Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Credit Grade System
Sixth Semester B.E. (Electronics 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						
EN 601	Principles of Communication Engineering	3	1	0	3	3	80	10	10	100	40	--	--	--	--
EN 602	Fields & Radiating Systems	3	1	0	4	3	80	10	10	100	40	--	--	--	--
EN 603	Control System Engineering	3	1	0	4	3	80	10	10	100	40	--	--	--	--
EN604	Computer Architecture and Organization.	3	1	0	4	3	80	10	10	100	40	--	--	--	--
EN 605	Microcontrollers & Its Applications	3	1	0	3	3	80	10	10	100	40	--	--	--	--
Laboratories															
EN 606	Principles of communication Engineering	0	0	3	2	--	--	--	--	--	--	25	25	50	25
EN 607	Microcontrollers & its Applications	0	0	3	2	--	--	--	--	--	--	25	25	50	25
EN 608	Minor Project	0	0	3	3	--	--	--	--	--	--	25	25	50	25
Total		**15**	**5**	**9**											
Semester Total		**29**			**25**					**500**				**150**	**650**

GONDWANA UNIVERSITY, GADCHIROLI

FACULTY OF ENGINEERING AND TECHNOLOGY

CONSOLIDATED STATEMENT OF VARIOUS PARAMETERS IN TEACHING & EXAMINATION SCHEME OF B.E. (ELECTRONICS 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	10	26	500	200	700
5	V	5	4	18	11	24	500	200	700
6	VI	5	3	20	9	25	500	150	650
7	VII	5	3	20	8	24	500	150	650
8	VIII	5	3	19	12	27	500	250	750
		30	**20**	**119**	**59**	**150**	**3000**	**1100**	**4100**

***Audit course. It is neither considered as passing head nor considered for earning some credit(s). However, this is mandatory to be taken up at the respective college level**

Subject wise Board of Studies Affiliation

Board of Studies	**Subject Codes**
APPLIED SCIENCES & HUMANITIES	EN 301,EN 401,EN 505
ELECTRICAL ENGINEERING	EN 303,EN 405,EN 503,EN 603
COMPUTER TECHNOLOGY/CSE	EN604
ELECTRONICS ENGINEERING	Rest all ,except above enlisted

VI Semester B.E.

Electronics Engineering

SIXSITH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : EN601

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 ENGINEERING

Course Code : **EN 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 ENGINEERING

Course Code : **EN 603**

Title of the Course **: B.E. V- SEMESTER (ELECTRONICS/ E&TC) AND**
B.E. VI SEMESTER (ELECTRICAL/E&P/EEE)

SUBJECT : CONTROL SYSTEM

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	**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
		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 ENGINEERING

Course Code : **EN 604**
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

VI SEMESTER B.E. ELECTRONICS ENGINEERING

Course Code : EN605

Title of the Course : MICROCONTROLLER AND ITS APPLICATIONS

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

Units	Contents	Hours
1	Evolution of microcontrollers, The 8051 Microcontroller**:** Block diagram, programming model, pin diagram, flag register and PSW, memory organization, stack and stack pointer, special function registers	10
2	I/O ports, Interrupts, counters and timers, Serial data Input/output, external memory	08
3	Addressing modes, Instruction set: Data transfer, logical, arithmetic, branching, Assembly language programming	10
4	Interfacing: keyboard, LED and LCD, ADC/DAC, stepper motor interfacing,	09
5	AT89C51microcontroller: Pin diagram, Architecture, features of flash memory AT89C2051microcontroller: the baby 8051, pin diagram, architecture, flash memory	8
	Total	**45**

Text Books :

1. 8051 Microcontroller and Embedded Systems using Assembly and C by Keneth J. Ayala, Dhananjay V. Gadre Cengage Learning
2. The 8051 Microcontroller Hardware, Software and applications by V. Udayshankara, M. S. Mallukarjunswamy, Mcgraw-Hill
3. 8051 Microcontroller and Embedded Systems using Assembly and C by Muhammad Ali Mazidi, Janice Gillispie Mazidi and Rolin D.MacKinlay, Pearson Education, Second Edition.

Reference Books :

1. Microprocessor and Microcontroller by R. Theagarajan, Sci Tech Publication, Chennai.
2. Architecture, Programming, Interfacing and System Design by Raj Kamal, Pearson Education.

FIFTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : EN606

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 B.E. ELECTRONICS ENGINEERING

Course Code : EN607

Title of the Course : MICROCONTROLLER AND APPLICATIONS LABORATORY

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

Course Objectives:

- Understand Hardware organization, Instruction Set, Bus structure, peripheral Support devices and Application of 8051 Microcontroller.
- Learn the Assembly Language as well as C language programming for 8051.
- Develop lab experiments based on 8051.
- Understand the use of real-time interrupt structure, programming timer and precise timing Control, Analog to Digital converter, Serial communication and system interface.

Suggested list of experiments: (Using Keil software):-

1. Programs illustrating Data Transfer Operations
2. Programs illustrating Arithmetic Operations
3. Programs illustrating Boolean & Logical Operations
4. Programs illustrating Conditional CALL & RETURN instructions
5. Programs illustrating different code conversions
6. Programs using Timers, Counter, Serial Ports and Interrupts
7. Keyboard interface to 8051
8. Traffic light interface to 8051
9. External ADC and Temperature control interface to 8051
10. Logic controller Interface to 8051
11. Elevator interface to 8051
12. ON/OFF alternate LEDs by sequential keys
13. Display string on LCD using
14. Create the delays with timers & interrupts
15. Read A/D value, convert it to actual & display it on LCD

Course Outcome:

To understand the architecture of 8051 microcontroller and how to write Assembly and high level languages as well as interfacing.

SIXTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : **EN 608**

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.