WITH EFFECT FROM THE ACADEMIC YEAR 2005-2006

SCHEME OF INSTRUCTION & EXAMINATION

B.E IV YEAR (REGULAR)

(ELECTRONICS & COMMUNICATION ENGINEERING)

SEMESTER - I

Sl. No.	Syllabus Ref.No	SUBJECT	Scheme of Instructions Periods per Week L/T	D/P	Scheme of Examination Dura-tion in Hrs	Maximum Marks Univ. Exam	Sessi-onals
		THEORY					
1.	EC 401	Microwave Engineering	**4**	**-**	**3**	**75**	**25**
2.	EC 402	Data Communication and Computer Networks	**4**	**-**	**3**	**75**	**25**
3.	EC 403	Modern Communication Systems	**4**	**-**	**3**	**75**	**25**
4.	EC 404	Digital Design with VHDL	**4**	**-**	**3**	**75**	**25**
5.		**ELECTIVE – I**	**4**	**-**	**3**	**75**	**25**
6.	ME 421	Industrial Administration & Financial Management	**4**	**-**	**3**	**75**	**25**
		PRACTICALS					
1.	EC 431	Microwave Lab	**-**	**3**	**3**	**50**	**25**
2.	EC 432	HDL Lab	**-**	**3**	**3**	**50**	**25**
3.	EC 433	Project Seminar	**-**	**3**	**-**	**-**	**25**
		TOTAL	**24**	**9**	**-**	**550**	**225**

Elective –I

EC 405 VLSI Design
EC 406 Operating Systems
EC 407 Digital Image Processing
EC 408 Optimization Techniques
EC 409 Television Engineering
ME 411 Entrepreneurship

EC 401

MICROWAVE ENGINEERING

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks.

UNIT -I

Guided Waves: Propagation of TE, TM and TEM waves between parallel planes. Velocity of propagation, wave impedance, attenuation in parallel plane guides. Elements of strip lines, micro strip lines, slot lines and fin lines. Introduction to MMICs.

UNIT-II

Wave Guides: TE and TM waves in rectangular and circular wave-guides, f~ Wave Impedance, Characteristic Impedance, Attenuation and a of wave- guides. Cavity resonators, resonant frequency and a, Applications of cavity resonator.

UNIT –III

Microwave Circuits and Components: Concept of Microwave circuit, Normalized voltage and current, Introduction to scattering parameters, Unitary property, Derivation of S Matrix for magic Tee, Direction coupler, E and H Plane Tees and their properties, Microwave components, Attenuators, Phase Shifters, Isolators and circulators, S matrix of circulator.

UNIT-IV

Microwave Tubes: High frequency limitations of conventional tubes, Bunching and velocity modulation, mathematical theory of bunching, principles and operation of two cavity, multi cavity, Reflex Klystron, TWT and BWO.

Theory of crossed field interaction; principles and operation of magnetrons and crossed field amplifiers.

UNIT-V

Microwave Solid State Devices: Principles of operation, characteristics and applications of Varactor, PIN diode, GUNN diode and IMPATT diode.

Suggested Reading

1. E. C. Jordan, EM Fields, Waves and Radiating System, 2nd ed., PHI, 1995.
2. Samuel V. Liao, Microwave Devices and Circuits, 3rd ed., PHI, 1995.
3. R. E. Collins, Foundations for Microwave Engineering, 2nd ed., TMH.
4. David M. Polar, Microwave Engineering, 2nd ed., John Wiley, 2001.
5. Peter A. Rilli, Microwave Engineering: Passive Circuits, PHI, 1999.

EC 402

DATA COMMUNICATIONS AND COMPUTER NETWORKS

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

UNIT -I

Introduction to Data Communications: Data Communication Networking, Computer Communication architecture, The OSI reference model.
Data Link Control: Line Configurations, Flow control, Error Control, Data Link Control Protocols, Multiplexing: FDM, Synchronous TDM, Statistical TDM.

UNIT -II

Circuit Switching: Single Node Networks, Digital Switching Concepts, Digital Private Branch Exchange, Control Signaling.
Packet Switching: Packet Switching Principles, Virtual Circuits and Data grams, Routing, Traffic Control, x.25 Packet Switching.

UNIT -III

Local and Metropolitan area Networks: LAN/MAN technology, Bus/Tree and Star topologies using metallic media Optical Fiber bus, The ring topology, Medium access control protocols, MAC performance, LAN/MAN standards, IEEE 802.2 ,802.3,802.4, IEEE 802.5, IEEE 802.6.

UNIT -IV

Protocols and Architecture: Transport services, Protocol mechanisms, Network services, The TCP/IP protocol suite, TCP, UDP and TP4, A comparison of OSI, TCP/IP , and SNA architectures.
Internet Working: Principles of internet working. The bridge, Routing with bridges, Connectionless and connection oriented internet working.

UNIT-V
Session Layer Services. Presentation Layer Facilities: Presentation concepts, Encryption and Public key cryptography, Application layer services, Network Management, SNMP.
Basic Principles of ISON, and BISON. Introduction to Frame relay and cell relay.

Suggested Reading

1. William Stallings, Data and Computer Communications, 7th ed. , PHI, 2004.
2. Halsall, F, Data Communications Computer Networks, and 081, 3rd ed., Addison-Wesley 1996.
3. Prakash C Gupta, Data Communications, PHI, 1996.

4. Behrouz A. Forouzan, Data Communications and Networking, 3rd ed., TMH,2004.
5. Achyast S. Godbole, Data Communications and Networks, 3rd ed., TMH,2004

EC 403

MODERN COMMUNICATION SYSTEMS

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

Unit I

Telephony: Basics of switching systems, Electronic Space division switching, stored program control, centralized and distributed SPC, 2- stage, 3-stage and n-stage network, time division switching, combination switching, telephone traffic, traffic load and parameters, GOS and blocking probability Markov Processor, Birth-Death process, Delay systems.

Unit II

Fiber Optic Communications: Introduction, Optical fiber, stepped indexed fiber, skew rays, modes, graded index fiber, loss mechanisms, absorption, scatter, radiation from bends, single mode fiber, detectors, PIN diode, APD device speed of response and quantum efficiency, reliability, noise, optical sources, LEDS, Lasers, optical communication systems.

Unit II

Introduction to optical amplifiers, point to pint links, Nose effects on digital transmission system performance, Multi channel transmission techniques, classification of coherent optical fiber systems, Modulation techniques, WDM, DWDM, Application of optical fiber in LAN

Unit IV

Introduction to cellular mobile systems, concept of frequency reuse channels, Handoff mechanism, Cell splitting, Introduction to cell site antennas and mobile antenna, Introduction to co-channel and non-co-channel interference, Introduction to frequency management and channel assignment.

Unit V

Introduction to digital mobile telephony, multiple access schemes, GSM and CDMA cellular radio networks. Future Public Land Mobile Telecommunication Systems (FPLTMTS).

Suggested Reading:

1. Thiagrajan Viswanathan, Telecommuncation switching systems and Networks, PHI, 1995
2. Gerd Keiser, Optiacal Fiber Communications MGH, 3rd ed., 2000.
3. William CY Lee, Mobile Cellular Telecommuncaitions, Analog and Digital Systems, 2nd ed., MGH, 1995

4. Wayne Tomask, Advanced Elecgtronic Communication Systems, 6 ed., PHI, 2004
5. Senior John M., Optical Fiber Comuncations Principles and Practice, PHI 2nd ed., 1996
6. P. Gnanasivam, Telecommuncation switching and networks, New Age, 2005

EC 404

DIGITAL DESIG WITH HDL

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

Unit I
Introduction to HDL's, Simulation, Capabilities of Verilog, Basic concepts, Data Types, System tasks and compiler directives, modules, ports, Gate level modeling, Gate types, Gate delays, Examples

Unit II
Data flow modeling, continuous assignments, Delays, Expressions, Operators, Operands, Operator types, Examples, Writing test bench. Behavioral modeling, structured procedures procedural assignments, timing controls, conditional statements, Multiway branching, loops, seque3ntial and parallel blocks, generate blocks, examples.

Unit III
Tasks, Functions, procedural continuous assignments, Overriding parameters, conditional compilation and execution, timing scales, System tasks, Timing and delays, Types of delay models, Path delay modeling, Timing checks, Switch level modeling, switch modeling elements, Examples. User defined primitives, Uses of programming language interface

Unit IV
Capabilities of VHDL, Primary constructs of VHDL. Entity declaration, Architecture body, configuration declaration, package declaration, package body, Design examples for data flow, Behavioral and structural style of modeling.

Unit V
Logic Synthesis, Impact of logic synthesis, HDL synthesis, Synthesis design flow, Verification of the Gate-Level Net list, Modeling tips for logic synthesis, Examples of synthesis

Suggested Reading

1. Stephen Brown & Zvonko Vranesic, Fundamentals of Digital Logic with Verilog design, TMH publication
2. Samir Palnitkar, Verilog HDL, A Guide to Digital Design and Synthesis, 2nd ed., Pearson Education
3. Clietti-Advanced Digital Design with verilog HDL-PHI, 1995
4. Douglas Perry L., VHDL, 2nd ed., MGH ed, 1995
5. Novabi Z., VHDL Analysis and Modeling of digital system, MGH, 1993

EC 405

VLSI DESIGN (Elective- I)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

Unit I

Review of Semiconductor devices, Passive components for ICs, Device structures, BJTS, JFETS, MOSFETS- depletion types and enhancement type. Basic logic (Gates) circuits with BJTS, MOSFETS(N-MOS, P-MOS, BICMOS). Sequential circuits-Flip Flops & latches.
Concept of sheet resistance-Resister design, capacitor design-considerations for the Design of BJT, MOSFET

Unit II

Circuit or Cell Design, Importance of aspect ration in FETS, emitter area in BJTS. Design of Inverters with different loads, design of AND, OR, NAND, NOR Gates, Influence of FAN-IN and FAN-OUT on Gate design, Design of latches and Flip Flops

Unit III

System level design considerations, Counters shift registers, Arithmetic logic Unit, Multiplexer, memories-ROM, Static RAM, Dynamic RAM. CAD tools-simulation and synthesis

Unit IV

Different layers of ICs, (Unit Processes) wafer preparation-Epitaxy, Diffusion, Ion implantation, oxidation, Chemical vapor d3eposition, Optical lithography, Etching, Metallization, Bonding, Packaging and testing. Process flow for N-MOS, CMOS, BiCMOS.

Unit V

Basic current mirrors and single stage amplifiers, simple CMOS current mirror, Common source, Common drain and common gate amplifiers, Bipolar current mirrors, Basic operational amplifier.

Suggested Reading

1. Wayne Wolf, Modern VLSI Design: System-on-Chip Design, Pearson Education 3rd ed. 2005.
2. Douglas A. Pucknell and Kamran Eshraghian, Basic VLSI Design, PHI,2004.
3. John Martin, Analog Integrated Circuits, John Wiley & Sons, 1997
4. Sung -Mo (Steve) Kang & Yusuf Leblebiei, CMOS Digital Integrated Circuits, 3rd ed., TMH, 2003.

EC 406

OPERATING SYSTEMS (Elective- I)

Instruction	4 Periods per
week Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

UNIT -I

Introduction: What is an OS, Mainframe Systems, Desktop systems, Multiprocessor Systems, Distributed System, Clustered Systems, Real-time Systems, and Handheld Systems. Operating Systems Structures: System concepts, OS Services, Systems Calls, system Programs, System Structure, Virtual Machines, System Design, Implementation and Generation.
Process: Concept, Scheduling, Operations, cooperation Processes, Inter- Process communication.
Threads: Overview, Models, Issues, Threads of Windows, Linux and Java.

UNIT -II

CPU-Scheduling: Concepts, Criteria, scheduling Algorithms, Multiple- Processor Scheduling, Real Time Scheduling, Algorithm Evaluation, Process Scheduling Models.
Process synchronization: Background, Critical Section Problem, Hardware, Semaphores, Classical Problems of Synchronization, Critical Regions, Monitors.
Deadlocks: System Model, Characterization, Methods For Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

UNIT -III

Memory Management: background, swapping, contiguous memory allocation paging, segmentation, segmentation with paging. Virtual Memory: Background, Demand Paging, Process Creation, Page Replacement, Allocation of Frames, Thrashing

File system interface: File Concept, Access Methods, Directory Structure, File System Mounting, File Sharing, and Protection.

UNIT -IV

File System Implementation: File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery
I/O systems: overview, I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O to Hardware, Streams.

UNIT -V

Mass-Storage Structure: Disk Structure, Disk Scheduling, Disk Management,
Swap-Space Management, Raid Structure, Disk Attachment;" Stable-Storage Implementation.
Protection and security: Goals of Protection, Domain of Protection, Access Matrix Implementation of Access Matrix, Revocation of Access Rights, Capability-Based Systems. Security Problem, User Authentication, Program Threats, System Threats, Securing Systems and Facilities.

Suggested Reading

1. Silberchartx, Galvin, Gagne, Operating System Concepts, 6th ed., Jon Wiley & Sons, 2002
2. Robert Love, Linux Kernel Development, Pearson Education, 2004.
3. Andrew S. Tanenbaum, Modern Operating Systems, 2nd ed. Pearson Education, 2002. ,
4. D.M. Dhamdhere, Operating System 2002, TMH,
5. William Stalling, Operating Systems, 4th ed., Pearson Education 2001.

EC 407

DIGITAL IMAGE PROCESSING (Elective- I)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

UNIT-I

Image Formation and Description: Digital image representation, elements of visual perception, sampling, Quantization and Elements of digital image processing system.

UNIT-II

Image Transforms: Fourier transform, FFT, Discrete cosine transform, Hadamard transform, Haar transform, Slant transform and Hotelling transform and their properties.

UNIT -III

Image Enhancement: Spatial enhancement techniques -Histogram equalization, direct histogram specification, Local enhancement. Frequency domain techniques -Low pass, High pass and Homomorphic Filtering, Image Zooming Techniques.

UNIT -IV

Image Restoration: Degradation model, Algebraic approach to restoration, inverse filtering, Least mean square (wiener) filter, Constrained least square restoration and interactive restoration. Speckle noise and its removal techniques.

UNIT-V

Image Compression: Redundancies for image compression: Huffman Coding, Arithmetic coding, Bit-plane coding, loss less and lossy predictive coding. Transform coding techniques, Zonal coding, Threshold coding.

Suggested Reading

1. Gonzalez R.C. and Woods R.E. Digital Image Processing, 2nd ed., PHI, 2005.
2. Jain Anil K, Fundamentals of Digital Image Processing, PHI, 1989.

EC 408

OPTIMIZATION TECHNIQUES (Elective- I)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

UNIT-I
Introduction to Optimization: Historical development -Classical Optimization techniques, Single variable multivariable optimization. Solution by Lagrange multiplier method. Kuh'n and Tucker conditions. Multivariable optimization problem with and without constraints.

UNIT -II

Linear Programming: Standard form, solution of simultaneous equations by pivotal condensation, Simplex algorithm, Duality principle, revised simplex method.

UNIT -III
Non-linear Programming: One dimensional search methods. Fibonacci method, golden section method. Interpolation methods.
UNIT IV

Unconstrained Optimization: Direct search method, Univariate search and pattern search methods. Powell's method.

UNIT-V

Gradient methods: Steepest Descent, Conjugate gradient and quasi Newton .. method. Fletcher-Reeves method of conjugate gradients.

Suggested Reading

1. Rao S.S., Optimization theory and application, Wiley Eastern, 2004.
2. Jasbir S. Arora, Introduction to Optimum Design, PHI, 1989.
3. Hillier & Hiebarman, Introduction to Operations Research, TMH, New Delhi, 2004.

EC 409

TELEVISION ENGINEERING (Elective- I)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

UNIT-I
Television Picture: Elements of T. V. System, Picture elements. Horizontal and vertical scanning, frame and field frequencies, horizontal and vertical synchronization, and blanking. T. V. Channel standard of transmission.

UNIT-II
Composite video Signal and Scanning: Construction of composite Video signal, horizontal blanking time and vertical blanking time. Linear scanning standard scanning pattern. Flicker sync. pulses blanking signals.

UNIT -III
TV Camera tubes: TV Camera tube requirement image orthicon, vidicon, plumbicon, characteristics of camera tubes.

TV Transmitters: Negative picture transmission, arrangements at TV Studios. Types of TV transmitters. Block diagram of TV transmitters and TV transmitting aerials.

UNIT -IV
TV Receiver (Black & White): Block diagram of TV receiver, receiving aerials, description of receiver circuits of different stages. Blocking oscillators, EHT and picture tube circuits. SMPS reception of TV signals from satellites.

UNIT-V
Colour TV transmission and reception: Fundamental concepts of 3 colours systems. Different colour systems like NTSC, PAL, SECAM, Colour TV transmitters block diagram. Colour TV receiver block diagram (PAL).
Audio / Video signal recording principles of VCR and VCP with block diagrams. I~~ Standard VHS recording, fault analysis of VCR. Principles of CATV and HDTV. I~

Suggested Reading
1. A.M. Dhake, Television and Video Engineering, 2nd ed., TMH, 1995.
2. R.R. Gulati, Modern Television Practice: Principles, Technology and Service, Wiley Eastern, 2000.

ME 411

ENTREPRENEURSHIP (Elective- I)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

UNIT -I
Indian Industrial Environment -competence, Opportunities and Challenges. Entrepreneurship and Economic growth. Small Scale Industry in India - Objectives, Linkage among small, medium and heavy industries. Types and forms of enterprises.

UNIT-II
Identification and characteristics of entrepreneurs. Emergence of First generation entrepreneurs, environmental influence and women entrepreneurs. Conception and evaluation of ideas and their sources. Choice of Technology -Collaborative interaction for Technology development.

UNIT -III
Project formulation, Analysis of market demand, Financial and Profitability and analysis and Technical analysis. Project financing in India.

UNIT -IV
Project Management during construction phase, project organization, project planning and control using CPM, PERT techniques, Human aspects of project management. Assessment of tax burden.

UNIT-V
Behavioral aspects of entrepreneurs: Personality -determinants, attributes and models. Leadership concepts and models. Values and attitudes. Motivation aspects. Change behavior.

Time Management: Various approaches of time management, their strengths and weaknesses. The urgency addiction and time management matrix.

Suggested Reading

1 .Vasant Desai , Dynamics and Entrepreneurial Development and management, HPH, 1997.
2. Prasanna Chandra, Project- Planning, Analysis, Selection, Implementation and Review, TMH, 1995.
3. Stephen R. Covey and A. Roger Merrill, First Tings First, Simon and; Schuster publication, 1994.
4. G.S. Sudha, Organizational Behaviour, NPH, 1996.
5. Robert D. Hisrich, Michael P. Peters, Entrepreneurship, TMH, 5th Ed, 2005.

ME 421

INDUSTRIAL ADMINISTRATION AND FINANCIAL MANAGEMENT

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

UNIT –I

Industrial Organisation: Types of various business organisations, Organisation structures and their relative merits and demerits. Functions of management. Plant Location and Layouts: Factors affecting the location of plant and layout.
Types of layouts and their merits and demerits.

UNIT-II

Work Study: Definitions, objectives of method study and time study. Steps in conducting method study. Symbols and charts used in method study. Principles of motion economy. Calculation of standard time by time study and work sampling. Performance rating factor. Types of ratings. Jobs evaluation and performance appraisal. Wages, incentives, bonus, wage payment plans.

UNIT -III

Inspection and quality control: Types and objectives of inspection S.Q.C., its principles. Quality control by chart and sampling plans. Quality circles, introduction to ISO.

UNIT -IV

Optimisation: Introduction to linear programming and its graphical solutions. Assignment problems.
Project Management: Introduction to CPM and PERT. Determination of critical ; path.
Material Management: Classification of materials, Materials planning. Duties of purchase manager. Determination of economic ordering quantities. Types of materials purchase.

UNIT-V

Cost Accounting: Elements of cost. Various costs. Types of overheads. Break even analysis and its applications. Depreciation. Methods of calculating depreciation fund. Nature of financial management. Time value of money. Techniques of capital budgeting and methods. Cost of capital, financial leverage.

Suggested Reading

1. Pandey '.M., Elements of Financial Management, Vikas Pulications, 1994.
2. Khanna O.P. Industrial Engineering and Management, Dhanapat Rai, 2000.

EC 431

MICROWAVE LAB

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks

List of Experiments

1. Characteristics of Reflex Klystron oscillator, finding the mode numbers and efficiencies of different modes.

2. Characteristics of Gunn diode oscillator, Power Output Vs Frequency, Power Output Vs Bias Voltage.

3. Measurement of frequency and Guide wavelength calculation:

   i. Verification of the relation between Guide wavelength, free space wavelength and cutoff wavelength of X- band rectangular waveguide.
   ii. Verification of the straight line relation between (1/Lambda)2 and (1/Lambda$_o$)2and finding the dimension of the guide.

4. Measurement of low and high VSWRs: VSWR of different components like matched terminals, capacitive and inductive windows, slide screw tuner for different heights of the tuning posts etc.

5. Measurement of impedance and phase shift.
To find the parameters and scattering matrices of different microwave components like:

6. Directional coupler.

7. Tees: E plane, H plane and Magic Tee.

8. Circulator.

9. Measurement of radiation patterns for basic microwave antennas like " horn and parabolic reflectors in E-plane and H-plane. Also to finding the gain, bandwidth and bandwidth these antennas.

10. Study of various antennas like dipoles, loops, Yagi antenna, log periodic antenna

11. Calibration of attenuator, frequency meter.

12. Mini Project (suggested):

i. To design microwave components such as: Directional couplers, circulators and Hybrid junctions using MATLAB software.
ii. To design antenna arrays such as: Binomial, Chebyshev, using MATLAB.
iii. Microwave link design.

Note: Simulation software like Ansys with electromag / Ansof may be procured for microwave and antenna system design.

EC 432

HDLLAB

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks

Write the Code (using VERILOG), Simulate and Synthesize.

1. Basic Logic Gates.
2. Flip -Flops.
3. Realization of a four variable function.
4. Registers/Counters.
5. Finite state machine description (Example: "Sequence Detector").
6. Arithmetic Units (Adders, Subtractors).
7. Multiplexers, Demultiplexers, Encoders, Decoders, Priority encoder.
8. Design of Static RAM.

Write the Code (using VHDL), Simulate and Synthesize

9. Four- bit Digital Comparator.
10. Arithmetic Logic Unit with 8 Instructions.
11. Eight stage PN sequence generator.
12. Realise Parallel adder using the bottom up/top down using behavioral, data flow and structural modeling.

Mini Project (Suggested):

i) 8 bit CPU
ii) Generation of different waveform using DAC.
iii) RTL code for Booths algorithm for signed binary number multiplication.
iv) Development of H DL code to control speed, direction of DC/Stepper motor.
v) Development of HDL code for MAC unit and realization of FIR Filter.

EC 433

PROJECT-SEMINAR

Instruction 3 Periods per week
Sessional 25 Marks.

Oral presentation is an important aspect of engineering education. The objective of the seminar is to prepare the student for a systematic and independent study of the state of the art topics in a broad area of his / her specialization.

Seminar topics may be chosen by the students with advice and approval from the faculty members. Students are to be exposed to the following aspects of a seminar presentation.

- Literature Survey
- Organization of the material
- Presentation of OHP slides / PC presentation .
- Technical writing

Each student is required to:

1. Submit a one-page synopsis before the seminar talk for display on the notice board.
2. Give a 20 minutes presentation through OHP, PC, slide projector followed by a 10 minutes discussion.
3. Submit a report on the seminar topic with list of references and slides used.

Seminars are to be scheduled from the 3rd week to the last week of the semester and any change in schedule should be discouraged.

For award of sessional marks students are to be judged by the last two faculty members on the basis of an oral and written presentation as well as their involvement in the discussions.