DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PROGRAMME: B.E. ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE OUTCOMES (COs)

Semester	01
Subject Code	HS3152
Subject Name	PROFESSIONAL ENGLISH I
Course Outcome	• To use appropriate words in a professional context • To gain understanding of basic grammatic structures and use them in right context. • To read and infer the denotative and connotative meanings of technical texts • To write definitions, descriptions, narrations and essays on various topics

CO's-PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	1	1	1	1	3	3	3	1	3	-	3	-	-	-
2	1	1	1	1	1	3	3	3	1	3	-	3	-	-	-
3	2	3	2	3	2	3	3	3	2	3	3	3	-	-	-
4	2	3	2	3	2	3	3	3	2	3	3	3	-	-	-
5	2	3	3	3	-	3	3	3	2	3	-	3	-	-	-
AVg.	**1.6**	**2.2**	**1.8**	**2.2**	**1.5**	**3**	**3**	**3**	**1.6**	**3**	**3**	**3**	**-**	**-**	**-**

1 - low, 2 - medium, 3 - high, '-' - no correlation

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E-Box Colleges

Semester	01
Subject Code	MA3151
Subject Name	MATRICES AND CALCULUS
Course Outcome	• Use the matrix algebra methods for solving practical problems. Apply differential calculus tools in solving various application problems. • Able to use differential calculus ideas on several variable functions. • Apply different methods of integration in solving practical problems. • Apply multiple integral ideas in solving areas, volumes and otherpractical problems.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO2	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO3	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO4	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO5	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
Avg	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-

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Semester	01
Subject Code	PH3151
Subject Name	ENGINEERING PHYSICS
Course Outcome	• Understand the importance of mechanics. • Express their knowledge in electromagnetic waves. • Demonstrate a strong foundational knowledge in oscillations, optics and lasers. • Understand the importance of quantum physics. • Comprehend and apply quantum mechanical principles towards the formation of energy bands.

CO	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	1	1	1	-	-	-	-	-	-	-	-	-
2	3	3	2	1	2	1	-	-	-	-	-	-	-	-	-
3	3	3	2	2	2	1	-	-	-	-	-	1	-	-	-
4	3	3	1	1	2	1	-	-	-	-	-	-	-	-	
5	3	3	1	1	2	1	-	-	-	-	-	-	-	-	-
AV	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-	-	-

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Sem	01
Subject Code	CY3151
Subject Name	ENGINEERING CHEMISTRY
Course Outcome	• To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water. • To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications. • To apply the knowledge of phase rule and composites for material selection requirements. • To recommend suitable fuels for engineering processes and applications. • To recognize different forms of energy resources and apply them for suitable applications in energy sectors.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	1	-	1	1	-	-	-	-	1	-	-	-
2	2	-	-	1	-	2	2	-	-	-	-	-	-	-	-
3	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
4	3	1	1	-	-	1	2	-	-	-	-	-	-	-	-
5	3	1	2	1	-	2	2	-	-	-	-	2	-	-	-
CO	**2.8**	**1.3**	**1.6**	**1**	**-**	**1.5**	**1.8**	**-**		**-**	**-**	**1.5**	**-**	**-**	**-**

Sem	01
Subject Code	GE3151
Subject Name	PROBLEM SOLVING AND PYTHON PROGRAMMING
Course Outcome	• Develop algorithmic solutions to simple computational problems. • Develop and execute simple Python programs. • Write simple Python programs using conditionals and loops for solving problems. • Decompose a Python program into functions. • Represent compound data using Python lists, tuples, dictionaries etc. • Read and write data from/to files in Python programs.

CO's	PO's												PSO's	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	3	3	2	-	-	-	-	-	2	2	3	3
2	3	3	3	3	2	-	-	-	-	-	2	2	3	-
3	3	3	3	3	2	-	-	-	-	-	2	-	3	-
4	2	2	-	2	2	-	-	-	-	-	1	-	3	-
5	1	2	-	-	1	-	-	-	-	-	1	-	2	-
6	2	2	-	-	2	-	-	-	-	-	1	-	2	-
AVg.	2	3	3	3	2	-	-	-	-	-	2	2	3	3

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E-Box Colleges

Sem	01
Subject Code	GE3171
Subject Name	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
Course Outcome	• Develop algorithmic solutions to simple computational problems • Develop and execute simple Python programs. • Implement programs in Python using conditionals and loops for solving problems.. • Deploy functions to decompose a Python program. • Process compound data using Python data structures. • Utilize Python packages in developing software applications.

CO's	PO's												PSO's	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	3	3	3	-	-	-	-	-	3	2	3	3
2	3	3	3	3	3	-	-	-	-	-	3	2	3	-
3	3	3	3	3	2	-	-	-	-	-	2	-	3	-
4	3	2	-	2	2	-	-	-	-	-	1	-	3	-
5	1	2	-	-	1	-	-	-	-	-	1	-	2	-
6	2	-	-	-	2	-	-	-	-	-	1	-	2	-
AVg.	2	3	3	3	2	-	-	-	-	-	2	2	3	3

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Sem	01
Subject Code	BS3171
Subject Name	PHYSICS LABORATORY
Course Outcome	• Understand the functioning of various physics laboratory equipment. • Use graphical models to analyze laboratory data. • Use mathematical models as a medium for quantitative reasoning and describing physical reality. • Access, process and analyze scientific information. • Solve problems individually and collaboratively.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
2	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
3	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
4	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
5	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
AVG	3	2.4	2.6	1	1										

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Sem	01
Subject Code	BS3171
Subject Name	CHEMISTRY LABORATORY
Course Outcome	• To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO. • To determine the amount of metal ions through volumetric and spectroscopic techniques • To analyse and determine the composition of alloys. • To learn simple method of synthesis of nanoparticles • To quantitatively analyse the impurities in solution by electroanalytical techniques

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	-	1	-	-	2	2	-	-	-	-	2	-	-	-
2	3	1	2	-	-	1	2	-	-	-	-	1	-	-	-
3	3	2	1	1	-	-	1	-	-	-	-	-	-	-	-
4	2	1	2	-	-	2	2	-	-	-	-	-	-	-	-
5	2	1	2	-	1	2	2	-	-	-	-	1	-	-	-
Avg.	2.6	1.3	1.6	1	1	1.4	1.8	-	-	-	-	1.3	-	-	-

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Sem	02
Subject Code	GE3172
Subject Name	ENGLISH LABORATORY
Course Outcome	• To listen to and comprehend general as well as complex academic information • To listen to and understand different points of view in a discussion • To speak fluently and accurately in formal and informal communicative contexts • To describe products and processes and explain their uses and purposes clearly and accurately • To express their opinions effectively in both formal and informal discussions

CO	PO												PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
2	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
3	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
4	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
5	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
AVg.	**3**	**3**	**3**	**3**	**1**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**-**

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Sem	02
Subject Code	HS3252
Subject Name	PROFESSIONAL ENGLISH - II
Course Outcome	• To compare and contrast products and ideas in technical texts.
	• To identify and report cause and effects in events, industrial processes through technical texts
	• To analyse problems in order to arrive at feasible solutions and communicate them in the written format.
	• To present their ideas and opinions in a planned and logical manner
	• To draft effective resumes in the context of job search.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
2	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
3	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
4	3	3	3	3	2	3	3	3	2	3	3	3	-	-	-
5	-	-	-	-	-	-	-	-	3	3	3	3	-	-	-
AVg.	3	3	3	3	2.75	3	3	3	2.2	3	3	3	-	-	-

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Sem	02
Subject Code	MA3251
Subject Name	STATISTICS AND NUMERICAL METHODS
Course Outcome	• Apply the concept of testing of hypothesis for small and large samples in real life problems. • Apply the basic concepts of classifications of design of experiments in the field of agriculture. • Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems. • Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations. • Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
CO2	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
CO3	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
CO4	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
CO5	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
Avg	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-

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Sem	02
Subject Code	PH3254
Subject Name	PHYSICS FOR ELECTRONICS ENGINEERING
Course Outcome	- Know basics of crystallography and its importance forvaried materials properties - Gain knowledge on the electrical and magneticproperties of materials and their applications - Understand clearly of semiconductor physics andfunctioning of semiconductor devices - Understand the optical properties of materials andworking principles of various optical devices appreciate the importance of nanotechnology and nanodevices.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-
2	3	2	1	2	-	2	-	-	-	-	-	-	-	-	-
3	3	2	2	-	2	-	-	-	-	-	-	-	-	-	-
4	3	-	1	-	3	2	3	-	-	-	-	1	-	-	-
5	3	-	2	1	-	2	-	-	-	-	-	1	-	-	-
AVG	3	2	1.4	1.5	2.5	2	3					1			

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Sem	02
Subject Code	BE3254
Subject Name	ELECTRICAL AND INSTRUMENTATION ENGINEERING
Course Outcome	• Explain the working principle of electrical machines • Analyze the output characterizes of electrical machines • Choose the appropriate electrical machines for various applications • Explain the types and operating principles of measuring instruments • Explain the basic power system structure and protection schemes

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

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E-Box Colleges

Sem	02
Subject Code	GE3251
Subject Name	ENGINEERING GRAPHICS
Course Outcome	• Use BIS conventions and specifications for engineering drawing. Construct the conic curves, involutes and cycloid. • Solve practical problems involving projection of lines. • Draw the orthographic, isometric and perspective projections of simple solids. • Draw the development of simple solids.

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

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Sem	02
Subject Code	EC3251
Subject Name	CIRCUIT ANALYSIS
Course Outcome	• Apply the basic concepts of circuit analysis such as Kirchoff's laws, mesh current and node voltage method for analysis of DC and AC circuits. • Apply suitable network theorems and analyze AC and DC circuits • Analyze steady state response of any R, L and C circuits • Analyze the transient response for any RC, RL and RLC circuits and frequency response of parallel and series resonance circuits. • Analyze the coupled circuits and network topologies

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

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Sem	02
Subject Code	GE3271
Subject Name	ENGINEERING PRACTICES LABORATORY
Course Outcome	• Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work. • Wire various electrical joints in common household electrical wire work. • Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work. • Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.

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

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Sem	02
Subject Code	EC3271
Subject Name	CIRCUIT ANALYSIS LABORATORY
Course Outcome	• Design RL and RC circuits. • Verify Thevinin & Norton theorem KVL & KCL, and Super Position Theorems.

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

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E-Box Colleges

Sem	02
Sub Code	GE3272
Sub Name	COMMUNICATION LABORATORY
Course Outcome	• Speak effectively in group discussions held in formal/semi formal contexts. • Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions • Write emails, letters and effective job applications. • Write critical reports to convey data and information with clarity and precision • Give appropriate instructions and recommendations for safe execution of tasks

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	3	3	3	1	3	3	3	3	3	3	3	-	-	-
2	2	3	3	3	1	3	3	3	3	3	3	3	-	-	-
3	2	2	3	3	1	3	3	3	3	3	3	3	-	-	-
4	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-
5	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-
AVg.	**2.4**	**2.8**	**3**	**3**	**1.8**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**-**

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E-Box Colleges

Sem	03
Sub Code	MA3355
Sub Name	RANDOM PROCESSES AND LINEAR ALGEBRA
Course Outcome	• Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts. • Demonstrate accurate and efficient use of advanced algebraic techniques. • Apply the concept of random processes in engineering disciplines. • Understand the fundamental concepts of probability with a thorough knowledge of standard distributions that can describe certain real-life phenomenon. • Understand the basic concepts of one and two dimensional random variables and applythem to model engineering problems

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	0	0	0	0	0	0	3	0	0	2	-	-	-
CO2	3	3	0	0	0	0	0	0	3	0	0	2	-	-	-
CO3	3	3	0	0	0	0	0	0	3	0	0	2	-	-	-
CO4	3	3	0	0	0	0	0	0	3	0	0	2	-	-	-
CO5	3	3	0	0	0	0	0	0	3	0	0	2	-	-	-
CO6	3	3	0	0	0	0	0	0	3	0	0	2	-	-	-

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E-Box
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Sem	03
Sub Code	CS3353
Sub Name	C PROGRAMMING AND DATA STRUCTURES
Course Outcome	• Develop C programs for any real world/technical application. • Apply advanced features of C in solving problems. • Write functions to implement linear and non–linear data structure operations. • Suggest and use appropriate linear/non–linear data structure operations for solving a given problem. • Appropriately use sort and search algorithms for a given application. • Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.

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

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E-Box Colleges

Sem	03
Sub Code	EC3354
Sub Name	SIGNALS AND SYSTEMS
Course Outcome	• Determine if a given system is linear/causal/stable • Determine the frequency components present in adeterministic signal • Characterize continuous LTI systems in the time domain andfrequency domain • Characterize discrete LTI systems in the time domain andfrequency domain • Compute the output of an LTI system in the time and frequency domains

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

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E-Box Colleges

Sem	03
Sub Code	EC3353
Sub Name	ELECTRONIC DEVICES AND CIRCUITS
Course Outcome	• Explain the structure and working operation of basic electronic devices. • Design and analyze amplifiers. • Analyze frequency response of BJT and MOSFET amplifiers • Design and analyze feedback amplifiers and oscillator principles. • Design and analyze power amplifiers and supply circuits

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
1	3	3	3	3	2	1	-	-	-	-	-	1	2	1	1
2	3	2	2	3	2	2	-	-	-	-	-	1	2	1	1
3	3	3	3	2	1	2	-	-	-	-	-	1	2	1	1
4	3	3	2	3	2	2	-	-	-	-	-	1	2	1	1
5	3	2	3	2	2	1	-	-	-	-	-	1	2	1	1
CO	**3**	**3**	**3**	**3**	**2**	**2**	-	-	-	-	-	**1**	**2**	**1**	**1**

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E-Box Colleges

Sem	03
Sub Code	EC3351
Sub Name	CONTROL SYSTEMS
Course Outcome	• Compute the transfer function of different physical systems. • Analyse the time domain specification and calculate the steady state error. • Illustrate the frequency response characteristics of open loop and closed loop system response. • Analyse the stability using Routh and root locus techniques. • Illustrate the state space model of a physical system and discuss the concepts of sampled data control system.

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

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Sem	03
Sub Code	EC3352
Sub Name	DIGITAL SYSTEMS DESIGN
Course Outcome	• Use Boolean algebra and simplification procedures relevant to digital logic. • Design various combinational digital circuits using logic gates. • Analyse and design synchronous sequential circuits. • Analyse and design asynchronous sequential circuits. • Build logic gates and use programmable devices

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2	-	2	-	-	-	-	3	3	3	3	2
2	-	-	-	-	-	-	-	-	-	-	2	1	2	3	2
3	-	3	3	2	-	2	-	-	-	-	2	2	3	3	2
4	-	-	-	-	-	-	-	-	-	-	3	2	2	3	1
5	-	3	3	3	-	-	-	-	-	-	2	2	3	3	2
CO	3	2.6	2.6	2.3	-	2	-	-	-	-	2	2	3	3	2

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Sem	03
Sub Code	EC3361
Sub Name	ELECTRONIC DEVICES AND CIRCUITS LABORATORY
Course Outcome	• Characteristics of PN Junction Diode and Zener diode. • Design and Testing of BJT and MOSFET amplifiers. • Operation of power amplifiers.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	2	3	3	2	1	-	-	-	-	-	1	2	1	1
2	2	2	3	3	2	1	-	-	-	-	-	1	2	1	1
3	2		2		1	1	-	-	-	-	-	1	2	1	1
4	-	-	-	-	3	1	-	-	-	-	-	1	2	1	1
5	-	-	-	-	2	1	-	-	-	-	-	1	2	1	1
CO	**2**	**2**	2.6	**3**	**2**	**1**	-	-	-	-	-	**1**	**2**	**1**	**1**

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Sem	03
Sub Code	CS3362
Sub Name	C PROGRAMMING AND DATA STRUCTURES LABORATORY
Course Outcome	• Use different constructs of C and develop applications • Write functions to implement linear and non-linear data structure operations • Suggest and use the appropriate linear / non-linear data structure operations for a given problem • Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval • Implement Sorting and searching algorithms for a given application

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

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E-Box Colleges

Sem	03
Sub Code	GE3361
Sub Name	PROFESSIONAL DEVELOPMENT
Course Outcome	- Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements - Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding - Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.

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Sem	04
Sub Code	EC3452
Sub Name	ELECTROMAGNETIC FIELDS
Course Outcome	• Relate the fundamentals of vector, coordinate system to electromagnetic concepts • Analyze the characteristics of Electrostatic field • Interpret the concepts of Electric field in material space and solve the boundary conditions • Explain the concepts and characteristics of Magneto Static field in material space and solve boundary conditions. • Determine the significance of time varying fields

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12
1	2	1	1	1	-	2	1	-	-	1	-	2
2	2	2	3	3	2	2	2	-	-	1	1	2
3	2	2	3	2	2	2	1	-	-	1	1	2
4	2	2	3	2	2	2	1	-	-	1	1	2
5	2	2	2	2	2	2	1	-	-	2	2	1
CO	**2**	**2**	**2**	**2**	**2**	**2**	**1**	-	-	**1**	**1**	**2**

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Sem	04
Sub Code	EC3401
Sub Name	NETWORKS AND SECURITY
Course Outcome	• Explain the Network Models, layers and functions. • Categorize and classify the routing protocols. • List the functions of the transport and application layer. • Evaluate and choose the network security mechanisms. • Discuss the hardware security attacks and countermeasures.

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E-Box Colleges

Sem	04
Sub Code	EC3451
Sub Name	LINEAR INTEGRATED CIRCUITS
Course Outcome	• Design linear and nonlinear applications of OP – AMPS • Design applications using analog multiplier and PLL • Design ADC and DAC using OP – AMPS • Generate waveforms using OP – AMP Circuits • Analyze special function ICs

C	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	PSO	PSO	PSO
1	2	-	-	-	-	-	-	-	-	-	1	-	2	1	1
2	2	3	3	2	-	-	-	-	-	-	-	-	2	1	1
3	1	-	-	2	-		-	-	-	-	-	-	2	1	1
4	1	-	-	2	-	-	-	-	-	-	-	-	2	1	1
5	1	2	3	3	-	-	-	-	-	-	-	3	2	1	1
C	1.4	2.5	3	2.2	-	-	-	-	-	-	1	3	2	1	1

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Sem	04
Sub Code	EC3492
Sub Name	DIGITAL SIGNAL PROCESSING
Course Outcome	• Apply DFT for the analysis of digital signals and systems • Design IIR and FIR filters • Characterize the effects of finite precision representation on digital filters • Design multirate filters • Apply adaptive filters appropriately in communication systems

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

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E-Box Colleges

Sem	04
Sub Code	EC3491
Sub Name	COMMUNICATION SYSTEMS
Course Outcome	• Gain knowledge in amplitude modulation techniques • Understand the concepts of Random Process to the design of communication systems • Gain knowledge in digital techniques • Gain knowledge in sampling and quantization • Understand the importance of demodulation techniques

CO	Pos											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	3	3	3	3	2	1	1	-	-	-	1	1
2	3	3	3	3	2	1	1	-	-	-	1	1
3	3	3	3	3	3	1	1	-	-	-	1	1
4	3	3	3	3	3	1	1	-	-	-	1	1
5	3	3	3	3	2	1	1	-	-	-	1	1
Avg	3	3	3	3	2.5	1	1	-	-	-	1	1

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Sem	04
Sub Code	GE3451
Sub Name	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY
Course Outcome	• To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation. • To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society. • To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations. • To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development. • To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	-	2	3	-	-	-	-	2	-	-	-
2	3	2	-	-	-	3	3	-	-	-	-	2	-	-	-
3	3	-	1	-	-	2	2	-	-	-	-	2	-	-	-
4	3	2	1	1	-	2	2	-	-	-	-	2	-	-	-
5	3	2	1	-	-	2	2	-	-	-	-	1	-	-	-
Avg.	2.8	1.8	1	1	-	2.2	2.4	-	-	-	-	1.8	-	-	-

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Sem	04
Sub Code	EC3461
Sub Name	COMMUNICATION SYSTEMS LABORATORY
Course Outcome	• Design AM, FM & Digital Modulators for specific applications. • Compute the sampling frequency for digital modulation. • Simulate & validate the various functional modules of Communication system. • Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes. • Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of Communication system.

CO	POs											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	3	3	3	3	3	3	-	-	-	1	1	1
2	3	3	3	3	3	2	-	-	-	1	1	1
3	3	3	3	3	3	2	-	-	-	1	1	1
4	3	3	3	3	3	3	-	-	-	1	1	1
5	3	3	3	3	3	2	-	-	-	1	1	1
Avg	3	3	3	3	3	2.5	-	-	-	1	1	1

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E-Box
Colleges

Sem	04
Sub Code	EC3462
Sub Name	LINEAR INTEGRATED CIRCUITS LABORATORY
Course Outcome	• Analyze various types of feedback amplifiers • Design oscillators, tuned amplifiers, wave-shaping circuits and multivibrators • Design and simulate feedback amplifiers, oscillators, tuned amplifiers,wave- shaping circuits and multivibrators, filters using SPICE Tool. • Design amplifiers, oscillators, D-A converters using operational amplifiers. • Design filters using op-amp and perform an experiment on frequency response

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	3	-	-	-	-	-	-	1	1
CO2	2	3	3	3	-	-	-	-	-	-	1	1
CO3	2	3	3	3	-	-	-	-	-	-	1	1
CO4	2	3	3	3	2	-	-	-	-	-	1	1
CO5	-	-	-	-	-	-	-	-	-	-	-	-
Avg	2	3	3	3	2	-	-	-	-	-	1	1

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E-Box Colleges

Sem	05
Sub Code	EC3501
Sub Name	WIRELESS COMMUNICATION
Course Outcome	• Understand The Concept And Design Of A Cellular System. • Understand Mobile Radio Propagation And Various Digital Modulation Techniques. • Understand The Concepts Of Multiple Access Techniques And Wireless Networks • Characterize a wireless channel and evolve the system design specifications • Design a cellular system based on resource availability and traffic demands.

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

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E-Box
Colleges

Sem	05
Sub Code	EC3552
Sub Name	VLSI AND CHIP DESIGN
Course Outcome	• In depth knowledge of MOS technology • Understand Combinational Logic Circuits and Design Principles • Understand Sequential Logic Circuits and Clocking Strategies • Understand Memory architecture and building blocks • Understand the ASIC Design Process and Testing.

C	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	PSO	PSO	PSO
1	1	1	-	-	-	-	-	-	-	-	-	-	3	3	3
2	3	2	3	2	-	-	-	-	-	-	-	1	3	3	3
3	2	3	2	3	1	1	-	-	-	-	-	2	3	2	3
4	-	-	1	1	-	-	-	-	-	-	-	3	3	3	2
5	-	-	-	-	-	2	-	-	-	-	1	-	3	2	2
Avg	2	2	2	2	1	1.5	-	-	-	-	1	2	3	3	3

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E-Box Colleges

Sem	05
Sub Code	EC3551
Sub Name	TRANSMISSION LINES AND RF SYSTEMS
Course Outcome	• Explain the characteristics of transmission lines and its losses. • Calculate the standing wave ratio and input impedance in high frequency transmission lines. • Analyze impedance matching by stubs using Smith Charts. • Comprehend the characteristics of TE and TM waves. • Design a RF transceiver system for wireless communication

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

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E-Box Colleges

Sem	05
Sub Code	CEC345
Sub Name	OPTICAL COMMUNICATION & NETWORKS
Course Outcome	• Realize Basic Elements In Optical Fibers, Different Modes And Configurations. • Analyze The Transmission Characteristics Associated With Dispersion And Polarization Techniques. • Design Optical Sources And Detectors With Their Use In Optical Communication System. • Construct Fiber Optic Receiver Systems, Measurements And Techniques. • Design Optical Communication Systems And Its Networks.

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

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E-Box Colleges

Sem	05
Sub Code	CEC352
Sub Name	SATELLITE COMMUNICATION
Course Outcome	• Identify the satellite orbits • Analyze the satellite subsystems • Evaluate the satellite link power budget • Identify access technology for satellite • Design various satellite applications

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

Sem	05
Sub Code	EC3561
Sub Name	VLSI LABORATORY
Course Outcome	• Write HDL code for basic as well as advanced digital integrated circuit • Import the logic modules into FPGA Boards • Synthesize Place and Route the digital Ips • Design, Simulate and Extract the layouts of Digital & Analog IC Blocks using EDA tools • Test and Verification of IC design

C	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	PSO	PSO	PSO
1	2	-	-	-	-	-	-	-	-	-	-	-	2	3	2
2	3	3	1	1	-	-	-	-	-	-	-	-	2	1	2
3	1	2	2	2	-	-	-	-	-	-	1	1	2	2	2
4	-	1	3	3	1	-	-	-	-	-	1	1	2	2	2
5	3	3	3	3	1	-	-	-	-	-	1	1	2	2	2
Avg	**2.2**	**2.2**	**2.2**	**2.2**	**1**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**2**	**2**	**2**

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Sem	05
Sub Code	CEC364
Sub Name	WIRELESS BROAD BAND NETWORKS
Course Outcome	• Design and implement the various protocols in wireless networks. • Analyze the architecture of 3G network standards. • Analyze the difference of LTE-A network design from 4G standard. • Design the interconnecting network functionalities by layer level functions. • Explore the current generation (5G) network architecture.

CO	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PSO 3
1	3	2	2	3	3	1	-	-	-	-	2	3	3	1	1
2	3	3	2	1	3	2	-	-	-	-	-	-	3	2	2
3	3	3	3	3	2	1	-	-	-	-	-	3	3	2	2
4	2	3	3	3	2	2	-	-	-	-	-	3	2	1	2
5	2	-	3	3	2	2	-	-	-	-	-	3	2	2	1
Avg	2.6	2.75	2.6	2.6	2.4	1.6	-	-	-	-	2	3	2.6	1.6	1.6

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E-Box
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Sem	06
Sub Code	ET3491
Sub Name	EMBEDDED SYSTEMS AND IOT DESIGN
Course Outcome	• Explain the architecture and features of 8051. • Develop a model of an embedded system. • List the concepts of real time operating systems. • Learn the architecture and protocols of IoT. • Design an IoT based system for any application.

C	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	PSO	PSO	PSO
1	3	3	3	2	2	-	-	-	-	-	-	-	3	2	1
2	3	3	3	2	2	-	-	-	-	-	-	-	3	2	1
3	3	3	2	2	2	-	-	-	-	-	-	-	2	1	1
4	3	3	2	2	2	-	-	-	-	-	-	-	3	3	2
5	3	3	3	3	3	-	-	-	-	-	-	-	3	3	2
Avg	3	3	2.6	2.2	2.2	-	-	-	-	-	-	-	2.8	2.2	1.4

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Sem	06
Sub Code	CS3491
Sub Name	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
Course Outcome	• Use appropriate search algorithms for problem solving • Apply reasoning under uncertainty • Build supervised learning models • Build ensembling and unsupervised models • Build deep learning neural network models

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

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Sem	06
Sub Code	CBM341
Sub Name	BODY AREA NETWORKS
Course Outcome	• Comprehend and appreciate the significance and role of this course in the present contemporary world. • Design a BAN for appropriate application in medicine. • Assess the efficiency of communication and the security parameters. • Understand the need for medical device regulation and regulations followed in various regions • Extend the concepts of BAN for medical applications.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	2	1	1	1	1	1	-	-	-	-	1	3	3	3
2	3	3	3	3	1	2	2	-	-	-	-	1	3	3	3
3	3	2	1	1	1	1	1	-	-	-	-	1	3	3	3
4	2	2	1	1	1	1	1	-	-	-	-	1	3	3	3
5	2	2	1	1	1	2	2	-	-	-	-	1	3	3	3
Avg	2.4	2.2	1.4	1.4	1	1.4	1.4	-	-	-	-	1	3	3	3

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E-Box Colleges

Sem	06
Sub Code	CEC348
Sub Name	REMOTE SENSING
Course Outcome	• To understand the principles of electromagnetic radiation. • To learn the atmospheric radiation interactions. • To study the laws of planetary motion. • To classify the different types of resolution. • To know the concepts of digital interpretation.

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

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Sem	06
Sub Code	CEC365
Sub Name	WIRELESS SENSOR NETWORK DESIGN
Course Outcome	• To be able to design solutions for WSNs applications • To be able to develop efficient MAC and Routing Protocols • To be able to design solutions for 6LOWPAN applications • To be able to develop efficient layered protocols in 6LOWPAN • To be able to use Tiny OS and Contiki OS in WSNs and 6LOWPAN applications

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	2	2	1	-	-	-	-	2	2	3	1	1
2	3	3	2	2	2	1	-	-	-	-	-	2	3	2	2
3	3	3	3	2	2	1	-	-	-	-	-	3	3	2	2
4	3	3	3	3	2	2	-	-	-	-	-	2	2	1	2
5	2	-	1	1	3	2	-	-	-	-	-	2	2	2	1
Avg	2.8	3	2.2	2	2.2	1.4	-	-	-	-	2	2.2	2.6	1.6	1.6