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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

CO-PO Matrix of all subjects of batch (2018-22) — Scheme 2018

Serial No: 1	18MAT11	Calculus & Linear Algebra	Semester: 1
	Course Code:101	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO101.1	Apply the Knowledge of calculus to solve the problems related to curvature and evaluate partial derivatives to estimate maxima and minima of multivariable functions.	
	CO101.2	Define the concept of multiple Integrals to Evaluate area, volume and to solve problems on improper integrals.	
	CO101.3	Solve first order ordinary linear/Non linear differential equation and able to apply in different engineering applications.	
	CO101.4	Use matrices techniques for solving system of simultaneous linear equations, Eigen values and Eigen vectors of the matrix.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO101.1	2	2	2	2	-	-	-	-	-	-	-	1	-	-
CO101.2	2	2	1	1	-	-	-	-	-	-	-	1	-	-
CO101.3	2	1	1	1	-	-	-	-	-	-	-	1	-	-
CO101.4	2	2	2	2	-	-	-	-	-	-	-	1	-	-
Achievable Value	**2**	**1.7**	**1.5**	**1.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 2	18PHY12	Engineering Physics	Semester: 1
	Course Code:102	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO102.1	Understand various types of oscillations and their implications, the role of Shock waves in various fields	
	CO102.2	Study and recognize the elastic properties of materials for engineering applications	
	CO102.3	Realize the interrelation between time varying electric field and magnetic field, the transverse nature of the EM waves and their role in optical fiber communication.	
	CO102.4	Learn the basics of quantum physics. Apprehend theoretical background of laser, construction and working of different types of laser and its applications in different fields	
	CO102.5	Understand various electrical and thermal properties of materials like conductors, semiconductors and dielectrics using different theoretical models.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO102.1	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO102.2	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO102.3	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CO102.4	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO102.5	1	1	-	-	-	-	-	-	-	-	-	-	-	-
Achievable Value	**1.8**	**2**	-	-	-	-	-	-	-	-	-	-	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 3	18ELE13	Basic Electrical Engineering	Semester: 1
	Course Code:103	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO103.1	Understand the basic principles of Electrical Engineering & study of different laws with illustrations.	
	CO103.2	Study and analyze the single phase and three phase AC circuits in electrical system	
	CO103.3	Analyze and Realize the Importance of Electrical Safety Rules, electric wiring , circuit protective devices and earthing	
	CO103.4	Study and analyze the performance of various types of AC machines and its significance	
	CO103.5	Study and analyze the performance of various types of DC Machines and its significance	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO103.1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO103.2	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO103.3	1	2	-	-	-	-	-	-	-	-	-	2	-	-
CO103.4	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO103.5	3	2	-	-	-	-	-	-	-	-	-	-	-	-
Achievable Value	**2.2**	**2.2**	-	-	-	-	-	-	-	-	-	**2**	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 4	18CIV14	Elements of Civil Engineering & Mechanics	Semester: 1
	Course Code:104	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO104.1	Mention the applications of various fields of Civil Engineering and compute the resultant of given force system subjected to various load.	
	CO104.2	Comprehend the action of forces, moments and other loads on systems of rigid bodies and Compute the reactive forces and effects that develop as a result of the external loads.	
	CO104.3	Locate the centroid and compute the moment of inertia of regular and built-up sections.	
	CO104.4	Express the relationship between the motion of bodies and analyze the bodies in motion.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO104.1	2	2	1	-	-	-	-	1	-	-	-	-	-	-
CO104.2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
CO104.3	3	2	1	-	-	-	-	-	-	-	-	-	-	-
CO104.4	2	2	-	1	-	-	-	-	-	-	-	-	-	-
Achievable Value	**2.5**	**2**	**1**	**1**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 5	18EGDL15	Engineering Graphics	Semester: 1
	Course Code:105	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO105.1	Identify the importance of computer aided sketching and orthographic projection of Points and lines.	
	CO105.2	Produce the sketch for projection of plane surfaces.	
	CO105.3	Use the knowledge of sketching to represent projection of solid surfaces.	
	CO105.4	Understand the importance of Lateral surfaces and able to sketch Development of given isometric drawings of simple objects.	

Course Outcome to PO and PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO105.1	1	1	-	-	2	-	-	-	-	-	-	1	-	-
CO105.2	2	2	-	-	2	-	-	-	-	-	-	1	-	-
CO105.3	2	2	-	-	2	-	-	-	-	-	-	1	-	-
CO105.4	2	2	-	-	2	-	-	-	-	-	-	1	-	-
Achievable Value	**1.75**	**1.75**	-	-	**2**	-	-	-	-	-	-	**1**	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 6	18PHYL16	Engineering Physics Lab	Semester: 1
	Course Code:106	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO106.1	Apprehend the concepts of interference of light, diffraction of light using laser light	
	CO106.2	Apprehend the concepts of radiation, resistance, Fermi energy and understand the principles of operation of dielectic material, optical fibres, Photodiode and Transistor using simple circuits	
	CO106.3	Determine elastic moduli and moment of inertia of given materials with the help of suggested procedures	
	CO106.4	Recognize the resonance concept and its practical applications	
	CO106.5	Understand the importance of measurement procedures, honest recording and representing the data and reproduction of final results	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO106.1	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO106.2	2	2	-	-	2	-	-	-	-	-	-	-	--	-
CO106.3	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO106.4	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO106.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Achievable Value	**1.88**	**2**	**-**	**-**	**2**	-	-	-	-	-	-	-	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 7	18ELEL17	Basic Electrical Engineering Lab	Semester: 1
	Course Code:107	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO107.1	Select a suitable measuring instrument for measuring electrical quantities for a given application	
	CO107.2	Understand and analyze the concepts, connections in single and three phase electrical system.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO107.1	2	2	1	-	-	-	-	-	-	-	-	1	-	-
CO107.2	2	2	1	-	-	-	-	1	1	1	-	1	-	-
Achievable Value	**2**	**2**	**1**	**-**	**-**	**-**	**-**	**1**	**1**	**1**	**-**	**1**	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 8	18EGH18	Technical English 1	Semester: 1
	Course Code:108	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO108.1	Use grammatical English and essentials of language skills and identify the nuances of phonetics, intonations and flaw less pronunciation.	
	CO108.2	Implement English vocabulary at command and language proficiency.	
	CO108.3	Identify common errors in spoken and written communication.	
	CO108.4	Understand and improve the non verbal communication and kinesics.	
	CO108.5	Perform well in campus recruitment, engineering and all other general competitive examination.	

Course Outcome to PO and PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO109.1	-	-	-	-	-	-	-	-	1	3	2	1	-	-
CO109.2	-	-	-	-	-	2	-	-	1	3	2	3	-	-
CO109.3	-	-	-	-	-	-	-	-	1	3	1	3	-	-
CO109.4	-	-	-	-	-	-	-	-	-	2	-	3	-	-
CO109.5	-	-	-	-	-	2	--	-	-	2	-	1	-	-
Achievable Value	-	-	-	-	-	**2**	-	-	**1**	**2.6**	**1.67**	**2.2**	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 9	18MAT21	Advanced Calculus & Numerical Methods	Semester: 2
	Course Code:109	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO109.1	Develop the applications of multivariate calculus to understand the solenoidal and irrotational vectors and also exhibit the interdependence of line, surface and volume integrals.	
	CO109.2	Demonstrate various physical models through higher order differential equations and solve such linear ordinary differential equations.	
	CO109.3	Construct a variety of partial differential equations and solution by exact methods/method of separation of variables.	
	CO109.4	Explain the applications of infinite series and obtain series solutions of ordinary differential equations. Apply numerical methods in the modeling of engineering problems.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO109.1	2	2	1	2	-	-	-	-	-	-	-	1	-	-
CO109.2	2	2	2	2	-	-	-	-	-	-	-	1	-	-
CO109.3	2	2	1	1	-	-	-	-	-	-	-	1	-	-
CO109.4	2	2	2	1	-	-	-	-	-	-	-	1	-	-
Achievable Value	**2**	**2**	**1.5**	**1.5**	-	-	-	-	-	-	-	**1**	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 10	18CHE22	Engineering Chemistry	Semester: 2
	Course Code:110	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	C110.1	To Understand free energy in equilibria and electrochermical energy systems	
	C110.2	Comprehend the causes and effects of corrosion of metals and control of corrosion.	
	C110.3	Explain production and consumption of energy for industrialization and consumption of solar energy for different useful forms of energy	
	C110.4	Analyze the environmental pollution, waste management and water chemistry	
	C110.5	Identify the different techniques of instrumental methods of analysis of given solution, Foundamental principles of nano materials.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C110.1	2	3	1	-	-	-	-	-	-	-	-	-	-	-
C110.2	2	-	-	-	-	-	-	-	-	-	-	-	-	-
C110.3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
C110.4	2	3	3	2	-	-	-	-	-	-	-	-	-	-
C110.5	2	2	2	1	-	-	-	-	-	-	-	-	-	-
Achievable Value	**2**	**2.67**	**2**	**1.5**	-	-	-	-	-	-	-	-	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 11	18CPS23	C Programming for problem solving	Semester: 2
	Course Code:111	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO111.1	Comprehend basics of computer hardware, software and overview of C.	
	CO111.2	Apply conditional and looping constructs to write C program.	
	CO111.3	Illustrate Arrays, data types, expressions, control statements, functions, file and I/O operations	
	CO111.4	Design iterative and recursive functions for computational problems. Illustrate usage of C library.	
	CO111.5	Use Structures, Pointers and Preprocessor directives in problem solving.	

Course Outcome to PO and PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO111.1	2	-	-	-	-	-	-	-	-	--	-	1	-	-
CO111.2	2	2	2	3	-	-	-	-	-	--	-	1	-	-
CO111.3	3	2	2	2	-	-	-	-	-	--	-	2	-	-
CO111.4	3	2	3	3	-	-	-	-	-	--	-	2	-	-
CO111.5	3	2	2	2	-	-	-	-	-	--	-	2	-	-
Achievable Value	**2.6**	**2**	**2.25**	**2.5**	-	-	-	-	-	--	-	**1.6**	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 12	18ELN24	Basic Electronics	Semester: 2
	Course Code:112	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO112.1	Describe the operation of diodes, BJT, FET and operational amplifiers	
	CO112.2	Design and explain constructions of rectifiers, regulators, amplifiers and oscillators	
	CO112.3	Describe the general operating principles of scr and its application	
	CO112.4	Explain the working and design of fixed IC voltage regulator using 7805 and a stable oscillator using timer IC555.	
	CO112.5	Different number conversions and construct simple combinational and sequential logic circuits using Flip Flops.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO112.1	3	2	-	-	-	-	-	-	--	-	-	-	-	-
CO112.2	2	2	2	-	-	-	-	-	--	-	-	-	-	-
CO112.3	3	2		-	-	-	-	-	--	-	-	-	-	-
CO112.4	3	2	2	-	-	-	-	-	--	-	-	-	-	-
CO112.5	2	-	3	-	-	-	-	-	--	-	-	-	-	-
Achievable Value	**2.6**	**2**	**2.33**	-	-	-	-	-	--	-	-	-	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 13	18EME25	Elements of Mechanical Engineering	Semester: 2
	Course Code:113	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO113.1	Identify different sources of energy and their conversion process.	
	CO113.2	Explain the working principle of hydraulic turbines, pumps and Boilers	
	CO113.3	Describe the working of I C engines and refrigeration systems.	
	CO113.4	Understand the properties of common engineering materials and their applications in engineering industry. Recognize various metal joining processes and power transmission elements.	
	CO113.5	Discuss the working of conventional machine tools, machining processes, tools and accessories. Describe the advanced manufacturing systems.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO113.1	3	2	2	-	-	-	-	-	--	-	-	3	-	-
CO113.2	3	-	2	-	-	-	-	-	--	-	-	3	-	-
CO113.3	3	2	3	-	-	-	-	-	--	-	-	3	-	-
CO113.4	3	2	2	2	-	-	-	-	-	--	-	3	-	-
CO113.5	3	-	2	-	-	-	-	-	-	--	-	2	-	-
Achievable Value	**3**	**2**	**2.2**	**2**	-	-	-	-	-	--	-	**2.8**	-	-

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Serial No: 14	18CHEL26	Engineering Chemistry Lab	Semester: 2
	Course Code:114	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO114.1	Use of different types of instruments for analysis of materials of low concentration for quick and accurate results.	
	CO114.2	Carry out Different Types of titrations for the estimation of specified materials.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO114.1	3	3	1	1	-	-	-	-	-	--	-	-	-	-
CO114.2	3	2	2	-	-	-	-	-	-	--	-	-	-	-
Achievable Value	**3**	**2.5**	**1.5**	**1**	-	-	-	-	-	--	-	-	-	-

Serial No: 15	18CPL27	C Programming Lab	Semester: 2
	Course Code:115	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO115.1	Explain the various commands used during the execution of the program.	
	CO115.2	Utilize the process of debugging and execution.	
	CO115.3	Develop and illustrate simple C programs.	
	CO115.4	Construct flowchart and algorithm for the given problems.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO115.1	3	-	-	-	-	-	--	-	-	1	-	-	-	-
CO115.2	2	-	-	-	1	-	-	-		1	-	-	-	-
CO115.3	1	1	3	-	3	-	-	-	1	1	-	1	-	-
CO115.4	-	2	2	-	-	-	-	-	1	1	-		-	-
Achievable Value	**2**	**1.5**	**2.5**	-	**2**	-	-	-	**1**	**1**	-	**1**	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 16	18EGH28	Technical English 2	Semester: 2
	Course Code:116	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO116.1	Identify common errors in spoken and written communication.	
	CO116.2	Get familiarized with English vocabulary and language proficiency.	
	CO116.3	Improve nature and style of sensible writing and acquire employment and workplace communication skills.	
	CO116.4	Improve their Technical Communication Skills through Technical Reading and Writing practices.	
	CO116.5	Perform well in campus recruitment, engineering and all other general competitive examination.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO116.1	-	-	-	-	-	-	-	-	-	3	-	1	-	-
CO116.2	-	-	-	-	-	-	-	-		3	1	2	-	-
CO116.3	-	-	-	-	-	1	-	-	1	3	2	3	-	-
CO116.4	-	-	-	-	-	1	-	2	2	3	2	3	-	-
CO116.5	-	-	-	-	-	2	-	-	-	2	-	1	-	-
Achievable Value	-	-	-	-	-	**1.3**	-	**2**	**1.5**	**2.8**	**1.67**	**2**	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 17	18MAT31	Transform Calculus, Fourier Series and Numerical Techniques	Semester: 3
	Course Code:201	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	C0201.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering	
	C0201.2	Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory	
	C0201.3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems	
	C0201.4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods	
	C0201.5	Determine the externals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C0201.1	2	2	2	2	-	-	-	-	-	-	-	1	-	-
C0201.2	2	2	1	1	-	-	-	-	-	-	-	1	-	-
C0201.3	1	1	1	1	-	-	-	-	-	-	-	1	-	-
C0201.4	2	2	2	2	-	-	-	-	-	-	-	1	-	-
C0201.5	3	2	2	2	-	-	-	-	-	-	-	1	-	-
Achievable Value	**2**	**1.8**	**1.6**	**1.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 18	18EC32	Network Theory	Semester: 3
	Course Code:202	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO202.1	Determine currents and voltages using source transformation/ source shifting/ mesh/ nodal analysis and reduce given network using star-delta transformation/source transformation/ source shifting.	
	CO202.2	Solve network problems by applying Superposition/ Reciprocity/ Thevenin's/ Norton's/ Maximum Power Transfer/ Millman's Network Theorems and electrical laws to reduce circuit complexities and to arrive at feasible solutions.	
	CO202.3	Calculate current and voltages for the given circuit under transient conditions. Apply Laplace transform to solve the given network	
	CO202.4	Solve the given network using specified two port network parameters-Z, Y, T & h	
	CO202.5	Understand the concept of resonance and determine the parameters that characterize series/parallel resonant circuits	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO202.1	3	3	-	-	-	-	-	-	-	--	-	-	3	-
CO202.2	3	3	2	-	-	-	-	-	-	--	-	-	3	-
CO202.3	2	3	2	-	-	-	-	-	-	--	-	-	2	**1**
CO202.4	2	3	2	-	-	-	-	-	-	--	-	-	2	-
CO202.5	2	3	1	-	-	-	-	-	-	--	-	-	2	-
Achievable Value	**2.4**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.4**	**1**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 19	18EC33	Electronic Devices	Semester: 3
	Course Code:203	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO203.1	Understand the principles of semiconductor Physics	
	CO203.2	Understand the principles and characteristics of different types of semiconductor devices	
	CO203.3	Understand the fabrication process of semiconductor devices	
	CO203.4	Utilize the mathematical models of semiconductor junctions and MOS transistors for circuits and systems.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO203.1	2	1	-	3	-	-	1	1	1	-	-	1	3	-
CO203.2	3	1	3	2	-	-	-	-	-	2	-	1	2	1
CO203.3	3	3	3	1	-	-	1	1	1	-	-	1	3	-
CO203.4	2	3	3	2	-	-	-	-	-	-	-	1	2	-
Achievable Value	**2.5**	**2**	**3**	**2**	**-**	**-**	**1**	**1**	**1**	**2**	**-**	**1**	**2.5**	**1**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 20	18EC34	Digital System Design	Semester: 3
	Course Code:204	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO204.1	Explain the concept of combinational and sequential logic circuits	
	CO204.2	Design the combinational logic circuits	
	CO204.3	Design the sequential circuits using SR, JK, D, T flip-flops and Mealy & Moore machines	
	CO204.4	Design applications of Combinational & Sequential Circuits	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO204.1	2	2	-	-	-	-	-	--	-	-	-	-	-	2
CO204.2	1	3	3	-	-	-	-	-	--	-	-	-	-	2
CO204.3	1	3	3	-	-	-	-	-	--	-	-	-	-	2
CO204.4	1	3	3	-	-	-	-	-	--	-	-	-	-	2
Achievable Value	**1.25**	**2.75**	**3**	-	-	-	-	-	--	-	-	-	-	2

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 21	18EC35	Computer Organization & Architecture	Semester: 3
	Course Code:205	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO205.1	Explain the basic organization of a computer system.	
	CO205.2	Explain different ways of accessing an input / output device including interrupts.	
	CO205.3	Illustrate the organization of different types of semiconductor and other secondary storage memories.	
	CO205.4	Illustrate simple processor organization based on hardwired control and micro programmed control.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO205.1	3	2	2	1	-	-	-	-	-	--	-	-	3	2
CO205.2	3	3	2	1	-	-	-	-	-	--	-	-	3	3
CO205.3	3	3	3	1	-	-	-	-	-	--	-	-	3	2
CO205.4	3	3	3	2	-	-	-	-	-	--	-	-	3	3
Achievable Value	3	2	2	1	-	-	-	-	-	--	-	-	3	2

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 22	18EC36	Power Electronics and Instrumentation	Semester: 3
	Course Code:206	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to	
	CO206.1	Study the analysis of thyristor circuits with different triggering conditions.	
	CO206.2	Learn the applications of power devices in controlled rectifiers ,converters and inverters.	
	CO206.3	Understand types of instrument errors.	
	CO206.4	Develop circuits for multirange ammeters and voltmeters.	
	CO206.5	Describe principle of operation of digital measuring instruments and bridges.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO206.1	3	2	2	-	-	-	-	-	-	--	-	-	-	1
CO206.2	2	3	3	2	-	-	-	-	-	--	-	-	-	1
CO206.3	3	2	-	-	-	-	-	-	-	--	-	-	-	2
CO206.4	3	2	2	-	-	-	-	-	-	--	-	-	-	2
CO206.5	2	2	2	-	-	-	-	-	-	--	-	-	-	1
Achievable Value	**2.6**	**2.2**	**2.25**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.4**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 23	18ECL37	Electronic Devices & Instrumentation Laboratory	Semester: 3
	Course Code:207	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO207.1	Understand the characteristics of various electronic devices and measurement of parameters.	
	CO207.2	Design and test simple electronic circuits	
	CO207.3	Use of circuit simulation software for the implementation and characterization of electronic circuits and devices.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO208.1	3	-	-	-	2	-	-	-	2	-	-	-	-	-
CO208.2	3	-	-	-	2	-	-	-	2	-	-	-	-	-
CO208.3	3	-	-	-	2	-	-	-	2	-	-	-	-	-
Achievable Value	**3**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 24	18ECL38	Digital System Design Laboratory	Semester: 3
	Course Code:208	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO208.1	Explain the concept of combinational and sequential logic circuits.	
	CO208.2	Implement the combinational logic circuits.	
	CO208.3	Develop the sequential circuits using SR, JK, D, T flip-flops and Mealy & Moore machines	
	CO208.4	Design applications of Combinational & Sequential Circuits.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO209.1	2	2	-	-	-	-	-	-	-	-	-	2	3	-
CO209.2	1	3	3	-	-	-	-	-	-	-	-	2	3	-
CO209.3	1	3	3	-	-	-	-	-	-	-	-	2	3	-
CO209.4	1	3	3	-	-	-	-	-	-	-	-	2	3	-
Achievable Value	1.25	2.75	3	-	-	-	-	-	--	-	-	**2**	3	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 25	18CPC39	Constitution of India, Professional Ethics and Cyber Law Syllabus	Semester: 3
	Course Code:209	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO209.1	State and Discuss the state and central policies, fundamental duties.	
	CO209.2	Discuss the Electoral Process, special provision.	
	CO209.3	Discuss powers and functions of Municipalities, Panchayats and Co-operatives Societies.	
	CO209.4	Demonstrate the principles of Engineering ethics and responsibilities.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO209.1	-	-	-	-	-	2	-	3	-	-	-	3	-	-
CO209.2	-	-	-	-	-	2	-	3	-	-	-	3	-	-
CO209.3	-	-	-	-	-	2	-	3	-	-	-	3	-	-
C209.4	-	-	-	-	-		-	3	-	-	-	3	-	-
Achievable Value	-	-	-	-	-	**2**		**3**	-	-	-	**3**	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 26	18MAT41	Complex Analysis, Probability and Statistical Methods	Semester: 4
	Course Code:210	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO210.1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.	
	CO210.2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.	
	CO210.3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.	
	CO210.4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.	
	CO210.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.	

Course Outcome to PO and PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO210.1	2	2	3	2	3	1	1	-	1	1	1	1	1	1
CO210.2	2	3	1	3	3	2	1	1	1	1	1	1	1	1
CO210.3	3	3	2	3	3	1	-	1	1	1	1	1	1	1
CO210.4	2	3	3	3	3	2	1	1	1	1	1	1	1	1
CO210.5	3	3	3	3	3	1	1	1	1	1	1	1	1	1
Achievable Value	**2.4**	**2.8**	**2.4**	**2.8**	**3**	**1.4**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 27	18EC42	Analog Circuits	Semester: 4
	Course Code:211	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO211.1	Understand the characteristics of BJTs and FETs.	
	CO211.2	Design and analyze BJT and FET amplifier circuits	
	CO211.3	Design sinusoidal and non-sinusoidal oscillators.	
	CO211.4	Understand the functioning of linear ICs.	
	CO211.5	Design of Linear IC based circuits.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO211.1	3	3	3	3	-	-	-	-	-	--	-	-	3	2
CO211.2	2	2	3	3	-	-	-	-	-	--	-	-	3	3
CO211.3	3	3	2	3	-	-	-	-	-	--	-	-	3	3
CO211.4	2	3	3	3	-	-	-	-	-	--	-	-	3	3
CO211.5	3	3	2	3	-	-	-	-	-	--	-	-	3	3
Achievable Value	2.6	2.8	2.6	3	-	-	-	-	-	-	-	-	3	2.8

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Serial No: 28	18EC43	Control Systems	Semester: 4
	Course Code:212	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO212.1	Develop the mathematical model of mechanical and electrical systems.	
	CO212.2	Develop transfer function for a given control system using block diagram reduction techniques and signal flow graph method	
	CO212.3	Determine the time domain specification s for first an d second order systems	
	CO212.4	Determine the stability of a system in the time domain using Routh-Hurwitz criterion and Root-locus technique	
	CO212.5	Determine the s stability of a system in the frequency domain u sing Nyquist and bode plots	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO213.1	3	2	2	-	-	-	-	-	--	-	-	-	-	-
CO213.2	3	2	1	-	-	-	-	-	--	-	-	-	-	-
CO213.3	2	1	1	-	-	-	-	-	--	-	-	-	-	-
CO213.4	1	2	1	-	-	-	-	-	--	-	-	-	-	-
CO213.5	2	1	1	-	-	-	-	-	--	-	-	-	-	-
Achievable Value	**2.2**	**1.6**	**1.2**	-	-	-	-	-	--	-	-	-	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 29	18EC44	Engineering Statistics & Linear Algebra	Semester: 4
	Course Code:213	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO213.1	Understand and Analyze Single and Multiple Random Variables, and their extension to Random Processes.	
	CO213.2	Familiarization with the concept of Vector spaces and orthogonally with a qualitative insight into applications in communications	
	CO213.3	Compute the quantitative parameters for functions of single and Multiple Random Variables and Processes	
	CO213.4	Compute the quantitative parameters for Matrices and Linear Transformations	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO213.1	3	3	3	-	-	-	-	-	-	-	-	-	-	-
CO213.2	3	2	2	-	-	-	-	-	-	-	-	-	-	-
CO213.3	2	3	1	3	-	-	-	-	-	-	-	-	-	-
CO213.4	3	1	3	3	-	-	-	-	-	-	-	-	-	-
Achievable Value	2.75	2.25	2.25	3	-	-	-	-	-	-	-	-	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 30	18EC45	Signals & Systems	Semester: 4
	Course Code:214	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO214.1	Classify the signals as continuous/discrete, periodic/aperiodic, even/odd, energy/power and deterministic/random signals.	
	CO214.2	Determine the linearity, causality, time-invariance and stability properties of continuous and discrete time systems. Evaluate the convolution sum and integral	
	CO214.3	Analyze LTI systems representations using impulse responses and represent periodic signals using Fourier series.	
	CO214.4	Determine the spectral characteristics of continuous and discrete time signal using Fourier analysis.	
	CO214.5	Compute Z-transforms, inverse Z- transforms and transfer functions of complex LTI systems.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO214.1	3	2	1	-	-	-	-	-	-	-	-	-	-	2
CO214.2	3	2	1	-	-	-	-	-	-	-	-	-	-	2
CO214.3	2	3	3	-	-	-	-	-	-	-	-	-	-	2
CO214.4	2	3	3	-	-	-	-	-	-	-	-	-	-	3
CO214.5	2	3	2	-	-	-	-	-	-	-	-	-	-	3
Achievable Value	2.4	2.6	2	-	-	-	-	-	-	-	-	-	-	2.4

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 31	18EC46	Microcontroller	Semester: 4
	Course Code:215	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO215.1	Explain the difference between Microprocessor and Microcontrollers, Architecture of 8051 Microcontroller, Interfacing of 8051 to external memory and Instructions set of 8051	
	CO215.2	Write 8051 Assembly level programming using 8051 instructions set	
	CO215.3	Explain the Interrupt system, operation Timer/Counters and Serial port of 8051	
	CO215.4	Write 8051 Assembly language programs to generate square wave on 8051 I/O port pin using interrupt and C Program to send & receive serial data using 8051 serial port.	
	CO215.5	Interfacing simple switches, simple LEDs, ADC0804, LCD and stepper motor to 8051 using 8051 I/O ports	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO215.1	3	3	-	-	-	-	-	-	-	-	-	-	1	-
CO215.2	2	3	3	2	-	-	-	-	-	-	-	1	2	-
CO215.3	3	2	-	-	-	-	-	-	-	-	-	-	2	-
CO215.4	1	2	3	2	-	-	-	-	-	-	-	1	3	2
CO215.5	1	2	3	-	-	-	-	-	-	-	-	-	3	2
Achievable Value	2	2.4	3	2	-	-	-	-	-	-	-	1	2.2	2

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 32	18ECL47	Microcontroller Laboratory	Semester: 4
	Course Code:216	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO216.1	Write Assembly language programs in 8051 for solving simple problems that manipulate input data using different instructions of 8051.	
	CO216.2	Interface different input and output devices to 8051 and control them using Assembly language programs.	
	CO216.3	Interface different input output devices to 8051 controller and control them to using assembly level language.	
	CO216.4	Interface the serial devices to 8051 and do the serial transfer using C programming.	
	CO216.5	Develop applications based on 8051 microcontroller.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO216.1	2	2	2	-	3	-	-	2	3	1	-	2	2	1
CO216.2	2	3	3	1	3	1	-	2	3	1	-	2	2	1
CO216.3	2	3	3	1	3	-	-	2	3	1	-	2	2	1
CO216.4	2	3	3	1	3	1	-	2	3	1	-	2	2	1
CO216.5	2	2	2	1	3	-	-	2	3	1	-	2	2	1
Achievable Value	**2**	**2.8**	**2.8**	**1**	**3**	**1**	**-**	**2**	**3**	**1**	**-**	**2**	**2**	**1**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 33	18ECL48	Analog Circuits Laboratory	Semester: 4
	Course Code:217	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO217.1	Design analog circuits using BJT/FETs and evaluate their performance characteristics.	
	CO217.2	Design analog circuits using OPAMPs for different applications	
	CO217.3	Simulate and analyze analog circuits that usesICs for different electronic applications.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO217.1	2	2	2	-	-	-	-	-	2	-	-	-	2	-
CO217.2	3	2	2	-	-	-	-	-	2	-	-	-	3	-
CO217.3	2	3	3	-	-	-	-	-	2	-	-	-	2	-
Achievable Value	**2.33**	**2.33**	**2.33**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**2.33**	**-**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 34	18KVK49	Vyavaharika Kannada	Semester: 4
	Course Code:218	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO218.1	ಕರ್ನಾಟಕದ ವಿದ್ಯಾರ್ಥಿಗಳು ಸಂಸ್ಕೃತಿ ಅಧ್ಯಯನದ ಮೂಲಕ ಕರ್ನಾಟಕ ಚರಿತ್ರೆ ಪರಿಸರ ಧರ್ಮ ಆಚಾರ ವಿಚಾರ ಮುಂತಾದ ವಿಷಯಗಳನ್ನು ಮೈಗೂಡಿಸಿಕೊಳ್ಳುತ್ತಾರೆ	
	CO218.2	ಕನ್ನಡ ಭಾಷೆಯಲ್ಲಿ ಸರಿಯಾದ ವಾಕ್ಯಗಳನ್ನು ಬರೆಯಲು ಸಕ್ರಿಯಗೊಳಿಸುವುದು	
	CO218.3	ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಬರೆಯಲು ಭಾಷೆ ಮತ್ತು ವ್ಯಾಕರಣ ಕೌಶಲ್ಯಗಳನ್ನು ಕಲಿಸುವುದು	
	CO218.4	ಕನ್ನಡ ಸಾಹಿತ್ಯ ಹಾಗೂ ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯ.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO218.1	-	-	-	-	-	2	-	-	-	1	-	-	-	-
CO218.2	-	-	-	-	-	1	-	-	-	1	-	-	-	-
CO218.3	-	-	-	-	-		-	-	-	1	-	-	-	-
CO218.4	-	-	-	-	-	1	-	-	-	1	-	-	-	-
Achievable Value	-	-	-	-	-	**1.3**	-	-	-	**1**	-	-	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 35	18ES51	Technological Innovation Management And Entrepreneurship	Semester: 5
	Course Code:301	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO301.1	Understand the fundamental concepts of Management and Entrepre neurship and opportunities in order to setup a busines	
	CO301.2	Identify the various organizations' architecture	
	CO301.3	Describe the functions of Managers, Entrepreneurs and their social responsibilities	
	CO301.4	Understand the components in developing a business plan	
	CO301.5	Recognize the various sources of funding and institutions supporting entrepreneurs.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO301.1	-	-	-	-	-	-	-	2	2	-	-	3	-	-
CO301.2	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO301.3	-	-	-	-	-	-	-	-	-	-	-		-	-
CO301.4	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO301.5	-	-	-	-	-	-	-	-	-	-	-		-	-
Achievable Value	-	-	-	-	-	-	-	2	2	-	-	**2.66**	-	-

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Serial No: 36	18EC52	Digital Signal Processing	Semester: 5
	Course Code:302	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO302.1	Determine response of LTI system using time domain and DFT techniques.	
	CO302.2	Compute DFT of real and complex discrete time signals.	
	CO302.3	Compute DFT using FFT algoritms and linear filtering approach.	
	CO302.4	Design and realize FIR and IIR digital filters.	
	CO302.5	Understand the DSP processor architecture.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO302.1	3	3	2	1	-	-	-	-	-	-	-	-	-	2
CO302.2	3	2	1	1	-	-	-	-	-	-	-	-	-	3
CO302.3	2	2	3	2	1	-	-	-	-	-	-	-	-	3
CO302.4	3	2	2	1	1	-	-	-	-	-	-	-	-	3
CO302.5	-	2	3	2	2	-	-	-	-	-	-	-	-	3
Achievable Value	**2.75**	**2.2**	**2.2**	**1.4**	**1.33**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.8**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 37	18EC53	Principles of Communication Systems	Semester: 5
	Course Code:303	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO303.1	Understand and analyse concepts of Analog Modulation schemes viz; AM, FM., Low pass sampling and Quantization as a random process	
	CO303.2	Understand and analyse concepts digitization of signals viz; sampling, quantizing and encoding.	
	CO303.3	Evolve the concept of SNR in the presence of channel induced noise and study Demodulation of analog modulated signals.	
	CO303.4	Evolve the concept of quantization noise for sampled and encoded signals and study the concepts of reconstruction from these samples at a receiver	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO303.1	3	2	-	-	-	-	-	-	-	2	-	2	3	2
CO303.2	3	2	2	1	-	-	-	-	-	2	-	1	3	2
CO303.3	3	3	2	2	-	-	-	-	-	1	-	1	2	1
CO303.4	3	3	3	3	-	-	-	-	-	1	-	2	3	1
Achievable Value	**3**	**2.5**	**2.33**	**2**	**-**	**-**	**-**	**-**	**-**	**1.5**	**-**	**1.5**	**2.75**	**1.5**

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Serial No: 38	18EC54	Information Theory & Coding	Semester: 5
	Course Code:304	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO304.1	Explain concept of Dependent & Independent Source, measure of information, Entropy, Rate of information and Order of a source	
	CO304.2	Represent the information using Shannon Encoding, Shannon Fano, Prefix and Huffman Encoding Algorithms	
	CO304.3	Model the continuous and discrete communication channels using input, output and joint probabilities	
	CO304.4	Determine a codeword comprising ofthe check bits computed using Linear Block codes, cyclic codes & convolution codes	
	CO304.5	Design the encoding and decoding circuits for Linear Block codes, cyclic codes, convolution codes, BCH and Golay codes	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO304.1	3	3	2	-	-	-	-	-	-	-	-	-	-	-
CO304.2	-	2	3	-	-	-	-	-	-	-	-	-	-	-
CO304.3	2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO304.4	-	2	3	-	-	-	-	-	-	-	-	-	-	-
CO304.5	-	2	3	-	-	-	-	-	-	-	-	-	-	-
Achievable Value	**2.5**	**2.2**	**2.6**	-	-	-	-	-	-	-	-	-	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 39	18EC55	Electromagnetic Waves	Semester: 5
	Course Code:305	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO305.1	Evaluate problems on electrostatic force, electric field duetopoint, linear, volume charges by applying conventional methods and charge in a volume	
	CO305.2	Apply Gauss law to evaluate Electric fields due to different charge distributions and Volume Charge distribution by using Divergence Theorem	
	CO305.3	Determine potential and energy with respect to point charge and capacitance using Laplace equation and Apply Biot-Savart's and Ampere's laws for evaluating Magnetic field for different current configurations	
	CO305.4	Calculate magnetic force, potential energy and Magnetization with respect to magnetic materials and voltage induced in electric circuits	
	CO305.5	Apply Maxwell's equations for time varying fields, EM waves in free space and conductors and Evaluate power associated with EM waves using Poynting theorem	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO 6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO305.1	3	2	2	1	-	-	-	-	-	-	-	-	-	1
CO305.2	2	2	2	1	-	-	-	-	-	-	-	-	-	2
CO305.3	3	3	1	1	-	-	-	-	-	-	-	-	-	2
CO305.4	2	2	1	1	-	-	-	-	-	-	-	-	-	3
CO305.5	2	1	1	1	-	-	-	-	-	-	-	-	-	1
Achievable Value	**2.4**	**2**	**1.4**	**1**	-	-	-	-	-	-	-	-	-	**1.8**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 40	18EC56	Verilog HDL	Semester: 5
	Course Code:306	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO306.1	Write Verilog programs in gate, dataflow (RTL),behavioral and switch modeling levels of Abstraction.	
	CO306.2	Design and verify the functionality of digital circuit/system using test benches.	
	CO306.3	Identify the suitable Abstraction level for a particular digital design.	
	CO306.4	Write the programs more effectively using Verilog tasks, functions and directives.	
	CO306.5	Perform timing and delay Simulation	
	CO306.6	Interpret the various constructs in logic synthesis.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO306.1	2	2	1	3	3	-	1	-	2	2	2	1	3	2
CO306.2	2	2	2	3	2	-	-	-	-	1	1	1	3	2
CO306.3	2	2	1	2	2	-	1	-	-	2	1	-	3	2
CO306.4	2	2	1	2	2	-	1	-	1	1	-	-	2	1
CO306.5	2	2	1	2	1	-	-	-	1	-	1	-	2	1
CO306.6	2	2	-	2	2	-	-	-	-	1	-	-	2	1
Achievable Value	**2**	**2**	**1.2**	**2.33**	**2**	**-**	**1**	**-**	**1.33**	**1.4**	**1.25**	**1**	**2.5**	**1.5**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 41	18ECL57	Digital Signal Processing Laboratory	Semester: 5
	Course Code:307	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO307.1	Understand the concepts of analog to digital conversion of signals and frequency domain sampling of signals	
	CO307.2	Modelling of discrete time signals and systems and verification of its properties and results	
	CO307.3	Implementation of discrete computations using DSP processor and verify the results.	
	CO307.4	Realize the digital filters using a simulation tool and a DSP processor and verify the frequency and phase response	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO307.1	3	2	-	-	3	-	-	2	3	1	-	2	-	3
CO307.2	2	3	1	-	3	-	-	2	3	1	-	2	-	3
CO307.3	2	3	1	-	3	-	-	2	3	1	-	2	-	3
CO307.4	2	3	3	-	3	-	-	2	3	1	-	2	-	3
Achievable Value	**2.25**	**2.75**	**1.66**	**-**	**3**	**-**	**-**	**2**	**3**	**1**	**-**	**2**	**-**	**3**

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Serial No: 42	18ECL58	HDL Laboratory	Semester: 5
	Course Code:308	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO308.1	Write the Verilog/VHDL programs to simulate Combinational circuits in Dataflow, Behavioral and Gate level Abstractions.	
	CO308.2	Describe sequential circuits like flip flops and counters in Behavioral description and obtain simulation waveforms.	
	CO308.3	Use FPGA/CPLD kits for downloading Verilog codes and check outputs	
	CO308.4	Synthesize Combinational and Sequential circuits on programmable ICs and test the hardware.	
	CO308.5	Interface the hardware to the programmable chips and obtain the required output.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO2
CO308.1	2	2	3	-	2	-	-	1	2	-	-	-	3	-
CO308.2	2	3	3	-	2	-	-	1	2	-	-	-	2	-
CO308.3	2	3	3	-	2	-	-	1	2	-	-	-	2	2
CO308.4	2	3	3	-	2	-	-	1	2	-	-	-	2	2
CO308.5	2	2	3	-	2	-	-	1	2	-	-	-	2	2
Achievable Value	**2**	**2.75**	**3**	**-**	**2**	**-**	**-**	**1**	**2**	**-**	**-**	**-**	**2.25**	**2**

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Serial No: 43	18CIV59	Environmental Studies	Semester: 5
	Course Code:309	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO309.1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale	
	CO309.2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.	
	CO309.3	Demonstrate ecology knowledge of a complex relationship between biotic and a biotic components.	
	CO309.4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO309.1	-	-	-	-	-	2	-	3	-	-	-	3	-	-
CO309.2	-	-	-	-	-	2	-	3	-	-	-	3	-	-
CO309.3	-	-	-	-	-	2	-	3	-	-	-	3	-	-
CO309.4	-	-	-	-	-		-	3	-	-	-	3	-	-
Achievable Value	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**3**	**-**	**-**	**-**	**3**	**-**	**-**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 44	18EC61	Digital Communication	Semester: 6
	Course Code:310	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO310.1	Associate and applythe concepts ofBandpass sampling to well specified signals and channels	
	CO310.2	Analyze and compute performance parameters and transfer rates for low pass and bandpass symbol under ideal and corrupted non band limited channels	
	CO310.3	Test and validate symbol processing and performance parameters at the receiver under ideal and corrupted bandlimited channels	
	CO310.4	Demonstrate that bandpass signals subjected to corruption and dis tortion in a bandlimited channel can be processed at the receiver to meet specified performance criteria	
	CO310.5	Understand the principles of spread spectrum communications	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO310.1	3	2	2	-	-	-	-	-	-	-	-	-	3	-
CO310.2	3	3	2	-	-	-	-	-	-	-	-	-	2	-
CO310.3	3	1	2	-	-	-	-	-	-	-	-	-	2	-
CO310.4	2	3	1	-	-	-	-	-	-	-	-	-	3	-
CO310.5	3	2	-	-	-	-	-	-	-	-	-	-	3	-
Achievable Value	**2.8**	**2.2**	**1.75**	-	-	-	-	-	-	-	-	-	**2.6**	-

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Serial No: 45	18EC62	Embedded Systems	Semester: 6
	Course Code:311	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO311.1	Describe the architectural features of 32 bit microcontroller ARM Cortex M3	
	CO311.2	Describe the instruction set of 32 bit microcontroller ARM Cortex M3 and apply the knowledge gained for Programming ARM Cortex M3 for different applications.	
	CO311.3	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.	
	CO311.4	Develop the hardware software co-design and firmware design approaches	
	CO311.5	Explain the need of real time operating system for embedded system applications	

Course Outcome to PO and PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO311.1	3	3	-	-	-	-	-	-	-	-	-	1	2	-
CO311.2	2	2	2	-	-	-	-	-	-	-	-	1	2	-
CO311.3	1	1	-	-	-	-	-	-	-	-	-	1	2	-
CO311.4	1	1	2	-	-	-	-	-	-	-	-	1	2	-
CO311.5	3	2	-	-	-	-	-	-	-	-	-	1	2	-
Achievable Value	2	1.8	2	-	-	-	-	-	-	-	-	1	2	-

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Serial No: 46	18EC63	Microwave & Antennas	Semester: 6
	Course Code:312	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO312.1	Describe the use and advantages of microwave transmission	
	CO312.2	Analyze various parameters related to microwave transmission lines and waveguides	
	CO312.3	Identify microwave devices for several applications	
	CO312.4	Analyze various antenna parameters necessary for building an RF system	
	CO312.5	Recommend various antenna configurations according to the applications	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO312.1	2		2	1	-	-	-	-	-	-	-	-	3	3
CO312.2	2	1		2	-	-	-	-	-	-	-	-	2	2
CO312.3	1		2	3	-	-	-	-	-	-	-	-	2	2
CO312.4	-	-	3	2	2	-	-	-	-	-	-	-	2	1
CO312.5	-	-	2	3	-	-	-	-	-	-	-	-	2	1
Achievable Value	**1.67**	**1**	**2.25**	**2.2**	**2**	-	-	-	-	-	-	-	**2.2**	**1.8**

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Serial No: 47	18EC641	Operating System	Semester: 6
	Course Code:313	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO313.1	Explain the goals, structure, operation and types of operating systems.	
	CO313.2	Apply scheduling techniques to find performance factors.	
	CO313.3	Explain organization of file systems and IOCS.	
	CO313.4	Apply suitable techniques for contiguous and non-contiguous memory allocation.	
	CO313.5	Describe message passing, deadlock detection and prevention methods.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO313.1	2	2	1	1	3	-	1	-	1	1	2	-	3	1
CO313.2	3	2	2	2	1	-	-	-	-	1	1	1	3	1
CO313.3	2	2	1	2	2	-	1	-	-	2	1	-	3	2
CO313.4	2	2	1	2	2	-	1	-	1	1	-	-	2	1
CO313.5	2	2	1	2	1	-	-	-	1	-	1	-	2	1
Achievable Value	**2.2**	**2**	**1.2**	**1.8**	**1.8**	**-**	**1**	**-**	**1**	**1.25**	**1.25**	**1**	**2.6**	**1.2**

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Serial No: 48	18EC644	Digital System Design using Verilog	Semester: 6
	Course Code:314	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO314.1	Construct the combinational circuits, using discrete gates and programmable logic devices.	
	CO314.2	Describe how arithmetic operations can be performed for each kind of code, and also combinational circuits that implement arithmetic operations.	
	CO314.3	Design a semiconductor memory for specific chip design.	
	CO314.4	Design embedded systems using small microcontrollers, larger CPUs/DSPs, or hard or soft processor cores.	
	CO314.5	Synthesize different types of I/O controllers that are used in embedded system.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO314.1	2	2	1	3	3	-	1	-	2	2	2	1	3	2
CO314.2	2	2	2	3	2	-	-	-	-	1	1	1	3	2
CO314.3	2	2	1	2	2	-	1	-	-	2	1	-	3	2
CO314.4	2	2	1	2	2	-	1	-	1	1	-	-	2	1
CO314.5	2	2	1	2	1	-	-	-	1	-	1	-	2	1
Achievable Value	**2**	**2**	**1.2**	**2.4**	**2**	**-**	**1**	**-**	**1.33**	**1.5**	**1.25**	**1**	**2.6**	**1.6**

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Serial No: 49	18ECL66	Embedded Systems Laboratory	Semester: 6
	Course Code:315	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO315.1	Understand the instruction set of 32 bit microcontroller ARM Cortex M3, and the software tool required for programming in Assembly and C language.	
	CO315.2	Develop assembly language programs using ARM Cortex M3 for different applications.	
	CO315.3	Interface external devices and I/O with ARM Cortex M3.	
	CO315.4	Develop C language programs and library functions for embedded system applications.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO315.1	2	2	2	-	-	-	-	-	-	-	-	-	3	3
CO315.2	3	3	2	2	-	-	-	-	2	-	-	-	3	2
CO315.3	2	2	2	2	-	-	-	-	2	-	-	-	3	2
CO315.4	3	3	-	3	-	-	-	-	2	-	-	-	2	2
Achievable Value	**2.5**	**2.5**	**2**	**2.33**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**2.75**	**2.25**

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Serial No: 50	18ECL67	Communication Laboratory	Semester: 6
	Course Code:316	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO316.1	Design and test circuits for analog modulation and demodulation schemes viz., AM, FM, etc.	
	CO316.2	Determine the characteristics and response of microwave waveguide.	
	CO316.3	Determine characteristics of microstrip antennas and devices & compute the parameters associated with it.	
	CO316.4	Design and test the digital and analog modulation circuits and display the waveforms.	
	CO316.5	Simulate the digital modulation systems and compare the error performance of basic digital modulation schemes.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO316.1	3	2	-	-	-	-	-	-	-	-	-	-	2	
CO316.2	3	2	-	-	-	-	-	-	-	-	-	-	2	2
CO316.3	2	2	3	2	-	-	-	-	-	-	-	-	2	2
CO316.4	-	2	-	3	-	-	-	-	-	-	-	-	2	-
CO316.5	2	2	3		-	-	-	-	-	-	-	-	2	2
Achievable Value	**2.5**	**2**	**3**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**2**

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Serial No: 51	18ECMP68	Mini Project	Semester: 6
	Course Code:317	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO317.1	Identify the problem by applying acquired knowledge.	
	CO317.2	Analyze and categorize executable project modules after considering risks.	
	CO317.3	Choose efficient tools for designing project modules.	
	CO317.4	Combine all the modules through effective team work after efficient testing.	
	CO317.5	Elaborate the completed task and compile the project report.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO317.1	3	3	-	1	-	-	1	2	3	-	-	-	-	-
CO317.2		3	2	3		3	1		3	3		2	3	2
CO317.3	-	-	3	3	3			3	3	3	1	2	3	3
CO317.4	-	-	-	-	-	-	3	3	3	3	2	3	2	2
CO317.5	-	-	-	-	-	-	-	-	3	3	-	3	2	2
Achievable Value	**3**	**3**	**2.5**	**2.33**	**3**	**3**	**1.67**	**2.7**	**3**	**3**	**1.5**	**2.5**	**2.5**	**2.25**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 52	18EC71	Computer Networks	Semester: 7
	Course Code:401	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO401.1	Understand the concepts of networking thoroughly.	
	CO401.2	Describe the various networking architectures.	
	CO401.3	Identify the protocols and services of different layers.	
	CO401.4	Distinguish the basic network configurations and standards associated with each network.	
	CO401.5	Analyze a simple network and measurement of its parameters.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO401.1	3	1	-	-	-	2	2	2	1	-	-	3	-	2
CO401.2	2	2	-	-	-	3	2	2	2	1	-	3	-	2
CO401.3	2	3	1	1	-	3	3	2	2	1	-	3	-	3
CO401.4	1	2	-	-	-	3	3	2	2	1	-	3	-	2
CO401.5	1	3	2	2	-	3	3	2	3	1	-	3	2	3
Achievable Value	**1.8**	**2.2**	**1.5**	**1.5**	**-**	**2.8**	**2.6**	**2**	**2**	**1**	**-**	**3**	**2**	**2.4**

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Serial No: 53	18EC72	VLSI Design	Semester: 7
	Course Code:402	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO402.1	Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and technology scaling	
	CO402.2	Draw the basic gates using the stick and layout diagrams with the knowledge of physical design aspects.	
	CO402.3	Demonstrate ability to design Combinational, sequential and dynamic logic circuits as per the requirements	
	CO402.4	Interpret Memory elements along with timing considerations	
	CO402.5	Interpret testing and testability issues in VLSI Design	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO402.1	3	2	2	-	-	-	-	-	-	-	-	-	-	-
CO402.2	2	3	2	2	-	-	-	-	-	-	-	-	2	2
CO402.3	3	2	2	2	-	-	-	-	-	-	-	-	-	3
CO402.4	2	3	2	-	-	-	-	-	-	-	-	-	2	-
CO402.5	2	2	-	-	-	-	-	-	-	-	-	-	-	2
Achievable Value	**2.4**	**2.4**	**2**	**2**									**2**	**2.33**

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Serial No: 54	18EC731	Real Time System	Semester: 7
	Course Code:403	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO403.1	Explain the fundamentals of Real time systems and its classifications	
	CO403.2	Understand the concepts of computer control and the suitable computer hardware requirements for real time applications.	
	CO403.3	Describe the operating system concepts and techniques required for real time systems	
	CO403.4	Develop the software algorithms using suitable languages to meet Real time applications	
	CO403.5	Apply suitable methodologies to design and develop Real-Time Systems.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO403.1	2	-	3	-	-	-	-	-	-	-	-	-	-	2
CO403.2	-	-	2	-	3	-	-	-	-	3	-	-	-	-
CO403.3	-	-	-	-		-	1	2		3	-	1	-	-
CO403.4	-	-	-	-	2	-	-	-	-	-	-		-	-
CO403.5	-	-	-	-	2	-	-	-	-	-	-	3	-	-
Achievable Value	2	-	2.5	-	2.33	-	1	2	-	3	-	2	-	2

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 55	18EC733	Digital Image Processing	Semester: 7
	Course Code:404	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO404.1	Describe the fundamentals of digital image processing.	
	CO404.2	Understand image formation and the role human visual system plays in perception of gray and color image data.	
	CO404.3	Apply image processing techniques in both the spatial and frequency (Fourier) domains.	
	CO404.4	Design and evaluate image analysis techniques.	
	CO404.5	Conduct independent study and analysis of Image Enhancement and restoration techniques.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO404.1	2	-	-	-	-	-	-	-	-	-	-	-	-	1
CO404.2	2	1	-	-	-	-	-	-	-	-	-	-	-	1
CO404.3	2	3	-	-	3	2	-	-	3	1	-	2	-	2
CO404.4	1	2	3	-	3	-	-	-	3	1	-	1	-	3
CO404.5	1	2	1	-	3	2	-	-	3	1	-	2	-	3
Achievable Value	**1.6**	**2**	**2**	**-**	**3**	**2**	**-**	**-**	**3**	**1**	**-**	**1.67**	**-**	**2**

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Serial No: 56	18ECL76	Computer Networks Lab	Semester: 7
	Course Code:406	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO406.1	Use the network simulator for learning and practice of networking algorithms	
	CO406.2	Illustrate the operations of network protocols and algorithms using C programming.	
	CO406.3	Simulate the network with different configurations to measure the performance parameters.	
	CO406.4	Implement the data link and routing protocols using C programming	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO406.1	2	-	-	-	-	-	-	-	-	-	-	-	3	-
CO406.2	3	3	3	-	-	-	-	-	-	-	-	-	2	-
CO406.3	3	2	3	3	3	-	-	-	-	-	-	-	2	-
CO406.4	3	2	3	3	2	-	-	-	-	-	-	-	3	-
Achievable Value	**2.75**	**2.33**	**3**	**3**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.5**	**-**

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Serial No: 57	18ECL77	VLSI Laboratory	Semester: 7
	Course Code:407	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO407.1	Write test bench to simulate various digital circuits.	
	CO407.2	Interpret concepts of DC Analysis, AC Analysis and Transient Analysis in analog circuits.	
	CO407.3	Design and simulate basic CMOS circuits like inverter, common source amplifier and differential amplifiers.	
	CO407.4	Use basic amplifiers and further design higher level circuits like operational amplifier and analog/digital converters to meet desired parameters.	
	CO407.5	Use transistors to design gates and further using gates realize shift registers and adders to meet desired parameters.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO407.1	3	3	-	-	-	-	-	-	1	-	2	-	2	2
CO407.2	-	-	3		3	-	-	-	3	-	-	-	2	2
CO407.3			3	-	-	-	-	-	-	-	-	-		-
CO407.4	2	-	-	-	2	-	-	-		-	-	-	2	1
CO407.5	3	3	-	-	-	-	-	-	3	-	1	-	2	-
Achievable Value	**2.67**	**3**	**3**	**-**	**2.5**	**-**	**-**	**-**	**2.33**	**-**	**1.5**	**-**	**2**	**1.67**

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Serial No: 58	18ECP78	Project work Phase -1	Semester: 7
	Course Code:408	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO408.1	Identify the problem by applying acquired knowledge.	
	CO408.2	Analyze and categorize executable project modules after considering risks.	
	CO408.3	Choose efficient tools for designing project modules.	
	CO408.4	Combine all the modules through effective team work after efficient testing.	
	CO408.5	Elaborate the completed task and compile the project report.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO408.1	3	3		1	-	-	1	2	3	-	-	-	-	-
CO408.2	-	3	2	3		3	1		3	3	-	2	3	2
CO408.3	-	-	3	3	3			3	3	3	1	2	3	3
CO408.4	-	-	-	-	-	-	3	3	3	3	2	3	2	2
CO408.5	-	-	-	-	-	-	-	-	3	3	-	3	2	2
Achievable Value	**3**	**3**	**2.5**	**2.33**	**3**	**3**	**1.67**	**2.67**	**3**	**3**	**1.5**	**2.5**	**2.5**	**2.25**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 59	18EC81	Wireless and Cellular Communication	Semester: 8
	Course Code:409	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO409.1	Understand the basics of LTE standardization phases and specifications	
	CO409.2	Explain the system architecture of LTE and E-UTRAN, the layer of LTE, based on the use of OFDMA and SC-FDMA principles.	
	CO409.3	Analyze the role of LTE radio interface protocols to set up, reconfigure and release the Radio Bearer, for transferring the EPS bearer.	
	CO409.4	Analyze the main factors affecting LTE performance including mobile speed	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO409.1	2	3	3	-	-	-	-	-	-	-	-	3	-	-
CO409.2	3	2	2	-	-	-	-	-	-	-	-		-	-
CO409.3	-	3	-	3	-	-	-	-	-	-	-	-	-	-
CO409.4	3	-	3	3	-	2	-	-	-	-	-		-	-
Achievable Value	**2.67**	**2.67**	**2.67**	**3**	-	**2**	-	-	-	-	-	**3**	-	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 60	18EC822	Micro Electro Mechanical Systems	Semester: 8
	Course Code:410	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO410.1	Appreciate the technologies related to Micro Electro Mechanical Systems.	
	CO410.2	Understand design and fabrication processes involved with MEMS Devices.	
	CO410.3	Analyze the MEMS devices and develop suitable mathematical models. Know various application areas for MEMS device	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO410.1	2	-	2	-	-	-	-	-	-	-	-	-	-	-
CO410.2	-	-	3	2	-	1	-	-	-	2	-	-	-	-
CO410.3	-	-	-	-	2	-	2	2	-	2	-	-	2	-
Achievable Value	2	-	2.5	2	2	1	2	2	-	2	-	-	2	-

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Serial No: 61	18EC824	Optical Communication Networks	Semester: 8
	Course Code:411	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO411.1	Classification and working of optical fiber with different modes of signal propagation.	
	CO411.2	Describe the transmission characteristics and losses in optical fiber communication	
	CO411.3	Describe the construction and working principle of optical connectors, multiplexers and amplifiers.	
	CO411.4	Describe the constructional features and the characteristics of optical Sources and detectors.	
	CO411.5	Illustrate the networking aspects of optical fiber and describe various standards associated with it.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO411.1	2	-	-	2	-	-	-	-	-	-	-	-	3	3
CO411.2	-	2	-	-	2	-	-	-	-	2	-	-	-	-
CO411.3	-	-	-	-	3	-	1	-	-	-	-	-	-	-
CO411.4	-	-	1	-	-	3	-	2	-	-	-	-	-	-
CO411.5	-	-	-	-	-	-	2	-	2		3	-	3	2
Achievable Value	2	2	1	2	2.5	3	1.5	2	2	2	3	-	3	2.5

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Serial No: 62	18ECP83	Project Work Phase -II	Semester: 8
	Course Code:412	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO412.1	Identify the problem by applying acquired knowledge.	
	CO412.2	Analyze and categorize executable project modules after considering risks.	
	CO412.3	Choose efficient tools for designing project modules.	
	CO412.4	Combine all the modules through effective team work after efficient testing.	
	CO412.5	Elaborate the completed task and compile the project report.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO412.1	3	3	-	1	-	-	1	2	3	-	-	-	-	-
CO412.2	-	3	2	3		3	1		3	3	-	2	3	2
CO412.3	-	-	3	3	3	-	-	3	3	3	1	2	3	3
CO412.4	-	-	-	-	-	-	3	3	3	3	2	3	2	2
CO412.5	-	-	-	-	-	-	-	-	3	3	-	3	2	2
Achievable Value	**3**	**3**	**2.5**	**2.33**	**3**	**3**	**1.67**	**2.7**	**3**	**3**	**1.5**	**2.5**	**2.5**	**2.25**

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Serial No: 63	18ECS84	Technical Seminar	Semester: 8
	Course Code:413	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO413.1	Identify the problem by applying acquired knowledge.	
	CO413.2	Analyze and categorize executable project modules after considering risks.	
	CO413.3	Choose efficient tools for designing project modules.	
	CO413.4	Combine all the modules through effective team work after efficient testing.	
	CO413.5	Elaborate the completed task and compile the project report.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO413.1	3	3	-	-	-	-	-	-	-	-	-	-	2	2
CO413.2	-	-	-	-	-	-	-	-	-	3	-	-	2	2
CO413.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO413.4	3	-	-	-	-	2	-	-	-	-	-	-	2	1
CO413.5	3	3	-	-	-	2	-	-	-	-	-	-	2	-
Achievable Value	**3**	**3**	-	-	-	**2**	-	-	-	**3**	-	-	**2**	**1.67**

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Serial No: 64	18ECI85	Internship	Semester: 8
	Course Code:414	Course Outcome	
	Course Outcomes	At the end of the course, students should be able to:	
	CO414.1	Identify the problem by applying acquired knowledge.	
	CO414.2	Analyze and categorize executable project modules after considering risks.	
	CO414.3	Choose efficient tools for designing project modules.	
	CO414.4	Combine all the modules through effective team work after efficient testing.	
	CO414.5	Elaborate the completed task and compile the project report.	
Course Outcome to PO and PSO Mapping:			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO414.1	3	-	3	-	-	-	3	3	-	1	-	-	-	-
CO414.2	3	3	3	3	3	3	-	2	-	1	-	-	-	-
CO414.3	3	3	3	3	3	2	-	-	-	2	-	-	-	-
CO414.4	1	-	-	-	-	-	3	-	-	3	-	-	-	-
CO414.5	3	-	-	3	-	-	3	-	-	-	-	-	-	-
Achievable Value	**2.6**	**3**	**3**	**3**	**3**	**2.5**	**3**	**2.5**	**-**	**1.75**	-	-	-	-

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