WITH EFFECT FROM THE ACADEMIC YEAR 2001-2002

SCHEME OF INSTRUCTION & EXAMINATION

B.E II YEAR (REGULAR)

(INFORMATION TECHNOLOGY)

SEMESTER - I

Sl. No.	Syllabus Ref.No	SUBJECT	Scheme of Instructions		Scheme of Examination		
			Periods per Week		Dura-tion in Hrs	Maximum Marks	
			L/T	D/P		Univ. Exam	Sessi-onals
		THEORY					
1.	MAT 211	Discrete Mathematics	**4**	**-**	**3**	**75**	**25**
2.	BIT 201	Micro Electronic Circuits	**4**	**-**	**3**	**75**	**25**
3.	BIT 202	Signals & Systems	**4**	**-**	**3**	**75**	**25**
4.	BIT 203	Fundamentals of Information Technology	**4**	**-**	**3**	**75**	**25**
5.	BIT 204	Data Structures & Algorithms	**4**	**-**	**3**	**75**	**25**
6.	EEE 222	Electrical Engineering	**4**	**-**	**3**	**75**	**25**
		PRACTICALS					
1.	BIT 231	Electronics Laboratory	**-**	**3**	**3**	**50**	**25**
2.	BIT 232	Data Structures Laboratory	**-**	**3**	**3**	**50**	**25**
3.	BIT 233	Mini Project – I	**-**	**3**	**-**	**-**	**25**
		TOTAL	**24**	**9**	**-**	**550**	**225**

MAT 211

DISCRETE MATHEMATICS

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

Unit –I

Logic, Sets and functions: Logic Prepositional equivalences, Predicates and quantifiers, sets, operations on sets, functions, sequences and summations, growth of functions, Algorithms- Complexities, integers and division, integers and algorithms, Number Theory.

Unit – II

Mathematical Reasoning- Methods of proof, Induction, Recursive definitions, Recursive algorithms, Program correctness. Counting – Basics, Pigeonhole Principle, permutations and combinations, Discrete probability, Probability theory, Generalized permutations and combinations, Generation of permutations and combinations.

Unit – IIII

Recurrence Relations- Solution, Divide and conquer relations Generating functions, Inclusion-exclusion, Applications of inclusion – exclusion.

Relations – Properties, a –ary relation and application, Representing relations, closures, equivalence relation, partial ordered relation.

Unit –IV

Graphs- Introduction, terminology, representation, isomorphism, connectivity, Euler and Hamiltonian paths, Shortest path problems, planar graphs, Graph coloring.

Trees- Introduction, Applications, Traversals, Trees and sorting, spanning trees, Minimal Spanning Trees.

Unit – V

Boolean Algebra- Boolean functions, Representation, Logic gates Minimization of circuits, Modeling computation – Languages and Grammars, Finite State Machines – with output, without output Language recognition, Turing Machines.

Suggested Reading:

1. Kenneth H Rosen – Discrete Mathematics and its applications – 4th edition, McGraw 1995.

References:

1. Joe L. Molt, Draham Kandel, Theodore P. Baker – Discrete Mathematics for Computer Scientists and Mathematicians – 2nd Edition, Prentice Hall, 1986.
2. J .P. Trembley, R. Manohar – Discrete Mathematical Structures Applications to Computer Science- McGraw Hill, 1975.

BIT 201

MICRO ELECTRONIC CIRCUITS

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

Unit **–I**

Semiconductors – Atomic Structures, Semiconductors, Conductors, and Insulators, Covalent bonds, Conduction in semiconductors, N-type and P-type semiconductors, PN junction, biasing, Physical operation of diodes, Analysis of diode circuits, Small signal model and its applications, Zenor diodes, Rectifier Circuits, Limiting and clamping circuits, special diode types.

Unit –II

Bipolar junction transistors- physical structure and modes of operation npn transistor, pnp transistor, circuit symbols and conventions, characteristics, analysis of transistor circuits at DC, transistor as amplifier, small signal equivalent circuit models, blessing, transistor as switch, internal capacitance.

Field – Effect transistor- Structure and physical operation characteristics, MOSFET as simplifier, biasing, basic configuration of signal stage IC MOS Amplifiers, MOSFET as analog switch, internal capacitance, JFET, Galhum- Arsendie dives.

Unit –III

Differential and Multistage Amplifiers- BJT differential pair, Small signal operation biasing, active lead, MOS differential amplifier, BICMOS amplifiers, GaAs Amplifiers, Multistage amplifiers.

Feedback – Structure properties of negative feedback, topologies, Series- series feedback, shunt-shunt feedback, and shunt- series feedback amplifier, loopgain.

Unit – IV

Power Amplifiers- Output stages, class A, B and AB output stages, biasing Class AB circuit power BJTs, IC power amplifier, MOS power transistors.

Analog Integrated circuits – 741 op-Amp circuit, small signal analysis CMOS Op mps, Alternative configurations for CMOS and BICMOX Op Amps, Data Converters.

Unit –V

Signal Generators and Waveform shaping circuits- Sinusodial oscillators, Op amp-RC oscillators, LC and Crystal oscillators, Bistable Multi vibrators, Generation of square and Triangular waveform, Mountable multi vibrator, IC times, Nonlinear Wave shaping circuits, precision rectifier circuits.

Suggested Reading:

1. Adel S. Sedra, Kenneth C. Smith . Micro Electronic Circuits, 4th Edition, Oxford, 1998.

References:

1. Jocob Millman , Arvin Grabel-Micro Electronics – 2nd Edition McGraw 1987.

BIT – 202

SIGNALS AND SYSTEMS

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

Unit –I

Introduction to Signals and Systems
Real functions – continuous time function, common function, Discrete time functions.

Signals- definition, Time scaling, Time shifting, and limits of signals, Signals defined on intervals, Digital waveforms, signals and sum of sinusoids.

Systems- Definition, representation, examples
Fourier series and Fourier transforms- Introduction to Fourier series Three representation, Computational formulas, Fourier transform properties.

Unit –II

Spectral content of a signal – Amplitude and phase spectra, Energy and power signals, Energy spectral density, Power spectral density, power calculations of periodic signals, examples static non linearities. Laplace Transform- Definition, Properties, partial fraction expansion, solution to differential equation, relationship to Fourier transforms.

Unit –III

Transfer function s and state space representation – transfer function, block diagram, clock diagram reduction, state space representatives, Calculation of a transfer function from state space representation. Realization, equivalent dynamical systems, state equations from physical law. Multivariable systems. Convolution representation Graphical convolution, Fourier Transfer function.

Unit – IV

Properties of System – BIBO stability, Properties of system representation, static non linearities.

Frequency response theorem frequency response function – Graphical Interpretation, Bandwidth of system, filtering.

Signal and system analysis in frequency demsin

Bode Plots- Introduction, Bode plots for constant, Real poles and zeros, Bode plots of Two complex poles and zeros, Graphical construction.

Unit – V

Discrete Time Signals- Introduction, sampling, cooling and quantization, Introduction to Discrete- time systems and Digital filters. Z-transform- Two sided z-transform properties, one – sided z- transform, discrete time Fourier transform.

Sampling – Fourier transform of a sampled signal, Reconstruction of signal from samples, aliasing, Nyquist sampling theorem, zero-order hold.

Suggested Reading:

1. Douglas K. Lindner- Introduction to Signals and systems- McGraw Hill, 1999.

Reference:

1. Rodger E. Ziemer, William H . Trenter, D. Ronald Fanion- Signals & Systems- 4th Edition, Pearson,1898.

BIT- 203

FUNDAMENTALS OF INFORMATION TECHNOLOGY

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

Unit –I

Digital Age-Technological convergence, Analog to digital, System elements-Data, Hardware, Software communications, Overview of development of computers and communications, connectivity and interactivity.

Processors and Memory-CPU and Main memory, representation of data, Microcomputer system unit, Future developments. Input-output devices.

Storage Devices.

Unit –II

Communication Technology- Analog 7 Digital signals, Communication Channels, Communication networks, factors affecting communications, future of communications uses of communications and connectivity. Application Software – categories, specialty software. System software

Unit –III

Information – Information, messages and signals, examples of information systems representing and quantifying information, Representation information in bits, need and basis for data protocols, graphics and Visual Information – Image formation, converting images to bits. Computer graphics virtual reality.

Unit –IV

Data Compression – compressing information, Image compression, Digital video Bandwidth and Information Theory – Audio as information, Sampling of Audio signals, Digital Audio, Telephone system.

Transmission and Storage Technology – Bandwidth and its use, Wire and fiber transmission system, Radio frequency and satellite systems, large – capacity storage.

Unit –V

Network and Internet – Data communication Networks, Local Area Network, Organization of Internet, Electronic commerce and Internet security, Voice over IP and convergence.

Suggested Reading:

1. Williams, Sawyer, Hutchinson – using Information Technology 3rd Edition, McGraw 1999 (for unit I&II)
2. Davod Cyganski, John A. Orr – Information Technology – Inside and Outside, Prentice Hall, 2001.

BIT 204

DATA STRUCTURES AND ALGORITHMS

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

Unit –I

Algorithm analysis

Asymptotic Notation
Foundational Data Structures- Dynamic Arrays, Singly linked lists. Multidimensional Arrays. Abstract Data types, Design patterns.

Unit –II

Stacks, Queues, Deques
Ordered lists, Sorted lists.
Hashing – basics, methods, functions, Hash tables, Scatter Tables Applications.

Unit –III

Trees – basics, N-ary trees, Binary trees, traversals, expression, implementation.
Search Trees- basics, Average case analysis, implementation, AVL search trees, M-way search trees, B-trees, Applications.

Heaps- basics, binary heaps, leftist heaps, binomial queues, applications.

Unit – IV

Sets- basics, Array and Bit vector sets, Multicast, Partitions, applications.
Dynamic storage, Buddy system, applications.

Graphs- basic implementation, traversals, shortest path shortest path algorithms, minimal – cost spanning trees- critical path analysis.

Unit – V

Algorithmic Patterns- Brute force, Greedy algorithm, Backtracking, Divide-and –conquer, Dynamic programming, Randomized Algorithms.

Sorting Algorithms- Insertion, Exchange, Selection, and Merge Lower bound on sorting, distribution sorting performance.

Suggested Reading:

1. Bruno R. Presis- Data Structures and Algorithms with object oriented design patterns in C++, Wiley 1999.

References:

1. Sartaj Sahni – Data Structures, Algorithms and Applications in C++, McGraw 2000.

EEE 222

ELECTRICAL ENGINEERING

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

Unit –I

DC Circuits: Ohms Law, network elements, Kirchoff's Law, Analysis of circuits using loop current method and node voltage method, power in DC circuits, Series and parallel combination of resistance, Thevenin's and Norton's theorems.

AC Circuits: Sinusoidal sources, Phasor representation of sinusoidal quantities, average and RMS value, Form factor, Analysis of RLC Circuits to sinusoidal inputs, power factor, active power, reactive power, energy stored in inductance and capacitance, concept of mutual inductance and polarity.

Unit –II

Single Phase Transformers: Principle of transformation of Voltages and currents, equivalent circuit, transformer on unload and load, efficiency and regulation of transformer OC and SC tests, Principle of Autotransformer.

Production of 3-Phase Voltage, star and delta connections, 3-Phase power measurement by two wattmeter method, working principle of signal phase energy meter.

Unit – III

DC Machines, Construction and working principle of a DC Machine, Production of emf in a generator, types of excitation, characteristics of sense, and compound generators, Applications, Production of torque in a DC motor, Construction and Characteristics of DC servo motors.

Unit – IV

Three phase introduction Motors: Production of rotating magnetic field, construction and principle of induction motors, slip Rotor current frequency-effect of slip on rotor circuit, Slip torque characteristics, star delta and auto-transformer starters, speed control by stator voltage and rotor resistance methods.

Unit –V

Single phase Meters: Various types of single phase motors- signal phase, capacitor start and capacitor run, universal motor, stepper motor.

Three phase Alternators: Construction, Production of emt, Armature reaction, synchronous impedance, Regulation by synchronous impedance method.

Suggested Reading:

1. M.S. Naidu and S. kamakshaiah – Introduction to Electrical Engineering, Tata McGraw Hill, 1995.
2. V .K. Mehta – Principles of Electrical Engineering and Electronics – S Chand 1995.

BIT 231

ELECTRONICS LABORATORY

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

1. **Characteristics of Semi conductor diode and zener diode.**
2. Rectifiers with without filters.
3. CRO – Application.
4. Characteristics of BJT and FET.
5. Single stage IC MOS amplifiers.
6. Differential Amplifiers.
7. Multi stage Amplifiers.
8. Feedback Amplifiers.
9. Operational Amplifiers – Applications.
10. LC Oscillators.
11. Power Amplifiers.
12. SPICE Simulations.

BIT 232

DATA STRUCTURES LABORATORY

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

1. Stacks, queues and de-queues using arrays.

2. Design patterns- Singleton, object Wrapper, Container using arrays, visitor, lterator.
3. Infix to postfix conversion, evaluation of expression.
4. Stack and queue using linked lists.
5. Implementation of Hash Tables.
6. Tree traversals.
7. Operations on AVL trees.
8. Operation on B-trees.
9. Operations on sets.
10. Sorting algorithms.

BIT 233

MINI PROJECT – I

Instruction	3 Periods per week
Sessionals	25 Marks

The student is required to take the one of larger project listed in the suggested reading under project exercises, implement and submit report. During the mini project, Personal Software Process principles should be applied and the workbook and project report should be evaluated.