Four Year Degree Course in Engineering and Technology
Course and Examination Scheme with Credit Grade System
Fifth 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 501	Linear Electronic Circuits	3	1	0	3	3	80	10	10	100	40	--	--	--	--
ET 502	Signals & Systems	3	1	0	3	3	80	10	10	100	40	--	--	--	--
ET503	Power Electronics	3	0	0	3	3	80	10	10	100	40	--	--	--	--
ET504	Microcontroller and its applications	4	1	0	4	3	80	10	10	100	40	--	--	--	--
ET 505	Theory of Communication Engineering	3	0	0	3	3	80	10	10	100	40	--	--	--	--
Laboratories															
ET 506	Linear Electronic Circuits	0	0	3	2	--	--	--	--	--	--	25	25	50	25
ET507	Microcontroller and its applications	0	0	3	2	--	--	--	--	--	--	25	25	50	25
ET 508	Signals and Systems	0	0	3	2							25	25	50	25
ET 509	Personal Proficiency -II	0	0	2	2							50		50	25
Total		**16**	**3**	**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

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

Course Code : **ET 501**

Title of the Course : **LINEAR ELECTRONIC CIRCUITS**

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.	Basic Operational Amplifier, Differential Amplifier Stages, Current Source Biasing, Level Shifting Techniques, Common Mode and Differential Mode Gains, Frequency Response and Compensation.	10
II.	Characteristics of Ideal And Non Ideal Op Amp, Error Measurement of Various Parameters, Linear Application Like Inverting, Non Inverting. Integrator, Differentiator, Differential Amp, Bridge Amplifier, Voltage to Current Converter, Regulators.	12
III.	Non-Linear Application Like Limiters, Precision Rectifier, Log Amplifier, Antilog Amplifier, Multiplier, Divider, Astable, Monostable, Comparator, Schmitt Trigger, Square to triangular Wave Generator.	08
IV.	Design of Active Filter. 1^{st} And 2^{nd} Order Butterworth Filter, Sinusoidal Oscillators D/A and A/D Conversion Circuits, Sample Hold Circuits.	08
V.	Application of ICs Like LM741, LM 555 Timer ICs, Phase Locked Loop, LM 566(VCO), LM 339 (Comparator), LM 723 (Voltage Regulator), Regulator IC Series 78xx, 79xx.	12

Reference Books :

1. R. A. Gaikwad, “Op Amps and Linear Integrated Circuits”, PHI Publication, 4th Edition
2. D. Roy Choudhary, Shail Jain, “Linear Integrated Circuits”, New Age International
3. U. A. Bakshi, A. P. Godse, “Linear Integrated Circuits & Application”, Technical Publication Pune
4. K. R. Botkar, “Integrated Circuits”, Khanna Publication 9th Edition
5. Coughlin, Driscoll, “Operational Amplifiers and Linear Integrated Circuits”, PHI Publication 4th Edition

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

Course Code : ET502

Title of the Course : Signals and 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
1	Classification of signals: Continuous time and discrete time, even, odd, periodic and non periodic, deterministic and non deterministic, energy and power. Fourier Transform of Elementary signals: exponential, sine, step, impulse, ramp, rectangular, triangular, signum, sinc. Properties of Fourier Transform, Convolution theorem, sampling theorem. Systems: Definition, Classification: linear and non linear, time variant and invariant, causal and non-causal, static and dynamic, stable and unstable, invertible. Introduction to Laplace Transform,	9
2	Linear Time Invariant Systems: Introduction, Discrete Time LTI Systems: The Convolution sum and the convolution Integral , Properties of Linear Time Invariant Systems, Causal LTI Systems described by Differential and Difference equations Singularity functions	9
3	Fourier Transform Analysis: Fourier Series representation of periodic Signals, The continuous time Fourier transform, discrete Fourier Transform and introduction to FFT.	9
4	Z-Transform: Definition, properties of z-transform, z-transform of standard sequences, inverse Z-transform, relationship of z-transform with Fourier transform, applications of Z-transform to solutions of difference equations, Properties and Applications of Z-transform.	9
5	Time and Frequency Characterization of Signals and Systems :-First & Second order Continuous and Discrete time System ,examples of Time and frequency domain Analysis of systems Sampling: Representation of a continuous –Time Signal by its Samples-Sampling Theorem, Reconstruction of a signal from its samples using interpolation, The effect of understanding : Aliasing, Discrete Time Processing of Continuous Time Signal and Sampling of Discrete time Signal.	9
	Total	**45**

TEXT BOOKS:

1. Signals and Systems by Alan V. Oppenheim, Alan S. Wilsky and S. Hamid Nawab, Publication: Prentice Hall of India Edition: Second Ed., 1997.

REFERENCE BOOKS:

1. Signals and Linear Systems by Gabel R.A. and Robert R.A, John Wiley and Sons, New York, 1987,Edition: 3rd Edition
2. Systems and Signal Analysis by C. T. Chen Publication: Oxford University Press, India, 3rd Edition, 2004
3. Introduction to Signals and Systems by Michael J. Robert, Publication: Tata Mc-Graw Hill, Edition: Second, 2003.
4. Signals and Systems by S. Haykin and B. V. Veen, Publications: John Wiley and Sons, Inc., Editions: Second Edition, 1999.
5. Signals and Systems Analysis using, Transform Methods and MATLAB by M. J. Roberts Tata McGraw-Hill Publishing Company Limited, Second Edition, 2003.

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

Course Code : ET503
Title of the Course : Power Electronics
FIFTH SEMESTER B.E. (Electronics/Electronics & Tele Communication)
SEVENTH SEMESTER B.E. (Electrical/ Electronics & Power/ EEE)

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
4	**1**	**0**	**5**	**5**	**3**	**10**	**10**	**80**	**100**

UNIT	CONTENTS	HOURS
I	**Basics in Power Electronics Engineering** Development of Power Controllers, Working Principle & Characteristics of different Power Controllers, Thyristor Family, Two Transistor model of SCR, Gate Characteristic, Turn On , Turn Off Mechanisms & other ratings of SCRs , Relaxation Oscillators using UJT, Basic Firing Circuits for SCR, Application of SCR in obtaining Logic Gates, Flip Flop and Circuit Breaker, AC Power control using TRIAC- DIAC, Basic Firing Circuits for SCR Power Transistor, Power MOSFET & IGBT (Basic properties, characteristics, comparison & applications)	12
II	**Phase Controlled Rectification** Principle of Phase Control, Line Commutation, Single phase half wave, Full wave mid –point, Fully controlled with & without freewheeling diode with different types of Loads, Effect of Source inductance, Half Controlled Bridge configurations, Development of expressions for mean current & voltage for different loads, Dual Converter Three Phase fully controlled & half controlled bridge circuits , Development of expressions for mean voltage	10
III	**Inverters** Principle of Inversion, Various Techniques of Forced Commutation & their designs, Single phase & Three phase series Inverter, Single Phase Parallel Inverter, Single phase bridge Inverter (All with commutation Circuits), Design of Filter	

	Three phase fully controlled bridge inverters in different modes (without commutation Circuit), Design of complete firing circuit for Three phase Power Control Circuits	12
IV	**Choppers & Cycloconverter** Principle of Working ,Types of Choppers, Oscillating Chopper, Jones & Morgan's Chopper, Multi Phase Chopper, Step Up Chopper, AC Chopper, Need & Principle of Working of Cycloconverter using single phase bridge circuits	08
V	**Multiple Connection & Protection** Need & methods of multiple connections of SCRs, Design of Equalizing Circuits, Firing Circuits during multiple connection, Gate protection, Over current & over voltage protections of SCR, Design of Snubber Circuit, Converter Faults	08
	Total	**50**

Text Books

(1) M.H. Rashid, "Power Electronics Circuits, Devives & Applications", Pearson Education
(2) C.W. Lander, "Power Electronics", McGraw Hill
(3) M. Ramamoorthy, " Thyristors & their Applications"
(4) GK Dubey, Doradla, Singh, Joshi " Thyristorstorized Power Controllers", New Age International
(5) Singh, Khanchandani, " Power Electronics", Tata McGraw Hill
(6) SCR Manaual by General Electric

Reference Books

(1) Philip T. Krein, "Elements of Power Electronics", Oxford University Press
(2) Vedam Subrahmanyam, "Power Electronics", New Age International
(3) MS Jamil Asghar, "Power Electronics", Prentice Hall of India
(4) PC Sen, 'Modern Power Electronics", S. Chand Publishers
(5) PS Bhimra, "Power Electronics", Khanna Publishers

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

Course Code : ET504

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 BOOK:

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 and Communication Engineering/
Electronics and Telecommunication Engineering

Course Code : **ET 505**

Title of the Course : **THEORY OF COMMUNICATION ENGINEERING**

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	**MODULATION TECHNIQUES**	
	Amplitude modulation, AM-DSB, SSB, SSB-SC, Demodulation of AM signals, Vestigial sideband transmission, Frequency modulation, Demodulation of FM signals, Frequency division multiplexing, Time division multiplexing.	10
II	**ENERGY & POWER DENSITY SPECTRA OF ANALOG AND DIGITAL SIGNALS**	
	Signal transmission through linear systems, Filter characteristics of linear systems, Distortion less transmission, Ideal and Practical filters, Energy and power density spectrum, Line coding, Manchester coding, Polar coding, Bi-polar coding, NRZ coding, RZ coding, PSD of digital signals, Control of PSD by pulse shaping, Nyquist first and second criteria.	10
III	**PROBABILITY AND RANDOM PROCESS**	
	Probability, Conditional Probability, Random Variables, Cumulative Distribution function, Probability Density Function & its properties, Statistical averages of Random Variables, Uniform Distribution, Gaussian or Normal Distribution, Introduction to random process.	10
IV	**PULSE COMMUNICATION**	
	Pulse modulation, PAM, PCM, DPCM, Delta modulation, Adaptive delta modulation, Matched filter detection of binary signals, Optimum receiver, Decision threshold, Error probability, ASK, FSK & PSK systems, DPSK systems, M-ary communication systems.	10
V	**INFORMATION THEORY**	
	Average information, Information measure, Entropy, Channel capacity of discrete & continuous channel, Shannon's theorem, Hamming codes, Huffman coding, Linear block codes, Cyclic codes, Convolution codes, Trellis diagram.	10

Text Books:

1. Modern Analog & digital Communications, B.P.Lathi
2. Communication Systems: Simon Haykins

Reference Books :

1. Communication System: B.P. Lathi
2. Communication System: A.B. Carlson

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

Course Code : ET 506

Title of the Course : **LINEAR ELECTRONIC CIRCUITS**

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

50 % of the experiments are based on ORCAD or any Equivalent simulation software.

List of suggested practical's
1. To Study elementary circuit using Op-amp(Inverting ,Non Inverting amplifiers, voltage follower, Integrator and Differentiator) 2. To study square and triangular wave generating circuits. 3. To study Op-Amp parameters-I (input impedance, output impedance, slew rate , frequency response) 4. To study Op-Amp parameters-II (Input offset voltage, Input offset current, Input bias current, CMRR) 5. To study instrumentation amplifier. 6. To study log amplifier 7. To study wein bridge oscillator 8. To study Op-Amp as low pass filter. 9. To study Op-Amp as high pass filter. 10. To study IC 555 timer.

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

Course Code : ET507

Title of the Course : MICROCONTROLLER AND ITS 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.

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

Course Code : ET508

Title of the Course : SIGNALS AND SYSTEMS

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

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

Course Code: **ET 509**

Title of the Course: **PERSONAL PROFICIENCY II**

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

Contents
After completing this course the student should get proficiency in 1. Effective communication: Introducing oneself, Asking questions, Giving polite replies, complaining and apologizing, persuading people, taking initiative, seeking permission, inviting friends, praising and complimenting people, expressing sympathy, telephonic conversation 2. Body Language: A frame work for understanding, territories and zone, palm gesture, hand and arm gesture, hand-to face gesture, arm barriers, leg barriers, other popular gesture and action, territorial and ownership gesture, body lowering and status pointers, desks tables and seating arrangement, power plays 3. Proposal and Report writing practices (R and D, project, patent, etc) 4. Concepts and Practical Approaches for "Self Development": Human Values, Non violent communication, Effective listening and silent communication. Practical Approach -Silence and Quiet time

Minimum 10 experiments based on above syllabus

1. Practicing effective communication through play, drama
2. Observation of the conversations
3. Learning body language through presentations and drama
4. Participating in one to one conversation
5. Participating in group conversation
6. Demonstration of Audio, Video CDs of well known personalities

7. Audio recording of the conversations and analyzing it offline
8. Video recording of the conversations and analyzing it offline
9. Talking in front of mirror in presence of observers like other batch mates, group leaders and/or teachers
10. Report writing
11. Diary writing a tool for “Self Development through Self exploration and introspection”
12. Case study on Non Violent Communication.

References:

1. Communication skill for technical students, T.M.Farhathullah, Orient Blackswan
2. Communication in English for technical students, TTTI Calcutta , Orient Longman
3. How to write and speak better, Reader’s digest, Editor : John Ellison Kahn
3. Body language, Allan Pease, Sheldon press
4. Course Material PPT on, “Self Development Program and Practical approach”