Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Credit Grade System
Sixth Semester B.E. (Electronics and Communication Engineering/ Electronics and Telecommunication Engineering)

Subject Code	Subject	Teaching Scheme				Examination Scheme									
		Hours Per Week			Number of Credits	THEORY						PRACTICAL			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks ESE	Max. Marks Sessional		Total	Min . Passing Marks	Max. Marks TW	Max. Marks POE	Total	Min . Passing Marks
								MSE	IE						
ET 601	Fields & Radiating Systems	3	1	0	4	3	80	10	10	100	40	--	--	--	--
ET 602	Principals of Communication	3	1	0	3	3	80	10	10	100	40	--	--	--	--
ET 603	Control System	3	1	0	3	3	80	10	10	100	40	--	--	--	--
ET604	Digital Signal Processing	3	1	0	3	3	80	10	10	100	40	--	--	--	--
ET 605	Computer Architecture and Organization	3	0	0	3	3	80	10	10	100	40	--	--	--	--
Laboratories															
ET 606	Control System	0	0	3	2	--	--	--	--	--	--	25	25	50	25
ET607	Principals of Communication	0	0	3	2	--	--	--	--	--	--	25	25	50	25
ET 608	Digital Signal Processing	0	0	3	2	--	--	--	--	--	--	25	25	50	25
ET 609	Minor Project	0	0	2	2							25	25	50	25
Total		**15**	**4**	**11**						**500**				**200**	
Semester Total		**30**			**24**										**700**

GONDWANA UNIVERSITY, GADCHIROLI

FACULTY OF ENGINEERING AND TECHNOLOGY

CONSLIDATED STATEMENT OF VARIOUS PARAMETERS IN TEACHING & EXAMINATION SCHEME OF B.E. (ELECTRONICS AND COMMUNICATION ENGINEERING / ELECTRONICS AND TELECOMMUNICATION ENGINEERING)

SR.NO.	SEMESTER	NO. OF THEORY SUBJECTS	NO OF LABS/PRACT	TEACHING HOURS(TH) (L+T)	TEACHING HOURS (PRACT)	TOTAL CREDIT	MAX. THEORY MARKS	MAX.PRACT MARKS	MAX. MARKS TOTAL
1	I								
2	II								
3	III	5	3	21	9	24	500	150	650
4	IV	5	4	20	11	27	500	200	700
5	V	5	4	19	11	24	500	200	700
6	VI	5	4	19	11	24	500	200	700
7	VII	5	4	19	11	24	500	200	700
8	VIII	5	3	19	12	27	500	250	750
		30	**22**	**117**	**65**	**150**	**3000**	**1200**	**4200**

Subject wise Board of Studies Affiliation

Board of Studies	**Subject Codes**
APPLIED SCIENCES & HUMANITIES	ET 301,ET 401,ET505
ELECTRICAL ENGINEERING	ET 303,ET 503,ET 603
ELECTRONICS ENGINEERING	Rest all ,except above enlisted

VI Semester B.E.

Electronics Engineering

SIXTH SEMESTER BE Electronics and Communication Engineering/ Electronics and Telecommunication Engineering

Course Code : ET601

Title of the Course : PRINCIPLES OF COMMUNICATION ENGINEERING

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	1	3	4	5	3	10	10	80	100

Units	Contents	Hours
1	**Wave propagation & Noise** Fundamentals of electromagnetic waves, Ground wave propagation, sky wave, space wave, and troposphere scatter. Electromagnetic frequency spectrum, communication systems, need of modulation and its types. Noise: Sources of noise and its types, signal to noise ratio, noise factor, noise figure, noise temperature, noise equivalent temperature.	10
2	**Amplitude Modulation :** Amplitude modulation (AM), double side band (DSB), double side band suppressed carrier (DSB-SC), single side band (SSB), vestigial side band modulation (VSB): generation, demodulation, Independent side band (ISB) transmission, modulation index, frequency spectrum. Power requirement of these Systems. AM transmitter (broadcast and low power), Noise in AM systems.	09
3	**Angle Modulation :** Generalized concept and features of angle modulation; Frequency modulation (FM): modulation index, power requirement, frequency spectrum, bandwidth, phasor comparison of narrowband FM and AM waves, Generation of FM, Demodulation of FM, interference in FM system, pre-emphasis and de-emphasis techniques, FM receiver, noise in FM receiver. Phase modulation (PM): modulation index, power requirement, frequency spectrum, bandwidth analysis of narrow band FM, wide band FM and PM, interference in angle modulated system, FM transmitter (broadcast and low power). Noise in FM systems	09
4	**Radio Reciever :** TRF and super-heterodyne receiver, AGC, FM receiver, sensitivity, selectivity, image frequency rejection measurements, communication receiver and its special features. Transceivers for wireless mobile communication devices. Types of antenna, radiation pattern, antenna arrays, turnstile, loop, log periodic, UHF and microwave antenna.	09
5	**Analog Pulse Modulation:** Sampling theorem, Pulse Amplitude Modulation (PAM), Pulse Width Modulation (PWM), Pulse Position Modulation (PPM), generation & Detection of these pulse modulated signals, Pulse Code Modulation (PCM), Differential Pulse Code Modulation (DPCM), Delta Modulation (DM), Adaptive Delta Modulation (ADM). Time Division Multiplexing (TDM) & Frequency Division Multiplexing (FDM)..	08

Text Books:

1) "Electronic Communication Systems", "Kennedy", TMH

References:

1. Introduction to Analog & Digital Communication Systems", "Haykin Simon", John Wile
2. "Modern Analog & Digital Communication Systems", "Lathi B.P", John Wiley
3. "Communication Electronics Principles and Applications", "Frenzel", TMH, 3rd Edition

SIXTH SEMESTER BE Electronics and Communication Engineering/ Electronics and Telecommunication Engineering

Course Code : **ET 602**

Title of the Course : **FIELDS AND RADIATING SYSTEMS**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	**1**	**0**	**4**	**4**	**3**	**10**	**10**	**80**	**100**

Unit	Contents	Hours
I	**Transmission Lines:**	
	Basic Principles of Transmission lines, Line Equations, Transmission line parameters, characteristic impedance, propagation constant, attenuation constant and phase constant, reflection coefficient and VSWR, Introduction to Smith Chart And Stub matching.	10
II	**Guided waves and waveguide:**	
	Parallel planes Wave Guide: Field Equation, TE, TM, TEM waves and their characteristics, Attenuation in parallel plane guides, wave impedances. Rectangular waveguides: Field Equation, TM, TE waves in rectangular guides and their characteristics, wave velocity, guide wavelength, wave impedances.	10
III	**Radiation and Antenna:**	
	Scalar and vector potentials, Concept of retarded potentials, field due to a current elements, power radiated and radiation resistance for field due to a dipole, Antenna Parameters: radiation intensity, Directive gain , directivity , antenna gain ,Antenna Efficiency, Effective aperture of an antenna, Effective Length, reciprocity theorem applied to antennas.	8
IV	**Antenna Array:**	
	Various forms of Antenna Arrays: Broadside Array, End Fire Array, Array of Point Sources, Two element arrays and their directional characteristics, linear array analysis of broadside and end-fire arrays, pattern multiplication, binomial arrays, Dolph-Tchebyscheff Array.	9
V	**Practical Antenna:**	
	Parabolic reflectors, Lens antennas, Folded dipole, Turnstile Antenna, Yagi Uda antenna, Log-periodic antennas, Horn antennas, Traveling wave antennas, Cassegrain antenna.	8

Text Books:

1. Edward C. Jordan & Keith G. Balmain ,'Electromagnetic waves and radiating systems', Prentice-Hall, 2006
2. K. D. Prasad, 'Antenna And Wave Propagation', Satya Prakashan

Reference Books:

1. John D. Kraus, 'Electromagnetic', Tata Mcgraw Hill, Book Co. New York.
2. Rajeshwari Chatterjee, 'Antenna Theory and Practice', New Age International (P) Limited.

SIXTH SEMESTER BE Electronics and Communication Engineering/ Electronics and Telecommunication Engineering

Course Code : **ET 603**

Title of the Course : **CONTROL SYSTEM**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
4	**1**	**3**	**5**	**5**	**3**	**10**	**10**	**80**	**100**

Unit	Contents	Hours
I	**Systems and their Representation** Basic elements in Control Systems, Open loop and Closed loop Systems, Electrical analogy of Mechanical and Thermal Systems, Transfer Function, Block diagram reduction technique, Signal flow graph, Effect of feedback on sensitivity to parameter variation and reduction of the noise.	10
II	**Time Response Analysis** Time response, Time domain specification, Types of test inputs, First and Second order system response, Error coefficient, Generalized error series , Steady State Error, P,PI,PID modes of feedback control.	10
III	**Stability of Control System** Stability of control system, location of roots in S plane for stability, characteristics equation, Routh-Hurwitz criterion, Special cases for determining relative stability, Root locus construction, Root location and its effect on time response, Effect of pole-zero addition on proximity of imaginary axis.	10
IV	**Frequency response methods** Frequency response of linear system, Logarithmic frequency response (Bode) plots from transfer function for various systems, Polar plots for various systems, Estimation of approximate transfer function from the frequency response, Stability analysis from Bode plots, Nyquist criterion, Nyquist Plots and stability analysis.	10
V	**State Space Analysis of Control System** State variable method of analysis, Characteristics of system state, Choice of state variables, representation of vector matrix differential equation, Standard form, relation between transfer function and state variable.	10
	Total	**50**

Text Books -

1. Automatic Control Systems (with MATLAB Programs) by S.Hasan Saeed, S.K.Kataria & Sons.
2. Control System Engineering by Nagrath I.J.Gopal M, Wiley Eastern.
3. Modern Control Systems by Ogata K,Prentice Hall of India.
4. Linear Control Systems by B.S.Manke, Khanna Publication.

Reference Books -

1. Analysis and Design of Control Systems using MATLAB by Rao.V.Dukkipati,New Age.
2. Modern Control System by Richard Dorf,Robert Bishop, IIth edition 2008.

SIXTH SEMESTER BE Electronics and Communication Engineering/ Electronics and Telecommunication Engineering

Course Code : ET604

Title of the Course : DIGITAL SIGNAL PROCESSING

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	**1**	**10**	**4**	**3**	**3**	**10**	**10**	**80**	**100**

Units	Contents	Hours
1	Review of Discrete time systems, Z transform & properties, DFT its properties, radix 2 decimation in time FTT and IFFT, radix 2 decimation in frequency FFT & IFFT	10
2	**Structure of FIR and IIR filters:** Structures for realization of discrete time systems, Basic structures for FIR systems: direct form, cascade form, lattice structure, frequency sampling structure. Basic structure for IIR systems: Direct forms I,II, cascade, parallel forms, lattice and lattice-ladder structures, transposed forms.	10
3	**FIR Filters :** Introduction to FIR filters, linear phase filters, symmetric and anti symmetric filters, Window method, frequency sampling method . Design of FIR filters using Kaiser Window. Comparison of design methods for linear phase FIR filters.	09
4	**IIR Filters :** Introduction to IIR filters, Butterworth approximation, Chebyshev approximation, Design of IIR filter: impulse invariance method, bilinear transformation, approximation derivative method, Frequency transformations: low pass to high pass, band pass, band reject. Comparison between FIR and IIR filters	09
5	**Multirate Digital Signal Processing :** Introduction, Decimation by a factor D, Interpolation by a factor I, Sampling rate conversion by a rational factor I/D, Implementation of sampling rate conversion, Applications of multi rate signal processing, Introduction to digital filter banks.	09
	Total	**47**

Text Books:

1. Proakis J. G and D. G. Manolakis, “Digital Signal Processing, Principles, Algorithms and Applications”, Pearson Education, PHI.
2. Johnson J. R, “Introduction to Digital Signal Processing”, PHI
3. P. Ramesh Babu, “Digital Signal Processing”, Sci- Tech Publications.
4. Digital Signal Processing by S Salivahanan, C Gnanapriya, TMH,2e

Reference Books:

1. S. K. Mitra, “Digital Signal Processing: A Computer based Approach”, TMH, 2001.
2. Oppenheim A. V and R. W. Schafer, “Discrete Time Signal Processing”, Person Education, India
3. Rabnier, Gold, “Theory and Applications of Digital Signal Processing”, TMH.

SIXTH SEMESTER BE Electronics and Communication Engineering/ Electronics and Telecommunication Engineering

Course Code : **ET605**

Title of the Course : **COMPUTER ARCHITECTURE AND ORGANIZATION**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper (hrs)	MSE	IE	ESE	Total
3	**1**	**0**	**4**	**4**	**3**	**10**	**10**	**80**	**100**

Unit	Contents	Hours
I	**Levels Of Design**	
	Basic structure and characteristics of computer hardware and software, functional units, basic operational concepts, bus structures, software. Component details, Combinational and sequential components, Description language, Design methods, Design components and design techniques.	9
II	**Processor Design**	
	The processing unit: some fundamental concepts, Computer peripherals : I/O devices. Architecture of CPU, Performance parameters, Instruction format, RISC, CISC, Addressing modes, Parallel processing, pipelining	8
III	**Micro-programmed Control**	
	Micro-programmed control: Microinstructions, grouping of control signals, micro program sequencing, micro instruction with next address field, perfecting microinstruction, emulation, introduction to microprogramming.	10
IV	**Number Format & Arithmetic Algorithms**	
	Floating point arithmetic, IEEE 754 floating point format, Single precision and double precision IEEE format, addition of positive numbers, addition and substraction, arithemetic and branching conditions, multiplications of positive numbers, signed-operand multiplication, fast multiplication, restoring and non restoring division.	10
V	**Memory organization**	
	Basic concepts of memory, semiconductor RAM memories, memory system considerations, semiconductor ROM memories, multiple module memories and interleaving, locality of reference, cache memories, virtual memories, CAM, replacement policies.	8

Reference Books:

1. V. Carl Hamacher, “Computer Organization”, Tata McGraw Hill Inc, 5th edition
2. William Stallings , “Computer Organization And Architecture”, PHI edition

SIXTH SEMESTER BE Electronics and Communication Engineering/ Electronics and Telecommunication Engineering

Course Code : ET606

Title of the Course : CONTROL SYSTEM ENGINEERING (LABORATORY)

Common for B. E. Electronics/Electrical /Instrumentation Engineering

Course Scheme				Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	3	2	25	25	50

Up to 8 practical based on above syllabus

SIXTH SEMESTER BE Electronics and Communication Engineering/ Electronics and Telecommunication Engineering

Course Code : ET607

Title of the Course : PRINCIPLES OF COMMUNICATION ENGINEERING (LABORATORY)

Course Scheme					Evaluation Scheme(Laboratory)		
Lecture	Tutorial	Practical	Periods/ week	Credits	TW	POE	Total
0	**0**	**3**	**3**	**2**	**25**	**25**	**50**

List of suggested practical's
1. Study of Amplitude modulation and demodulation.
2. Study of Frequency modulation and Demodulation.
3. Study of AM transmitter And Receiver.
4. Study of FM transmitter and receiver.
5. Study of SSB and DSB.
6. Study of PAM.
7. Study of PWM.
8.Study of PPM
9. Study of Delta Modulation.
10. Study of Adaptive Delta Modulation.
11. Study of TDM.
12. Study of FDM.

SIXTH SEMESTER BE Electronics and Communication Engineering/ Electronics and Telecommunication Engineering

Course Code : ET608

Title of the Course : DIGITAL SIGNAL PROCESSING

Common for B. E. Electronics/Electrical /Instrumentation Engineering

Course Scheme				Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	3	2	25	25	50

Up to 8 practical based on above syllabus

SIXTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : **ET 609**

Title of the Course : **MINOR PROJECT**

Course Scheme					Evaluation Scheme(Laboratory)		
Lecture	Tutorial	Practical	Periods/ week	Credits	TW	POE	Total
0	**0**	**3**	**3**	**3**	**25**	**25**	**50**

Contents
After completing this Minor Project the student should be able to practice complete process of designing and making of PCB and Electronics circuit design 1. PCB Layout: Drawing PCB layout, standard rules, precautions, use of software like Eagle, ORCAD Layout for PCB layout 2. PCB manufacturing process: Mirror image of PCB layout, printing, exposing, itching, tanning of PCB 3. Fabrication of circuit on PCB: Mounting components, soldering, testing

A group of students (not more than five) should submit the Project Report based on Minor project

References:

1. PCB Design by Boshart, TMH publications.
2. Integrated Circuit Fabrication Technology by Elliot TMH publications.
3. Manuals of ORCAD and Eagle.