Proposed Scheme for opinion/suggestions (You are requested to go through the proposed schemes of III & IV semesters as per CBCS scheme. Send your opinion / feedback and valuable suggestions latest by 30/05/2016, to cbcs@rgtu.net, ce@rgtu.net)

Bachelor of Engineering (Electronics & Communication Engineering) Semester: IV

S. No.	Subject Code	Subject Name	Maximum marks allotted									Hours /Week			Total Credits
			Theory						Practical						
			End Sem	Minor-I	Minor-II	Quiz	Assignments	Tutorials/Problem Solving	End Sem	Lab Work	Viva Voce / Assign	L	T	P	
1.	BS MA-241	~~System Engineering~~ Maths III	60	10	10	5	5	10	-	-	-	3	1	-	4
2.	DC EC-242	Digital Electronics circuit & systems	60	10	10	5	5	10	10	20	20	3	1	2	5
4.	DC EC-243	Integrated Circuits and its Applications	60	10	10	5	5	10	10	20	20	2	1	2	4
5.	DC EC-244	Communication ~~Systems~~ I	60	10	10	5	5	10	10	20	20	3	1	2	5
6	DC EC-245	Electromagnetic Fields & Waves	60	10	10	5	5	10	-	-	-	3	1	-	4
7.	DC EC-247	Simulation Lab	-	-	-	-	-	-	10	20	20	-	-	2	1
8.	OC EC-246	Open Category Elective 1. Cyber law	60	10	10	5	5	10	-	-	-	3	-	-	3
		Total 3. Entrepreneurship	360	60	60	30	30	60	40	80	80	17	5	8	26

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COURSE CONTENT & GRADE (w.e.f. July 201)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
B.E/PTDC	DIGITAL CIRCUITS & SYSTEM	EC-242	Min "D"	Min "D"	5.0

DIGITAL CIRCUITS & SYSTEM

~~Unit I~~

Boolean algebra and switching function: Minimization of switching function. Concept of prime implicant etc. Karnuagh's map method, Quine & McCluskey's method, cases with don't care terms and multiple output, switching function, introduction to logic gates NAND, NOR realization of switching function.

~~Unit II~~

Design and analysis of combinational circuits : Design and analysis of code convertor. half – adders, half-subtractor, full adders, fullsubtractor circuits. Series & parallel adders and BCD adders. look-ahead carry generator and adders. Decoders, Encoders, multiplexers & demultiplexers. Designing of combinational circuits with ROM and PLA.

~~Unit III~~

Specification of sequential system: Characterizing equation & definition of synchronous sequential machines Realization of State table from verbal description , Mealy and moore machines state table and transition diagram. Minimization of the state table of completely specifies sequential machines.

~~Unit IV~~

Design and Analysis of sequential circuits: Design and analysis of registers, synchronous & asynchronous counters etc. introduction to asynchronous sequential machines. Races and hazards.

~~Unit V~~

Algorithmic state machine: Controllers and data system designing.

Books:

i) W. H. Gothman, "Digital Electronics" (PHI)
ii) R.J. Tocci, "Digital System Principles & Application"
iii) Z. Kohair (TMH), "Switching & Automata Theory"
iv) M. Mano (PHI) "Digital Logic & Computer Design"
v) M. Mano (PHI) "Digital Design".

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COURSE CONTENT & GRADE (w.e.f. July 201[6])

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
B.E/PTDC	~~ANALOG~~ INTEGRATED CIRCUITS & ih application	EC-243	Min "D"	Min "D"	5.0

~~ANALOG~~ INTEGRATED CIRCUITS & ih Applications

~~UNIT-I~~ **Integrated Circuit Fabrication:**
Introduction, Classification, IC Chip Size and Circuit Complexity, Fundamentals of Monolithic IC Technology, Basic Planar Processes, Fabrication of a Typical Circuit, Active and Passive Components of ICs, Fabrication of FET ,Thin & Thick Film Technology

~~UNIT-II~~ **Operational Amplifier:**
Ideal Operational amplifier, Operational Amplifier Internal Circuit, FET Operational Amplifier, Operational Amplifier DC Characteristics : Input bias Current, Input offset Current, Input offset Voltage, Thermal Drift, Operational amplifier AC Characteristics : Frequency Response, Stability of an OP-AMP, Frequency Compensation (External & Internal), Slew Rate.

~~UNIT-III~~ **Basic Operational Amplifier Applications:**
Instrumentation amplifier, AC amplifier, Voltage to current and current to Voltage Converter, Op-amp circuits using diodes, Sample and hold circuits ,Log & antilog amplifier Multiplier & Divider, Differentiator, Integrator, Electronic Analog Computation, Operational Transconductance Amplifier(OTA).

~~UNIT-IV~~

Comparator: Regenerative Comparator (Schmitt Trigger), Square Wave generator (Astable Multivibrator), Monstable Multivibrator, Triangular Wave Generator, Basic Principle of Sine Wave Oscillators,

Voltage Regulator: Series OP-AMP Regulator, IC Voltage Regulators, 723 General Purpose Regulators, Switching Regulator,

Active Filters: RC Active filters, Transformation, State variable filter, Switched capacitor filters, Active filters using OTA's.

~~UNIT-V~~

IC 555 Timers: Description of Functional Diagram, Monostable Operation, Astable Operation, Schmitt Trigger,
Phased- Locked Loops: Basic Principles, Phase Detector /Comparator, Voltage Controlled Oscillator (VCO), Low Pass Filter, Monolithic Phase- Locked Loop, PLL Applications.
D-A & A-D Converters: Basic DAC Techniques, A-D Converters.

REFERENCES:

1. Millman and Halkias : Integrated Electronics, TMH
2. Gayakwad: OP-AMP and Linear Integrated Circuits, Pearson Education
3. D. Roy Choudhury and Shail B. Jain: Linear Integrated Circuits, New Age
4. Boylestad and Nashelsky: Electronic Devices and Circuit Theory, PHI
5. Sedra and Smith : Microelectronics, Oxford Press
6. Graham Bell : Electronics Devices and Circuits, PHI
7. Donald A Neamen: Electronic Circuits Analysis and Design, TMH
8. S. Rama Reddy: Electronic Devices and Circuits, Alpha Science International Limited

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COURSE CONTENT & GRADE (w.e.f. July 201)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
B.E/PTDC	~~ANALOG~~ COMMUNICATION I	EC-244	Min "D"	Min "D"	5.0

~~ANALOG~~ COMMUNICATION System I

~~Unit-1~~ Amplitude Modulation System

Representation of band pass signals, Frequency Translation, A Method of Frequency Translation, Recovery of Baseband Signal, Amplitude Modulation, Maximum Allowable Modulation, Spectrum of an Amplitude Modulated Signal, Generation and Detection of AM waves. Suppressed Carrier Systems (DSB-SC), Single Sideband Modulation, Vestigial Sideband Modulation, Comparison of various AM Systems, Frequency Division Multiplexing, AM Transmitter and AM Radio Broadcasting.

~~Unit-2~~ Angle Modulation System

Angle modulation, Phase & Frequency Modulation, Relation between Phase & Frequency Modulation, Phase & Frequency Deviation, Spectrum of an FM Signal, Features of Bessel Coefficient, Narrowband FM, Wideband FM, Bandwidth of FM Signal, Effect of Modulation Index on Bandwidth, Phasor Diagram of FM signal, FM Generation and Detection, FM Radio Broadcasting.

~~Unit-3~~ Random Variables

Random Variables, CDF, PDF, relation between CDF & PDF, Average Value of Random Variables, Variance of Random Variable, Tchebycheff's Inequality, Guassian Probability Density, Error Function, Rayleigh Probability Density, Correlation between Random Variables, Central Limit Theorem, Autocorrelation.

~~Unit-4~~ Random Processes

Description of Statistical Average, Stationary, Random Processes and Linear System, Power Spectrum of Stochastic Processes, Transmission over LTI System, Gaussian processes , White processes, Bandlimited Processes and Sampling, Bandpass Processes.

~~Unit-5~~ Effect of Noise on Analog Communication Systems

Effect of noise on a Baseband Signal, DSB-SC AM, SSB AM, and Conventional System, The PLL, Effect of Additive Noise on Phase Estimation, Threshold effect in Angle Modulation, Pre-Emphasis and De-Emphasis Filtering, Comparison of Analog Modulation System, Characterization of Thermal Noise Sources, Effective Noise Temperature and Noise Figure, Transmission Losses, Repeaters for Signal Transmission.

Reference Books:

1. H.Taub & D.L.Schilling: Principles of Communication System; TMH
2. Simon Haykins- Communication System; John Wiley
3. B P Lathi- Modern Digital and Analog Communication, Oxford University.
4. J.Prokis and Salehi- Communication Engineering System, Prentice Hall.
5. Hwie. P. Hsu- Schaum's Outline of Analog and Digital Communication

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COURSE CONTENT & GRADE (w.e.f. July 201)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
B.E/PTDC	ELECTROMAGNETIC ~~THEORY~~ Fields & Waves	EC-245	Min "D"	Min "D"	5.0

ELECTROMAGNETIC ~~THEORY~~ Fields & Waves

~~UNIT-I~~ **Coordinate systems and transformation**: Cartesian coordinates, circular cylindrical coordinates, spherical coordinates..Vector calculus: Differential length, area and volume, line surface and volume integrals, del operator, gradient of a scalar, divergence of a vector and divergence theorem, curl of a vector .Green's and Stoke's theorem, Laplacian of a scalar.

~~UNIT-II~~ **Electrostatics**: Electrostatic fields, Coulombs law and field intensity, Electric field due to charge distribution, Electric flux density, Gausses' Law – Maxwell's equation, Electric dipole and flux lines, energy density in electrostatic fields. Electric field in material space: Properties of materials, convection and conduction currents, conductors, polarization in dielectrics, dielectric constants, continuity equation and relaxation time, boundary condition. Electrostatic boundary value problems: Poisson's and Laplace's equations, general procedures for soling Poisson's or Laplace's equations, resistance and capacitance, method of images.

~~UNIT-III~~ **Magnetostatics**: Magneto-static fields, Biot-Savart's Law, Ampere's circuit law, Maxwell's equation, application of ampere's law, magnetic flux density- Maxwell's equation, Maxwell's equation for static fields, magnetic scalar and vector potential.

Magnetic forces, materials and devices: Forces due to magnetic field, magnetic torque and moment, a magnetic dipole, magnetization in materials, magnetic boundary conditions, inductors and inductances, magnetic energy.

~~UNIT-IV~~ **Waves and applications**: Maxwell's equation, Faraday's Law, transformer and motional electromotive forces, displacement current, Maxwell's equation in final form. Electromagnetic wave propagation: Wave propagation in lossy dielectrics, plane waves in lossless dielectrics, plane wave in free space, plain waves in good conductors, power and the pointing vector, reflection of a plain wave in a normal incidence.

Transmission lines: Transmission line parameters, Transmission line equations, input impedance, standing wave ratio and power, The Smith chart, Some applications of transmission lines.

~~UNIT-V~~ **Radiation, EMI and EMC:** Retarded Potentials and concepts of radiation, Radiation from a small current element. Radiation resistance: Introduction to Electromagnetic Interference and Electromagnetic compatibility, EMI coupling modes, Methods of eliminating interference, shielding, grounding, conducted EMI, EMI testing: emission testing, susceptibility testing.

Text Book:

1. Hayt, W.H. and Buck, J.A. 'Engineering Electromagnetics Tata McGraw Hill Publishing Co. Ltd., New Delhi Seventh edition.
2. Jordan E.C. and Balmain K.G. 'Electromagnetic' wave and radiating systems. PHI Second edition.
3. Krauss J. D. 'Electromagnetics ' Tata McGraw Hill Fifth edition.
4. Ramo S, Whinnery T.R. and Vanduzer T, 'Field and Waves in Communication electronics' John Wiely and Sons Third edition.
5. Elements of Engineering Electromagnetics, N.N. Rao, 5th Ed., PHI.
6. Electromagnetic Waves and Antennas: Collins: TMH

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