PROGRAMME: 106: B.TECH (ELECTRONICS ENGINEERING)

Sr. No.	Course Code	Course Title	L	P/T	TOTAL	Cr	Evaluation weightage			ESE (Theory) Hours
							TWA	MST	ESE	

Semester Five

1	200040	Engineering Statistics	3	1	4	7	10	15	75	3
2	306090	Electromagnetics & Wave Propagation	3	2	5	8	20	20	60	3
3	306100	Control Systems	3	2	5	8	20	20	60	3
4	306110	Signal Processing	3	2	5	8	20	20	60	3
5	306120	Microprocessors and Micro controllers	3	2	5	8	20	20	60	3
6	200080	Industrial Economics & Management	2	2	4	6	20	20	60	3
7	306140	Electronics Workshop	-	2	2	2	100	-	-	
		TOTAL	17	13	30	47				

Semester Six

1	306150	Electronic Measuring Instruments	3	2	5	8	20	20	60	3
2	306160	Integrated Circuits and Applications	4	2	6	10	20	20	60	3
3	306170	Communication Systems	3	2	5	8	20	20	60	3
4	306180	Filter Theory & Applications	3	2	5	8	20	20	60	3
5	306190	Computer Organization	3	2	5	8	20	20	60	3
6	200030	Technical Communication and Presentation Skills	2	2	4	6	20	20	60	3
		TOTAL	18	12	30	48				

200040: **Engineering Statistics**

1)Review of probability. Baye's theorem. Discrete and continuous random variables. Probability mass function and density function. Expected value. (Expectation) Moments and moments generating functions. Relation between Raw moments and Central moments.

2) Probability, distribution : Binomal, Poisson, Normal, Student's distribution, x^2 (Chisquare), F distribution.

3) Sampling theory : Sampling distribution. Test of hypothesis. Level of significance. Critical region. One- tailed and two-tailed tests. Degree of freedom. Estimation of population parameters. Central limit theorem.

Large and Small samples :

A) Test of significance for large samples.
   - i) Test of significance of the difference between sample proportion and population proportion.
   - ii) Test of significance of the difference between the sample proportions.
   - iii) Test of significance of the difference between sample mean and population means.
   - iv) Test of significance of the difference between the means of two samples.

B) Test of significance for small samples :
   - i) Test of significance of the difference between sample mean and population mean.
   - ii) Test of significance of the difference between means to two small samples drawn from the same normal population
   - iii) Paired- t test.

C) F-test of significance of the difference between population variances.

D) Test of the Goodness of fit and independence of attribute. Contingency table. Yate's correction.

4) Fitting of curves : Least square method. Fitting of the straight line and parabolic curve. Bivariate frequency distribution. Co-relation, Co-variance. Karl Pearson's Coefficient and Spearman's Rank Co-relation coefficients, Regression coefficients and lines of regression.

5) Analysis of variance: one way and two way classification

6) Statistical quality control and control charts.

Text Books:

1. S G Gupta, V K Kapur, Fundamentals of Mathematical Statistics, S Chand & Co
2. T Veerrajan, Probability, Statistics and Random Processes, Tata McGraw Hill
3. R P Hooda, Statistics for Business and Economics, Macmillan

306090: Electromagnetics & Wave Propagation

Maxwell Equations:
Derivation of various basic electro magnetic laws using Maxwell's Equations, Conditions at a Boundary Surface, Basic idea of inductance & capacitance.

Electromagnetic waves
Solution of free space conditions, Uniform plane-propagation, Uniform plane waves, The wave equation for conducting medium, Sinusoidal Time Variations, Conductors & Dielectrics, Polarization, Direction cosines, Reflection by a perfect conductor-Normal Incidence, Reflection by a perfect conductor-Oblique Incidence, Reflection by a perfect dielectric-Normal Incidence, Reflection by a perfect insulator-oblique Incidence, Reflection at surface of a Conductive Medium, Surface Impedance, The Transmission-line analogy.

Poynting vector & flow of power
Poynting's Theorem, Note on interpretation of E×H, Instantaneous, Average & Complex Poynting vector, Power Loss in a Plane Conductor.

Guided Waves
Waves between parallel planes, Tranverse electric waves ($E_z \equiv 0$), Transverse Magnetic waves ($H_z \equiv 0$), Characteristics of TE & TM waves, Transverse electromagnetic waves, Velocities of propagation, attenuation in parallel-plane guides, Wave impedances, Electric field & current flow within the conductor, Transmission line, Circuit representation of of the parallel-plane transmission line, Parallel plane transmission line with loss, **E** & **H** about long parallel Cylindrical conductors of arbitrary cross section, Transmission –line theory, Low loss radio frequency & UHF transmission lines, UHF lines as circuit elements, Transmission-line charts, Impedance matching by means of stub lines.

Radiation
Potential Functions & the electromagnetic field, Potential functions for sinusoidal oscillations, The alternating current element (or Oscillating Electric Dipole), Power radiated by a current element, Application to short antennas, assumed current distribution, Radiation from a quarter-wave monopole or half-wave dipole, Sine integral & cosine integral, Electromagnetic field close to antenna, Solution of the potential Equations, Far-field approximation.

Transmission Lines Transmission Line equations, Transmission Line parameters, Transmission Line examples, Use of Smith Chart, Impedance matching.

Text Book

1. E. C. Jordan & K. G. Balmain-Electromagnetic Waves & Radiating Systems, PHI, Second Edition, 1988.

Additional Reading

1. John D Krauss – Engineering Electromagnetics, McGraw-Hill, sixth edition, 2001.
2. J. Edminister- Engineering Electromagnetics, Schaum series, Tata McGraw-Hill, second edition,1992.

306100: Control Systems

Introduction to control system analysis
Introduction, examples of control systems, open loop control systems, closed loop control systems. Transfer function and impulse response of systems.

Control system components
DC and AC servomotors, servoamplifier, potientiometer, synchro transmitters, synchro receivers, synchro control transformer, stepper motors.

Mathematical modeling of systems
Importance of a mathematical model, Block diagrams, signal flow graphs, Masan's gain formula and its application to block diagram reduction.

Transient-Response Analysis
Impulse response function, First order system, second order system, time domain specifications of systems, analysis of transient-response using Second order model.

Steady – state Error Analysis
Classification of control systems according to "Type" of systems, Steady – state errors, static error constants, Steady – state analysis of different types of systems using step, ramp and parabolic input signals.

Stability Analysis
Introduction to concept of stability, Stability analysis using Routh's stability criterion, Absolute stability, Relative stability.

Root-Locus Analysis
Introduction, Root–Locus plots, summary of general rules for constructing Root–Locus, Root–Locus analysis of control systems.

Frequency-Response Analysis
Introduction, Frequency domain specifications, resonance peak and peak resonating frequency, relationship between time and frequency domain specification of systems.

Frequency-Response Plots
Bode plots, Polar plots, Log–magnitude Vs phase plots, Nyquist stability criterion, stability analysis, Relative stability, gain margin, phase margin, stability analysis of system using Bode plots.

Closed-Loop Frequency Response
Constant gain and phase loci, Nichol's chart and their use in stability study of systems.

Introduction to State Space Analysis
The general state-space representation, applying the state-space representation, converting a transfer function to state-space, converting from state-space representation to a transfer function.

Textbooks:

1. K. Ogata, Modern Control Engineering, Prentice Hall of India, third edition.
2. Benjamin C. Kuo, Automatic Control Systems, Prentice Hall of India, seventh edition.
3. Madan Gopal, Control Systems Principles and Design, Tata McGraw Hill, seventh edition, 1997.

Additional reading:

1. Norma S. Nise, Control Systems Engineering, John Wiley and Sons, third edition.

306110: Signal Processing

1. **Introduction to signals & Systems (CT and DT domain)**
   - ♦ Definition of Signal
   - ♦ Signal classification
   - ♦ Signal manipulations
   - ♦ Periodicity in CT (Continuous Time) & DT(Discrete Time) domain
   - ♦ Concept of a system
   - ♦ System representations & classification
   - ♦ Concept of Impulse Response
   - ♦ Convolution in CT domain
2. **Review of Fourier Series (FS) & Fourier Transform (FT) for CT systems**
3. **Fourier Series & Fourier Transform for DT systems(DTFS & DTFT):**
   - Concept, properties and uses
   - Amplitude & phase spectra
   - Energy Spectral Density
   - Power Spectral Density
4. **Review of the Laplace Transform**
   - ♦ Definition & properties of Two-sided & one-sided Laplace Transform
   - ♦ Region of Convergence (ROC)
   - ♦ System transfer function
   - ♦ Relationship with Fourier Transform & mapping
   - ♦ Zero state & zero input responses
5. **Z Transform**
   - ♦ Definition & properties of Two-sided & one-sided Z Transform
   - ♦ Region of Convergence (ROC)
   - ♦ Relationship with Fourier and Laplace Transform , & mapping
   - ♦ Inverse Z Transform
6. **Introduction to DT Systems**
   - ♦ Difference equation
   - ♦ FIR & IIR systems
   - ♦ System transfer function
   - ♦ System realization: Direct forms, Cascade & parallel forms
   - ♦ Linear and circular Convolution
   - ♦ BIBO stabillity
7. **Time Domain Analysis of DT Systems**
   - ♦ System Transfer function & Impulse response
   - ♦ Solution of a difference equation
   - ♦ zero input & zero state response calculations
8. **Discrete Fourier Transform (DFT)**
   - ♦ DTFT & DFT
   - ♦ DFT Properties
   - ♦ Fast Fourier Transform (FFT)
     - DITFFT and DIFFFT Algorithms
     - Divide and Conquer Algorithms
   - ♦ DFT analysis of Sinusoidal signals
   - ♦ Limitations of DFT

Text- Books:

1. S. Haykin, Signals and Systems , Wiley Eastern Publication
2. J.G. Proakis, D. G. Manolakis, Digital Signal Processing: Principles, Algorithms and applications, Prentice Hall of India, 1995
3. Ashok Ambardar, Analog and Digital Signal Processing, Thomson Learning, second edition, 2001
4. Oppenheim and Schafer with Buck, Discrete- Time Signal Processing, Prentice Hall of India, 2000

Additional Reading:

1. Lathi, Signal Processing & Linear Systems, Oxford University Press, First Indian Impression, 2000

306120: Microprocessors and Microcontrollers

Overview
Overview of microcomputer systems. Hardware and software principles.

Intel MCS 51 family
Introduction to Single chip microcontrollers of Intel MCS 51 family. Architectural and operational features. Its instruction set. CPU timing and machine cycles. Interrupt structure and priorities. Internal Timer / counters, serial interface. Connection of external memory. Power saving modes. Interfacing of 8051 with EPROM programming for EPROM versions. 8051 variations

Intel 8086/8088 microprocessor family
Architecture and organisation of 8086/8088 microprocessor family. Study of its Instruction set. Assembly language programming, Introduction to mixed language programming using C and Assembly language. 8086 family minimum and maximum mode operation. Timing diagram for 8086 family, detailed study of maximum mode connection: study of 8288 bus controller. 8086 interrupt structure.

Memory & I/O design
Memory system design for 8086 family including interface of dynamic Read/ write memory, timing considerations for memory interfacing. Connection of I/O Controllers 8255AH programmable peripheral Interface, Programmable Interrupt Controller 8259A, UART 8250, programmable D.M.A. Controller 8237. Data communications, EIA RS-232C serial interface and IEEE 488 General purpose interface. Error detection and correction - parity and cyclic redundancy check.

8087 Math Co-processor
Study of architecture of 8087 floating point co- processor. Data types supported by 8087. Host and co - processor interface, Assembly language Programming for 8086 - 8087 based systems.

Introduction to Multiprocessor systems
Multiprocessor configurations. Study of the 8289 bus arbiter. Design of 8086 based multiprocessor systems (without timing considerations).

Text Books:

1. John Uffenback, 8086 / 8088 Design, Programming and Interfacing, second edition, ninth Indian reprint, Prentice Hall of India, 2001
2. Kenneth Ayala, The 8051 Microcontrollers Architecture, Programming & Applications, Penram International (India)
3. Douglas Hall, Microprocessors interfacing and programming, Tata McGraw Hill, third edition

Additional Reading:

1. Muhammad A Mazidi, The 8051 Microcontroller and Embedded Systems, Pearson Education Asia, first Indian reprint, 2002
2. John Uffenback, The 80X86 family Design, Programming and Interfacing, third edition, Pearson Education Asia, 2002
3. Intel Corporation, Data manuals

200080: Industrial Economics & Management

Basic economic problems. Resource constraints and welfare maximization. Nature of economics. Positive and normative economics, micro and macroeconomics. The role of the state in economic activity; market and government failures. Theories of demand, supply and market equilibrium. Market structures, perfect and imperfect competition commercial and central banking. International trade. Foreign exchange and balance of payments.

Management : Definition process. The functions of a manager. Planning – its nature, objectives, types of plans. Decision – making. Organising – departmentalization, delegation decentralization, span of management. Staffing – selection and recruitment, appraisal, management development. Leadership motivation and communication. Controlling – its nature techniques.

Books recommended

1) Economics : Samuelson & Nordhaus
2) Principles of Economics : Mankiw
3) Essential of Management : Koontz & O'donnell
4) Management : David R. Hampton

306140: Electronics Workshop

Soldering Soldering techniques, stripping and tinning stranded wires, installing and soldering tinned wires, mounting components – plated through hole and surface mount technology, hand soldering and wave soldering, de-soldering techniques, electrostatic discharge.

Analog Troubleshooting Electronics troubleshooting basics, troubleshooting with meters and Oscilloscopes, signal injection and signal tracing, system analysis, diagnostics and statistical methods, servicing close loop circuits, troubleshooting noise and intermittents.

Digital Troubleshooting Introduction to troubleshooting digital logic, use of logic probes, understanding and use of logic analyzers, working with microprocessor / microcontroller systems, use of logic analysis system for troubleshooting microprocessor / microcontroller systems, use of incircuit emulators.

PC Hardware PC hardware basics – how computers work, how software and hardware work together, system board, floppy and hard drives, troubleshooting fundamentals, supporting I/O devices, multimedia technologies, power supplies.

Textbooks:

1. H. (Ted) Smith, Quality hand soldering and circuit board repair, second edition, Delmar publishers
2. J. A. Sam Wilson, et. al., Electronic troubleshooting and servicing techniques Volume I, 1998, Howard W. Sams publication
3. Jean Andrews, Enhanced guide to managing and maintaining your PC, Enhanced third edition, 2001, Course Technology – Thomson learning publishers
4. Jan Axelson, The Microcontroller Idea Handbook, Penram Publishing (India) Pvt. Ltd., 2002

Termwork:

The termwork shall consist of at least four laboratory experiments on designing, fabricating, testing and troubleshooting simple electronic circuits already studied. A mini project to design, fabricate, test and troubleshoot a simple digital electronic system based on a microprocessor / microcontroller.

306150: Electronic Measuring Instruments

Introduction: Fundamentals of operational amplifier circuits, Principles of working of an electronic meter

Electronic Voltmeters: Principles of operation, advantages over conventional type analog voltmeters, factors involved in selection of voltmeters, basic voltmeter, peak reading, average reading true RMS reading, sampling type, FET voltmeters , sensitivity considerations & calculations.

Digital Voltmeters: Methods of analog-to-digital and digital-to-analog conversion, principles of operation and typical specifications of a digital voltmeter, description of various types of DVMs with block diagrams, Resolution and Sensitivity of a digital meter, digital displays for meters.

Frequency Meters: Analog-schematic & operational details, limitations. Digital Frequency meters, Time interval measurements, frequency ratio measurements

Phase Meters: Phase measurement by voltage addition method, balanced modulation type, phase meters using flip-flops, advantages & limitations of each type. Digital Phase meters for entire A.F. range & their limitations.

Oscilloscopes: Block diagram study of C.R.O., Description of panel layout & implementation of controls. Requirement of time base , triggered time base, delayed time base, external triggering etc. Lissagios patterns, circular time base, intensity modulation, velocity modulation, use of these in phase & frequency measurements. Frequency time base, Wobbler scope & its applications, Dual trace, multi trace, Double beam, Sampling; Storage, Digital read-out oscilloscopes. Use of CRO in square wave testing of amplifiers, tracing of diode & transistor characteristics.

Signal Generators : Requirement of a good laboratory type signal generator, A.F. signal genrators, Beat frequency oscillator & its advantages.

Q meter: Principle of operation, Sources of Error, Measurement of a).Stray capacitance ,b) Impedance , c) Characteristic impedance of transmission line using Q meter.

Text books:

1. Cooper W. D. & Helfrick A.D., Electronics Instrumentation & Measurement Techniques, third edition Prentice Hall of India, 1985
2. Kalsi H.S., Electronic Instrumentation, first edition, Tata McGraw Hill, 1997.
3. Doebelin E.O., Measurement Systems, Applications and Design, fourth edition,Tata McGraw Hill, 1990.
4. Oliver Cage, Electronic Measurements and Instrumentation, McGraw Hill ,1975.

306160: Integrated Circuits and Applications

Operational Amplifier Fundamentals
Basic Op Amp Configurations, Ideal Op Amp Circuits Analysis, Negative Feedback, Feedback in Op Amp Circuits.

Circuits with Resistive Feedback
Current-to-Voltage Converters, Voltage-to-Currents Converters, Current Amplifiers, Difference Amplifier, Instrumentation Amplifier (Three Op-amp and IC AMP-01), Instrumentation Applications, Flying capacitor techniques (LTC 1043), Active Guard drive, Current Input Instrumentation Amplifier

Active Filter
The Transfer function, First-Order Active Filters, Audio Filter Applications, Standard Second- Order Responses, KRC Filters, Multiple-Feedback Filters, State-Variable and Biquad Filters, Sensitivity, Filter approximations, generalized impedance converters, direct design, Switched capacitor filters.

Static Op Amp Limitations
Simplified Op Amp Circuits Diagram, Input Bias and Offset Currents, Low-Input-Bias-Current Op Amps, Input Offset Voltage, Low-Input-Offset-Voltage Op Amps, Input Offset-Error Compensation, Maximum Ratings.

Dynamic Op Amp Limitations
Open-Loop Response, Closed-Loop Response, Input and Output Impedances, Transient Response, Effect of Finite GBP on Integrator Circuits, Effect of Finite GBP on Filters, Current-Feedback Amplifiers.

Nonlinear Circuits
Voltage Comparators, Comparator Applications, Schmitt Triggers, Precision Rectifier(half wave and full wave), Analog Switches, Peak Detectors, Sample-and-Hold Amplifiers. Op-amps for high current, voltage and power applications, high speed amplifiers, voltage followers and buffers, operational trans-conductance amplifiers.

Waveform Generators
Sine Wave Generators using Op-Amps, Multivibrators using Op-Amps, Monolithic Timer – NE555 with applications, Triangular Wave Generator using Op-Amps, Saw tooth Wave Generator using Op-Amps, Monolithic Waveform Generator - ICL8038, V-F and F-V Converters.

Voltage References And Regulators
Performance Specifications, Voltage References, Voltage-Reference Applications, Linear Regulators, IC 723 low voltage, high voltage and high current designs, three terminal Linear Regulators and Applications, Switching Regulators, Monolithic Switching Regulators, IC LM 3525.

D-A and A-D Converters
D-A Conversion Techniques, R – 2R ladder, Multiplying DAC with Applications, A-D Conversion Techniques, Dual slope ADC, Ramp ADC, Successive approximation ADC, half flash and flash ADC, Delta modulation.

Nonlinear Amplifiers and Phase-Locked Loops
Log / Antilog Amplifiers, Analog Multipliers, VCO IC NE 566, Phase-Locked Loops, IC NE 565, 4046, Analog multiplexer and de-multiplexer, IC CD 4051.

Operational Amplifier Circuit Design
Introduction, Differential Amplifier, current mirror, output stage, General Op-Amp circuit design, Detailed circuit description and working of 741 Op-Amp, small signal analysis, frequency response.

Text Books:

1. Sergio Franco, Design with operational amplifiers and analog integrated circuits, Third edition, McGraw Hill International edition, 2002.
2. James M. Fiore, Op Amps and Linear Integrated circuits, First reprint, Thomson Asia Pte. Ltd., 2001.
3. William D. Stanley, Operational Amplifiers with Linear Integrated circuits, Pearson Education Asia, fourth edition.
4. Robert Coughlin and F Driscoll, Operational Amplifiers and Linear Integrated circuits, sixth edition, Pearson Education Asia, 2001.

Additional Reading:

1. Donald A. Neamen, Electronic Circuit Analysis and Design, Second edition, McGraw Hill International edition 2001

306170: **Communication Systems**

Antennas The half-wave dipole, Antenna characteristics, Ground effects, Effects of Antenna height, Antenna coupling, Antenna arrays, Special purpose Antennas, UHF and microwave Antennas.

Television Principles Television system and standards, The composite video signal, Blanking and Synchronizing pulses, Monochrome Television transmission and reception, Horizontal and Vertical deflection circuits, Synchronizing circuits, Colour transmission, Colour reception, Cable TV, Digital TV, HDTV.

Satellite Communication Kepler's Laws, Satellite orbits, Spacing and frequency allocation, Look angles, Orbital perturbations and corrections, Satellite Launching, Spacecraft subsystems, Satellite system link models, Link equations, Multiple access, Direct broadcast satellite services, Applications of LEO, MEO and Geo-stationary satellites.

Radar Systems Basic principles, Radar performance factors, MTI and Pulse Doppler radar, Continuous wave Doppler radar, Radar antenna, Phased array radars.

Text Books

1. Wayne Tomasi - Electronic Communication Systems, Pearson Education, fourth edition, 2001
2. Kennedy, Davis - Electronic Communication Systems, Tata McGraw - Hill, fourth edition, 1999
3. Roy Blake - Electronic Communication Systems, Thomson Learning, second edition, 2002
4. Gulati - Monochrome and Colour Television, New Age International (P) Limited, 1983

Additional Reading

1. Pratt, Bostian - Satellite Communication, John Wiley and Sons, 1986
2. Dennis Roddy - Satellite Communications, McGraw - Hill, third edition, 2001
3. Skolnik - Introduction to Radar Systems, McGraw - Hill, third edition, 2001
4. Gulati - Colour Television Principles and Practice, New Age International (P) Limited, 1988
5. Jordan, Balmian - Elecromagnetic Waves and Radiating Systems, PHI, second edition, 1988

306180: Filter Theory and Applications

Frequency Domain Analysis of DT Systems

- Pole-zero diagram
- Frequency domain analysis using Analytical & graphical techniques
- System classification based on pass-band as low pass, high pass, Band pass & band reject
- System classification based on phase response as Minimum phase , maximum phase , mixed phase or linear phase systems
- Stability Analysis
- Finite word-length effect on system poles

Linear Phase FIR Systems

- Need for linear phase, concept of phase delay & group delay
- Condition for Linear Phase
- Magnitude & phase response for Four types of Linear Phase systems
- Location of zeros

FIR Filter Design

- FIR versus IIR filters
- Design of FIR filters by windowing technique:
  -Gibb's phenomenon
  -Use of different windows: rectangular, triangular, hamming, hanning, Kaiser
- Design of FIR filters using Frequency sampling techniques
- Design of optimal linear phase FIR filters
- Structures for implementation: canonic and lattice

Design of IIR filters

- The design process Methodology
- Different types of analog approximations: butterworth, chebyshev, inverse chebyshev, elliptical, Bessel etc.
- Spectral transformations
- Conversion techniques like bilinear transformation, impulse invariance, matched Z-transform
- Intuitive approaches

Quantization Effects

- Quantization methods
- Limit cycle oscillations due to Quantization
- Errors in frequency response due to coefficient Quantization

DSP processors

- Need for Special architecture
- Difference between DSP processor & microprocessor
- A general DSP processor

Text Books:

1. Oppenheim and Schafer with Buck, Discrete- Time Signal Processing, Prentice Hall of India, 2000
2. A. Antoniou, Digital Filters: Analysis Design and Applications, Tata McGraw-Hill, .2001

3. Ashok Ambardar, Analog and Digital Signal Processing, Thomson Learning, second edition, 2001
4. J.G. Proakis, D. G. Manolakis, Digital Signal Processing: Principles, Algorithms and applications, Prentice Hall of India, 1995

306190: **Computer Organization**

Performance measure
Definition, Throughput and Response time, Measuring performance (MIPs, FLOPs etc.).

Preliminaries
Computer Arithmetic – Number representation and Arithmetic, Floating-point representation, Multiplication and Division algorithms and circuits. Operation on Data structures like Arrays, Lists, Stacks, and Queues.

Instruction types and sequencing, addressing modes with **case study for Pentium processor**

Input / Output Organization

I/O devices types and access methods, interrupts, DMA, I/O processors, types of busses and bus arbitration, various bus standards, I/O interface – serial and parallel ports

Basic Processing Unit
The data path and components of Instruction Execution, Bus Organization, Hardwired control, Micro-programmed control, Exceptions and their handling. Performance Enhancement using pipelining – Pipelining Introduction, Instruction set, Hazards, Case study

Memory organization
RAM organization – SRAM and DRAM, ROM and Flash memory, addressing, Cache – mapping , handling cache miss , multi level caches, Virtual memory – Concept , Address translation, paging, TLB, segmentation

Peripherals
Storage Devices – Organization, Access techniques, Input andOutput devices - Organization, Access techniques, Network devices – modems, serial communication links

Multiprocessor systems
Introduction to Multiprocessor systems, Connection techniques, Cache issues

Text Books
1. Hamacher , Vranesic, Zaky ,Computer Organization , Fifth Edition, Tata McGraw-Hill, 2002.

Additional Reading
1. Patterson & Hennessy, Computer Organization, Second Edition, Morgan Kaufmann Publishers, 1998
2. John Carpinelli, Computer Systems Organization and Architecture, first Indian reprint, Addison Wesley Longman – Indian Branch, 2001

200030 :- Technical Communication and Presentation Skills

Detailed Syllabus	
1	Communication in a Business Organisation: Channels,media,internal and external, formal and informal, upward and downward, nonverbal.
2	Technical Writing Skills: definition, importance, qualities, choosing words, sentences and paragraphs; audience recognition.; principles of Business correspondence; job application and resumes
3	Report Writing: types, qualities, , defining objectives and scope, organizing and interpreting information,, individual and group reports, formal and informal reports.
4	Technical proposal
5	Presentation Skills
6	Group Discussion
	Assignments: Written One assignment each from topics 1 to 4 Oral One presentation One group discussion
	Books recommended: 1. Lesiker & Petit " report Writing for Business " McGraw Hill 2. Meenakshi Raman , Sharma Sangeetha " Technical Communication – Principles & Practices" Oxford University Press