RAMIREDDY SUBBARAMI REDDY ENGINEERING COLLEGE

(Promoted by RAMIREDDY SUBBARAMI REDDY EDUCATIONAL TRUST)
Approved by AICTE & Affiliated to JNTUA
An ISO 9001:2015 Certified Institution

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE OUTCOMES (COS) OF ALL COURSES FRAMED UNDER

JNTUA-R19 REGULATION

INDEX

List of all courses in EEE, offered by the institution for the regulation R19, JNTUA

S.No	Course Code	Course Name	Year & Sem
1	19A54101	Algebra & Calculus	
2	19A56101T	Applied Physics	
3	19A05101T	Problem Solving & Programming	
4	19A52101T	Communicative English 1	
5	19A02101	Electrical & Electronics Engineering Workshop	I-I Sem
6	19A56101P	Applied Physics Lab	
7	19A05101P	Problem Solving & Programming Lab	
8	19A52101P	Communicative English 1 Lab	
9	19A01201T	Basic Civil & Mechanical Engineering	
10	19A54201	Differential Equations and Vector Calculus	
11	19A51102T	Chemistry	
12	19A05201T	Data Structures	
13	19A03101	Engineering Workshop	I-II Sem
14	19A03102	Engineering Graphics Lab	
15	19A01201P	Basic Civil & Mechanical Engineering Lab	
16	19A51102P	Chemistry Lab	
17	19A05201P	Data Structures Lab	
18	19A54302	Complex Variables & Transforms	
19	19A02301T	Basic Electrical Circuits	
20	19A02302	Power System Architecture	
21	19A02303T	DC Machines & Transformers	
22	19A04306T	Semiconductor Devices and Circuits	
23	19A04304	Digital Electronics and Logic Design	II-I Sem
24	19A02303P	DC Machines & Transformers Lab	
25	19A04306P	Semiconductor Devices and Circuits Lab	
26	19A02301P	Basic Electrical Circuits Lab	
27	19A99302	Biology For Engineers	
28	19A54401	Numerical Methods & Probability Theory	
29	19A02401T	Electrical Circuit Analysis	
30	19A02402	Engineering Electromagnetics	
31	19A02403	Power Electronics	II-II Sem
32	19A04405	Analog Electronic Circuits	
33	19A05304T	Python Programming	
34	19A52301	Universal Human Values	

S.No	Course Code	Course Name	Year & Sem
35	19A02401P	Electrical Circuit Analysis Lab	
36	19A04406	Electronic Circuits Lab	
37	19A99301	Environmental Science	
38	19A02501T	AC Machines	
39	19A02502	Control Systems	
40	19A52601T	English Language Skills	
41	19A02504	Electrical Machine Design	
42	19A02503a	HVDC and FACTS (Professional Elective-I)	
43	19A52506a	Technical Communication and Presentation Skills (Open Elective-I)	III-I Sem
44	19A02501P	AC Machines Lab	
45	19A52601P	English Language Skills Lab	
46	19A02506	Power Electronics & Simulation Laboratory	
47	19A02507	Socially Relevant Project	
48	19A99601	Research Methodology	
49	19A04301	Signals & Systems	
50	19A02601T	Digital Computer Platforms	
51	19A02602	Power System Analysis	
52	19A04703c	Introduction to Embedded System Design	
53	19A52604a	Soft Skills	
54	19A52602b	Managerial Economics And Financial Analysis (Humanities Elective-I)	III-II Sem
55	19A02605	Control Systems & Simulation Lab	
56	19A02601P	Digital Computer Platforms Lab	
57	19A02606	Socially Relevant Project	
58	19A99501	Constitution of India	
59	19A02701	Measurements & Sensors	
60	19A02702	Power System Protection	
61	19A02703a	Power System Operation & Control	
62	19A04704b	Principles of Digital Signal Processing	
63	19A52701b	Management Science	IV-I Sem
64	19A02705	Power Systems & Simulation Lab	
65	19A02706	Measurements Lab	
66	19A02707	Industrial Training/Skill Development/Research Project	
67	19A02801a	Electrical Distribution System Automation	
68	19A04802d	Electronic Instrumentation	IV-II Sem
69	19A02803	Project	

I B.Tech, I Sem EEE COs (R19-JNTUA)

Year& Sem	Course Code	Course Name	CO's	
I-I	19A54101	ALGEBRA & CALCULUS	4101.1	Develop the use of matrix algebra techniques that is needed by engineers for practical applications. (BTL6)
			4101.2	Utilize mean value theorems to real life problems. (BTL3)
			4101.3	Familiarize with functions of several variables which is useful in optimization. (BTL6)
			4101.4	Familiarize with 2- dimensional coordinate systems. (BTL2)
			4101.5	Learn the Utilization of special functions such as Beta and Gamma Functions. (BTL4)

Year& Sem	Course Code	Course Name	CO's	
I-I	19A56101T	APPLIED PHYSICS	6101T.1	Analyze the wave properties of light and the interaction of energy with the matter.(BTL2)
			6101T.2	Analyze electromagnetic wave propagation in different guided media. (BTL4)
			6101T.3	Illustrate the electromagnetic wave propagation and its power in different media (BTL4)
			6101T.4	Illustrate conductivity of semiconductors (BTL4)
			6101T.5	Distinguish between normal conductor and superconductor and the application of nano materials (BTL2)
			CO's	
I-I	19A05101T	PROBLEM SOLVING & PROGRAMMING	5101T.1	Discuss the fundamentals of computers and Introduction to Programming, Algorithms and Flowcharts(BTL2)
			5101T.2	Understanding computer problem solving and Fundamental algorithms(BTL2)
			5101T.3	Implement Types, Operators, and Expressions, Input and output, Control Flow, Functions and Program Structure(BTL2)
			5101T.4	Analyze the Factoring methods, Pointers and arrays(BTL3)
			5101T.5	Implement Sorting and Searching, Structures, programs ,Some other Features(BTL2)

I B.Tech, I Sem EEE COs (R19-JNTUA)

Year& Sem	Course Code	Course Name		CO's
I-I	19A52101T	COMMUNICATIVE ENGLISH 1	2101T.1	Identify the need for understanding context, topic and specific information from social and transactional dialogues spoken by native speakers of English language. (BTL-3)
			2101T.2	Apply rules of grammar for flawless writing and speaking with good vocabulary. (BTL-3)
			2101T.3	List discourse markers to speak clearly on a specific topic/occasion in various discussions. (BTL-4)
			2101T.4	Comprehend the texts after listening or reading and summarize them effectively. (BTL-2)
			2101T.5	Infer a table/chart/graph by writing a paragraph coherently. (BTL-2)
			CO's	
I-I	19A02101	ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP	2101.1	Able to demonstrate knowledge on different tools, abbreviations and symbols used in Electrical Engineering(BTL-2)
			2101.2	Able to measure different electrical quantities using measuring instruments (BTL-2)
			2101.3	Able to demonstrate how to trouble shoot the electrical equipments (like fan, grinder, motor, etc.) (BTL-2)
			2101.4	Able to do wiring and earthing for residential houses(BTL-2)

I B.Tech, I Sem EEE COs (R19-JNTUA)

Year& Sem	Course Code	Course Name		CO's
I-I	19A56101P	APPLIED PHYSICS LAB	6101P.1	Analyze different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fiber optics.(BTL2)
			6101P.2	Analyze important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction are focused along with defects in crystals and ultrasonic non-destructive techniques.(BTL4)
			6101P.3	Illustrate discrepancies between the classical estimates and laboratory observations of physical properties exhibited by materials would be lifted through the understanding of quantum picture of subatomic world. (BTL4)
			6101P.4	Illustrate the properties and device applications of semiconducting and magnetic materials are illustrated (BTL4)
			6101P.5	Design the importance of superconducting materials and nano materials along with their engineering applications are well elucidated. (BTL6)
CO's				
I-I	19A05101P	PROBLEM SOLVING AND PROGRAMMING LAB	5101P.1	Identify and setup program development environment(BTL2)
			5101P.2	Implement the algorithms using C programming language constructs(BTL2)
			5101P.3	Write programs that perform conditional , selection statements and Implement Programs with arrays and functions, strings(BTL2)
			5101P.4	Design the programs with pointers, structures(BTL2)
			5101P.5	Implement the sorting and linked list programs(BTL2)

Year& Sem	Course Code	Course Name		CO's
I-I	19A052101P	COMMUNICATIVE ENGLISH 1 LAB	2101P.1	Assess their proficiency by listening to audio and video materials to develop their listening, speaking, reading and writing skills. (BTL-5)
			2101P.2	Develop pronunciation, accent, stress, rhythm and all other aspects of the phonetics of a language for speaking and listening comprehension. (BTL-3)
			2101P.3	Understand the nuances of English language with a focus on removing the influence of the mother tongue while conversing. (BTL-2)
			2101P.4	Develop their communication skills and overcome the fear of public speaking by participating in GDs and role plays thereby make themselves employable. (BTL-3)
			2101P.5	Evaluate and demonstrate acceptable etiquette required in social and professional contexts. (BTL-5)

I B.Tech, II Sem EEE COs (R19-JNTUA)

Year& Sem	Course Code	Course Name		CO's
I-II	19A01201T	BASIC CIVIL & MECHANICAL ENGINEERING	1201T.1	Draw SFD and BMD for cantilever and Simply supported beams. (BTL1)
			1201T.2	Understand the working principles of electrical resistors and capacitors. (BTL2)
			1201T.3	Apply concepts of Rosetta analysis for strain measurements. (BTL3)
			1201T.4	Outline sources of energy, power plant economics, and environmental aspects (BTL2).
			1201T.5	Illustrate the working mechanism of Diesel and Gas turbine power plants (BTL2).
			1201T.6	Explain working of IC engines with combustion process (BTL2).

			CO's	
I-II	**19A54201**	**DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**	4201.1	Solve the linear differential equations with constant coefficients by appropriate method (BTL3)
			4201.2	Classify and interpret the solutions of Linear Differential equations (BTL4)
			4201.3	Apply a range of techniques to find solutions of standard PDEs (BTL3)
			4201.4	Interpret the physical meaning of different operators such as gradient, curl and divergence. (BTL2).
			4201.5	Estimate the work done against a field, circulation and flux using vector calculus. (BTL4)

Year& Sem	Course Code	Course Name	CO's	
I-II	**19A51102T**	**CHEMISTRY**	1102T.1	**Compare** the materials of construction for battery and electrochemical sensors (BTL2)
			1102T.2	**Explain** the preparation, properties, and applications of thermoplastics &thermosettings, elastomers & conducting polymers. (BTL2)
			1102T.3	**Explain** the principles of spectrometry, GC and HPLC in separation of gaseous and liquid mixtures (BTL2)
			1102T.4	**Apply** the principle of supramolecular chemistry in application of molecular machines and switches (BTL3)

			CO's	
I-II	**19A05201T**	**DATA STRUCTURES**	5201T.1	Apply the concept of arrays with asymptotic notations in building of different sorting technique. (BTL3)
			5201T.2	Analyze stacks, queues and linked list using dynamic memory allocation. (BTL4)
			5201T.3	Develop algorithms for trees and graphs(BTL4)
			5201T.4	Apply various graph traversal methods to applications &Design a hashing technique(BTL3)
			5201T.5	Organize data in the form of Files & Apply sorting on large amount of data(BTL3)

Year& Sem	Course Code	Course Name	CO's	
I-II	19A03101	ENGINEERING WORKSHOP	3101.1	Apply wood working skills in real world applications. (BTL 3)
			3101.2	Build different parts with metal sheets in real world applications. (BTL 3)
			3101.3	Apply fitting operations in various applications. (BTL 3)
			3101.4	Apply different types of basic electric circuit connections. (BTL 3)
			3101.5	Demonstrate soldering and brazing. (BTL 2)
			CO's	
I-II	19A03102	ENGINEERING GRAPHICS LAB	3102.1	Draw various curves applied in engineering. (BTL2)
			3102.2	How projections of solids and sections graphically. (BTL2)
			3102.3	Draw the development of surfaces of solids. (BTL3)
			3102.4	Use computers as a drafting tool. (BTL2)
			3102.5	Draw isometric and orthographic drawings using CAD packages. (BTL3)

I B.Tech, II Sem EEE COs (R19-JNTUA)

Year& Sem	Course Code	Course Name	CO's	
I-II	19A01201P	BASIC CIVIL & MECHANICAL ENGINEERING LAB	1201P.1	Explain different working cycles of engine. (BTL2)
			1201P.2	Illustrate the working of refrigeration systems. (BTL2)
			1201P.3	Evaluate heat balance sheet of IC engine. (BTL3)
CO's				
I-II	19A51102P	CHEMISTRY LAB	1102P.1	Discuss the MOT, Apply Schrodinger wave equation to H. (BTL3)
			1102P.2	Demonstrate the application of Fullerene, CNT and Nano particles(BTL2)
			1102P.3	Differentiate between pH metry, Potentiometry (BTL2)
			1102P.4	Discuss about solid, liquid, gaseous fuels (BTL2)
			1102P.5	Understand the principles of analytical instruments (BTL2)

Year& Sem	Course Code	Course Name	CO's	
I-II	19A05201P	DATA STRUCTURES LAB	5201P.1	Select the data structure appropriate for solving the problem (BTL5)
			5201P.2	Implement searching and sorting algorithms(BTL3)
			5201P.3	Design new data types(BTL6)
			5201P.4	Illustrate the working of stack and queue(BTL4)
			5201P.5	Organize the data in the form of files (BTL6)

				CO's	
II-I	**19A54302**	**COMPLEX VARIABLES & TRANSFORMS**	4302.1	Understand the analyticity of complex functions and conformal mappings. (BTL2)	
			4302.2	Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improper integrals along contours. (BTL3)	
			4302.3	Understand the usage of Laplace Transforms. (BTL2)	
			4302.4	Evaluate the Fourier series expansion of periodic functions. (BTL5)	
			4302.5	Understand the usage of Fourier Transforms and Z-transforms. (BTL2)	

Year& Sem	Course Code	Course Name	CO's	
II-I	**19A02301T**	**BASIC ELECTRICAL CIRCUITS**	2301T.1	Determine the equivalent impedance of given network by using network reduction techniques and determine the current, voltage and power in any element(BTL3)
			2301T.2	Explain basic graph theory definitions, loop and nodal methods of analysis of electrical circuits(BTL2)
			2301T.3	To understand voltage, current and power relationships in 1-ϕ AC circuits with basic elements R,L,C (BTL2)
			2301T.4	Apply the network theorems suitably(BTL3)
			2301T.5	Analyze 3-phase electrical circuits, understand the procedure of power measurement in 1-ph and 3-ph electrical circuits(BTL3)

				CO's	
II-I	**19A02302**	**POWER SYSTEM ARCHITECTURE**	2302.1	Remember and understand the concepts of conventional and nonconventional power generation [BTL1]	
			2302.2	Apply the economic aspects to the wind and solar power generating systems.[BTL3]	
			2302.3	Analyze the transmission lines and obtain the transmission line parameters and constants [BTL4]	
			2302.4	Analyze voltage regulation of transmission lines [BTL4]	
			2302.5	Describe principles of substation maintenance [BTL2]	

II B.Tech, I Sem EEE COs (R19-JNTUA)

Year& Sem	Course Code	Course Name		CO's
II-I	19A02303T	DC MACHINES & TRANSFORMERS	2303T.1	Understand about various magnetic materials, properties and applications, illustrate the principles of electromechanical energy conversion [BTL2]
			2303T.2	Able to understand the construction, operation and armature windings of a DC generator, analyze the characteristics of DC generators[BTL2]
			2303T.3	Gain Knowledge on Principle of DC motors, analyze the characteristics of DC motors, analyze speed control of DC motors, testing methods of DC machines[BTL2]
			2303T.4	Understand the construction, operation and parallel operation of transformer, predetermine the efficiency and regulation of a transformer [BTL2]
			2303T.5	Understand the principles of a three-phase transformer, analyze the phase conversions, Analyze the tap changing of transformers [BTL2]
CO's				
II-I	19A04306T	SEMICONDUCTOR DEVICES AND CIRCUITS	4306T.1	Understand the concepts of p-n junction as a diode and rectifier temperature dependence of diode characteristics. (BTL2)
			4306T.2	Apply the concepts of special purpose diodes and BJT characteristics.(BTL3)
			4306T.3	Analyze the concept of biasing and transistor hybrid model to calculate h-parameters. (BTL4)
			4306T.4	Apply the concept of BJT to develop amplifier circuits. (BTL3)
			4306T.5	Understand the characteristics of JFET, MOSFET and UJT.(BTL2)

II B.Tech, I Sem EEE COs (R19-JNTUA)

Year& Sem	Course Code	Course Name		CO's
II-I	19A04304	DIGITAL ELECTRONICS AND LOGIC DESIGN	4304.1	Understand the various number systems, error detecting, correcting binary codes, logic families, apply Boolean laws, K-Map, Q-methods to minimize switching functions. (BTL2)
			4304.2	Apply Boolean algebra for describing combinational digital circuits, design various combinational logic circuits and analyze standard combinational circuits such as adders, subtractors, multipliers and comparators. (BTL3)
			4304.3	Design of synchronous sequential circuits and construct digital systems using components such as registers and counters. (BTL6)
			4304.4	Compare different types of logic devices and logic families. (BTL4)
			4304.5	Understand digital logic families such as TTL, ECL, and CMOS. Explain the characteristics of digital ICS such as speed, power dissipation, figure of merit, and fan out, noise immunity. (BTL2)
			CO's	
II-I	15A05101	DC MACHINES & TRANSFORMERS LAB	5101.1	Able to understand and analyze magnetization characteristics of DC shunt generator, conduct and analyze load test on DC shunt generators [BTL2]
			5101.2	Conduct and Analyze Direct and Indirect Tests on DC shunt motor [BTL3]
			5101.3	Understand and predetermine efficiency and regulation of single phase Transformers, Analyze the Parallel operation of two single phase transformers [BTL2]
			5101.4	Conduct and analyze load test on DC short shunt and long shunt compound generators [BTL3]
			5101.5	Understand and analyze speed control techniques and efficiency of DC machines [BTL2]

II B.Tech, I Sem EEE COs (R19-JNTUA)

Year& Sem	Course Code	Course Name		CO's
II-I	19A04306P	SEMICONDUCTOR DEVICES AND CIRCUITS LAB	4306P.1	Design and study the characteristics of semiconductor diode and Zener diode and its application.(L6)BT
			4306P.2	Design and study the input and output characteristics of Transistor in Common Emitter, Common base, Common source Configuration and UJT. (BTL6)
			4306P.3	Design Rectifiers with and without filters, Common emitter amplifier.(BTL6)
			4306P.4	Design and simulate Miller's and dual of miller's theorem. (BTL6)
			4306P.5	Design and simulate FET amplifier. (BTL6)
				CO's
II-I	19A02301P	BASIC ELECTRICAL CIRCUITS LAB	2301P.1	Gains knowledge on theorems [BTL1]
			2301P.2	Knows the transformer uses and determines the self,& mutual inductance [BTL2]
			2301P.3	Measures active power and reactive power for star connected loads BT[L2]
			2301P.4	Measures active power and reactive power for delta connected loads [BTL2]

Year& Sem	Course Code	Course Name		CO's
II-I	19A99302	BIOLOGY FOR ENGINEERS	9302.1	Explain about cells and their structure and function. Different types of cells and basics for classification of living Organisms. [BTL2]
			9302.2	Explain about biomolecules, their structure and function and their role in the living organisms. How biomolecules are useful in Industry.[BTL2]
			9302.3	Briefly about human physiology.[BTL2]
			9302.4	Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.[BTL2]
			9302.5	Know about application of biological Principles in different technologies for the production of medicines and Pharmaceutical molecules through transgenic microbes, plants and animals [BTL2]

II B.Tech, II Sem EEE COs (R19-JNTUA)				
II-II	19A54401	NUMERICAL METHODS & PROBABILITY THEORY	4401.1	Apply numerical methods to solve algebraic and transcendental equations (BTL3)
			4401.2	Derive interpolating polynomials using interpolation formulae (BTL4)
			4401.3	Solve differential and integral equations numerically (BTL3)
			4401.4	Understand the concept of Probability theory to find the chances of happening of events (BTL2)
			4401.5	Understand various probability distributions and calculate their statistical constants (BTL2)

Year& Sem	Course Code	Course Name	CO's	
II-II	19A02401T	ELECTRICAL CIRCUIT ANALYSIS	2401T.1	Analyze series and parallel resonance circuits [BTL4]
			2401T.2	Analyze two port networks[BTL4]
			2401T.3	Calculate the transient response of R-L, R-C, R-L-C circuits for D.C. and A.C. excitations [BTL3]
			2401T.4	Apply Fourier transforms to electrical circuits excited by non-sinusoidal sources [BTL3]
			2401T.5	Calculate different types of filters [BTL3]
CO's				
II-II	19A02402	ENGINEERING ELECTROMAGNETICS	2402.1	Knowledge on basic principles, concepts and fundamental laws of electromagnetic fields [BTL2]
			2402.2	Understands the concept of Conductors, Dielectrics ,polarization process [BTL2]
			2402.3	Knowledge of different laws for magneto statics, Develop MFI for different applications [BTL2]
			2402.4	The knowledge to understand 3-dimensional co-ordinate systems, electrostatics, magneto statics, time-varying fields and interaction between electricity and magnetism. [BTL2]
			2402.5	Understand the concepts of Magnetic Potential and Time varying Fields [BTL2]

II B.Tech, II Sem EEE COs (R19-JNTUA)

Year& Sem	Course Code	Course Name		CO's
II-II	**19A02403**	**POWER ELECTRONICS**	2403.1	To **Construct** the I-V Characteristics of Basic Power Switching Devices and to **Interpret** the Firing and Commutation Circuits of Thyristor (BTL-L5 and BTL-L2)
			2403.2	To **Elaborate** the Operation of Single-Phase and Three-Phase Rectifiers and to **Analyze** the same (BTL-L6 and BTL-L4)
			2403.3	To **Examine** a basic chopper, its principles and to **Discuss** the operation of Buck, Boost and Buck-Boost Converters. (BTL-L6 and BTL-L4)
			2403.4	To **Inspect** the Single-phase Voltage source inverters, their control and modulation techniques and to **Explain** the operation of Basic Series and Parallel Inverters. (BTL-L4 and BTL-L5)
			2403.5	To **Examine** the operation of AC Voltage controller and Cyclo-Converter using different loads and to **Discuss** the modes of operation of a TRIAC. (BTL-L6 and BTL-L4)
CO's				
II-II	**19A04405**	**ANALOG ELECTRONIC CIRCUITS**	4405.1	Analyze various multistage amplifiers (BTL3)
			4405.2	Design various types of negative feedback and oscillator circuits (BTL4)
			4405.3	Explain the operation of various types of large signal amplifiers BT(L2)
			4405.4	Discuss the operation of op-amp and its applications (BTL2)
			4405.5	Explain the operation of special purpose ICs like IC 555, VCO 566 and PLL565 (BTL2).

II B.Tech, II Sem EEE COs (R19-JNTUA)

Year& Sem	Course Code	Course Name		CO's
II-II	19A05304T	PYTHON PROGRAMMING	5304T.1	List the basic constructs of Python and solve the problems by applying modularity principle (BTL1)
			5304T.2	Apply the conditional and principle of recursion execution of the program (BTL3)
			5304T.3	Use the data structure list and Design programs for manipulating strings.(BTL6)
			5304T.4	Use data structure dictionaries, Organize data in the form of files and object orientation concepts.(BTL5)
			5304T.5	Plan programs using object orientation approach. Illustrate the principle of inheritance (BTL4)
				CO's
II-II	19A52301	UNIVERSAL HUMAN VALUES	2301.1	Students are expected to become more aware of themselves, and their surroundings (family, society, nature)[BTL2]
			2301.2	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.[BTL5]
			2301.3	They would have better critical ability.[BTL4]
			2301.4	They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).[BTL5]
			2301.5	It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in[BTL3]
Year& Sem	**Course Code**	**Course Name**		**CO's**
II-II	19A02401P	ELECTRICAL CIRCUIT ANALYSIS LAB	2401P.1	Understand and experimentally verify various resonance phenomenon [BTL2]
			2401P.2	Understand and analyze various current locus diagrams [BTL2]
			2401P.3	Apply and experimentally analyze two port network parameters [BTL3]
			2401P.4	Apply computer mathematical and simulation programs to solve various real life disciplinary topics through circuit solution[BTL3]
			2401P.5	Acquire knowledge on Transient response of RL, RC, RLC series circuits[BTL2]

II B.Tech, II Sem EEE COs (R19-JNTUA)				
Year& Sem	Course Code	Course Name		CO's
II-II	19A99301	ENVIRONMENTAL SCIENCE	9301.1	Understand the various natural resources (BTL2)
			9301.2	Describe about the Biodiversity and Ecosystem (BTL2)
			9301.3	Discuss about the pollution aspects (BTL3)
			9301.4	To know about the social issues related to environment and their protection acts (BTL1)
			9301.5	Describe about the population explosion and welfare programme (BTL2)
II-II	19A04406	ELECTRONIC CIRCUITS LAB	4406.1	Analyze various amplifier circuits. [BTL3]
			4406.2	Design multistage amplifiers[BTL4]
			4406.3	Design OPAMP based analog circuits. [BTL4]
			4406.4	Understand working of logic gates. [BTL2]
			4406.5	Design and implement Combinational and Sequential logic circuits.[BTL4]

III B.Tech, I Sem EEE COs (R19-JNTUA)

Year& Sem	Course Code	Course Name		CO's
III-I	19A02501T	AC MACHINES	2501T.1	Understand the basics of ac machine windings, construction, principle of working, equivalent circuit of induction and synchronous machines (BTL2,BTL5)
			2501T.2	Analyze the phasor diagrams of induction and synchronous machine, parallel operation of alternators, synchronization and load division of synchronous generators (BTL3)
			2501T.3	Apply the concepts to determine V and inverted V curves and power circles of synchronous motor.(BTL5)
			2501T.4	Analyze the various methods of starting in both induction and synchronous machines.(BTL3)
			2501T.5	Chooses specific 1-phase motor and/or special motors for a given application (BTL6)
Year& Sem	Course Code	Course Name		CO's
III-I	19A02502	CONTROL SYSTEMS	2502.1	Understand the concepts of control systems classification, feedback effect, mathematical modelling, time response and frequency response characteristics (BTL2)
			2502.2	Apply the concepts of block diagram reduction, signal flow graph method and root locus, bode, Nyquist, polar plots for stability calculations, and demonstrate the use of these techniques(BTL3)
			2502.3	Analyze time response analysis ,error constants, and stability characteristics of a given mathematical model using different methods (BTL4)
			2502.4	Design and develop different compensators, controllers and their performance evaluation for various conditions. Implement them in solving various engineering applications (BTL6)
			2502.5	Understand the concepts of state space analysis ,controllability and observability (BTL2)

Year& Sem	Course Code	Course Name	CO's	
III-I	**19A52601T**	**ENGLISH LANGUAGE SKILLS**	2601T.1	Understand the purpose of rhythm and rhyme making the presentation lively and attractive. BTL-2
			2601T.2	Apply the knowledge of structure and style in a presentation, identify the audience and make note of key points. BTL-3
			2601T.3	Evaluate reading/Listening texts and to write summaries based on global comprehension of these texts. BTL-5
			2601T.4	Express thoughts and ideas with acceptable accuracy and fluency. BTL-1
			2601T.5	Create a coherent paragraph interpreting figure/graph/chart/table BTL-4

Year& Sem	Course Code	Course Name	CO's	
III-I	**19A02504**	**ELECTRIC MACHINE DESIGN**	2504.1	Understand various design factors, types of windings, choice of machine, selection and ratings (BTL2)
			2504.2	Able to design DC machine based on specified rating (BTL4)
			2504.3	Able to design 1-ϕ transformer based on specified rating (BTL4)
			2504.4	Able to design 3-ϕ Induction machine based on specified rating (BTL3)
			2504.5	Able to design 3-ϕ Synchronous machine based on specified rating (BTL4)

Year& Sem	Course Code	Course Name		CO's
III-I	19A02503a	HVDC AND FACTS	2503a.1	To **Compare** Existing Electrical Transmission Networks with Emerging Transmission Networks namely HVDC and FACTS.(BTL-L2)
			2503a.2	To **Identify** Various HVDC Links and **Analyze** the Graetz Circuit(BTL-L3 and BTL-L4)
			2503a.3	To **Construct** the Equivalent Circuits of Rectifier and Inverter. (BTL-L6)
			2503a.4	To **Inspect** various features of controls like CIA, CEA and CC in HVDC systems. (BTL-L4)
			2503a.5	To **Summarize** various types of FACTS Controllers and To **Examine** various types of Controllable Series and Shunt VAR generation.(BTL-L2 and BTL-L4)
			2503a.6	To **Discuss** the principle of operation of UPFC and IPFC and To **Construct** their Characteristics.(BTL-L6)

Year& Sem	Course Code	Course Name		CO's
III-I	19A52506a	TECHNICAL COMMUNICATION AND PRESENTATION SKILLS	2506a.1	To Understand the importance of effective technical communication[BTL2]
			2506a.2	To Apply the knowledge of basic skills to become good orators[BTL3]
			2506a.3	To Analyze non-verbal language suitable to different situations in professional life[BTL3]
			2506a. 4	To Evaluate different kinds of methods used for effective presentations[BTL3]
			2506a..5	To Create trust among people and develop employability skills[BTL3]

III B.Tech, I Sem EEE COs (R19-JNTUA)				
III-I	19A02501P	AC MACHINES LAB	2501P.1	Analyze and apply load test, no-load and blocked-rotor tests for construction of circle diagram and equivalent circuit determination in a single phase induction motor. (BTL4)
			2501P.2	Predetermine regulation of a three-phase alternator by synchronous impedance &m.m.f methods (BTL3)
			2501P.3	Predetermine the regulation of Alternator by Zero Power Factor method Xd and Xq determination of salient pole synchronous machine. (BTL3).
			2501P.4	Evaluate and analyze V and inverted V curves of 3 phase synchronous motor (BTL4).

III B.Tech, I Sem EEE COs (R19-JNTUA)

Year& Sem	Course Code	Course Name	CO's	
III-I	19A52601P	ENGLISH LANGUAGE SKILLS LAB	2601P.1	Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills[BTL1]
			2601P.2	Apply communication skills through various language learning activities[BTL2]
			2601P.3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension. [BTL4]
			2601P.4	Evaluate and exhibit acceptable etiquette essential in social and professional settings.[BTL6]
			2601P.5	Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.[BTL6]
CO's				
III-I	19A02506P	POWER ELECTRONICS & SIMULATION LAB	2506P.1	Understand and analyze various characteristics of power electronic devices with gate firing circuits and forced commutation techniques. (BTL4)
			2506P.2	Analyze the operation of single-phase half & fully-controlled converters and inverters with different types of loads. (BTL4)
			2506P.3	Analyze the operation of DC-DC converters, single-phase AC Voltage controllers, cyclo converters with different loads (BTL3)
			2506P.4	Create and analyze various power electronic converters using PSPICE software (BTL5)
Year& Sem	Course Code	Course Name	CO's	
III-I	19A99601	RESEARCH METHODOLOGY	9601.1	Explain various types of research (BTL3)
			9601.2	Explain various techniques in measurement and scaling (BTL3)
			9601.3	Compare and contrast correlation and regression (BTL4)
			9601.4	Analyze various statistical inference tests (BTL4)
			9601.5	Understand how to write a research paper along with ethics (BTL2)

III B.Tech, II Sem EEE COs (R19-JNTUA)				
III-II	19A04301	SIGNALS AND SYSTEMS	4301.1	Understand different types of signals and systems, describe vector analysis and examine Fourier series (BTL2)
			4301.2	Examine the spectral properties of signals using Fourier Transform and understand process of sampling (BTL3).
			4301.3	Examine the spectral properties of signals using Discrete Time Fourier Transform (BTL3).
			4301.4	Describe system properties based on Impulse response and Fourier analysis (BTL1).
			4301.5	Understand different types of signals and system with Laplace and Z-Transforms (BTL2)

Year& Sem	Course Code	Course Name	CO's	
III-II	19A02601T	DIGITAL COMPUTE PLATFORMS	2601T.1	Understand the architecture and pindiagram of 8086 microprocessor(BTL2)
			260T1.2	Analyze the program and understand the interrupts(BTL4,BTL2)
			2601T.3	Designing of Microprocessors and Microcontrollers for various applications(BTL6)
			2601T.4	Design programs for digital signal processors and understand the interrupts(BTL6,BTL2)
			2601T.5	Design Xilinx programming and understand spartan FPGA BOARD(BTL6,BTL2)
CO's				
III-II	19A02602	POWER SYSTEM ANALYSIS	2602.1	Remember and understand the concepts of per unit values, Y Bus and Z bus formation, load flow studies, symmetrical and unsymmetrical fault calculations. [BTL2]
			2602.2	Apply the concepts of good algorithm for the given power system network and obtain the converged load flow solution and experiment some of these methods using modern tools and examine the results. [BTL3]
			2602.3	Analyze the symmetrical faults and unsymmetrical faults and done the fault calculations, analyze the stability of the system and improve the stability. Demonstrate the use of these techniques through good communication skills[BTL4]
			2602.4	Develop accurate algorithms for different networks and determine load flow studies and zero, positive and negative sequence impedances to find fault calculations[BTL4]
			2602.5	Design and select efficient Circuit Breakers to improve system stability. Implement them in resolving various day-to-day issues in a Power System. .[BTL5]

III B.Tech, II Sem EEE COs (R19-JNTUA)

Year& Sem	Course Code	Course Name	CO's	
III-II	**19A04703c**	**INTRODUCTION TO EMBEDDED SYSTEM DESIGN**	4703c.1	Understand the fundamentals of embedded systems, input and output devices, design of power [BTL1]
			4703c.2	Understand the Architecture of MSP430 Microcontroller, interfacing of LED and different [BTL1]
			4703c.3	Interfacing the MSP430 controller with seven segment displays, LCD, Analog inputs. [BTL5]
			4703c.4	Able to program the msp430 microcontroller using Embedded C,CCS Studio [BTL5]
			4703c.5	Understand the Timers and different operating modes, Serial communication protocols: UART, SPI,I2C [BTL2]
CO's				
III-II	**19A54604a**	**SOFT SKILLS**	4604a 1	Understand the importance of soft skills (BLT2)
			4604a.2	Develop creative thinking and decision-making skills (BLT6)
			4604a.3	Understand the importance of interpersonal skills (BLT2)
			4604a.4	Apply verbal skills personal and professional life (BLT3)
			4604a.5	Apply various techniques to use para language (BLT3)

Year& Sem	Course Code	Course Name	CO's	
III-II	**19A52602B**	**MANAGERIAL ECONOMICS &FINANCIAL ANALYSIS**	2602b.1	Get the basic inputs of Managerial Economics and demand concept and able to estimate the future demand of a product.(BTL2)
			2602b.2	Explain the concepts of cost and production and can calculate the breakeven point. (BTL2)
			2602b.3	Learn how to take effective decisions under various market situations and also about different forms of business organizations. (BTL2)
			2602b.4	Get the inputs of accounting concepts and analyze the financial statements. (BTL4)
			2602b.5	Know how to take an effective investment decision. (BTL2)
III-II	**19A02605**	**CONTROL SYSTEMS & SIMULATION LAB**	2605.1	Model the systems and able to design the controllers and compensators. [BTL2]
			2605.2	Understand the effect of location of poles and zeros on transient and stead state behavior of systems [BTL2]
			2605.3	Asses the performance, in terms of time domain specifications of first and second order systems [BTL2]
			2605.4	Use MATLAB/SIMULINK software for control system analysis and design [BTL2]
			2605.5	Design PID controllers for given control system model [BTL5]

Year& Sem	Course Code	Course Name	CO's	
III-II	**19A02601P**	**DIGITAL COMPUTE PLATFORMS LAB**	2601P.1	Develop assembly language program on 8086 microprocessor(BTL6)
			2601P.2	Develop assembly language program on 8051 microcontroller(BTL6)
			2601P.3	Able to interface various devices with 8086(BTL3)
			2601P.4	Design MASAM Programming(BTL6)
			2601P.5	Able to interface 8051 micro controller with peripheral devices(BTL3)

CO's				
Year& Sem	Course Code	Course Name	CO's	
III-II	**19A99501**	**CONSTITUTION OF INDIA**	9501.1	Understand historical background of the constitution making and its importance for building a democratic India (BTL2)
			9501.2	Understand the functioning of three wings of the government ie., executive, legislative and judiciary (BTL2
			9501.3	Understand the value of the fundamental rights and duties for becoming good citizen of India (BTL2
			9501.4	Analyze the decentralization of power between central, state and local self-government (BTL4
			9501.5	Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy (BTL3)

IV B.Tech, I Sem EEE COs (R19-JNTUA)					
IV-I	19A02701	MEASUREMENTS & SENSORS	2701.1	Understand the principles and working of various measuring instruments used to detect electrical circuit parameters R,L,C	
			2701.2	Design the various voltage and current measuring instruments for the various electric / magnetic field applications	
			2701.3	Distinguish between CTs and PTs	
			2701.4	Distinguish between DC and AC potentiometers	
			2701.5	Identify errors in measurements and to mitigate them for desired precision and accuracy	

Year& Sem	Course Code	Course Name	CO's		
IV-I	19A02702	POWER SYSTEM PROTECTION	2702.1	Distinguish between the principles of operation of electromagnetic relays, static relays and microprocessor based relays (BTL2)	
			2702.2	Determine the unprotected percentage of generator winding under fault occurrence (BTL2)	
			2702.3	Design the protection system for transformers(BTL5)	
			2702.4	Identify various types of the relays in protecting feeders, lines and bus bars(BTL2)	
			2702.5	Solve numerical problems for arc interruption and recovery in circuit breakers and Demonstrate the protection of a power system from over voltages (BTL2)	
CO's					
IV-I	19A02703a	POWER SYSTEM OPERATION & CONTROL	2703a.1	To be able to understand to deal with problems in Power System as Power System Engineer (BTL2)	
			2703a.2	To be able to Understand to deal with AGC problems in Power System(BTL2)	
			2703a.3	To be able to understand to deal the problems in hydro electric and hydro thermal problems (BTL2)	
			2703a.4	To understand the complexity of reactive power control problems and to deal with them(BTL2)	
			2703a.5	To understand the necessity of deregulation aspects and demand side management problems in the modern power system era. (BTL2)	

Year& Sem	Course Code	Course Name		CO's
IV-I	**19A04704b**	**PRINCIPLES OF DIGITAL SIGNAL PROCESSING**	4704b.1	Define basic signals and its operations, Classify discrete time signals and systems. (BTL2)
			4704b.2	Solve Laplace Transform and z-Transform for various signals, Calculate DFT of a given sequence by using Fast Fourier Transform. (BTL2)
			4704b.3	Analyze the continuous and discrete signals and systems (BTL3)
			4704b.4	Design and realize IIR and FIR filters from the given specifications(BTL5)
CO's				
IV-I	**19A52701b**	**MANAGEMENT SCIENCE**	2701b.1	Understand the concepts & principles of management and designs of organization in a practical world (BTL2)
			2701b.2	Apply the knowledge of Work-study principles & Quality Control techniques in industry (BTL3)
			2701b.3	Analyze the concepts of HRM in Recruitment, Selection and Training & Development (BTL4).
			2701b.4	Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time & cost of project & to analyze the business through SWOT. (BTL3)
			2701b.5	Create Modern technology in management science. (BTL5)

IV B.Tech, I Sem EEE COs (R19-JNTUA)

Year& Sem	Course Code	Course Name	CO's	
IV-I	19A02705	POWER SYSTEMS & SIMULATION LAB	2705.1	Get the practical knowledge on calculation of sequence impedance, fault currents, voltages and sub transient reactances. Get the practical knowledge on how to draw the equivalent circuit of three winding transformer(BTL2)
			2705.2	Get the knowledge on development of MATLAB program for formation of Y and Z buses(BTL2)
			2705.3	Get the knowledge on development of MATLAB programs for Gauss-Seidel and Fast Decouple Load Flow studies. (BTL2)
			2705..4	Get the knowledge on development of SIMULINK model for single area load frequency problem. (BTL2)
CO's				
IV-I	19A02706	MEASUREMENTS LAB	**2706.1**	Calibrate various electrical measuring instruments (BTL2)
			2706.2	Accurately determine the values of inductance and capacitance using AC bridges (BTL2)
			2706.3	Compute the coefficient of coupling between two coupled coils (BTL2)
			2706.4	Accurately determine the values of very low resistances (BTL2)

IV B.Tech, II Sem EEE COs (R19-JNTUA)

Year& Sem	Course Code	Course Name	CO's	
IV-II	19A02801a	ELECTRICAL DISTRIBUTION SYSTEM AUTOMATION	2801a.1	To understand basics of distribution systems and substations(BTL2)
			2801a.2	To understand about modeling of various loads (BTL2)
			2801a.3	To perform distribution load flow solutions(BTL2)
			2801a.4	To evaluate power loss and feeder cost (BTL2)
			2801a.5	To know the principles of SCADA, Automation distribution system and management(BTL2)
CO's				
IV-II	19A04802d	ELECTRONIC INSTRUMENTATION	4802d.1	Learn different types of errors in measurement, calibration process and standards, various methods for measurement of non-electrical quantities, Understand the different methods for measurement of various electrical quantities. (BTL2)
			4802d.2	Familiarize the dynamics of instrument systems, various passive and active transducers (BTL2)
			4802d.3	Compare the various measuring techniques for measuring voltage (BTL4)
Year& Sem	Course Code	Course Name	CO's	
IV-II	19A02803	PROJECT	2803.1	Identifying and define the engineering problems and complex problems related to the specific engineering branch [BTL-1]
			2803.2	Identify, formulate, research literature and analyze complex engineering problems[BTL-1]
			2803.3	Design/development of solutions and conducts investigations of complex engineering problems [BTL-6]
			2803..4	Creates, select and apply appropriate techniques , uses modern tools including predictions and limitations [BTL-6]
			2803.5	Applying, analyzing health safety legal & cultural environmental issues. Applying ethical principles and commit to professional ethics [BTL-3]
			2803.6	Analyze result, communicate and discuss with team members managing the project and recognize the need for lifelong learning [BTL-4]

* * *
_ _