.4	3	2	2	2	2							2			1
CO309.5	3	3	2	2	2							2			1
CO309.6	3	2	2	1	2	2	1		1	2	2	2			1
SUM	18	14	14	11	13	3	1		2	4	6	13			5
AVG	3	2.33	2.33	1.83	2.16	0.5	0.16		0.33	0.66	1	2.16			0.83

COURSE CODE WITH COURSE NAME: **U20EE602-DESIGN OF ELECTRICAL APPARATUS**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO310.1	Understand basics of design considerations for rotating and static electrical machines and application of field systems (K2)
CO310.2	Design single and three phase transformer (K3)
CO310.3	Design armature and field of DC machines (K3)
CO310.4	Design stator and rotor of induction motor (K3)
CO310.5	Design and analyse synchronous machines (K3)
CO310.6	Describe the basic design considerations of full load MMF (K2)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO310.1	3	2	2	2	2	1	1			1	2	2	1	2	3
CO310.2	3	2	3	2	2		1			1	2	2	1	2	3
CO310.3	3	2	3	2	2	1	1			1	2	2	1	2	2
CO310.4	3	2	3	2	2	1	1			1	2	2	1	2	2
CO310.5	3	3	3	2	2	1	1			1	2	2	1	2	2
CO310.6	3	2	2	1	2	1	1			1	2	2	1	2	2
SUM	18	13	16	11	12	5	6			6	12	12	6	12	14
AVG	3	2.16	2.66	1.83	2	0.83	1			1	2	2	1	2	2.33

COURSE CODE WITH COURSE NAME: **U20EE603-POWER SYSTEM OPERATION AND CONTROL**

Course code	*Course Outcome* *On Successful completion of the course, Student will be able to,*
CO311.1	Understand the day-to-day operation of electric power system and significance of power system operation and control (K2)
CO311.2	Analyze the control actions to be implemented on the system to meet the minute-to-minute variation of system demand (K4)
CO311.3	Acquire knowledge on real power-frequency interaction (K2)
CO311.4	Understand the reactive power-voltage interaction (K2)
CO311.5	Design SCADA and its application for real time operation (K3)
CO311.6	Acquire knowledge on state estimation problem (K2)

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO311.1	3	2	2	2	2	1	1				1	2	2	3	3
CO311.2	3	3	3	2	2	1	1				2	2	2	3	2
CO311.3	3	2	2	2	2	1	1				1	2	2	3	3
CO311.4	3	2	2	2	2	1	1				1	2	2	3	2
CO311.5	3	2	3	2	3	1	1		1	2	2	2	2	3	3
CO311.6	3	3	2	3	3	1	1				1	2	2	3	2
SUM	18	14	14	13	14	6	6		1	2	8	12	12	18	15
AVG	3	2.33	2.33	2.16	2.33	1	1		1	0.33	1.33	2	2	3	2.5

COURSE CODE WITH COURSE NAME: **U20EE604-PROTECTION AND SWITCHGEAR**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO312.1	Understand and analyze Electromagnetic and Static Relays.(K2)
CO312.2	Find the causes of abnormal operating conditions of the apparatus and system.(K3)
CO312.3	Analyze the characteristics and functions of relays and protection schemes.(K4)
CO312.4	Study about the apparatus protection, static and numerical relays.(K2)
CO312.5	Acquire knowledge on functioning of circuit breaker and suitability circuit breaker.(K2)
CO312.6	Explain about interruption of capacitive current. (K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO312.1	3	2	2	2	2	1	1	1	1	1	2	2	2	2	1
CO312.2	3	3	2	2	2	1	1	1	1	1	2	2	2	2	2
CO312.3	3	3	3	2	2	1	1	1	1	1	2	2	2	2	1
CO312.4	3	2	3	2	3	1	1	1	1	1	2	2	2	2	1
CO312.5	3	2	2	2	2	1		1	1	1	2	2	2	2	2
CO312.6	3	2	2	2	2	1		1	1	1	2	2	2	2	2
SUM	18	14	14	12	13	6	4	6	6	6	12	12	12	12	9
AVG	3	2.33	2.33	2	2.16	1	1	1	1	1	2	2	2	2	1.5

COURSE CODE WITH COURSE NAME: **U20EE605 Power Electronics and Drives Laboratory**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO313.1	Practice and understand converter and inverter circuits and apply software for engineering problems.(K2)
CO313.2	Experiment about switching characteristics various switches (K2)
CO313.3	Analyze about AC to DC and DC to AC converter circuits.(K4)
CO313.4	Acquire knowledge on AC to AC converters (K2)
CO313.5	Acquire knowledge on simulation software. (K2)
CO313.6	Explain about BMBLDC motor.(K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO313.1	3	2	2	2	2				2			2	2	2	3
CO313.2	3	3	2	2	2				2			2	2	2	3
CO313.3	3	3	3	2	2				2			2	2	2	3
CO313.4	3	2	3	2	3				2			2	2	2	3
CO313.5	3	2	2	2	2				2			2	2	2	3
CO313.6	3	2	2	2	2				2			2	2	2	3
SUM	18	14	14	12	13				12			12	12	12	18
AVG	3	2.33	2.33	2	2.16				2			2	2	2	3

COURSE CODE WITH COURSE NAME: **U20EE606 Power System Simulation Laboratory**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO312.1	Understand power system planning and operational studies.(K2)
CO312.2	Acquire knowledge on Formation of Bus Admittance and Impedance Matrices and Solution of Networks.(K2)
CO312.3	Analyze the power flow using GS and NR method and electromagnetic transients (K4)
CO312.4	Find Symmetric and Unsymmetrical fault (K2)
CO312.5	Describe the economic dispatch.(K3)
CO312.6	Acquire knowledge on EMTP (K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO312.1	3	2	2	2	2				2			2	2	3	3
CO312.2	3	3	2	2	2				2			2	2	3	3
CO312.3	3	3	3	2	2				2			2	2	3	3
CO312.4	3	2	3	2	3				2			2	2	3	3
CO312.5	3	2	2	2	2				2			2	2	3	3
CO312.6	3	2	2	2	2				2			2	2	3	3
SUM	18	14	14	12	13				12			12	12	18	18
AVG	3	2.33	2.33	2	2.16				2			2	2	3	3

COURSE CODE WITH COURSE NAME: **U20HS601-Professional Communication**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO313.1	Make effective presentations (K2)
CO313.2	Participate confidently in Group Discussions.(K2)
CO313.3	Attend job interviews and be successful in them.(K2)
CO313.4	Develop adequate Soft Skills required for the workplace (K3)
CO313.5	English Language Testing systems (K3)
CO313.6	Develop adequate basic knowledge required for the workplace (K3)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO313.1								1	1	3	2				
CO313.2								1	-	3	2				
CO313.3								1	1	3	2				
CO313.4								1	1	3	2				
CO313.5								1	1	3	2				
CO313.6								1	1	3	2				
SUM								6	5	18	12				
AVG								1	1	3	2				

IV-YEAR

COURSE CODE WITH COURSE NAME: **U20EE701-RENEWABLE ENERGY SYSTEMS**

Course code	*Course Outcome* *On Successful completion of the course, Student will be able to,*
CO401.1	Create awareness about renewable Energy Sources and technologies.(K3)
CO401.2	Get adequate inputs on a variety of issues in harnessing renewable Energy.(K2)
CO401.3	Recognize current and possible future role of renewable energy sources.(K2)
CO401.4	Explain the various renewable energy resources and technologies and their applications.(K2)
CO401.5	Understand solar energy and biomass energy systems (K2)
CO401.6	Explain the Fuel cell and energy storage systems.(K2)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO401.1	3	2	2	1	2	3	3	1	1			2	2	3	3
CO401.2	3	3	2	2	2	3	3		1			2	2	3	3
CO401.3	2	2	1	1	1	2	3		1			2	2	3	3
CO401.4	3	2	2	2	2	2	2		1			2	2	3	3
CO401.5	3	2	2	2	2	2	3		1			2	2	3	3
CO401.6	3	2	2	2	3	2	2		1			2	2	3	3
SUM	17	13	11	10	12	14	16	1	6			12	12	18	18
AVG	2.8	2.16	1.8	1.6	2	2.3	2.7	1	1			2	2	3	3

COURSE CODE WITH COURSE NAME: **U20EE702-SOLID STATE DRIVES**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO402.1	Understand and suggest a converter for solid state drive.(K2)
CO402.2	Select suitability drive for the given application.(K3)
CO402.3	Study about the steady state operation and transient dynamics of a motor load system.(K2)
CO402.4	Analyse the operation of the converter/chopper fed dc drive and AC motor drives.(K4)
CO402.5	Analyse and design the current and speed controllers for a closed loop solid state DC motor drive.(K4)
CO402.6	Understand the concept of converter selection and characteristics.(K2)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO402.1	3	2	3	2	3	1	1				1	2	2	2	2
CO402.2	3	2	3	2	2		1				1	2	2	2	2
CO402.3	3	2	2	2	2	1	1		1		1	2	2	2	2
CO402.4	3	3	3	3	3		1		1			2	2	2	2
CO402.5	3	2	3	3	3	1	1		1		2	2	2	2	2
CO402.6	3	2	2	2	2	1						2	2	2	2
SUM	18	13	16	14	15	4	5		3		5	12	12	12	12
AVG	3	2.16	2.66	2.33	2.5	1	1		1		1	2	2	2	2

COURSE CODE WITH COURSE NAME: **U20EE703-UTILIZATION OF ELECTRICAL ENERGY**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO403.1	Explain the concept behind illumination and design a suitable illumination system for a specific application.(K2)
CO403.2	Describe the basic knowledge about electric traction system.(K2)
CO403.3	Demonstrate the economic aspects connected with power system.(K3)
CO403.4	Design and choose an appropriate Heating method for specific application and gain knowledge about electric Welding system.(K3)
CO403.5	Understand the concept of conservation of electrical energy.(K2)
CO403.6	Explain the concept of conservation of Refrigeration and HVAC system (K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO403.1	3	2	3	2	2	2	2				1	2	2	2	2
CO403.2	3	2	2	2	2	2	2		1		1	2	2	2	2
CO403.3	3	3	2	2	2	3	3		1		2	2	2	2	2
CO403.4	3	2	3	2	2	2	2		1		1	2	2	2	2
CO403.5	3	2	2	2	2	3	3				1	2	2	2	2
CO403.6	3	2	2	2	2	3	3				1	2	2	2	2
SUM	18	13	14	12	12	15	15		3		7	12	12	12	12
AVG	3	2.16	2.33	2	2	2.5	2.5		1		1.16	2	2	2	2

COURSE CODE WITH COURSE NAME: **U20OEC71-FIBER OPTICS AND LASER INSTRUMENTATION**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO404.1	Understand the basic concepts of optical fibres and their properties.(K2)
CO404.2	Apply the various applications of optical fibres.(K3)
CO404.3	Analysis of basic concept of Laser fundamentals.(K4)
CO404.4	Analysis of well about the industrial application of laser.(K4)
CO404.5	Understand laser theory and laser generation system (K2)
CO404.6	Know about the various medical applications of Lasers.(K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO404.1	3	2			1				2						2
CO404.2	3	2	1		1				2						1
CO404.3	3	2			1				2						2
CO404.4	3	2	1		1				2						1
CO404.5	3	2	1		1				2						1
CO404.6	3	2	1		1				2						2
SUM	18	12	4		6				12						9
AVG	3	2	1		1				2						1.5

COURSE CODE WITH COURSE NAME: **U20EE724 -POWER QUALITY AND IMPROVEMENT TECHNIQUES**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO405.1	Understand various sources, causes and effects of power quality issues, electrical systems and their measures and mitigation.(K2)
CO405.2	Study about the various Active & Passive power filters.(K2)
CO405.3	Understand the concepts about Voltage and current distortions, harmonics.(K2)
CO405.4	Acquire knowledge on compensation techniques.(K2)
CO405.5	Explain the concept of DVR.(K2)
CO405.6	Acquire knowledge on power line disturbance analyser and harmonic / spectrum analyser (K2)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO405.1	3	3	2	2	2	2	3					2	2	2	2
CO405.2	3	2	3	2	2		2					2	2	2	1
CO405.3	3	3	2	2	2		2					2	2	2	2
CO405.4	3	2	3	2	2		2					2	2	2	2
CO405.5	3	2	3	2	3							2	2	2	2
CO405.6	3	2	2	3	3							2	2	2	2
SUM	18	14	15	13	14	2	9					12	12	12	11
AVG	3	2.33	2.5	2.16	2.33	2	2.25					2	2	2	1.83

COURSE CODE WITH COURSE NAME: **U20EE704-PROJECT WORK PHASE-I**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO406.1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology. (K4)
CO406.2	Develop project management skills for effective planning and execution. (K3)
CO406.3	Collaborate in cross-functional teams to achieve project objectives.(K4)
CO406.4	Apply critical thinking and problem-solving techniques to address project challenges. (K3)
CO406.5	Foster creativity and innovation in project solutions and deliverables.(K3)
CO406.6	Communicate project progress and outcomes through effective presentations and reports.(K4)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO406.1	3	3	2	2	2	1	1	1	2	2	2	2	2	3	3
CO406.2	2	2	2	1	2	2	2	1	2	2	3	2	2	3	3
CO406.3	1	1	2	1	1	2	1	2	3	2	2	2	2	3	3
CO406.4	2	3	2	2	2	1	1	1	2	2	2	2	2	3	3
CO406.5	2	2	3	2	2	1	2	1	2	2	2	3	2	3	3
CO406.6	1	1	1	1	1	1	1	1	2	3	2	2	2	3	3
SUM	11	12	12	9	10	8	8	7	13	13	13	13	12	18	18
AVG	1.83	2	2	1.5	1.6	1.33	1.33	1.16	2.16	2.16	2.16	2.16	2	3	3

COURSE CODE WITH COURSE NAME: **U20EE705-RENEWABLE ENERGY SYSTEMS LABORATORY**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO407.1	Understand basics of Intelligent Controllers and analyse Renewable energy systems.(K2)
CO407.2	Train the students in Renewable Energy Sources and technologies.(K3)
CO407.3	Provide adequate inputs on a variety of issues in harnessing Renewable Energy.(K2)
CO407.4	Simulate the various Renewable energy sources.(K4)
CO407.5	Recognize current and possible future role of Renewable energy sources.(K2)
CO407.6	Understand basics of Energy Storage System and Hybrid Energy Systems(K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO407.1	3	2	1	2	2		1					2	2	3	3
CO407.2	2	2	2	2	2	1	1		2	2	2	3	2	3	3
CO407.3	2	2	1	2	1	2	3					2	2	3	3
CO407.4	2	2	3	1	3				1		2	2	2	3	3
CO407.5	1	2	1	1	2	2	3	1				2	2	3	3
CO407.6	3	2	2	1	2		1				2	2	2	3	3
SUM	13	12	10	9	12	5	9	1	3	2	6	13	12	18	18
AVG	2.16	2	1.66	1.5	2	1.66	1.8	1	1.5	2	2	2.16	2	3	3

COURSE CODE WITH COURSE NAME: **U20EE834-POWER ELECTRONICS FOR RENEWABLE ENERGY SYSTEMS**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO408.1	Understand and analyse power system operation, stability, control and protection.(K2)
CO408.2	Handle the engineering aspects of electrical energy generation and utilization.(K3)
CO408.3	Acquire knowledge on power converters (K2)
CO408.4	Analysis of solar and wind power systems (K3)
CO408.5	Design and develop hybrid renewable energy systems (K3)
CO408.6	Acquire knowledge on PV Maximum Power Point Tracking (MPPT). (K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO408.1	3	3	2	2	2	1	1				1	2	2	2	2
CO408.2	3	2	2	1	2	1	1				2	2	2	2	2
CO408.3	3	2	2	1	3	1	2		1		1	2	2	2	1
CO408.4	2	2	2	2	2	1	3		1		1	2	2	2	2
CO408.5	3	2	3	2	3	1	3		1		2	2	2	2	2
CO408.6	3	2	2	1	3	1	2				1	2	2	2	2
SUM	17	13	13	9	15	6	12		3		8	12	12	12	11
AVG	2.83	2.16	2.16	1.5	2.5	1	2		1		1.33	2	2	2	1.83

COURSE CODE WITH COURSE NAME: **U20EE841-HVDC Transmission**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO409.1	Understand the principles and types of HVDC system.(K2)
CO409.2	Analyze and understand the concepts of HVDC converters.(K4)
CO409.3	Understand the concepts of reactive power management, harmonics and power flow analysis (K2)
CO409.4	Explain DC power transmission and comparison with AC power transmission.(K2)
CO409.5	Describe the importance of power flow in HVDC system under steady state. (K2)
CO409.6	Demonstrate the concepts of Sources of reactive power.(K3)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO409.1	3	2	1	2	1			1		1	1	2	2	2	1
CO409.2	3	3	2	2	2			1	1	1	1	2	2	2	1
CO409.3	3	3	2	2	2			1	1	1	1	2	2	2	2
CO409.4	2	2	1	1	1			1	1		1	2	2	2	2
CO409.5	3	2	2	2	2			1		1	1	2	2	2	2
CO409.6	3	2	1	1	2			1	1	1	1	1	2	2	2
SUM	17	14	9	10	10			6	4	5	6	11	12	12	10
AVG	2.8	2.3	1.5	1.16	1.6			1	1	1	1	1.8	2	2	1.66

COURSE CODE WITH COURSE NAME: **U20EE801-Project Work - Phase-II**

Course code	*Course Outcome* *On Successful completion of the course, Student will be able to,*
CO410.1	Apply engineering knowledge to design and implement hardware-based systems for solving real-time electrical/electronic problems
CO410.2	Demonstrate technical competency in using appropriate tools, components, and hardware platforms (e.g., microcontrollers, sensors, actuators) for project development
CO410.3	Analyze and evaluate hardware performance with respect to functionality, reliability, safety, and efficiency.
CO410.4	Develop problem-solving and critical thinking skills by integrating interdisciplinary concepts in hardware system design
CO410.5	Communicate effectively the project objectives, methodology, and outcomes through technical documentation and presentation
CO410.6	Exhibit teamwork and project management skills while adhering to ethical practices and sustainable engineering solutions

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO410.1	2	3	2	2	1	1	1	1	2	2	2	3	2	3	3
CO410.2	3	3	2	2	2	1	1	1	1	2	2	3	2	3	3
CO410.3	3	2	3	2	2	2	2	1	2	2	2	3	2	3	3
CO410.4	2	2	3	1	2	2	2	1	2	2	2	3	2	3	3
CO410.5	2	2	2	3	3	1	1	1	1	2	2	3	2	3	3
CO410.6	2	3	2	3	2	2	3	1	2	2	2	3	2	3	3
SUM	14	15	14	13	12	9	10	6	10	12	12	18	12	18	18
AVG	2.33	2.5	2.33	2.16	2	1.5	1.6	1	1.6	2	2	3	2	3	3

COURSE CODE WITH COURSE NAME: **U20EE615- SPECIAL ELECTRICAL MACHINES**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO1	Analyse and design controllers for special Electrical Machines.(K3)
CO2	Acquire the knowledge on construction and operation of stepper motor and switched reluctance motors (K2)
CO3	Explain the construction and operation of permanent magnet brushless D.C. motors (K2)
CO4	Describe the construction and operation of permanent magnet synchronous motors.(K2)
CO5	Select a special Machine for a particular application.(K3)
CO6	Understand the concepts of performance characteristics of special machines.(K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	2							2	2	1	2
CO2	3	2	2	1	1							2	2	2	2
CO3	3	2	2	1	1							2	2	2	2
CO4	3	2	2	1	1				1			2	2	1	1
CO5	2	3	3	2	2				1			2	2	1	1
CO6	3	2	2	2	1				1			2	2	2	1
SUM	17	13	14	9	8				3			12	12	9	9
AVG	2.8	2.16	2.3	1.5	1.3				1			2	2	1.5	1.5

COURSE CODE WITH COURSE NAME: **U20GE635- INTELLECTUAL PROPERTY RIGHTS**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO1	Manage Intellectual Property portfolio to enhance the value of the firm.(K4)
CO2	Make use of copy Rights and trade Secrets in India (K3)
CO3	Apply appropriate techniques for different Patent and Patent Amendment Act (K3)
CO4	Illustrate the Cyber Law and Digital Content Protection (K2)
CO5	Choose appropriate Infringement of IPRs and emerging issues (K4)
CO6	Write case study about Enforcement of IPRs (K3)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1							3	2	2	2	3	3			
CO2							3	2	2	2	3	3			
CO3							3	2	2	2	3	3			
CO4							3	2	2	2	3	3			
CO5							3	2	2	2	3	3			
CO6							3	2	2	2	3	3			
SUM							18	12	12	12	18	18			
AVG							3	2	2	2	3	3			

COURSE CODE WITH COURSE NAME: **U20EE722- HIGH VOLTAGE ENGINEERING**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO1	Describe the transients in power systems..(K2)
CO2	Explain the Generation and measurement of high voltage.(K2)
CO3	Demonstrate the high voltage testing and Measure over voltages.(K3)
CO4	Illustrate various types of over voltages in power system.(K2)
CO5	Test power apparatus and insulation coordination (K3)
CO6	Explain Dielectric breakdown (K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	3	2		2					1	2	2	2
CO2	3	3	3	2	2		2		1			1	2	1	2
CO3	3	3	3	2	2		2		1			1	2	1	2
CO4	3	3	2	3	2		2		1			1	2	2	2
CO5	3	3	3	2	2		2					1	2	2	2
CO6	3	3	2	3	2		2					1	2	2	2
SUM	18	18	15	15	12		12		3			6	12	10	12
AVG	3	3	2.5	2.5	2		2		1			1	2	1.6	2

COURSE CODE WITH COURSE NAME: **U20EE724- POWER QUALITY AND IMPROVEMENT TECHNIQUES**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO1	Demonstrate the various sources, causes and effects of power quality issues, electrical systems and their Measures and mitigation.(K3)
CO2	Study about the various Active & Passive power filters.(K2)
CO3	Understand the concepts about Voltage and current distortions, harmonics.(K2)
CO4	Acquire knowledge on compensation techniques.(K2)
CO5	Acquire knowledge on DVR.(K2)
CO6	Explain about power quality monitoring and measurements.(K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	1						3	2	2	2
CO2	3	2	3	2	2	2			1			3	2	2	2
CO3	3	2	3	2	2	1			1			3	2	2	2
CO4	3	2	2	2	2	2			1			3	2	2	2
CO5	3	2	3	2	2	2						3	2	2	2
CO6	3	3	3	2	2	1						3	2	2	2
SUM	18	14	16	12	12	9			3			18	12	12	12
AVG	3	2.3	2.6	2	2	1.5			1			3	2	2	2

COURSE CODE WITH COURSE NAME: **U20MG755- TOTAL QUALITY MANAGEMENT**

Course code	*Course Outcome* *On Successful completion of the course, Student will be able to,*
CO1	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.(K3)
CO2	Know the principles of total quality management and peculiarities of their implementation (K2)
CO3	Develop in-depth knowledge on various tools and techniques of quality management (K2)
CO4	Learn the applications of quality tools and techniques in both manufacturing and service industry (K3)
CO5	Develop analytical skills for investigating and analysing quality management issues in the industry and suggest implement able solutions to those (K4)
CO6	Understand the importance of continuous improvement and quality standards, and apply them to ensure sustainable organizational excellence.(K3)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1								2	3		2	2			
CO2								2	3		2	2			
CO3								2	3		2	2			
CO4								2	3		2	2			
CO5								2	3		2	2			
CO6								2	3		2	2			
SUM								12	18		12	12			
AVG								2	3		2	2			

COURSE CODE WITH COURSE NAME: **U20EE835- ELECTRIC VEHICLES AND HYBRID VEHICLES**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO1	Acquire knowledge on Electric and Hybrid Electric Vehicles.(K2)
CO2	Understand the concepts about Energy Storage in Fuel Cells (K2)
CO3	Develop the electric and hybrid vehicles (K3)
CO4	Design the power electronic converter (K3)
CO5	Understand the concept of electric propulsion (K2)
CO6	Acquire knowledge on Charging method for batteries. (K2)

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	1	1	2					1	2	3	2
CO2	3	2	2	1	2	1	1					1	2	3	2
CO3	3	3	3	2	3	1	2		1			1	2	3	2
CO4	3	3	3	3	3	2	1		1			1	2	3	2
CO5	3	2	2	2	2	2	1		1			1	2	3	2
CO6	3	2	2	1	2	2	1					1	2	3	2
SUM	18	14	14	10	13	9	8		3			6	12	18	12
AVG	3	2.3	2.3	1.6	2.16	1.5	1.3		1			1	2	3	2

COURSE CODE WITH COURSE NAME: **U20EE846- APPLIED SOFT COMPUTING**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO1	Understand basic neural network architecture and perform linear separability.
CO2	Apply suitable activation functions for the various neural networks.
CO3	Understand various neural network architectures and algorithms
CO4	Acquires knowledge on Fuzzy Logic Control System and use it for real time applications
CO5	Gain knowledge about genetic algorithm and Particle swarm optimization and use them in optimizing real time applications.
CO6	Acquires knowledge on Particle swarm optimization and use them in optimizing real time applications.

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	2	2	2		1	1		2	2	2	2
CO2	3	2	3	2	2	2	2		1	1		2	2	2	2
CO3	3	2	3	2	2	2	2		1	1		2	2	2	2
CO4	3	2	3	2	3	1	1			1		2	2	2	2
CO5	3	3	3	3	3	1	1			1		2	2	2	2
CO6	3	3	3	3	3	1	1		1			2	2	2	2
SUM	18	14	18	14	15	9	9		4	5		12	12	12	12
AVG	3	2.33	3	2.33	2.5	1.5	1.5		1	1		2	2	2	2

COURSE CODE WITH COURSE NAME: **U20OME51- Testing of Materials**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO1	Classify various materials and describe the importance and methods of material testing
CO2	Explain the principles, methods, advantages, and limitations of mechanical tests for different materials
CO3	Demonstrate the ability to conduct and interpret multiple non-destructive testing techniques for industrial components
CO4	Prepare specimens and perform material characterization using optical and electron microscopy as well as diffraction techniques.
CO5	Analyse results from thermal and chemical testing methods and articulate their industrial applications
CO6	Identify suitable testing methods for various engineering applications and justify their use based on application requirements.

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2													
CO2	3	2													
CO3	3	2	2	2					1						
CO4	3	2	2	2	1										
CO5	3	2		2	1										
CO6	3	2		1	1						1				
SUM	18	12	4	7	3				1		1				
AVG	3	2	2	1.75	1				1		1				

COURSE CODE WITH COURSE NAME: **U20EE611- FLEXIBLE AC TRANSMISSION SYSTEMS**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO1	Understand, analyze and develop analytical model of FACTS controller for power system application.
CO2	Explain the concepts about load compensation techniques.
CO3	Describe the working principles, characteristics, and functions of various FACTS devices and advanced FACTS controllers
CO4	Describe the operating principles, control strategies, and applications of Voltage Source Converter (VSC) based FACTS controllers
CO5	Explain the start-of-art of the power system
CO6	Analyze the performance of steady state and transients of facts controllers

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	1	–	–	–	–	1	–	2	1	3	2
CO2	3	2	2	1	–	–	–	–	–	1	–	1	1	3	2
CO3	3	3	2	2	1	–	–	–	1	1	–	1	1	3	2
CO4	3	3	3	2	2	–	–	–	1	1	–	2	1	3	2
CO5	2	2	1	1	–	–	1	–	1	1	1	2	1	3	2
CO6	3	3	2	3	2	–	–	–	–	1	–	2	1	3	2
SUM	17	16	12	11	6		1		3	6	1	10	6	18	12
AVG	2.8	2.7	2	1.8	1.5		1		1	1	1	1.7	1	3	2

COURSE CODE WITH COURSE NAME: **U20EE612- THERMAL AND FLUID ENGINEERING**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO1	Design compressors and turbines
CO2	Explain the concept of steam power generation
CO3	Evaluate the performance characteristics of gas turbines
CO4	Describe the underlying concept of IC engines
CO5	Understand principles, types, and performance of hydraulic turbines and pumps.
CO6	Analyze operational parameters, efficiency, and effects of design factors on turbines and pumps.

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	1	–	–	–	–	1	–	1			
CO2	3	2	2	1	–	–	–	–	–	1	–	1			
CO3	3	3	3	2	2	–	–	–	–	1	–	2			
CO4	3	2	2	2	1	–	–	–	–	1	–	1			
CO5	3	2	2	2	1	–	–	–	–	1	–	1			
CO6	3	3	3	2	2	–	–	–	–	1	–	2			
SUM	18	14	14	11	7					6		8			
AVG	3	2.3	2.3	1.8	1.4					1		1.3			

COURSE CODE WITH COURSE NAME: **U20EE613- MODERN CONTROL SYSTEMS**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO1	Design different compensators and compensation schemes of linear systems.
CO2	Analyse and design digital systems
CO3	Modeling and analysis of systems in state space
CO4	Design systems in state space
CO5	Design system based on performance index
CO6	Analyze and design optimal control systems

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	1	–	–	–	–	2	–	1	2	3	2
CO2	3	3	3	3	2	–	–	–	–	2	–	1	2	3	2
CO3	3	3	2	2	2	–	–	–	–	1	–	2	2	3	2
CO4	3	3	3	3	2	–	–	–	1	2	–	2	2	3	2
CO5	3	3	3	3	2	–	–	–	1	2	–	2	2	3	2
CO6	3	3	3	3	2	–	–	–	–	2	–	2	2	3	2
SUM	18	18	16	16	11				2	11		10	12	18	12
AVG	3	3	2.7	2.7	1.8				1	1.8		1.7	2	3	2

COURSE CODE WITH COURSE NAME: **U20EE614- MICRO ELECTRO MECHANICAL SYSTEMS**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO1	Explain the operation of micro devices and their applications.
CO2	Describe the operation of micro systems and their applications
CO3	Understand the concept of sensors and actuators
CO4	Design the micro devices using the MEMS fabrication process
CO5	Design the micro systems using the MEMS fabrication process
CO6	Analyze the properties and applications of polymer and optical MEMS materials in sensor and actuator design.

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	1	–	–	–	–	2	–	1	1		
CO2	3	2	2	2	1	–	–	–	–	2	–	1	1		
CO3	3	2	2	2	2	–	–	–	–	1	–	1	1		
CO4	3	3	3	3	2	–	–	–	–	2	–	2	1		
CO5	3	3	3	3	2	–	–	–	–	2	–	2	1		
CO6	3	3	2	2	2	–	–	–	–	2	–	2	1		
SUM	18	15	14	14	10					11		9	6		
AVG	3	2.5	2.3	2.3	1.7					1.8		1.5	1		

COURSE CODE WITH COURSE NAME: **U20EE616- MICROCONTROLLER BASED SYSTEM DESIGN**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO1	Describe the concepts of Architecture of PIC microcontroller
CO2	Demonstrate the concepts of interrupts and timers in microcontroller systems
CO3	Explain the importance of peripheral devices for data communication
CO4	Illustrate the fundamentals of sensor interfacing
CO5	Describe the architecture and features of ARM processors
CO6	Analyze ARM instruction set, coprocessor interface, and applications in embedded systems

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	1	–	–	–	–	1	–	1			
CO2	3	3	2	2	1	–	–	–	–	1	–	1			
CO3	3	3	2	2	2	–	–	–	–	1	–	1			
CO4	3	3	2	2	2	–	–	–	–	1	–	1			
CO5	3	3	3	3	2	–	–	–	–	2	–	2			
CO6	3	3	3	3	2	–	–	–	–	2	–	2			
SUM	18	18	14	14	10					8		8			
AVG	3	3	2.3	2.3	1.6					1.3		1.3			

COURSE CODE WITH COURSE NAME: **U20EE617- MODERN POWER CONVERTERS**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO1	Select appropriate converters for AC–DC conversion and SMPS applications
CO2	Explain the principles of DC–AC conversion for inverters
CO3	Demonstrate the concepts of AC-AC conversion for with DC link
CO4	Illustrate the concepts of AC-AC conversion for without DC link
CO5	Understand soft-switching techniques such as ZVS, ZCS, and quasi-resonant operation
CO6	Analyze and compare the performance of hard-switched and soft-switched AC–DC, DC–DC, and DC–AC converters.

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	–	–	–	–	1	–	1	2	2	2
CO2	3	3	2	2	2	–	–	–	–	1	–	1	2	2	2
CO3	3	3	2	2	2	–	–	–	–	1	–	1	2	2	2
CO4	3	3	2	2	2	–	–	–	–	1	–	1	2	2	2
CO5	3	3	3	2	2	–	–	–	–	1	–	1	2	2	2
CO6	3	3	3	3	2	–	–	–	–	2	–	1	2	2	2
SUM	18	18	14	13	12					7		6	12	12	12
AVG	3	3	2.3	2.16	2					1.16		1	2	2	2

COURSE CODE WITH COURSE NAME: **U20EE721- VIRTUAL INSTRUMENTATION**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO1	Explain the graphical programming techniques
CO2	Analyse and select proper instruments interface for a specific application
CO3	Describe the protocols used in network based automation.
CO4	Design and Implement File I/O functions available in Lab-VIEW.
CO5	Do Calibration, Resolution for analog inputs and outputs
CO6	Illustrate components and signal conditioning in data acquisition systems.

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	–	–	–	–	1	–	1			
CO2	3	3	3	2	2	–	–	–	–	2	–	1			
CO3	3	3	2	2	2	–	–	–	–	1	–	1			
CO4	3	3	3	3	2	–	–	–	–	2	–	2			
CO5	3	3	2	2	2	–	–	–	–	2	–	1			
CO6	3	3	2	2	2	–	–	–	–	1	–	1			
SUM	18	18	14	13	12					9		7			
AVG	3	3	2.3	2.16	2					1.5		1.16			

COURSE CODE WITH COURSE NAME: **U20EE723- CONTROL OF ELECTRICAL DRIVES**

Course code	*Course Outcome*
	On Successful completion of the course, Student will be able to,
CO1	Explain the control of DC drives
CO2	Describe the concepts voltage and frequency control
CO3	Analyze the control of synchronous motor drives
CO4	Illustrate the control of SRM and BLDC motors
CO5	Demonstrate the phase-locked loop and microcomputer-based control techniques for DC drives
CO6	Analyze speed, current, and feedback circuits for constant torque and constant horsepower operations.

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															
SUM															
AVG															