

EC301-Electromagnetic Engineering and Antenna Theory

Teaching Scheme :

Lectures: 4 Hrs. / Week
 Practical: --

Exam Scheme :

Paper: 100 Marks
 Practical: --
 Term Work: --

Topics and Contents		Hours
1	Coulomb's Law and Electric field intensity : Coulomb's Law, Electric field intensity, calculation of Electric field intensity for various charge distributions, streamlines and sketches of field	05
2	Electric flux density and Gauss's Law : Electric flux density, Gauss's law, Application of Gauss's law, vector operator and divergence theorem Energy and potential : Energy expended in moving a point charge in an Electric field, line integral, potential and potential difference, calculations of Electric field of both point charge and system of charges potential gradient, dipole & energy density.	09
3	Conductors, Dielectrics, Capacitance : Current and current density, continuity of current, conductor properties, Dielectric material and properties, capacitance, calculation of capacitance of various configurations, method of images	03
4	Poisson and Laplace's Equation's : Poisson and Laplace's equation and its application, uniqueness theorem, product solution of Laplace's Equation	03
5	Steady Magnetic Field : Biot savart law, Amperes circuital law, curl of H, Stokes's theorem, Magnetic flux and flux density, scalar and vector magnetic potentials of steady magnetic field lines	05
6	Time Varying field and Maxwell's Equations : Faradays law, concept of displacement currents, Maxwell's Equations in point form, Maxwell's in point form, Maxwell's Equations in Integral form, Boundary conditions and significance of Maxwell's Equations	03
7	Uniform plane Waves : Uniform plane waves in time domain in free space, sinusoidally time varying uniform plane waves in free space, wave Equation and solution for material uniform plane. Waves in dielectrics and conductors, reflection of uniform plane waves significance of plane waves, polarization of waves	05
8	Pointing Vector and flow of power : Pointing theorem, power flow for a plane wave, power flow in a concentric cable, pointing vector about R-C lines, heterogeneous average and complex pointing vector, pointing loss in a plane conductor	03
9	Antenna Theory: Review of basic of antennas, RF/HF antennas for transmission and reception. Types of antennas: Horn, Slot, parabolic, End fire antenna, microstrip, helical and broadband antennas.	04

Recommended books:

1. Engineering Electromagnetic – William H. Hayt Tata MC-Graw Hill Publication.
2. Elements of Engineering Electromagnetic – Nanapaneni Narayana Rao Prentice Hall of India Publication.
3. Electromagnetic Waves and Radiating Systems – Edward C. Jordan, Keith G Balmain
4. Electromagnetic with applications – Kraus / Fleisch, MC graw Hill.

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5. Elements of Electromagnetic fields by – S. P. Seth Dhanpat Rai & Co.
6. Electromagnetic fields and waves by – K. D. Prasad, stya prakashan.
7. Theory and problems of " Electromagnetic" 2e, Schaum outline's, J. A. Edminister.
8. Elements of Electromagnetic- Matthew N.D.Sadiku, OXFORD UNIVERCITY PRESS.
9. Antenna & Wave prapogation by K.D. Prasad

EC302-Power Electronics

Teaching Scheme :

Lectures : 4 Hrs. / Week
 Practical : 2 Hrs. /Week

Exam Scheme :

Paper: 100 Marks
 Practical: --
 Term Work: 50

Topics and Contents		Hours
1	Thyristor Power Devices: Construction and symbol, operation, steady state and switching characteristics, performance parameters of following: Power diode, Power transistor, Power MOSFET, IGBT, GTO, S.C.R, DIAC, TRIAC Applications of these devices	08
2	Triggering and Commutation of SCR Necessity of electrical isolation for triggering circuits, pulse transformer, opto-coupler firing circuit for S.C.R., R, R-C, UJT triggering circuits, different commutation techniques-circuits and principle of operation	06
3	AC Power Control Principle of integral cycle and phase angle control, Circuit diagram, waveforms, operation and analysis of single phase AC voltage controller with R and RL loads, cycloconverters, reduction of output harmonics in cycloconverters	06
4	Controlled Converters Single phase & three phase controlled converters, full controlled converters, dual converters, effect of load and source inductance, power factor improvement techniques	06
5	DC Choppers Principles of operation of step-up and step-down choppers, 2 - Quadrant & 4 - Quadrant choppers, voltage and current commutated choppers, use of source filter	04
6	Inverters Series inverter, parallel inverter, PWM Inverter (various PWM techniques for voltage control and harmonic elimination) & its control	04
7	Induction Motors and Control General principle, construction, performance characteristics, starting torque & starting torque variation with different factors, stator voltage and V/f control methods, Non- drive applications of power electronic converters-UPS, electronic ballast, HF induction heating	06

Practical Examination:

The practical examination shall consist of performing an experiment on the practical work done during the course, the record of the experiments submitted by the candidate and Viva-voce based on the syllabus.

The assessment will be based on

1. Performing an Experiment.
2. Record of experiments submitted by the candidate.
3. Viva-voce on the syllabus.

List of Experiments:

(Minimum eight experiments should be conducted during the course)

1. Study of V-I characteristics of SCR, DIAC, TRIAC.
2. Study of V-I characteristics of power semiconductor devices: GTO, MOSFET, IGBT.
3. Study of R and R-C firing circuit.
4. Commutation circuits: Class A, B, C, D.

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5. Study of 1-ph half controlled and full controlled converter. (R & RL Load)
6. Application of phase control using SCR/TRIAC.
7. Study of chopper circuit (CLC,TRC techniques)
8. Study of Series Inverter.
9. Study of Parallel Inverter.
10. Study of UPS.

Recommended books:

1. M.H.Rashid, "Power Electronics", PHI
2. V.R.Moorthi "Power Electronics", Oxford university press.
3. M.Ramamoorthy, "Introduction to thyristor and their applications", East-West Press
4. P.C.Sen, "Power Electronics", Tata McGraw Hill
5. General Electric, "SCR Manual", PHI
6. Dr.Bimbra, "Power Electronics", Khanna Pub. N. Delhi
7. Edward Hughes, "Electrical Technology", ELBS/Longman
8. M.D. Singh, K.B. Khenchandani "Power Electronics", TMH

EC 303 - Microprocessor and Peripherals

Teaching Scheme :

Lectures : 4 Hrs. / Week
 Practical : 2 Hrs. /Week

Exam Scheme :

Paper: 100 Marks
 Practical: 50
 Term Work: --

Topics and Contents		Hours
1	Introduction to computer architecture and organization : Architecture trends of Microprocessors, efficiency versus performance, Introduction to CISC processor architecture, RISC architecture; Memory organization, allocation and management; hierarchical memory structure and virtual memory; cache memory, Operating system concepts & architectural support - CPU organization Control Unit, registers and ALU.	06
2	Introduction to 8 bit microprocessor: Internal architecture of Intel 8085 microprocessor: Block diagram, Registers, Internal Bus organization, Functional details of pins, Control signals, Concept of external Address / Data bus multiplexing, Demultiplexing, Interrupt features, Serial communication feature, DMA support.	06
3	8086 Microprocessor Architecture 16 bit microprocessors: Intel 8086 Architecture ;Memory address space and data organization; Segment registers and memory segmentation ;I/O address space; Addressing modes	06
4	Intel 8086 programming: 8086 Instruction set. Program development tools: editor, assembler, linker, locator, debugger and emulator. Assembly level programming with DEBUG and MASM- MS DOS Functions and BIOS Calls – programming examples using 8086.	05
5	System Bus Structure : Comparison of 8086 and 8088. Basic 8086/8088 configuration – Minimum mode, Maximum mode. System timing - Bus interface. Interrupts and interrupt priority management. Memory interfacing- RAM , ROM, EPROM	07
6	Interfacing Devices: Interfacing of Display [LED, LCD, SEVEN Segment] & Keyboard, ADC & DAC, Stepper motor with 8086.	05
7	Multiprocessor Configuration Study of NDP 8087- Architecture, Data types, Interfacing with 8086, Instruction set Study of 8089 I/O processor- Architecture, Interfacing.	05

Practical Examination:

The practical examination will be of three hours duration. It will consist of one experiment conducted during the course and an oral examination based on the syllabus

List of Experiments:

Software based:

Any eight experiments from the list given below.

- 01) Arithmetic operation on two 8 bit numbers
- 02) Addition and subtraction of two 16-bit numbers.
- 03) Operation on two 16-bit BCD numbers. (using DAA instruction.)
- 04) Block transfer of data bytes.
- 05) Searching of the smallest and largest element in a block of data.
- 06) Sorting the elements of a block of data in ascending and descending order.
- 07) Converting 2 digit numbers to their equivalents.
a) BCD to HEX and b) HEX to BCD
- 08) Floating point operations

Hardware Based:

Any four experiments from the list given below.

- 01) Program controlled data transfer using 8255 PPI.
- 02) Interfacing 7 segment LED display using 8255A – in static and dynamic mode.
- 03) Interfacing keyboard-using 8279.
- 04) Interfacing display-using 8279.
- 05) Interfacing ADC 0808/0809.
- 06) Interfacing DAC 0808.
- 07) Interfacing stepper motor with microprocessor using 8255A – in Half and Full excitation.
- 08) Interfacing of 8253 / 8254.
- 09) Interfacing of 8251.

Recommended books:

01. Microprocessors Architecture, Programming and Applications with the 8085A - Ramesh S Gaonkar.
02. Microprocessors and Digital systems. - Douglas V Hall.
03. Microprocessors and Programmed Logic - Kenneth L Short.
04. Microcomputer Systems: The 8086/8088 family Architecture, Programming, and Design. By Yu-Cheng Liu Glenn A. Gibson.
05. Microprocessors and Interfacing Programming and Hardware. By – Douglas V. Hall.
06. The 8086/8088 family: Design, Programming, and Interfacing by – John Uffenbeck.
07. Ajoy Kumar Ray & Kishor M.Bhurchandi, "Advance Microprocessors & Peripherals" (Architecture, Programming & Interfacing), Tata Mcgraw-Hill Publishing Company Limited, New Delhi.
- 08 Hamacher C V, " Computer Organisation - 3rd Edition" , Mc.Graw Hill., NewYork, 1990
09. Pal Chaudhary P, "Computer Organisation and Design" , Prentice Hall, New Delhi, 1995
10. Hayes J P , "Computer Organisation and Architecture - 2nd Edition", Mc Graw Hill, NewYork,

EC304-Signal Coding and Estimation Theory (E&TC/E&C)

Teaching Scheme :

Lectures: 3 Hrs. / Week

Practical: --

Exam Scheme :

Paper: 100 Marks

Practical Exam.: --

Term Work: --

Topics and Contents		Hours
1	Source Coding Introduction to probability: Properties and theorems., Relation between probability and information, Introduction to information theory, Uncertainty and information, Information Measure, Average Information and mutual Information, Source coding theorem, Shannon-Fanon Algorithm, Huffman coding , The Lempel-Ziv algorithm, Run length coding ,	06
2	Channel Capacity and coding Introduction, Type of sources and channels, Channel models, Channel capacity, Channel coding, Information Capacity Theorem, Shannon's theorem, the Shannon limit	06
3	Linear block codes. Introduction to error correcting codes, basic definitions, matrix description of linear block codes, equivalent codes, parity check matrix, syndrome decoding, perfect codes, hamming codes, optimal linear code, maximum distance separable codes	06
4	Cyclic codes: Introduction to cyclic codes, polynomials the division algorithms for polynomials, a method for generating cyclic codes, matrix description of cyclic codes, circuit implementation for cyclic codes, Burst error correction, Fire codes, Golay codes, BCH Codes, Cyclic Redundancy Codes (CRC), Reed- Solomon Codes, Nested Codes	08
5	Convolution codes and coding methods: Introduction to convolutional codes, Tree codes and trellis codes, Polynomial description of convolutional codes, distance notions for convolutional codes, The generating functions, matrix description of convolutional codes, Viterbi decoding of convolutional codes, Introduction to TCM, the concept of coded modulation, mapping by set partitioning, Tem decoder, performance evaluation of Awgn channel, Tcm for fading channels	10
6	Estimation Theory: Basic concepts and criterion, Bayes Criterion, Maximum Likely Hood Estimation, Maximum a priori Estimation, Least Square estimation	04

List of Experiments :

1. Generation of Codes (at least three codes)
2. Study of Source coding (data compression)
3. Study of Hamming Distance calculation
4. Encryption and Decryption of data
5. Study of error detecting codes
6. Study of error correction using hamming code.
7. Study of Convolution codes.
8. Study of Block Codes.
9. Study of sequential decoding.

Note: 1. Above experiments can be performed either by using C Programming or any HLL.
2. At Least eight experiments to be conducted.

Practical Examination.

The Practical Examination will be of three Hours duration. It will consist of one experiment out of the list of experiments specified and an oral exam based on the syllabus.

Term Work:

Term Work will consist of record of Minimum eight experiments out of the following and the assessment will be based on.

1. Performing an Experiment.
2. Record of experiments submitted by the candidate.
3. Viva-Voce on the syllabus.

Recommended books:

1. Information Theory coding and Cryptograph, -- Ranjan Bose, TMHI, 2002.
2. N.Abramson – Information and coding , Mc-Graw Hill.
3. M.Mansurpur- Introduction to information Theory, Mc-Graw Hill, 1987
4. R.B.Ash- Information Theory, Prentice- Hall, 1970.
5. Simon Haykin – Digital Communication, John Willey, 1998.
6. K.Sam Shanmugam – Digital and Analog communication systems, John Willey, 1994.
7. Analog and digital communication, 2/e, Schaum’s Outlines, Hwai P Hsu, TMH

EC305-ANALOG INTEGRATED CIRCUITS AND APPLICATIONS

Teaching Scheme :

Lectures: 4 Hrs. / Week
 Practical: 2 Hrs. /Week

Exam Scheme :

Paper: 100 Marks
 Practical : 50 Marks
 Term Work: --

Topics and Contents		Hours
1	Op-Amp Fundamentals : Block diagram of Op-Amp (Basic building blocks), Basic differential amplifier using transistors it's operation, DC & AC analysis, current sources, current mirrors, Active load, Differential to single ended conversion	04
2	Operational Amplifier : Op-Amp, Parameters & characteristics, defination, & measurement, Ideal Op-Amp, equ. Circuit, volt. Transfer curve, open & closed loop, Inverting & Non-inverting configurations, Concept of virtual shorts & grounds. Non-ideal (AC & DC) Op-Amp behavior & its effect on performance offset nulling techniques	06
3	Op-Amp Linear Applications : Voltage follower, Summing amplifier, Scaling & averaging amplifier, Instrumentation amplifier & applications, V to I to V converter, Integrator & Differentiators, Practical considerations, peak detector, log & antilog amplifiers and analog multipliers	05
4	Op-Amp Nonlinear Applications : Comparators, Limitations of Op-Amp as comparator, Schmit trigger, Comparator IC such as LM 339, Sample & hold circuit, Window detector, Clipper & clamper, Square wave generator using op-Amp Precision Rectifier	05
5	Signal Generators : Multi-vibrators using timer IC-555 & Op-Amp Study of function generator IC-8038, XR2206, Study of VCO-IC 566.	04
6	Active Filter Design : Advantages of active filters, Filter class-Butterworth, Chebyshev, Bessel, Elliptic. Design of active filter of LPF, HPF, BPF, of 1st order & 2nd order. Buterworth filter.	05
7	Phase Locked Loops : Block diagram of PLL, Block diagram of PLL IC 565, Definations – free running frequency, lock range, capture range, pull in time. Transfer characteristic of PLL	05
8	Voltage Regulator : Linear IC voltage regulator, Need for voltage regulation, fixed voltage regulator (78XX, 723), adjustable voltage regulator: (723, LM317, LM337) Switching regulator IC 78S40	06

LIST OF EXPERIMENTS:

1. Op-Amp parameters measurements – offset voltage, Bias current, CMRR, Slew rate, Output resistance.
2. Op-Amp Applications – I: Integrator & Instrumentation Amplifier.
3. Op-Amp Applications – II: Comparator, Schmitt Trigger.
4. Design, Simulate, Build & Test Active Filters.
5. Design, Build & Test a square wave generator using Op-Amp.
6. To study the operation of IC 565 as PLL.
7. Implementation of IC 723 as basic high / low voltage regulator.

8. To verify precision rectifier using Op-Amp

Practical Examination:

The practical examination will be of three hours duration. It will consist of one experiment out of the list of the experiments specified and an oral examination based on the syllabus.

Recommended books:

1. Coughlin, Driscoll, Operational Amplifiers & Linear Integrated circuits, PHF, Fourth Edi.
2. D. Roy Choudhary, Shail Jain, Linear Integrated Circuits', New Age International.
3. Ramakant Gaikwad, 'Op-Amp & Integrated circuits', PHI.
4. G. B. Clayton, Operational Amplifiers' ELBS Edition.
5. Govind Daryananj, 'Principles of Active Network Synthesis & Design,' John Wiley & Sons.
6. Seryio Franco,' Operational Amplifiers & Analog Integrated circuits'

EC306- MICROELECTRONICS (EC/IE)

Teaching Scheme :

Lectures : 3 Hrs. / Week

Practical : --

Exam Scheme :

Paper: 100 Marks

Practical: --

Term Work: --

	Topics and Contents	Hours
1	IC Technology Semiconductors and devices, an overview of IC Technology and its requirements, Unit steps used in IC Technology	06
2	Clean room Environment for VLSI Technology : Clean room and safety requirements, Wafer cleaning processes, Crystal growth, impurity incorporation through diffusion and ion implantation, guttering	07
3	Oxidation, Etching Oxidation : Kinetics of Silicon dioxide growth both for thick and thin films, Oxidation technologies in VLSI , Plasma etching and RIE techniques; RTP techniques for annealing, growth and deposition of various films.	07
4	Lithography Lithography : Photolithography, E-beam lithography and newer lithography techniques for VLSI, Mask generation, PPR and NPR	07
5	CVD Chemical Vapor Deposition techniques: CVD techniques for deposition of polysilicon, silicon dioxide, silicon nitride and metal films; Epitaxial growth of silicon. Metal film deposition : Evaporation and sputtering techniques	07
6	Fabrication and Layout Process integration for NMOS, CMOS; Advanced MOS technologies.	06

Recommended books:

Text Books :

1. Plummer, Deal, Griffin, 'Introduction to semiconductor fabrication', Prentice Hall publication – 2001. ISBN No 0130224049

Reference Books :

1. Richard Jaeger, 'Introduction to Microelectronic Fabrication', Prentice Hall, 2nd edition 2002.
2. C.Y. Chang and S.M. Sze (Ed), 'ULSI Technology', McGraw-Hill, 1996.
S.K.Gandhi, 'VLSI fabrication Principles', John Wiley Inc., New York, 1983.
3. Sadra/Smith, "Microelectronics circuits". Oxford Publication.

EC307- Electronic System Design Lab

Teaching Scheme :

Lectures: 1 Hrs. / Week

Practical: 2 Hrs. /Week

Exam Scheme :

Paper: --

Practical Exam.: 50 Marks

Term Work: --

Module 1: (12 hours)

Topics and Contents

- 1 **Rectifiers & Filters:** Design a Full wave centre-tap rectifier circuit with an LC filter to supply centre-tap 9V dc at 50 mA with a ripple factor of 0.02
- 2 **Voltage regulators:** Design a series voltage regulator for 15V at 100mA the unregulated power supply provide output of 25V and $r_o = 10\Omega$.
- 3 **Voltmeters:** Design multi range Voltmeter using op-amp for the voltage of 0.1-1-10-100-1000V. Use moving coil instrument of $5k\Omega$ internal resistance and $50\mu A$ full-scale deflections current. The total impedance of the meter should be greater than or equal to $100M\Omega$.
- 4 **Amplifiers:** Design a two stage RC coupled amplifier to meet the following specifications, Load resistor $R_L = 3K\Omega$, Source resistance $R_s = 600\Omega$, output voltage $9V_{pp}$ with a supply voltage of 15 V, lower 3dB frequency is $50H_z$.
- 5 **Power amplifiers:** Design power amplifier using LM 380 for following specification, $P_o = 1.5W$; $R_L = 4\Omega$; $BW = 30H_z$ to $15KH_z$; $A_v = 50$.
- 6 **Oscillators:** Design a Transistorized Colpitt's oscillator for the frequency of 1 Mhz and giving output voltage of $1V_{(rms)}$.
- 7 **Oscillators:** Design Wein bridge oscillator using IC 741 for frequency of $1KH_z$ at peak output voltage of 14V.
- 8 **Multivibrators:** Design a 555 Astable Multivibrator to operate at 10kHz with duty cycle of 60%.
- 9 **Combinational Circuit:** Design a priority encoder.
- 10 **Flip flops:** Design JK flip flop and verify its truth table using NAND gate.
- 11 **Counters:** Design a BCD/Decade using IC74192 for the following specification, clear output to Zero, load (preset). Draw the o/p waveform for clear, load & count sequence and also interface the o/p of counter with FND display in order to check the count sequence
- 12 **Detector:** Design the diode detector circuit for AM wave with following specifications $R_i = 10K\Omega$, $f_m = 5KH_z$, $f_c = 455KH_z$, $m_a = 0.6$.

The Practical work will be carried out by a student working on topic related to the electronics Telecommunication and allied fields. (At least eight experiments related to the above topics)

Module 2: (2 hours)

- 13 **Printed Circuit Board:** PCB design steps and concepts; also design PCB for any one of the above circuit.

Module 3: (2 hours)

- 14 **Introduction to Electronic System Design;** Packaging & Enclosures of Electronic System; Cooling in/of Electronic System; Electromagnetic Compatibility (EMC); Cabling of Electronic Systems; Grounding of Electronic Systems; Balancing & Filtering in Electronic Systems; Shielding of Electronic Systems; Protection Against Electrostatic Discharges (ESD).

Recommended books:

1. Op-Amp's and linear integrated circuits by Ramakant Gaikwad.
2. Fundamentals of digital electronics by Floyd.
3. Electronic Devices & circuit theory by Boylestad.
4. Electronic Instrument Design, 1st edition; by: Kim R. Fowler; Oxford University Press.
5. Noise Reduction Techniques in Electronic Systems, 2nd edition; by: Henry W. Ott; John Wiley & Sons.
6. Digital Design Principles & Practices, 3rd edition by: John F. Wakerly; Prentice Hall International, Inc.

EC308- SOFTWARE LAB (JAVA PROGRAMMING/.NET)

Teaching Scheme :

Lectures : --
Practical : 2 Hrs. /Week

Exam Scheme :

Paper: --
Practical: --
Term Work: 50

The software lab will be based on one of the following languages

- I .Java programming
- II. .Net

I .Java programming

Topics and Contents

- 1 **Java as a OOP (Object Oriental Programming) language**
Features of OOP, OOP vs procedural language, Goals of Java programming language. Key features of Java, Difference between c++ & Java, The Java Virtual Machine (JVM), JVM run time environment, concept of Byte code, Garbage collection.
- 2 **Java Programming**
The source file layout, compiling & running program, Primitive data type, Wrapper classes, variables, Type conversion & casting, operators & assignments, Arrays, Java classes & methods, Declaring objects, constructors ,'this' keyword. Overloading methods and constructor passing arguments using call by value & call by reference. Access control, understanding static.
- 3 **Inheritance & Multithreading**
Basics using super, method overriding, dynamic method dispatch, Abstract classes, using final, Java thread model, The main thread ,(reating a thread, creating multiple threads, using Alive() & Join (), Thread priorities, synchronization, Interthread communication, suspending, resuming & stopping threads.
- 4 **Packages, Interfaces & Exception handling**
Packages, Access protection, Importing Packages, Interfaces, Accessing implementations through interface references – Extending interfaces , classes versus Abstract class versus interface
Exception handling fundamentals, using try & catch, Exception types, multiple catch clauses, throw, throws, finally, Javas build in exceptions, Creating your own exception subclasses.

Term Work:

Assessment of term work should be done as follows

Continuous lab assessment

Actual performing Practicals in lab

Oral examination (Internally) conducted of the time of submission on the syllabus & practical performed

It shall consists at least 10 programs based on the above mentioned topics Or One mini project.

Recommended books:

Text Book:

Patric Naughton & Herbert Schildt, Java 2: The complete refrence third edition, Tata McGraw Hill.

Refrence Books :

Pragramming with Java A primer :E Balguruswamy,

II.NET

1. Introducing .Net

.Net framework overview, common type system, common language specification

Common Intermediate language, Just in time complier,.Net framework class library, Namespaces, Languages in .NET, Assemblies

2. First VB.NET Program

The solution Explorer window, the class View window, the toolbox, The output window, the task list window

3. Data types, operators and control statement

Variables and Data types assignment and arithmetic operators, comparison and logical operators, controlling the flow of program, controls structures, loops , arrays, procedures.

4. Creating Menus and using dialog boxes

Menus, multiple document interface (MDI), context menu, rich text box, colour dialog control, font dialog control.

5. Object Oriented concepts in VB.NET

Boxing and unboxing, read only and write only properties, adding methods to class, classes with constructor,Assemblies that access C# Program,names spaces inheritance, overriding properties and methods, shadows statement,polymorphism

6. Events delegates and exception handling

Events in class,delegates, single cast delegates, Mmulticast delegates, exception try, catch, finally, end try, try-catch, multiples catch, Nested try statement, try finally

7. Data Access with ADO.NET

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Special features of ADO.NET, Difference between ADO and ADO.NET, connection , commands – execute reader, execute query, execute scalar, using data grid, complex data binding.

8. Web Application with VB.NET and ASP.NET.

First ASP.NET application, server controls, validation summary controls, ADO.NET and data binding.

Text Books

- 1 VB.NET – P.Radhaganesal SCITECH PUBLICATION.
2. Visual Basic .Net: Tps & Techniques, Author: Jamsa, ISBN: 0-07-052919-1
Edition: 01, Publisher: Tata McGraw- Hill
3. Visual Basic.Net : A Beginners Guide Author: KANT, TMH.
4. The Complete reference as P-NET – Mathew Mac Donald TMH PUBLICATION.

Term-Work:-

It shall consist of at least one mini project package based on above syllabus.

Assessment of term work should be done as follows:-

*Continuous Lab Assessment

*Actually performing practicals in laboratory

*Oral Examination (Internally) conducted at the time of submission on the syllabus and practicals performed.

Prof. Prashant S. Kolhe
Chairman
Board of Study
Dr. B. A. M. U. Aurangabad

EC309-Digital Communication

Teaching Scheme :

Lectures: 4 Hrs. / Week
 Practical: 2 Hrs. /Week

Exam Scheme :

Paper: 100 Marks
 Practical Exam.: 50 Marks
 Term Work: --

Topics and Contents		Hours
1	Introduction: Differences between digital and analog communication systems. Block diagram of digital communication system, Bandwidth of digital data and bandwidth dilemma. Review of Random variables & Stochastic process.	06
2	Digital Transmission of Analog Signals: Introduction, Sampling Theory and Practices, Sampling Theorem, Ideal Sampling and Reconstruction of low-pass signals, the Uniform sampling theorem for band-pass signals, Practical Sampling.	06
3	Digital Coding of Analog Waveforms: Digital pulse Modulation, Uniform Quantization, Non-uniform Quantization, Quantization noise, Companding, coding, Digital-formats, Decoding, Regeneration, Differential Pulse Code Modulation, Delta Modulation, Quantization noise, Time Division Multiplexing, TI System.	08
4	Inter symbol Interference and it's Cures: Base-band Transmission of Binary Data, The Inter symbol interference problem, Ideal solution, Raised Cosine Spectrum, Correlative-Level Coding, Base-band transmission of M-array Data, Synchronization & Framing.	06
5	Spread Digital Modulation Techniques: Binary Modulation Techniques, ASK, PSK and ESK, Generation and Detection of Binary Modulated waves, Quadrature Shift Keying, Minimum Shift Keying.	08
6	Introduction to Spread Spectrum Techniques: A model of Spread Spectrum digital communication system, direct sequence spectrum signals, Frequency Hopped Spread Spectrum signals, Slow Frequency and Fast Frequency Hopping.	06

List of Experiments :

1. Verification of sampling theorem using flat top sampling.

2. Study of TDM.
3. ASK Generation & detection.
4. FSK Generation & detection.
5. PSK Generation & detection.
6. DPSK Generation & detection.
7. QPSK Generation & detection.
8. Study of PCM Generation & detection.
9. Study of Delta Modulation

Recommended books:

1. An introduction to Analog and Digital Communication – S. Haykin, John-Wiley.
2. Digital and Analog Communication Systems – K. S. Shanmugam, John-Wiley.
3. Digital communications, 4th Ed, John G Proakis, McGraw Hill.
4. Digital Communications, - Simon Haykin John-Wiley, 1998.
5. Principles of Communication Systems, 2/e, Taub Schilling. TMH.

EC310-Digital Signal Processing

Teaching Scheme :

Lectures: 4 Hrs. / Week
 Practical: 2 Hrs. /Week

Exam Scheme :

Paper: 100 Marks
 Practical Exam.: --
 Term Work: 50 Marks

Topics and Contents		Hours
1	Introduction: Basic elements of DSP and its requirement, Advantages of digital over analog signal processing. Analog-to-Digital and Digital-to-Analog conversion.	03
2	Z-Transforms: Definition and properties, significance of ROC, Poles and zeros, Inversion of the Z-transforms, Analysis of LTI systems in the Z-domain.	04
3	Discrete and Fast Fourier Transforms: Definition and properties of DFT, IDFT, and Linear filtering methods based on DFT, FFT algorithms, Frequency analysis of discrete time signals, Gortzel algorithm, relation between DFT and Z-transform.	06
4	IIR Filter design: Filter design methods- Approximation of derivatives, Impulse invariance, bilinear transformation, characteristics of Butterworth, chebyshev, frequency transformations, IIR filter structures- Direct form, parallel form, Lattice and Lattice-ladder structures.	06
5	FIR Filter design: Symmetric and Antisymmetric FIR filters, design of FIR filters using windows, frequency sampling methods, Alteration theorem in equiripple linear phase FIR filters, FIR differentiators, FIR filter structures-Direct form structures, cascade form structure, frequency-sampling structures.	06
6	Multirate DSP: Introduction, Decimation by factor D, Interpolation by factor I, sampling rate conversion by a rational factor I/D, filter design and implementation for sampling rate conversion Direct form FIR filter structures, Time variant filter structures, Sub band coding of speech signals, over-sampling A/D and D/A,	06

- wavelet transform.
- 7 **Analysis of Finite world length effect:** 06
Quantization process and errors, Analysis of coefficient quantization effects, A/D conversion, Noise analysis, Analysis of Arithmetic round-off errors, Dynamic range scaling, signal to noise ratio in low order IIR filters, Low sensitivity, Digital filters, reduction of product round-off errors using error table, limit cycles in IIR digital filters, Round-off errors in FFT algorithms, Desirable features and architecture of DSP processor.
- 8 **Applications of Digital Signal Processing:** 03
Dual tone multi frequency signal detection, musical sound processing, digital FM stereo generation, application to speech: channel vocoder, speech analysis/synthesis system, application to radar.

Term Work:

Term work will consist of record of eight experiments out of the following and the assessment will be based on

- 1 Performing an experiment
- 2 Record of experiments submitted by the candidate
- 3 Viva-Voce on the syllabus

List of Experiments:

1. Zero-pole analysis using transfer function, zero-pole-gain
2. Partial fraction expansion and second order sections and convolution matrix.
3. Spectral analysis
4. FFT based time frequency analysis
5. IIR filter design Butterworth and chebyshev type I and type II
6. FIR filter design Linear phase and windows.
7. Illustration of Decimation and Interpolation process.
8. Computation of Output Noise
9. Dual-Tone Multi-frequency Tone Detection

Any other experiments Based on the above syllabi.

Recommended books:

1. J.G. Proakis, D.G. Manolaakis, "Digital Signal Processing", PHI.
2. Chi-Tsong Chen Digital Signal Processing Oxford university press.
3. A.V. Oppenheim, R.W Schaffeur, "Discrete-Time Signal Processing", PHI.
4. S.K.Mitra, "Digital Signal Processing", TMH
5. S. Salivahanan, A Vallavaraj, "Digital Signal Processing", TMH.
6. Rabiner Gold, "Theory and Application of DSP", PHI.
7. Ifeachor, Jervis "Digital Signal Processing", Pearson.
8. Texas Instruments and Analog Devices DSP Chip Manuals.

EC311- Microcontrollers & Advanced Processors

Teaching Scheme :

Lectures: 4 Hrs. / Week

Practical: 2 Hrs. /Week

Exam Scheme :

Paper: 100 Marks

Practical Exam.: 50

Term Work: --

Topics and Contents		Hours
1	Intel microcontroller 8051: Features of MCS-51 family ,8051 microcontroller architecture, pin details, addressing modes, memory organization, special function registers On chip peripheral devices such as timer/counter, I/O ports, serial port. Interfacing of external program & data memory. Interfacing of 8255. LCD,ADC & stepper motor	12
2	Atmel 89CXXmicrocontrollers: 89CXX microcontroller, Flash programming, Application such as square wave generation, pulse width measurement, Frequency counter	04
3	PIC/AVR microcontrollers: Overview &features of PIC 16C6X/16C7X &16F8X.AVR microcontroller family features, architecture	04
4	80286 microprocessor: Features,internal architecture / block diagram, pin description, real address & protected virtual address mode (PVAM) .Physical address calculation in PVAM.Descriptors and their types..Local & Global descriptor tables.Privilege ,protection mechanism.Bus interface, minimum system configuration.	10
5	80386 microprocessor: Features, architecture, signal description, register organization.Data types supported by 80386.Segmentation and paging. .80486 silent features, architecture.	06
6	Recent advances in microprocessors: Pentium processor features , architecture. Overview of Pentium pro	04
		20

,Pentium-II & III processors

Term Work:

The term work will consists of record of minimum eight experiments
Minimum four from the following list of experiments..

1. Interfacing of ADC to 8051 microcontroller.
 2. Interfacing of LCD to 8051 microcontroller.
 3. Interfacing of LEDs to 8051 microcontroller
 4. Interfacing of stepper motor to 8051 microcontroller
 5. Programming the on chip Flash memory of 89c51 microcontroller.
 6. Frequency counter using 89c51 microcontroller
- Rest of the four are software programs in 8051 Assembly Level Language

Recommended books:

1. Muhammad Ali Mazidi & Janice Gillispie Mazidi: The 8051 Microcontroller and Embedded System, PEARSON Education
2. Ajay Deshmukh: Microcontrollers (Theory & Applications) Tata McGraw Hill Publishing Company.
3. A.K. Roy & K.M. Bhurchandi: Advanced Microprocessors and Peripherals, Tata McGraw Hill Publishing Company.
4. Dhanajay V. Gadre: Programming and Customizing the AVR microcontrollers, Tata McGraw Hill Publishing Company.
5. Md. Rafiqzaman: Microprocessor and Microcomputer based system Design

EC312- ELECTRONIC MEASUREMENTS

Teaching Scheme :

Lectures: 2 Hrs. / Week
Practical: --

Exam Scheme :

Paper: 50 Marks
Practical Exam.: --
Term Work: --

Topics and Contents		Hours
1	Oscilloscope: Overview of analog CRO, Dual/ multitrace CRO, various types of probes, sampling oscilloscope, storage CRO, Digital Storage CRO, and its enhanced features such as automatic measurements, typical specification of DSO, concept of Digital Phosphor Oscilloscope (DPO),	08
2	Signal Analyzing Instruments: Wave analyzer, Harmonic distortion analyzer, spectrum analyzer, logic analyzer, network analyzer, FFT analyzer.	04
3	Communication related measurements Measurement on audio/video amplifier, measurements on transmitter/ receiver; sensitivity, selectivity, non-linear distortion, fiber optic power measurement, measurement of microwave frequencies, RF/ UHF field strength meter, fiber system loss, modulation measurement, Bolometer.	08

Recommended books:

1. Alan S. Morris, "Principles of measurements and instrumentation", PHI.
2. A.D. Helfrick and W.D. Cooper, "Modern Electronic Instrumentations and Measurements Techniques", PHI.
3. A.J. Bowon, "Digital Communication"
4. H.S. Kalsi, "Electronic Instrumentation and Measurements", Tata McGraw Hill.

Reference Books:

1. Oliver Cage, "Electronic Measurement and Instrumentation", Tata McGraw Hill.
2. J.J. Carr, "Elements of Electronic Instrumentation and Measurements Hand book ", 3rd Edition Pearson Education.
3. Coombs, "Electronic Instrumentation Hand book".

EC313-FEEDBACK CONTROL SYSTEM

Teaching Scheme :

Lectures: 4 Hrs. / Week
Practical: 2 Hrs. /Week

Exam Scheme :

Paper: 100 Marks
Practical: 50 Marks
Term Work: --

Topics and Contents		Hours
1	INTRODUCTION TO FEEDBACK CONTROL SYSTEM : Basic Components, Classification, Open loop & Closed loop system, Examples of control system & feedback systems, overview for Laplace Transform, Z-Transform, Differential equations	06
2	MODELLING A CONTROL SYSTEM: Transfer function approach –Introduction, Definition, Procedure for physical, Hydraulic, pneumatic, thermal systems. Block Diagram representation – Advantages, Error detection, procedure for Drawing blocks & reduction Signal flow graph - Rules for construction of signal flow graph & Drawing S SFG from a given block diagram, differential equation.	08
3	ANALYSIS OF CONTROL SYSTEM: Time response analysis- standard test signal, time response of second order Systems, steady state error & error constant, design specification of second order System. Frequency response analysis – Bode plots, gain margin, phase margin, effect of addition of poles and zeros on bode plot. Root locus techniques.	10
4	Stability analysis Concept of stability condition, characteristics equation, Relative stability, Routh-Hurwitz criterion. And Nyquist stability criterion. State Variable	04

- analysis: Basic concept, state variable, state model, solution of state equations
- 5 **Compensators:** 06
Preliminary design considerations, needs of compensations, lead compensations, Lag compensation, lag-lead compensation
- 6 **CONTROL SYSTEM COMPONENTS:** 06
AC/DC Servomotors, stepper motor, tachometers, sensors, potentiometer as error Detector, Actuators, valves and solenoid valves, relays, electronic controllers, synchronous machines. Programmable logic controllers, concepts of Fuzzy logic, Neural based Control system.

TERM WORK:

Minimum eight Experiment should be performed the given list.

LIST OF EXPERIMENT:

1. Study of control loop: temp / pressure.
2. Determination of transfer function of generator set .
3. Study of potentiometer as a transducer & error detector.
4. Study of synchro machines .
5. Study of AC/DC position servo system.
6. Study of Transients response of second order system.
7. Software based expts –based on Matlab control system Toolbox, & simulink (Any three)1. Bode plot 2.Root locus 3.Nyquist plot 4.Transient response.

Recommended books:

1. Modern control system. (II Edition) –Katsuhiko Ogata
2. Control System Engineering, I.J.Nagrath, M.Gopal (willey Eastern)
3. Automatic control system. (II Edition)-Benjamin c.Kuo ,PHI
4. Control Systems Engineering. S.K.Bhattacharya , Pearsons Edu
5. Modern Control System, Drof, Bishop, Wesly Publication

EC314- INDUSTRIAL DRIVES AND CONTROL (I.E.)

Teaching Scheme :

Lectures: 4 Hrs. / Week
Practical: 2 Hrs. /Week

Exam Scheme :

Paper: 100 Marks
Practical: 50 Marks
Term Work: --

	Topics and Contents	Hours
1	DC Motor Drive : Basic characteristics of DC motor, Single phase drives , single phase half wave converter drives, Single Phase full wave converter drives, single phase dual converter drives, three phase drives, three phase half wave converter drives, three phase full wave converter drives.	10
2	Chopper Based DC Motor Drives: Introduction to choppers, first, second, four quadrant choppers, continuous & discontinuous current mode, step up & step down choppers. Control techniques for choppers- PWM, constant pulse width & variable frequency, CLC.	08
3	AC Motor Drives : Performance characteristics, circuit for speed control, control techniques & their analysis, close loop & open loop operation. Current source inverter, drives, voltage source inverter drives.	10
4	Synchronous Motor Drives : Types of synchronous motors- wound field cylindrical rotor motor, permanent magnet synchronous motor, operation, equivalent circuits & speed control techniques, stepper motor drives.	04
5	Electrical Drives :	04

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Dynamics of electrical drives, four quadrant operation, component & classification of load torques, steady state stability.

6 Traction Drives :

04

Traction Drives circuit for main line trains, trolleys, electrical buses traction load, braking, DC traction drives with resistive control, DC traction semiconductor chopper drives, AC motor drives.

TERM WORK:

Term work will consists of record of minimum eight experiments based on above syllabi.

LIST OF EXPERIMENTS :

1. Speed control of Universal Motor using SCR/TRIAC/IGBT.
2. Speed Control of DC shunt motor using three phase converter.
3. Speed Control of DC shunt motor using chopper.
4. Study of complete control system consisting of soft start circuit, speed errors amplifier current controller for DC motor.
5. Speed Control of single phase induction motor.
6. Speed Control of three phase induction motor.
7. Study of closed loop speed control of AC motor.
8. Microprocessor/ Microcontroller based speed control DC motor.
9. Study of traction for Trolley/ Train/ Bus.
10. Speed control of Stepper motor.

PRACTICAL EXAMINATION :

The practical examination will be of three hours duration. It will consists of one experiment out of the list of experiments specified & an oral examination based on the syllabus.

TEXT BOOKS :

1. AC,DC Drives – B.K.Bose.
2. AC,DC Drives – P.C.Sen, TMH.
3. Power Electronics – M.H.Rashid.
4. First course on Electrical Drives – S.K.Pillai (Wiley Eastern LFD Bombay)

REFERENCE BOOKS :

1. Electrical Drives Concepts & Applications – Subrahmany, AM Vedam, TMH.
2. An Introduction to Thyristors & Application –M.Ramamoorthy.

EC315- BUSINESS MANAGEMENT

Teaching Scheme :

Lectures: 2 Hrs. / Week
Practical: --

Exam Scheme :

Paper: 50 Marks
Practical: --
Term Work: --

	Topics and Contents	Hours
1	Basics concepts of management – Definition – Evolution of management thoughts – Functions of management. Planning – Nature and purpose – Setting objectives – Management by Objectives – Strategies, Policies and Planning premises. Organizing – Nature and purpose – Departmentation – Line and Staff Authority- Decentralization – Coordination. Controlling – Process of controlling – Control techniques. Decision making – Nature and purpose – principles.	05
2	Knowledge Management – Key issues – KM Strategies – Architecture and Tools – KM Practices – Concerns and Future. Six Sigma – Infrastructure for Six Sigma initiatives – steps involved in launching Six Sigma – identifying key areas – knowledge management and Six Sigma interface. Mergers and Acquisitions – Take over Defenses – Methods of Payment & Leverage – Regulatory control. World Class Manufacturing - Total Quality / Total Cost Management – Lean	06

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	Manufacturing Practices – Just in Time Inventory Management	
	Corporate Governance – Corporate Social Responsibility.	
3	Financial Planning and Management: Role of Financial Planning Objectives of Financial Management: Finance Manager and its responsibilities. Major Participants in Financial Markets Ratio Analysis: Role of ratio analysis for finance.	03
4	Marketing: Nature and Role of Markets and Marketing The Role of Marketing in the Firm and Society Production – Selling – Marketing Orientation The Marketing Concept The Marketing Planning Process : Elements of a Marketing Plan	03
5	Managing Global Business Nature and Trends of Globalization Marketing Aspects of Managing Global Business	03

Recommended Books :

Knowledge Management - Awad Elias M, Ghaziri Hassan M (Pearson Education)
Six Sigma for Every One - Eckes (John Wiley & Sons, New Jersey)
Mergers Restructuring and Corporate Control – Weston, Chung, Hong (Prentice Hall)
Corporate Governance – Dr. S. Singa (Excel Books)
World Class Manufacturing – Vol.-1 and 2 (ICFAI University Press)
Principles and practice of Management – Shejwalkar and Ghanekar
Essentials of Management – Koontz
Principles and practice of Management – L.M. Prasad.
Financial Management- Khan and Jain
International Business – Sundaram and Black

EC316- Seminar

Term Work: 50

Topics and Contents

The student shall study individually some special topic beyond the scope of the syllabus under the subjects of electronics, Electronics & Telecommunication, Electronics and Communication and Industrial electronics branch from current literature, by referring the current technical journal or reference books, under the guidance of the teacher.

The student shall prepare his report together with design computation, circuit/block diagram etc, if any, and deliver talk on the topic for other students of his class in the presence of his guide and internal Examiner. The student is permitted to use audio-visual aids or any other such teaching aids.

Term work:

The term work for this head will consist of the report written in a technical reporting manner and presentation of the talk on the subject and will be assessed by the two internal examiners appointed by the HOD of concern Department of the institution one of whom will be his guide and the other internal teacher of the concerned branch

Prof. Prashant S. Kolhe
Chairman
Board of Study
Dr. B. A. M. U. Aurangabad

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Revised Structure of T. E. (Electronics & Telecommunication / Electronics & Communication /
Electronics / Industrial Electronics)

Part – I

Sr. No.	Subject Code	Name of the subject	Teaching Scheme			Examination Scheme			
			Th.	Pr.	Total	PP	TW	Pr.	Total marks
1.	EC301	Electromagnetic Engg. and Antenna Theory	04	-	04	100	-	-	100
2.	EC302	Power Electronics	04	02	06	100	50	-	150
3.	EC303	Microprocessor & Peripherals	04	02	06	100	-	50	150
4.	EC304	Signal Coding and Estimation Theory (E&TC, E&Comm.)	03	-	03	100	-	-	100
5.	EC305	Analog Integrated Circuit and Applications	04	02	06	100	-	50	150
6.	EC306	Microelectronics (EC,IE)	03	-	03	100	-	-	100
7.	EC307	Electronic System Design Lab.	01	02	03	-	-	50	50

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8.	EC308	Software Lab.	-	02	02	-	50		50
Total			20	10	30	500	100	150	750

Part – II

Sr. No.	Subject Code	Name of the subject	Teaching Scheme			Examination Scheme			
			Th.	Pr.	Total	PP	TW	Pr.	Total marks
1.	EC309	Digital Communication (EC, E&TC, E&Comm.)	04	02	06	100	-	50	150
2.	EC310	Digital Signal Processing	04	02	06	100	50	-	150
3.	EC311	Microcontroller & Advanced Processors	04	02	06	100	-	50	150
4.	EC312	Electronic Measurement	02	--	02	50	-	-	50
5.	EC313	Feedback Control System	04	02	06	100	-	50	150
6.	EC314	Industrial Drives & Control (IE)	04	02	06	100	-	50	150
7.	EC315	Business Management	02	-	02	50	--	--	50
8.	EC316	Seminar	-	02	02	-	50	-	50
Total			20	10	30	500	100	150	750

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