FACULTY OF ENGINEERING & TECHNOLOGY

SYLLABI

AND THE

REGULATIONS

FOR

Bachelor of Engineering MBA (Electronics & Communication)
Third-Eighth Semesters
Examinations, 2011-2012
### Third Semester

<table>
<thead>
<tr>
<th>Theory Paper Code</th>
<th>Paper Title</th>
<th>Hours/Week L+T</th>
<th>Credit Theory</th>
<th>Marks Uni. Exam</th>
<th>Int. Ass.</th>
<th>Hours/Week</th>
<th>Credit Practical</th>
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**Paper Title:** Semiconductor Electronics (Theory)

**Paper Code:** EC 306  
**Max. Marks/ Credit:** 50/3  
**Time:** 3 hours

**Course duration:** 45 lectures of one hour duration each  
**Note for paper setter:** Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

**PART A**

Transistor characteristics: [10]
Junction transistor, transistor current components, current gain, transistor as an amplifier, common emitter, common base, common collector configurations, Input & output characteristics in CE, CB & CC configurations, photo transistor & its characteristics, unijunction transistor & its characteristics.

**Transistor at low frequencies:** [08]
Graphical analysis of CE configuration two port devices and hybrid model, h-parameters, Comparison of amplifier configurations of circuits

**Transistor biasing and Thermal stabilization:** [08]
Concept of biasing & biasing of BJT circuits, Operating point, bias stability, stabilization against variation in Ico, Vbe, and β, thermal runaway, thermal stability.

**PART B**

**Field Effect Transistor:** [09]
Junction field effect transistor, JFET characteristics, pinch off voltage and equivalent circuit, MOSFETs - their modes of operation and characteristics, equivalent circuit, biasing of FETs.

**Power amplifiers:** [10]
Classification of amplifiers, Class A large signal amplifier, second and higher harmonic distortion, transformer coupled amplifiers, Efficiency of amplifiers, Push pull amplifiers (class A & class B).

**Recommended Books:**

1. Integrated Electronics, Millman & Halkias (Mc-Graw Hill)
2. Microelectronics Circuits, AS Sedra & KC Smith (OXFORD)
3. Electronics Devices & Circuit Theory, RL Boylestad & L Nashelsky (PHI)
4. Electronic Circuit Analysis & Design, Donald A. Neamen (TMH)

**Paper Title:** Semiconductor Electronics (Practical)

**Paper Code:** EC356 **Credit:** 1

**List of Experiments**

1. To study the specification sheet & draw the characteristics of transistor in CB or CE configuration.
2. To study the specification sheet & draw the characteristics of FET in CD or CC configuration.
3. To draw the frequency response of a single stage BJT amplifier.
4. To measure the voltage and current gain of a BJT amplifier.
5. To measure the distortion in the output of a push pull amplifier.

**To simulate the following using P-spice**

1. Frequency Response of a single state FET amplifier.
2. Voltage and current gain of BJT amplifier.
3. Distortion of a push pull power amplifier.

Paper Title: Electromagnetic Theory (Theory)

Paper Code: EC 307 Max. Marks/ Credit: 50/3 Time: 3 hours

Course duration: 45 lectures of one hour duration each
Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

PART A

Maxwell’s equation:
Maxwell’s equations in their integral and differential forms, Maxwell’s equations in free space and in harmonically varying fields. Physical Interpretation and Boundary Conditions [8]

Plane waves in Dielectric and Conducting Media:
Conductors and Dielectrics, Wave equations in conducting and dielectric media its solution, Skin effect, relaxation time, impedance of the conducting medium. Reflection and transmission of the wave at a boundary. Poynting Vector: application to energy radiation, Velocities of propagation: group velocity, phase velocity, wave polarization. [16]

PART B

Guided Waves:

Wave Guides:
Rectangular and Circular waveguides: T.M. & T.E. Modes ,Wave impedance and characteristic impedances, Attenuation factor and Q of waveguides. [12]

Recommended Books:

3. Antennas and Wave Propagation by G S N Raju, Pearson publications, Edition 1ST
**PART A**

**Impedance Functions and Networks functions:**
Concept of complex frequency, Transform Impedance and transform circuits, Network functions for the one port and two port, Calculation of network functions. Poles and Zeros for Network functions, Restrictions on Poles and Zeros, Locations for Driving Point and Transfer functions, Time domain behavior from Pole and Zero plot, Stability of Active networks. [09]

**Filter Synthesis:**
Classification of filters, Characteristics, impedance (input & characteristic) and propagation constant of pure reactive network, Ladder Network, T-section, Π-section, Pass and stop bands, Constant –K low pass and high pass filters, m-derived T and Π-section, Design of k and m-derived filters, Band pass filters, band elimination filters, Composite filters. [12]

**PART B**

**Two Port Parameters:**
Relationship of Two port variables, Short Circuit Admittance and Open circuit Impedance parameters, Transmission and hybrid parameters. [06]

**Sinusoidal Steady State Analysis:**
Network Synthesis for two terminal network, Foster and Cauer forms. [03]

**Transmission Lines:**
Line parameters, Inductance and capacitance of a line of two parallel conductors, inductance of coaxial line, Line of Cascaded T-section, Transmission line-general solution, Physical significance of the equations; the infinite line, wavelength, velocity of propagation, waveform distortion, distortionless line, telephone cable, Reflection on a line not terminated in \( Z_0 \), Reflection constant, Line calculation, Input and transfer impedance, open and short circuited lines, Reflection factor and reflection loss, parameters of open wire line and coaxial line at high frequencies, constants for the line of zero dissipation, Voltage and currents on dissipationless line, standing wave nodes, standing wave ratio. Input impedance of dissipationless line, power loss in unmatched lines, single stub matching and smithchart. [15]

**Recommended Books**

7. Network Analysis by M.E. Van Valkenburg (PHI), Edition 3+0RD.

Paper Title: FILTERS AND TRANSMISSION LINES (PRACTICAL)

Paper Code: EC358 Max. Marks: 25 Credit: 1

List of Experiments

1. To Design & implement a constant K low pass / high pass filter.
2. To Design & implement a band pass filter.
3. To Design & implement a m-derived low pass / high pass filter
4. To Design & implement a composite low pass/ high pass filter.
5. To Measure the characteristics and attenuation of a Transmission line.
6. To Measure the input impedance of a Transmission line.
7. To Measure phase displacement between the current and voltage at input of Transmission line.
8. To Study the Frequency characteristics and stationary waves of a Transmission line.
9. To Measure Signal Phase shift along the line.
10. Fault localization within the line.

Paper Title: Digital Electronics (Theory)

Paper Code: EC 309 Max. Marks/ Credit: 50/3 Time: 3 hours

Course duration: 45 lectures of one hour duration each
Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

PART A

Introduction [10]
Concept of digitisation, Representation of Logic, Logic Variables, Boolean Algebra, Boolean Expressions and minimization of Boolean expression using K-Map(up to five variables), Review of Logic Gates, design & Implementation of Adder, Subtractor, Multiplexer, DeMultiplexer, Encoder, Decoder, ROM, Digital Comparators, Code Converters using gate, multiplexers / decoders

Flip-Flops [04]
A 1- bit memory cell, clocked & unclocked flip flop, S-R Flip-Flop, JK Flip-Flop, Race around Condition, Master Slave Flip-Flop, D&T type Flip-Flop

Counters & Shift Registers
Ripple Counters, Design of Modulo-N ripple counter, Presetable Counters, Up-Down counter, design of synchronous counters with and without lockout conditions, design of shift registers with shift-left, shift-right & parallel load facilities, Universal shift Registers

PART B

Data Converters
Sample & Hold switch, D/A converters: weighted resistor type, R-2R Ladder type; A/D Converters: Counter-Ramp type, Dual Slope Type, Successive approximation type, flash type; Specifications of ADC & DAC

Digital Logic families
Characteristics of digital circuits: fan in, fan-out, power dissipation, propagation delay, noise margin; Transistor-transistor Logic(TTL), manufacturer Data Sheets & Specifications, Types of TTL Gates (Schottky, standard, low power, high speed). Emitter Coupled Logic(ECL), Manufacturers Data sheets & Specifications, Comparison of Characteristics of TTL and ECL, Tristate Logic & its applications.

Semiconductor Memories & Programmable Logic
ROM, PROM, EPROM, EEPROM; RAM: Static RAM, Typical Memory Cell, Memory Organisation, Dynamic RAM cell, Reading, & Writing Operation in RAM, PLA, PAL & FPGA

Recommended Books
2. Integrated Electronics by Millman & Halkias, TMH
3. Digital System Principles & Applications by R J Tocci (PHI)

Paper Title: Digital Electronics (Practical)

Paper Code: EC359   Max. Marks : 25   Credit: 1

List of Experiments
1. To Study the data sheets of TTL and ECL gates
2. Verify the truth tables of with various gates, RS, D, JK Flip Flops
3. To design and implement a Modulo-N Counter
4. To Design and implement a Universal shift register
5. To Perform arithmetic & Logic operations on two 4-bit binary numbers using an ALU.
6. To Transfer the Data between Three Registers through Tristate Circuit
7. To Understand Decoder/Driver and their applications with display. To display a count from 00 to 99 with a delay of N seconds.
8. Design & implementation of synchronous counter
9. Design & implementation of Combinational circuits using Multiplexers
10. To convert 8 bit Digital data to Analog value using DAC
11. To convert Analog value into 8 bit Digital data using ADC

Paper Title: Organization Behavior (Theory)
**Course duration**: 45 lectures of one hour duration each

**Note for paper setter**: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

**Note**: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

**Part A**

**Introduction to Organization Behavior**

Definition and meaning of OB, impact of other sciences (Anthropology, Sociology, Psychology) on OB, perception, self esteem, attitude & personality, meaning of culture, impact of technology on OB.

**Motivation, Learning & Leadership**

Meaning of Motivation, Content theories of motivation (Maslows Hierarchy of needs, Herzberg’s two factor theory), Process theories (Vroom’s Expectancy theory, Porter-Lawler Model), Motivation applied (Job design, job rotation, goal setting, MBO), various methods of motivating employees, Behavioral & Cognitive theories of learning, Leadership theories (Trait theory, Fiedler’s Contingency theory, Path –Goal leadership theory), Leadership styles (Blake & Mouton managerial grid, Hersey & Blanchard’s life cycle approach)

**Part B**

**Group behavior:**

Group Dynamics, conflict, power & politics, Group behavior, types of groups, group decision making, conflict in organizations and reason, interpersonal conflict, inter group conflict, meaning of power, classification of power, politics in organizations

**Organization environment & Communication**

Authority & responsibility, delegation and division of work, quality of work life, communication process, modes of communication in organization and barriers to communication, formal & informal communication.

**Recommended Books:**

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**Paper Title:- Object Oriented Programming (Theory)**

**Course duration**: 45 lectures of one hour duration each

**Note for paper setter**: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

**PART A**

**Principles Of Objected Oriented Programming**

Advantages of OOP, comparison of OOP with Procedural Paradigm
C++ Constructs
Tokens, Expressions and control structures, various data types, and data structures, Variable declarations, Dynamic Initializations, Operators and Scope of Operators, Typecasting, Unformatted and formatted console I/O Operations

Functions
Classes and Objects: Prototyping, Referencing the variables in functions, Inline, static and friend functions. Memory allocation for classes and objects. Arrays of objects, pointers to member functions.

Constructors and Destructors
Characteristics and its various types, Dynamic Constructors, Applications, Order of Invocation, C++ garbage collection, dynamic memory allocation.

Polymorphism
Using function and Operator overloading, overloading using friend Functions, type conversions from basic data types to user defined and vice versa.

PART B

Inheritance
Derived classes, types of inheritance, various types of classes, Invocation of Constructors and Destructors in Inheritance, aggregation, composition, classification hierarchies, metaclass/abstract classes.

Pointers
constant pointers, Use of this Pointer, Pointer to derived and base classes, virtual functions, Bindings, Pure virtual Functions and polymorphism

I/O Operations and Files
Classes for files, Operations on a file, file pointers

Generic Programming with Templates
Definition of class template, Function Templates, Overloading Template Functions, Class templates and member functions templates with parameters, Standard C++ classes, persistent objects, streams and files, namespaces, exception handling, generic classes, standard template library: Library organization and containers, standard containers, algorithm and Function objects, iterators and allocators, strings, streams, manipulators, user defined manipulators and vectors

Introduction
Object Oriented System, Analysis and Design

Recommended Books
1. Object Oriented Programming with C++ By Bala Guruswamy, TMH, Edition 3rd
3. The C++ Programming Language By Bjarne Stroustrup, Edition 3rd
Paper Title: Object Oriented Programming (Practical)

Paper Code: EC 360  Max. Marks: 25  Credit: 1

List of Experiments

1. Implementation of Functions, Classes and Objects
2. Constructors and Destructors
3. Operator Overloading and Type Conversion
4. Inheritance and Virtual Functions
5. Files
6. Exception Handling and Generic Programming

FOURTH SEMESTER

Paper Title: Communication Theory

Paper Code: EC 407  Max. Marks/ Credit: 50/4  Time: 3 hours

Course duration: 45 lectures of one hour duration each

Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

PART A

Signal & its Representations

Random Signal Theory
Sample space, random variables-discrete & Continuous, examples of probability Density Functions- Moments, joint & conditional PDF density functions of sums, Transformation, concept of correlation, auto & Cross-correlation functions, white Noise. [8]

Transmission of Signals through Networks

PART B

Noise & Interference
Classification of Noise, Sources of noises, atmospheric shots, Thermal noise, noise in Semiconductors, Noise spectral density, Noise calculations, Noise Figures of devices & circuits, cascaded networks, Minimum noise, Figures of networks. Experimental determination of Noise Factor

Basic Information Theory
Concept Information, Entropies of Discrete Systems, Rate of transmission- Redundancy, Efficiency & Channel capacity, Source encoding including Huffman’s Technique, continuous Channel- Entropy maximization, Transmission rate of Channels, capacity of Noisy channels. Discussion of Shannon’s Coding theorem, Comparison of Analog & Digital Communication Systems with reference to the Ideal Channel Capacity Theorem.

Recommended Books
- Introduction to Modern Communication by P D Sharma, Edition Latest
- Introduction to Information Theory by F M Reza, Edition Latest

Paper Title:- Analog Electronic Circuits (Theory)

Paper Code: EC 408  Max. Marks/ Credit: 50/4  Time: 3 hours

Course duration: 45 lectures of one hour duration each

Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

PART A

Response of transistor Amplifier
Review Biasing, classification of amplifier, distortion in amplifiers, frequency & phase response of an amplifier, RC coupled amplifier, its low and high frequency responses, transistor model at high frequencies for CE and Emitter follower configuration, high frequency response of two cascaded CE transistor stages

Feedback and Stability
Introduction to feedback, Basic-Feedback Concepts, Ideal Feedback Topologies, Voltage(Series-Shunt) Amplifiers, Current(Series-Shunt) Amplifiers, Transconductance(Series-Series) Amplifiers, Transresistance(Shunt-Shunt) Amplifiers, Operational Amplifier

- Differential Amplifier, Block diagram representation of a typical Op-amp, Interpreting of a typical set of data sheets, ideal op-amp, equivalent circuit. of op-amp, ideal voltage transfer curve, open loop op-amp configuration, the practical op-amp, input offset voltage, input bias current, input offset current, total output offset voltage, thermal drift, noise, common mode configuration, CMRR., Frequency Response, Frequency
response of internally compensated Op-Amps, Frequency response of Non-compensated OP-Amps, Open loop voltage gain as a function of frequency, Closed loop frequency response, Slew rate

PART B

Op-amp Applications
DC and AC Amplifiers, summing, Voltage–to-current converter, current to voltage converter, the Integrator, the Differentiator, Comparator, Zero-crossing detector, Voltage to frequency and frequency to voltage converters, Clippers and Clampsers, Sample and Hold Circuit, Instrumentation Amplifier.

Active Filter, Oscillators & Tuned Amplifiers
Active filters, Essentials of Oscillator, Types of Oscillator, Sinusoidal Oscillator, Schmitt Trigger Circuits, Introduction of Tuned Amplifiers, Single & Double Tuned Amplifiers

Recommended Books
1. Electronics Circuit Analysis and Design by Donald A. Neamen, Tata McGraw Hill
3. Integrated electronics by Millman & Halkias, TMH, Latest Edition

Paper Title:- Analog Electronic Circuits (Practical)

Paper Code: EC 458
Max. Marks: 50/Credit: 1
List of Experiments
1. To study the Pspice Simulation software
2. Design fabrication & testing of Differentiator Circuits using Op-Amp & simulate using P-spice
3. Design fabrication & testing of Integrator Circuits using Op-Amp & simulate using P-spice
4. Design fabrication & testing of adder/Subtractor Circuits using Op-Amp & simulate using P-spice
5. Design fabrication & testing of Clippers and Clampsers Circuits using Op-Amp & simulate using P-spice
6. Design fabrication & testing of Universal Active filter & simulate using P-spice
7. To study the frequency response of OP-Amp & simulate using P-spice
8. To design Butter worth Low pass filter & simulate using P-spice
9. To design Butter worth High pass filter & simulate using P-spice
10. To design Butter worth Band pass filter & simulate using P-spice
11. To design Monostable & Free running Multivibrator using 555

Paper Title:- Microprocessors (Theory)

Paper Code: EC 409
Max. Marks/ Credit: 50/4
Time: 3 hours

Course duration: 45 lectures of one hour duration each

Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

PART A
Microprocessor Architecture and Microcomputer Systems:

Interfacing I/O Devices:

Programming the 8085:

Programming Techniques with Additional Instructions:

PART B

Counters and Time Delays:
Counters and Time Delays, Hexadecimal Counter, Modulo Ten, Counter, Generating Pulse Waveforms, Debugging Counter and Time-Delay Programs. [4]

Stack and Subroutines: Stack, Subroutine, Conditional Call and Return Instructions. [3]

Interrupts: The 8085 Interrupt, 8085 Vectored interrupts. [3]

Interfacing Data Converters:

General –Purpose Programmable Peripheral Devices:
The 8255A Programmable Peripheral Interface, Illustration: Interfacing Keyboard and Seven-Segment Display, Illustration : Bi- directional Data Transfer between Two Microcomputers, The 8254 Programmable Interval Timer, The 8259 A Programmable Interrupt Controller, Direct Memory Access (DMA) and the 8257 DMA Controller, serial communication, Programmable communications interface 8251. [8]

Recommended Books
4. Douglas V. Hall , “Microprocessors and Interfacing programming and Hardware, Edition 2nd

Paper Title: Microprocessors (Practical)

Paper Code: EC 459 Max. Marks: 50 Credit : 1

List of Experiments
1. Familiarization of 8085 kits.
2. Verification of arithmetic and logic operations using above kits. (At least 5 programs)
3. Development of interfacing circuits of various control applications based on 8085.
4. Application of assembly language using 8085 instructions set to develop various programs.
5. Applications of data movement instructions to develop relevant programs.

Paper Title: Communication Engineering (Theory)

Paper Code: EC 410 Max. Marks/ Credit: 50/4 Time: 3 hours

Course duration: 45 lectures of one hour duration each
Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

PART A

Amplitude Modulation & Demodulation and Systems

Frequency Modulation
Principles and generation of FM and PM signals, Reactance Modulator method, Armstrong Method, noise consideration in FM and PM system. [7]

PART B

Frequency Demodulation and FM Systems
Detection of FM and PM signals, Foster Discriminator, ratio and PLL detectors, FM Transmitter (Block Diagram), FM receiver (Block Diagram), Pre-emphasis and de-emphasis circuit. [8]

Pulse Modulation & Demodulation
Principles, generation and detection of PAM, PWM, PPM & PCM signals, noise in pulse modulation system, band width consideration, companding, delta modulation, adaptive delta modulation systems. TDM & FDM [15]

Recommended Books

1. Electronic Principles by Dennis Raddy & John Coolin, PHI, Edition Latest

Paper Title: Communication Engineering (Practical)
List of experiments

1. To measure the modulation index of AM signals using the trapezoidal method
2. To study DSB/SC AM signal and its demodulation using product Detector Circuit.
3. To study the voltages and waveforms of various stages of super-heterodyne receiver
4. To measure the sensitivity and selectivity of a super heterodyne radio receiver
5. To study the voltages and waveforms of various stages of FM Receiver
6. To study the pulse code modulation and de-modulation circuit
7. To study the Time division multiplexing and demultiplexing circuit
8. To study delta modulation and demodulation circuits.
9. To study sigma delta modulation and demodulation circuits.

PART A

Concept of an operating systems, batch system, Multi-programmed, Time sharing, Personal Computer System, Parallel system, Real time system, General system Architecture.

System components, operating system services, System calls, System Programs, System Structure, System design and implementation. Concept of process, process states, process state transition, process control block, operations of processes, concurrent processes, deadlocks, scheduling algorithms, scheduling criteria, Process Synchronization.

Memory Management: [6]
Logical and physical address space, storage allocation and management techniques, swapping, concepts of multi programming, paging, segmentation, virtual storage management strategies, Demand Paging, Page Replacement Algorithms, Thrashing.

PART B

Information Management: [6]
File concept, Access method, Directory structure, Protection File system structure, Allocation methods, Free space management, Directory implementation, Disk structure, Disk Scheduling, Disk management, Swap space management.

Distributed-System Structures: [6]
Network operating system, Distributed operating systems, Remote services, Robustness, Design Issues.
Distributed file systems and Distributed Coordination: [6]

Case Studies: [5]
Unix O.S. Architecture, Operating system services, user perspective, representation of files in Unix system processes and their structure, Input-output system, Memory management, Unix shell, history and evolution of Unix system.

Recommended Books


Reference Books


Paper Title: Management of Information Technology (Theory)

Paper Code: IBM 401 Max. Marks/ Credit: 50/4 Time: 3 hours

Course duration: 45 lectures of one hour duration each

Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

Part A

Information Technology (IT) [8]
IT and society, IT infrastructure in India vis-à-vis developed nations (Telecommunication, Internet reach, PC, Broadband, Mobile Phones), IT applications in Healthcare & Education, meaning of E-Readiness and E-participation index as defined by United Nations, areas where growth is expected in future.

System Investigation & Analysis, Networking [8]
System Analysis & Design, Symbols used in modeling a business process, Networking concepts, Ethernet, IP addressing, Functioning of Routers, Bridges, hubs and switches in a network, Telecommunication (GSM, CDMA, Wireless and other new technologies)

Internet & Intranet [7]
Functioning of Internet, Encryption & Digital signatures, Firewalls, Fraud on the Internet, Virus, Hacking & Denial of Service attacks, Intellectual Property Protection on the Internet, Intranet & security

Part B
E-Commerce & E-Governance [12]
E-Commerce models, Intermediaries in E-Commerce, E-Governance in India, study of successful E-Governance models like E-Choupal, E-Payments (E-Cash, E-Wallets) and major players in the area, Online Shopping, Revenue models for Online Shopping Portals, Web Auctions like eBay, dealing with E-Waste.

Knowledge Management & Business Intelligence [10]
Meaning of Knowledge Management, Designing a Knowledge Management System, Nature & Scope of Business Intelligence, Software for Business Intelligence, Data Warehousing and Data Mining techniques.

Recommended Books:

FIFTH SEMESTER

Paper Title: Marketing Management (Theory)
Paper Code: IBM 501 Max Marks: 100 Time: 3 Hrs

Course duration: 45 lectures of one hour duration each
Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

Objectives: (i) To understand the nature, tasks and the environment under which marketing operates. (ii) To study the theory, principles and practical aspects of various marketing functions. (iii) To learn to take marketing decisions.

Part A
Introduction to Marketing: [5]
Definition; Scope and Importance of Marketing; Key Customer Markets; Concepts/Philosophies of Marketing; Holistic Marketing Concept; Marketing Tasks; Marketing Mix
Marketing Environment:
Marketing Environment; New Marketing Realities; New Consumer Capabilities; Demographic Environment; Social-Cultural Environment; Natural Environment; Technological Environment and Political-Legal Environment; SWOT analysis.

Analyzing Markets:
Marketing Research Process; Sources of data collection; factors influencing consumer behavior; buying decision process; post-purchase behavior; Organizational Buying; Stages in the Buying Process.

Market Segmentation:
Levels of market segmentation; segmenting consumer markets; Niche Marketing; segmenting business markets; Michael Porter’s five forces model; Analyzing competitors; strategies for market leaders; Targeting and Positioning.

Part B

Product Decisions:
Product characteristics; classifications; differentiation; packaging and labeling; Product Life Cycle.

Pricing Strategies:
Understanding Pricing; Setting the Price; Initiating and Responding to Price Changes; Reactions to Competitor’s Price Changes.

Marketing Channels:
Marketing Channels; Role of Marketing Channels; Identifying Major Channel Alternatives; Types of Intermediaries; Channel-Management Decisions, Retailing, Wholesaling.

Marketing Communication:
The Role of Marketing Communications; Communications Mix-Advertising, Sales Promotion, Public Relations and Publicity, Events and Experiences, Direct and Interactive Marketing, Personal Selling.

References:
2. Ramaswamy, V.S. & Namakumari, S: Marketing management, planning, implementation and control, 2nd edition Mcmillan

Paper Title: Human Resource Management (Theory)
Paper Code: IBM 502 Max Marks: 100 Time : 3Hrs

Course duration: 45 lectures of one hour duration each
Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

Objectives: The objective of the paper is to make student aware of the various functions and importance of the HR department in any organization. It is basically concerned with managing the human resources, whereby the underlying objective is to attract retain and motivate the human resources in any organization, which is the most challenging and daunting look for any organization today.

Part A

Introduction: [5]
Meaning, scope, objectives and functions of HRM; Importance of Human Resource Management; HRM & HRD a comparative analysis;

Environment of HRM: [5]
Role of government, internal and external forces; Human Resource Management practices in India.

Definition, objectives, process and importance; Job analysis, description, specification & job evaluation; Recruitment, selection, placement and induction process;

Human Resource Development: [6]
Concept, Employee training & development; Career Planning & development; Promotions, demotions, transfers, separation, absenteeism & turnover;

Part B

Job Compensation: [6]
Wage & salary administration, incentive plans & fringe benefits.

Performance Management: [6]
Concept & process, performance appraisal, Potential appraisal;

Quality of work life (QWL): [6]
Meaning, techniques for improving QWL.

Industrial Relations: [6]
Concept and theories, trade unions; Health, Safety & Employee welfare measures; Employee grievances and discipline, participation & empowerment; Introduction to collective bargaining.

References:

Paper Title: Integrated Circuits (Theory)
PART A

Introduction:
General classification of Integrated Circuits, advantages of ICs over Discrete Components, Computer Generations.

Thick Film and Thin Film Hybrid ICs:
Features of Hybrid IC technology, Thick Film technology, Thick film processing, Thick Film design, guidelines and applications of thick film hybrids. Thin film technology, Thin film processing, Thin film design, guidelines, advantage and applications of Thin film hybrids.

Monolithic IC Processes:

PART B

Monolithic Components:

Basic Building Blocks for ICs:
Bipolar Transistor current sources. FET current sources independent of supply voltage variations.

Recommended Books

1. Integrated circuits by K.R. Botkar, Khanna Publishers
3. VLSI Technology by Simon Sze, Tata Mc Grawhill

Paper Title: Integrated Circuits (Practical)
List of Experiments

1. VI Characteristics of NMOS Transistor
2. VI Characteristics of PMOS Transistor
3. Voltage Transfer characteristics of CMOS Inverter for Inverter threshold to be Vdd/2, \( \text{Id}=1\mu A \)
4. Study the Transient characteristics of CMOS Inverter for different frequencies.
5. Design of CMOS Nand Gate
6. Design of CMOS NOR Gate
7. Design of CMOS 2:1 Mux
8. Study the characteristics of CMOS Transmission Gate
9. Study the characteristics of NMOS Pass transistor
10. Design of CMOS current source, current = 1uA
11. Design of CMOS Differential amplifier

Paper Title: Microcontrollers and Interfacing (Theory)

PART A

Microprocessor and Microcontroller [2]
Comparison of Microprocessor and Microcontroller, Overview of 4 bit, 8 bit, 16 bit and 32 bit Microcontrollers, Overview of 8051 family

The 8051 Architecture [12]
8051 Oscillator and clock, Program counter and Data pointer, A and B CPU registers, Flags and Process Status Word, Internal Memory and RAM, The Stack and Stack Pointer, Special Function registers, Internal ROM, Input/ output pins and ports, External Memory connection, Counters and Timers, Timer Counter Interrupts, Timer Modes of operation, Serial data Interrupts and Modes, Timer flag Interrupt, Serial port Interrupt, External Interrupts, Reset, Interrupt Control, Interrupt Priority, Interrupt Destination, Software generated Interrupts.

8051 Assembly Language Programming [12]
8051 Assembly Language Mnemonics and Syntax, Data Moving Instructions, Byte Level and Bit Level Logical Operations, Rotate and Swap operations, Arithmetic Operations, Jump and Call Instructions, Calls and Subroutines, Interrupts and returns.

PART B

8051 Microcontroller Design [10]
Microcontroller Specification, A Microcontroller design, External memory and Memory Space decoding, reset and clock circuits, expanding I/O, Memory mapped I/O, Memory Address Decoding, Testing the design- Crystal test, ROM test, RAM test, Timing subroutines- Hardware and Software time delays, Lookup tables for 8051, 8051 Serial Communication, 8051 connection to RS 232, Interrupt Programming, Interrupt Priority in 8051, Programming Timer Interrupts, External hardware Interrupts and Serial Communication Interrupts.

Real World Interfacing
Interfacing of 8051 to LCD, ADC, DAC, Sensors, Stepper Motor, Keyboard, Interfacing to External Memory, Interfacing to the 8255.

Recommended Books
Sanjay Attri, “Microcontrollers and PLC’s”, Dhanpat Rai and Sons.

Paper Title: Microcontrollers and Interfacing (Practical)

List of Experiments

1. Write programs for Data Moving Instructions, Byte Level and Bit Level Logical Operations, Rotate and Swap operations, Arithmetic Operations, Jump and Call Instructions, Calls and Subroutines, Interrupts and returns as follows:
   a. Write a program to compute sum of N natural numbers.
   b. Write a program to find the smallest element of an array of N integers.
   c. Write a program to perform BINARY SEARCH on an array that is sorted in ascending order.
   d. Write a program to compute the sum of odd elements of an array of 8-bit integers.
   e. Compute the address of the elements of 5 x 5 matrix
   f. Multiply two 2 x 2 matrices. Try to make it generalized.
   g. Write programs for Timer Interrupts, Serial port Interrupts

2. Write programs for Interfacing of 8051 to LCD, ADC, DAC, Sensors, Stepper Motor, keyboard, Interfacing to External Memory, Interfacing to the 8255.

Paper title: Digital Communication (Theory)

Paper Code: EC504 Max. Marks: 100 Time: 3 hours
Course duration: 45 lectures of one hour duration each

Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

PART A


Digital modulation techniques: PSK, FSK, MSK, QAM. Error calculations for PSK, FSK, MSK, QAM, Shannon’s limit, Signal to Noise Ratio Calculations in PCM and DM systems.  [8]

Information theory and coding: Entropy, Capacity of a Gaussian Channel. Block codes, Convolution coding and decoding, Soft and Hard decision decoding, State & Trellis diagrams, Viterbi Algorithm, Trellis decoded modulation.  [10]

PART B


Signal design for band-limited channels for No Inter Symbol Interference: Pulse shaping to Reduce ISI, types of error-performance degradation, demodulation/detection of shaped pulses  [7]

Recommended Books

1. Digital Communications by Bernard Sklar , PHI

Paper title: Digital Communication (Practical)

Paper Code: EC554  Max. Marks: 50

List of Experiments

1. Design and practical implementation of ASK systems
2. Design and practical implementation of PSK systems
3. Design and practical implementation of QPSK systems
4. Design and practical implementation of FSK systems
5. To study the application of CDMA in voice communications
6. To practically compare the noise in PCM and DM systems
7. To practically study Frequency Division Multiplexing.
8. To practically study Time Division Multiplexing.
9. Implementation of Viterbi algorithm using C-language

Paper Title: Antennas and Wave Propagation (Theory)

Paper Code: EC505 Max. Marks: 100 Time: 3 hours

Course duration: 45 lectures of one hour duration each
Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

**PART A**

**Antenna Radiation** [15]
Antenna Parameters: Antenna impedance, Directional patterns, Effective length, Radiation Intensity, Directivity, Power gain, Efficiency, Effective area, Equivalent circuit, Front to back ratio, polarisation and antenna temperature, Radiation field, Radiation power, Radiation resistance, Directivity and gain of an alternating current element, half wave dipole and quarter wave monopole. Effect of earth on patterns.

**Antenna arrays** [10]

**PART B**

**Practical Antennas** [8]
Top loading and tuning, rhombic antennas, ferrite rod, whip antennas. Receiving antennas, frequency independent antennas.

**Wave Propagation:** [12]
Modes of Propagation: Surface Wave Propagation, Sky Wave (Ionospheric) Propagation- Virtual height, Maximum usable Frequency, Skip Distance, Optimum working frequency; Space Wave (Tropospheric) Propagation- line of sight distance.

**Recommended Books**

1. Antennas and Wave Propagation by G S N Raju, Pearson publications
2. Antennas and Radio Wave Propagation by K D Prasad Satya Prakashan
4. Antenna and Radio Wave Propagation by Krauss, TMH
5. Antenna and Radio Wave Propagation by Ballanis, John Wiley & Sons
SIXTH SEMESTER

Paper title: Advanced Microprocessors (Theory)

Paper Code: EC601  Max. Marks: 100  Time: 3 hours

Course duration: 45 lectures of one hour duration each

Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

PART A

8086 ARCHITECTURE: [4]
CPU Architecture, Internal operation, addressing modes, instructions formats, Instruction execution timing.

ASSEMBLY LANGUAGE PROGRAMMING: [7]
Assembler Instruction formats, Data Transfer, Arithmetic, Branch, loop, machine control, logical, Shift and rotate instructions, Directives and operators.

MODULAR PROGRAMMING: [4]
Linking & relocation, stacks, procedures, Interrupt and routines.

BYTE AND STRING MANIPULATION: [4]
String instruction, prefix, text editor, number format conversion.

I/O PROGRAMMING: [3]
Fundamental I/O consideration programmed I/O, Interrupt I/O, Block Transfer and DMA.

PART B


NUMERIC DATA PROCESSOR: [8]
8087, NOP data types, Processor architecture

INTEL 386 AND 486 MICROPROCESSORS: [10]
Intel 386 Microprocessor, Intel 486 Microprocessor, 486DX Architecture, Register Organisation of 486 Microprocessor, memory organization, Virtual Memory, Memory Management Unit(MMU), Interrupts and Exceptions, Addressing Modes of 80486.

Recommended Books

Microcomputer Systems 8086/8088, Family Yu Cheng Liu and G.A.Gibson, PHI
REFERENCES

Intel's Microcontroller Handbook

Paper Title: Advanced Microprocessors (Practical)

Paper Code: EC651

Max. Marks: 50

List of Experiments

1. Write a program to load register A, B, C and D with same constant (e.g., A1). Try to optimize your program in such a way that you use the smallest number of program bytes. Test your program in single step mode.

2. Assume that 4 bytes of data restored at consecutive locations of the data memory starting at location X. Write a program that loads register E with (X) i.e. with data contained at memory location X, D with (X+1), C with (X+2) and B with (X+3+0)
   (a) Use direct addressing mode (LDA)
   (b) User register indirect addressing mode (M)
   Test your program in single step mode.

3. (a) Write a program which tests the zero condition of data byte specified at data memory location X. If it is zero, a 00 should be stored at location X+1, otherwise FF.
   (b) Write a program which tests the all–one–condition of data byte specified at data memory location X. If all the bytes are 1, store 01 at location X+1, otherwise 00.

4. Four bytes of data are specified at consecutive data memory locations starting X. Write a program which increments the value of 4 bytes by 1.

5. Two unsigned binary numbers are stored at consecutive data memory locations, X+1. Write a program for computing (X+1)-(X). The magnitude of the result should be stored at Y and the sign 00 if positive and 01 if negative at Y+1.

6. (a) A double precision number, i.e. a 16 bit unsigned number, is stored X and X+1, with low order byte at X. Another double precision number is stored at Y and Y+1. Add the two numbers and store the result at W and W+1.
   (b) Same as (a). Subtract the two numbers and store the result at W and W+1.

7. A code word is stored at memory location X. Write a program for testing whether the code word belongs to 2/5 code, and set the location Y to FF if yes 00 if no. The code word is valid if three MSBs are zero and if the number if 1’s in the remaining 5 bits is 2 (2/5 Code).

8. A counter is defined as register (e.g., B) which gets decremented till zero. Define such a counter as subroutine. Write a program, which consist of two counters, You must implement the following steps
   1. Set initial value of counter to 1.
   2. Call counter subroutine.
   3. Set initial value of counter to 2.
   4. Call counter subroutine.
   5. Go back to step 1.
9. (a) N binary numbers are stored at consecutive data memory locations, starting at x, where N is defined at data member location “NUMBER”. Find the largest number and display it in the data field.
   (b) N binary numbers are started consecutive data member locations starting at X. Rearrange the numbers in ascending order.

10. A binary number is stored at data member locations X. Multiply the number by 10 and display the result in the address field (Hint: bx10=bx2 +bx8, a multiplication by 2 corresponds to a shift left on a bit).

11. An 8 bit binary number is stored at data memory locations. Y. Convert the decimal (BCD) and display the result in the address field.

12. Given 2 digit decimal number at data memory location X and X+1. Find the product using binary multiplications and display the result in address field.

13. Write a program for moving a data block starting a address X to address Y. The address X, Y as well as the block length are specified at some suitable data memory locations.

14. Write a program for moving a data block starting a address X to address Y. The address X,Y as well as the block length are specified at some suitable data memory locations.

15. A two digit BCD number is stored at memory location X. Convert the number into binary and display the result in data field.

16. Divide a 16 bit number by a 8 bit number and display the result in data field.

17. Write a program for display of decimal numbers 00-99 in sequence with a delay of 15 seconds between any two consecutive numbers.

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**Paper Title: Microwave Engineering (Theory)**

**Paper Code: EC602**  Max. Marks: 100  Time: 3 hours

**Course duration:** 45 lectures of one hour duration each  
**Note for paper setter:** Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

**PART A**

**Waveguide Components**  
Transitions, Discontinuities, Matched loads, Shorts, Flanges, Bends & Twists.  
Attenuator & phase shifters, Microwave Hybrid Circuits: Waveguide Tees, Magic (Hybrid) Tees, Scattering matrix of tees, Hybrid Rings (Rat-Race Circuits), Directional Couplers: Two Hole Directional Couplers, Scattering matrix of a directional coupler, Hybrid Couplers, Multi-hole couplers.
Propagation in ferrites, Faraday rotation, Microwave Circulators: 3+0 port circulators and Isolators, YIG filter rectangular, Microwave cavities: Rectangular, Cylindrical Cavity Resonators, Q-factor of cavity resonator, aperture coupled cavity.

**Measurements** [5]
Slotted waveguide, Vector Voltmeter, Swept Frequency Technique Detectors, Power & Impedance measurement.

**Solid State Sources – I** [8]
Microwave BJTs, Heterojunction Bipolar Transistors (HBTs) and Tunnel Diodes.
Metal-Semiconductor Field Effect Transistors (MESFET), High Electron Mobility Transistors (HEMT).
Transferred Electron Devices (TEDs) : GUNN Diode, LSA Diodes.

**PART B**

**Solid State Sources – II** [4]

**Microwave Tubes** [12]
Microwave Linear Beam Tubes: Klystron, Multicavity Klystron, Reflex Klystron, Helix Traveling-Wave Tubes (TWT), Coupled Cavity Travelling-Wave Tubes. Microwave Crossed-Field Tubes: Cylindrical Magnetron.

**Microwave Transmission Lines** [6]
Strip Lines: Introduction, Microstrip Lines, Parallel Strip Lines, Coplanar Strip Lines and Shielded Strip Lines

**Recommended Books**


**Paper Title: Microwave Engineering(Practical)**

**Paper Code: EC652**

Max. Marks: 50

**List of Experiments**

4. Measurement of SWR.
5. Reflex klystron mode curves.
6. Antenna radiation pattern.
7. Verify Diode law.
8. Gunn Oscillator characteristics.
9. Directivity & Coupling of a directional coupler.
10. To verify the waveguide law.

Paper title: Computer Networks (Theory)

Paper Code: EC603 Max. Marks: 100 Time: 3 hours

Course duration: 45 lectures of one hour duration each
Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

PART A

INTRODUCTION [5]

PHYSICAL LAYER [5]
Data Communication concepts, Wired and Wireless transmission media, Transmission Impairments and Performance, Introduction to PSTN, Switching, Circuit Switching and Packet Switching, Virtual Circuits.

DATA LINK LAYER [6]
Data link layer Design Issues, Framing, Error Detection and Correction, Flow Control, Sliding Window Protocols, HDLC, SLIP, and PPP.

MEDIUM ACCESS CONTROL SUBLAYER [6]
Channel Allocation, ALOHA, Slotted ALOHA, CSMA, CSMA/CD, IEEE LAN Standards: Ethernet (802.3), Gigabit Ethernet, Wireless LAN (802.11), Broadband Wireless (802.16), Bluetooth.

PART B

NETWORK LAYER [12]
Network layer Design Issues, Routing algorithms– Shortest path, Flooding, Distance Vector Routing and Link State Routing; General principles of Congestion Control, Congestion Control in Datagram and Virtual Circuit Subnets, Brief idea of Quality of Service, Internetworking, IP protocol, IP Addresses, Internet Control Protocols, Subnetting and Super subnetting, NAT, DHCP, IPv4 and IPv6.

TRANSPORT LAYER [5]
The Transport Service, Elements of Transport Protocols, TCP & UDP Protocols

APPLICATION LAYER [6]
Brief Introduction to DNS, SMTP, FTP, TELNET, HTTP, WWW, SNMP and Cryptography.

Recommended Books

Paper Title: Computer Network (Practical)

Paper Code: EC653               Max. Marks: 50

List of Experiments:

1. To familiarize with the basic tools (crimping) used in establishing a LAN.
2. To study various topologies for establishing computer networks.
3. To familiarize with switch (manageable & Unmanageable) Hub, connectors, cables used in computes Networks.
4. To familiarize with routers & bridges.
5. To use basic commands like ping, trace-root, ipconfig, arp for troubleshooting network related problems.
6. To use various utilities for logging in to remote computer and to transfer files from/to remote computer.
7. To develop a program to implement the hamming code.
8. To develop a program to compute check sum for an ‘m’ bit frame using a generator polynomial.
9. To develop a program for implementing sliding window protocols.
10. To develop a program to implement a routing algorithm
11. Study the various commands used to configure a router.
12. Study the performance of ALOHA, Slotted ALOHA, Ethernet, CSMA/CD on Network simulator.
13. Study the performance of Hub, switch, Bridge and router on network simulator.
14. Study the performance of various routing algorithms on network simulator.
15. Study the effect of various traffic patterns on network simulator.
16. Study the effect of IP multicasting on network simulator.
PART A

Software Evolution

Project Management Concepts

Software Project Planning

Risk Management

Software Quality Assurance
S/w quality concept, SQA- Software quality assurance activities, reviews, SQA plan, ISO 9000, Quality standards, ISO approach to quality assurance systems. [6]

PART B

S/W Configuration Management
Baselines, S/w configuration Items, SCM process, Version control, Change control. [5]

Design
Design Concepts and principles, Modular Design, Design Methods [6]

S/W Testing Methods
Testing Fundamentals, test case design, White box testing, Black Box testing, Testing Strategies, Verification & validation, Unit, Integration, Validation, System Testing. (6)

Computer aided S/W Engineering
CASE, Building blocks For CASE, Integrated CASE Environment. [4]

Recommended Books

Reference Books
Software Engineering by Ian Somerville (Addison Wesley), Edi 7th.
Software Engineering by Jalote, Pearson, Edi 1st.
PART A

INTRODUCTION: [6]
History of automatic control, servomechanism, regulating systems, open loop, closed loop control systems, feedback, effect of feedback, linear and non-linear control systems, block diagrams. Examples: speed control system, robot control system, temperature control system, traffic control system, business control systems etc.

MODELING: [7]

TIME DOMAIN ANALYSIS: [4]
Typical test input signals, Transient response of the first order, second order system. Time domain specifications, Dominant closed loop poles of higher order systems, Steady state error and error coefficients.

STABILITY: [2]
Concepts of absolute and relative stability, pole zero location, routh Hurwitz criterion.

ROOT LOCUS TECHNIQUE: [4]
Introduction, Root Locus Concept, Construction Root Loci, Stability analysis.

PART B

FREQUENCY RESPONSE: [8]
Introduction, bode diagram, polar plots, log magnitude vs. phase plot, nyquist stability criterion, stability analysis, relative stability, Gain margin & Phase margin close loop frequency response.

INTRODUCTION TO DESIGN: [5]
Necessity of compensation, lag and lead compensation, design of PID Controller.

STATE SPACE ANALYSIS: [9]
Concept of State, state variable and state vector, state space modeling of continuous time and discrete time systems, solution of state equation, concepts of controllability and observability, pole-placement design.
Recommended Books


References
2. K. Ogata, Modern Control Engineering, PHI

Paper Title: Managerial Economics (Theory)
Paper Code: IBM 601      Maximum Marks: 100      Time of examination: 3hrs.

Course Duration: 45 lectures of one hour each.

Note for the paper setter: Total of 8 questions may be set covering the whole syllabus. Candidate will be required to attempt any 5 questions selecting at least two from each part.

Objectives: To provide students with an understanding of basic economic principles of production & exchange-essential tools in making business decisions in today's global economy. The object presents the foundation to understanding how the economy works, covering microeconomic description of business applications, including pricing for profit maximization, price elasticity, market structures and modeling of business in varying economic climates. The focus is on market economics, the organization that operation there and their business strategies.

Part A

Introduction to Managerial Economics:
Nature Scope and Importance of Managerial Economics, opportunity costs, incremental principle, time perspective, discounts and equi marginal principles.

Demand Concepts and Analysis: [4]
Individual Demand, Market Demand, Kinds of Demand, Determinants of Demand, Demand Functions, Functions, Demand Schedule and Law of Demand.

Theory of Consumer Behavior: [4]
Cardinal Utility Approach and Ordinal Utility (Indifference Curves) Approach;

Elasticity of Demand: [4]
Concept, Types, Measurement and importance.

Demand Forecasting: [5]
Sources of Data-Expert Opinions, Surveys and Market Experiments; Time Series Analysis-Trend Projection; Barometric Forecasting-Leading Indicators, Composite and diffusion Indices.

Part B

Production Function: [4]
Concept and types, Returns to Factor and Returns to Scale, Law of Variable Proportions.

Cost concepts and Analysis: [4]
Concept of Cost, Short run and Long-run Cost Curves, Relationships among various costs, Break-even Analysis.

**Revenue Curves:**
- Concept and Types. [4]

**Perfect Competition:**

**Monopoly:**

**Imperfect Competition:**
- Monopolistic Competition, oligopoly and Barriers to Entry. [4]

**References:**
3. Dr. V. Panduranga Rao: Microeconomics-IBS Publication
8. Mote, Paul Gupta: Managerial Economics, Vikas Publisher, New Delhi, 2001 TMH

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Paper Title: **Corporate Legal Environment (Theory)**

**Paper Code: IBM 602**
**Maximum Marks: 100**
**Time of examination: 3hrs.**

Course Duration: 45 lectures of one hour each.

Note for the paper setter: Total of 8 questions may be set covering the whole syllabus. Candidate will be required to attempt any 5 questions selecting at least two from each part.

**Objective:** Corporate legal environment represents that external environment in which the organization has to work. The course covers the basic laws which a student must be aware of.

**Part A**

**Information Technology Act-2000:**
Objective of the act, documents excluded from the scope of the act, digital signatures, types of digital signatures in India, certifying authorities in India, regulation of certifying authorities, duties of subscribers, offences, appellate tribunal, penalties and adjudication

**Company Law:**
Definition and nature of a company, kinds of companies, formation of a company, memorandum of association, articles of association, prospectus, membership in a company, shares, transfer and transmission of shares, meetings and proceedings.

**Part B**

**Patents Law:**

[11]

Consumer Protection Act 1986:

Definitions under the act: complaint, consumer, defect, deficiency, unfair trade practice, consumer protection councils, redressal machinery under the act, district forum, state commission, national commission

References:

SEVENTH SEMESTER

Paper Title: Entrepreneurship and Project Management (Theory)

Paper Code: IBM 701 Max. Marks: 100 Time: 3 hours

Course duration: 45 lectures of one hour duration each

Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

Objectives: To understand the concept and importance of entrepreneurship and its role in business life for individual, corporate growth and development.

Part – A

Introduction: Definition, Need, Classification, Process, Scope and Nature of Entrepreneurship, Difference between entrepreneur, entrepreneurship, enterprise and entrepreneurial. (6 hrs)

Concepts of Entrepreneurship: Factors affecting entrepreneurship, Functions of entrepreneurship, Culture of modern entrepreneurship, Competencies and traits of entrepreneurship, Entrepreneurial ventures in India. (6 hrs)

Types of entrepreneurship: Role of mitigation in entrepreneurship, Myths of entrepreneurship, Role of family structure in entrepreneurship. Women entrepreneurs, Internet Entrepreneurship, Case Study. (8 hrs)

Part – B

Project Management: Meaning, Concept, Characteristics, Types, Importance, and Steps in Project Identification, Concept of Project Management, Forms of Project Organization. (11 hrs)
**Project system**: Life cycle of system; Project Manager: Attributes;  
(7 hrs)

(7 hrs)

**Internal Assessment**:
- Sessionals: 15+15 marks
- Quiz/Project/Assignment: 20 marks

**Text Books**:

**Reference Books**:

**Paper Title**: Industrial Relations (Theory)

**Paper Code**: IBM 702  
Max. Marks: 100  
Time: 3 hours

**Course duration**: 45 lectures of one hour duration each

**Note for paper setter**: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

**Objective**: The objective of this course is to make the students familiar with various industrial relations approaches and procedure to resolve industrial dispute and with various industrial relations legislations

**Part A**

**Industrial Relations** - Concepts & Definitions - Impact of Industrial Revolution on Industrial Relations - Indian Industrial Workers - Work Culture - wages and industrial relations - Objectives of Industrial Relations.  
6hrs

**Four Actors in Industrial Relations** – The Workers – management – Government – Society & their Importance in maintaining Industrial Relations.  
4hrs

4hrs

6hrs

** Strikes** – Types of strikes  
2hrs

**Part B**
Trade Union – Definition structure – features – Functions of trade Union – Trade Union Security – Types of Trade Unions – Reformist trade union 4hrs  


Industrial Democracy and Workers’ participation in Management -Role of workers and management in the industry. 3hrs

Employees’ grievance – Meaning – Causes – Grievance redressal procedures. 2hrs

Industrial Relations Legislations:
   a)  Trade Union Act,1926
   b)  Industrial Disputed Act, 1947
       (Tripartite and Bipartite bodies : Resolution of Industrial Disputes by conciliation , Arbitration, Ad-judication, Prohibition of strikes – Lockout – Layoff – Retrenchment – Closure etc. )
   c)  Industrial Employment (Standing Orders) Act, 1946
       (Terms and Conditions of employment and disciplinary procedure) 6hrs

Other Legislations
Payments of Wages Act,1936
Minimum Wages Act,1948
The Factories Act,1948 6hrs

Suggested Readings:
1. Industrial Law –P.L.Malik,Eastern Book Co.Lucknow

Paper Title:- VLSI DESIGN (Theory)

Paper Code: EC 701           Max. Marks: 100           Time: 3 hours

Course duration: 45 lectures of one hour duration each

Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

Part A

1. Introduction to MOS Technology (5)
   Basic MOS transistors, Enhancement and Depletion mode transistors, nMOS fabrication.

2. MOS Circuits (7)
   Parameters, Pass Transistor, nMOS inverter, CMOS inverter, MOS transistor circuit model, Latch up in CMOS circuits, Basic gates, depletion and enhance mode pull ups.

3. MOS circuit Design Processes (10)
   MOS layers, Stick Diagrams, nMOS design style, CMOS design style, Design rules and layout, Lambda based design rules, contact cuts, Double Metal MOS process rules, CMOS lambda-based design rules.

Part B

4. Circuit Characterization (8)
Resistance estimation, Capacitance Estimation, Power dissipation, Inverter delays, super buffers, propagation delays, Charge sharing.

5. **CMOS Design Methods and Testing** (10)
   Design strategies, CMOS chip design options, the need for testing, Design strategies for test, Chip-level test techniques

6. **VLSI TOOLS** (5)
   Role of CAD tools in VLSI design process, Hierarchy of simulation tools, Tanner tool, CMOS Layout tool: Microwind

**Recommended Books**


**Paper Title:- VLSI DESIGN (Practical)**

**Paper code: EC 751**

**Max. Marks: 50**

**List of Experiments (T-SPICE)**

1. Introduction to Tanner tool.
3. Transient analysis of NOR, OR.
4. Transient analysis of NAND, AND.
5. DC and AC analysis of Inverter.
6. DC and AC analysis of Common source amplifier configuration.
7. DC and AC analysis of basic MOS based current mirror.

**References**


**Paper Title:- Digital Signal Processing**

**Paper code: EC 702**

**Max. Marks: 100**

**Time: 3 hours**

**Course duration:** 45 lectures of one hour duration each
Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

PART A

Continuous Time Signals
Review of Fourier series and Fourier Transform, Sampling of Continuous Time signals.

Discrete Time Signals
Discrete time Signals & Systems, Linear Time Invariant systems, Stability and Causality, Solution of Linear constant coefficient difference equations, Convolution, Correlation, Z-Transform and its properties, Inverse Z transform.

Frequency Domain Representation of Signals & Systems

PART B

Digital Filters
Ideal Filter vs. Practical Filters, General Specifications and Design Steps, Comparison of FIR & IIR Filters.

Design of FIR Filters: Window technique, Frequency sampling technique.

Design of IIR Filters: Impulse Invariance technique, Bilinear Transformation, Design of IIR Filters using Butterworth, Chebyshev and Elliptic filter, Digital frequency transformation.

Implementation of Discrete Time Systems
Block diagrams and signal flow graphs for FIR and IIR systems. Direct form, Cascade and Frequency Sampling Structures for FIR systems, Direct forms, Cascade and Parallel form realization of IIR systems, Finite Word Length Effects.

DSP Processors
Introduction to fixed point and floating point processors and their architecture, TMS320C5X Architecture, Memory, Addressing Modes, Interrupts and Assembly Language Programming.

Recommended Books

Paper Title:-Digital Signal Processing (Practical)

Paper code: EC 752 Max. Marks: 50
List of Experiments:
1. Introduction to MATLAB.
2. Generating & Plotting Discrete time signals.
3. Study the effect of noise on signals in MATLAB.
4. Inverse Z Transform.
5. Convolution of Causal & Non Causal sequences in MATLAB.
6. Auto & Cross-Correlation in MATLAB.
8. System Response to Arbitrary Inputs.
9. DFT & IDFT of two sequences.
10. FFT of two Sequences.
11. Circular Convolution.
12. FIR Filter Design using Window Method in MATLAB.
13. IIR Filter Design using Bilinear Transformation in MATLAB.
14. IIR Filter Design using Impulse Invariance in MATLAB.
15. Butterworth and Chebyshev Digital IIR Filters in MATLAB.
17. Study of DSP kits.

Paper Title:- Optical Communication (Theory)

Paper code: EC 703 Max. Marks: 100 Time: 3 hours

Course duration: 45 lectures of one hour duration each
Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

PART A

Overview of Optical Fibre Communication: -
Elements of basic communication system, communication system architecture, advantages of optical communication, Definition of dB and dBm.

Optical Fibre Wave Guides: -
Ray Theory of Transmission: Total Internal reflection, Acceptance Angle, Numerical Aperture, Electromagnetic mode theory for optical communication of both types of fibers viz step index fiber and graded index fibres.

Signal Degradation In Optical Fibres: -
Attenuation, Material absorption losses, linear and non linear scattering losses, fiber bend loss, dispersion viz intermodal dispersion and intramodal dispersion, overall fiber dispersion and polarization mode dispersion, Introduction to nonlinear effects: Self phase modulation, cross phase modulation, Stimulated Brillouin and Raman scattering, Four Wave Mixing.

PART B

Optical Sources And Detectors:
Sources: Basic principle of surface emitter LED and edge emitter LED - material used, structure, internal quantum efficiency and characteristics, LASER Diode - material used, structure, internal quantum efficiency and characteristics, working Principle and characteristics of Distributed feedback (DFB) laser.

Detectors: PIN photodiode - material used, working principle & characteristics, Avalanche Photodiode - material used, working principle and characteristics.

**Digital And Analog Transmission System:**
Overview of Analog Links, Carrier to Noise Ratio, Multichannel Amplitude &Frequency Modulation. Point to point Digital links, link power budget, Rise time budget, Introduction to Principle of WDM, Basic Application and types of Optical Amplifiers, Semiconductor Optical Amplifier, Eribium doped fiber amplifiers, Amplifier Noise.

**Optical Fiber Measurements:**
Test Equipments: Optical Power Meter, optical attenuator, Attenuation Measurements: Cutback technique, Insertion losses Method, Optical Time domain Reflectometer (OTDR), OTDR Trace, Eye Patterns.

**Recommended Books**
2. Optical Fiber Communication Principles & Practice by John M.Senior, PHI Publication

**Reference Books**
2. G.P Agrawal, “ Fiber Optic Communication” Wiley Publisher

**Paper Title:- Optical Communication (Practical)**

**Paper code:** EC 753

**Max. Marks:** 50

**List of Experiments**
1. To study the propagation loss and bending loss in optical fiber.
2. To set up a fiber optic analog link.
3. To set up a digital fiber optic link.
4. Study of intensity modulation technique using analog and digital input signal.
5. To study the frequency modulation and demonstrate voice transmission through optic fiber using FM.
6. Measurement of optical power and propagation loss using optical power meter.
7. To determine the bit rate supported by the fiber optic link.
8. To study the characteristics of PIN diode.
9. To demonstrate the concept of WDM system.
EIGHTH SEMESTER

Paper Title: Research Methodology (Theory)

Paper code: IBM 801  Max. Marks: 100  Time: 3 hours

Course duration: 45 lectures of one hour duration each

Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

Objectives: The main objective of this subject is to help the students to understand the nature, scope, complexities and process of defining a business research question. The learning focus is on developing business research skills to underpin the approach taken to a work integrated project.

PART-A

Introduction: Meaning, Features, Objectives/Motives, Steps & Types of Research; Attributes of good Research, Research Methods and Research Methodology; Research Process, Significance of Research in Managerial decision making. (8 hrs)

Research Design: Meaning, Characteristics and various concepts relating to research design and classification of research design, Importance, Design for different types of research. (5 hrs)

Concepts: Concept, Constructs, case study and Variables. (3 hrs)

Formulation of Hypothesis: Meaning, Characteristics and Concepts relating to testing of Hypothesis, Types of Hypothesis, Procedure of testing Hypothesis. Chi – Square test. (5 hrs)

PART-B

Data Collection: Sources of Data-Primary/Secondary Methods of collecting data; direct personal interview, indirect oral interview, information through local agencies, mailed questionnaire method, schedule sent through enumerators; questionnaire and its designing and characteristics of a good questionnaire. (8 hrs)

Sampling Design: Meaning, Need, Purpose and Principles of Sampling, Types of Sampling. (5 hrs)

Data Analysis & Interpretation: Introduction to Multivariate analysis- Multiple and partial correlation, multiple regression analysis (with two independent variables), specification of regression models and estimation of parameters, interpretation of results. Analysis of Variance (ANOVA)-One way and Two way ANOVA. (Numerical not to be asked) (6 hrs)

Report writing: Style/format, contents and essential steps for report writing. (5 hrs)

Internal Assessment:
Sessionals 15+15 marks
Quiz/Project/Assignment: 20 marks

Text Books:

Reference Books:
2. Ranjit Kumar: Research Methodology, Pearson Education.

**Paper Title: Computer Architecture & Organization (Theory)**

**Paper code:** EC 801  
**Max. Marks:** 100  
**Time:** 3 hours

**Course duration:** 45 lectures of one hour duration each  
**Note for paper setter:** Total of **Eight** questions may be set covering the whole syllabus taking **four** from Part A & **four** from Part B. Candidates will be required to **attempt any five questions taking at least two** from each Part.

**Objectives:** This course offers a good understanding of the various functional units of a computer system and prepares the student to be in a position to design a basic computer system. Finally the student will be exposed to the recent trends in parallel and distributed computing and multithreaded application.

**PART A**

**Register Transfer and Micro-Operations**  
Register Transfer Language, Inter Register Transfer Arithmetic, Complements, fixed and floating point Representation, Micro-Operations, Shift Micro-Operations and Control Operations.

**Basic Computer Origination and design**  
Instruction Codes, Computer Instructions, Timing and Control, Execution of Instructions, Input, Output and interrupt, Design of Computer.

**Computer Software**  

**Control Processor Organization**  
Processor Bus Organization, ALU stack Organization, General Register Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Microprocessor Organization, Pipelining, Parallel Processing.

**PART B**

**Micro program Control Organization**  
Control Memory, Address Sequencing, Micro program Sequences, Microinstruction Formats, and Software Aids.

**Arithmetic Processor Design**
Comparison and Subtraction of unsigned Binary Numbers, Addition, Subtraction, Multiplication, Division Algorithm, Processor configuration and control

Input-Output & Memory Organization [7]
Input-Output interface, Asynchronous Data Transfer, DMA, Priority Interrupt, I/O Processor, Virtual Memory, Cache Memory, Associative memory, Memory Management Hardware.

Recommended Books
M. Morris Mano, Computer system & Architecture, Pearson Education

References
2. M. Morris and Charles R. Kinre, Logic and computer design Fundamentals, Pearson Education

Paper Title: Wireless Communication (Theory)

Paper code: EC 802 Max. Marks: 100 Time: 3 hours

Course duration: 45 lectures of one hour duration each
Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

Rationale:
This course will familiarize the students with latest wireless communication techniques and the evolution in wireless communication systems from the 1G to 3G. A detailed study of Wireless system designing, modulation techniques, Wireless networking will broaden their thoughts in a wireless communication.

PART A

INTRODUCTION [12]
Evolution of Mobile Communication Systems, Paging systems, cordless telephone systems, cellular telephone systems, comparison of common wireless communication systems, 2G cellular networks, 2.5 G wireless network, HSCSD, GPRS, EDGE technology, 3G wireless network, UMTS, 3G CDMA2000, 3G TD-SCDMA, Wireless Local Loop, Blue tooth and Personal Area Networks.

SYSTEM DESIGN FUNDAMENTALS [9]
Frequency reuse, Channel alignment strategies, handoff strategies, interference and system capacity, improving coverage and capacity in cellular systems, parameters for mobile multipath channel, Small scale fading.

MODULATION TECHNIQUES [10]
Amplitude modulation, Angle Modulation, Digital Modulation, Linear modulation techniques, Constant envelope modulation, spread spectrum modulation techniques, Equalization, Equalizers in communication receiver, Diversity techniques, RAKE receiver, Fundamentals of channel coding
MULTIPLE ACCESS TECHNIQUES
FDMA, TDMA, CDMA, SDMA

WIRELESS NETWORKING
Difference between wireless and fixed telephone networks, development of wireless networks, ISDN

WIRELESS SYSTEMS
GSM, GSM architecture, CDMA digital cellular standard, IS-95 system.

Recommended Books
Wireless Communications Principles and practice by Theodore S. Rappaport, Prentice Hall India

References
1. Modern Wireless Communications by Simon Haykin, Michael Moher, PHI
2. Wireless Communication and Networking By Jon W Mark, PHI

Paper Title: Wireless Communication (Practical)

Paper code: EC 852 Max. Marks: 50

Note: Students are required to perform experiments from any six blocks by selecting atleast two from each sub-block.

List of practicals

1. Equipment orientation
   (i) Familiarisation with spectrum analyser, simulation softwares, various kits to be used in the laboratory.
   (ii) Review of working of function generator, CRO, multimeter & other instruments.

2. Simulation and implementation of baseband digital signals
   (i) Types of baseband signals: unipolar, polar, bipolar, RZ, NRZ, etc.
   (ii) Distortion and noise. Eye diagram.

3. Simulation and implementation of modulated digital signals
   (i) PSK, ASK and FSK modulations.
   (ii) Demodulation with envelope detection and synchronous.
   (iii) PSK differential modulation.
   (iv) Quadrature modulations (QASK and QPSK).
   (v) QAM modulation.

4. Global System for Mobiles (GSM)
   (i) Cellular telephony. GSM Architecture.
   (iii) AT Commands
   (iv) working of GSM mobile station.
5. Multiple Access
   (i) Time division multiple Access
   (ii) Frequency division multiple access

6. Spread Spectrum communication systems
   (i) Pseudo-noise coders
   (ii) Direct sequence spread spectrum communication systems
   (iii) Frequency hopped spread spectrum communication systems
   (iv) CDMA wireless computer communication systems

7. Channel Characteristics
   (i) Multipath channel propagation characteristics
   (ii) Bit-error rate measurement

8. Wireless Networks
   (i) Bluetooth wireless network.
   (ii) Wi-Fi
   (iii) Wi-Max

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**Paper Title: Digital System Design (Theory)**

**Paper Code: EC803**  
Max. Marks: 100  
Time: 3 hours

**Course Duration:** 45 lectures of one hour each.

**Note for paper setter:** Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.

**Rationale:**
With the incorporation of this subject, students are able to design, test and realize the minimized combinational and sequential circuits. In today’s world, where the miniaturization plays an important role, students by studying this subject would be able to realize a given circuit with minimum hardware and space requirement.

**PART A**

**COMBINATIONAL CIRCUITS**  
[20]

Error Correction and Detection: Error detection and correction techniques, Single error detection, Single error correction with double error

Fault detection and Location in combinational circuits: Different methods of detecting and locating Faults in combinational circuits.

**PART B**

**SEQUENTIAL CIRCUITS**  
[25]
Synchronous circuits: Concept of state diagram and state table, state assignment, Analysis and synthesis of sequential circuits, designs of Next state decoder and output decoder, state reduction, Machine minimization of completely and incompletely specified machines.


Fault detection and Location in sequential circuits.

Recommended Books

1. Switching and Finite Automata Theory by Kohavi, TMH.
2. Switching Theory & Logic Design by Rao, Pearson Ed.
3. Digital circuits and Logic Design By Lee, PHI.

References

1. Computer Logic Design, Morris Mano, PHI
2. Switching circuits for Engineers, Marcus, PHI
3. Introduction to Digital systems, James Palmier, David Perlman

Paper Title: Digital System Design (Practical)

Paper Code: EC 853 Max. Marks : 50

List of Experiments

1. To Design and test the minimized circuit of Full Adder.
2. To Design and test the minimized circuit of BCD to Binary Converter
3. Implement decade counter using minimum number of gates
4. To test the minimized circuit of Decimal to BCD Encoder
5. Design and test hexadecimal to binary Encoder
6. Implement and test BCD to 7-Segment decoder
7. Design a sequence detector to detect a given sequence
8. Design and test twisted type ring counter
9. Implement the minimized circuit of Modulo-6 counter
10. To design, implement and test a 16 :4 multiplexer using logic gates.
11. To design, implement and test a 4:16 demultiplexer using logic gates.
12. Design & test Johnson Counter.

Paper Title: Financial Management (Theory)

Paper code: IBM 802 Max. Marks: 100 Time: 3 hours

Course duration: 45 lectures of one hour duration each

Note for paper setter: Total of Eight questions may be set covering the whole syllabus taking four from Part A & four from Part B. Candidates will be required to attempt any five questions taking at least two from each Part.
**Objective:** The objective of this course is to create basic understanding of corporate finance, Capital Budgeting decisions, working capital management, project management etc in the Engineering profession.

**PART-A**

**Corporate Finance**

**Working Capital Management**
Concept, Need and Types of Working Capital Management of Cash, Inventory, Accounts Receivable and Accounts Payable, Over and Under Trading. 6hrs

**Ratio Analysis**

**Techniques of capital Budgeting:** Various types of Capital Budgeting, Payback method, NPV, IRR, ARR, Capital Rationing. 6hrs

**Cost of Capital:** Cost of Enquiry, Cost of Debt, Cost of Retained Earnings, Weighted Average cost of Capital. 3hrs

**PART-B**

**Portfolio Management**
Securities, Markets, Stock Exchanges, Risk Return, Relationship, Portfolio Structures. 6hrs

**Dividends, Bonus and Rights**
Dividends Policy, Legal Requirements for issue of Bonus Shares, Right Shares and Share Premium. 6hrs

**Financial Management in Public Enterprises.**
Concept & its applications 4hrs.

**Concept of Leverages**
Operating, Financial and Combined 3 hrs.

**Optimum Capital Structure**
EBIT-EPS Relationship, Tax shield Analysis 3 hrs.

**Suggested Readings:**