

<b>EC 4105</b>	<b>DISCRETE AND INTEGRATED ANALOGUE CIRCUITS</b>	<b>1.0 UNIT</b>	<b>BE – SEM IV</b>
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**Module 1: RC Filters**

RC loss pass and high pass filters and their response to sinusoidal, step, pulse, square wave and ramp inputs.

**Module 2: Transistors at high frequencies**

Hybrid  $\pi$  model, Amplifier response at high frequencies, Gain- Bandwidth product, FET at high frequencies

**Module 3:**

Low frequency response of RC coupled stage and Multistage amplifiers, Single tuned amplifier, Cascade (CE-CB pair) amplifier

**Module 4: Feedback amplifiers**

Classification of amplifiers, Voltage series, Voltage shunt, Current series, Current shunt feedback

**Module 5: OP-Amp based Oscillators**

Barkhausen criterion, Phase shift and Wein bridge oscillators, Hartley and Colpitt's oscillators, Crystal oscillators, Frequency stability.

**Module 6: Voltage and current time base generators**

Exponential sweep, UJT as a negative resistances switch in sawtooth generators, Miller and Bootstrap time base generators, A simple current sweep, Linearity correction through adjustment of driving waveforms, A transistor current time-base generator

**Module 7: A/D and D/A Converters**

D/A converters – Binary Weighted D/A Converter, Ladder type D/A converters, Specifications for D/A Converters, A/D Converters – Simultaneous A/D converter, Counter type A/D converter, Successive approximation type A/D converter, Dual slope converter, Comparison of converter types

**Reference Books:**

1. "Electronics Circuits: Discrete and Integrated", D. Schilling and C. Belove, McGraw ill.
2. "Modern Digital Electronics", R. P. Jain, TMH
3. "Digital Principles & Application", Malvino & Leach, TMH.
4. "Digital Integrated Electronics". Taub & Schilling, TMH
5. "Pulse Digital and Switching Waveforms", Millman & Taub, TMH
6. "Integrated Electronics". Millman & Halkias, McGraw Hill.

<b>EC 4107</b>	<b>SEMICONDUCTOR DEVICES</b>	<b>1.0 UNIT</b>	<b>BE – SEM IV</b>
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**Module 1: Carrier Concentrations**

The Fermi level, Electron and Hole concentration at equilibrium, Direct and Indirect recombination of electrons and holes, Hall effect, Steady-state carrier generation, Quasi-Fermi levels.

**Module 2: Transport Phenomena**

Drift and Diffusion of Carriers, Recombination, Continuity and Diffusion equations, Hynes-Shockley experiment.

**Module 3: P-N junctions**

The Contact Potential, Space Charge at a junction, Steady state condition, Current at a junction, Carrier injection, Junction breakdown, Time variation of stored charge, P-N junction capacitance, Graded junction

**Module 4: Junction Diodes**

Varactor Diode, Concept of negative resistance, Tunnel Diode, Current and Voltage in an illuminated junction, Photo Diode, Photo detector, Solar Cells, Light Emitting Diode, Metal Semiconductor Junction, Principle of PIN photo detector and Avalanche photodiode, Noise in photo detectors, Detector response time, Photodiode materials.

**Module 5: Bipolar Junction Transistor (BJT)**

Charge transport and current in a BJT, Current transfer ratio, Terminal currents, Generalised biasing, Charge control analysis, BJT switching, Turn-on and Turn-off transients, Base narrowing, Frequency limitations of a transistor

**Model 6: FET, MOSFET**

Principle of Operation and I-V Characteristics of FET, MESFET, MOSFET, MOS Capacitor, Threshold voltage in MOSFET

**Module 7: CCD & Fabrication**

The basic CCD, Improved CCD p-n junction fabrication

**Reference Text Books:**

1. "Solid State Electronic Devices" – B. G. Streetman, PHI
2. "Integrated Electronics" – Millman & Halkies, Tata McGraw
3. "Physics of Semiconductor Devices" – S. M. Sze
4. "Optical Fibre Communications" – G. Keiser, 3/e, McGraw Hill
5. "Semiconductor Devices"- Jusprit Singh, John Wiley Eastern

<b>EC 4111</b>	<b>ANALOG COMMUNICATION SYSTEM</b>	<b>1.0 UNIT</b>	<b>BE – SEM IV</b>
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### **Module 1: Signal Analysis**

Time domain and Frequency domain representation of a signal, Fourier series, Complex Fourier spectrum (Discrete spectrum or line spectrum), Fourier Transform, Properties of Fourier transform

### **Module 2: Representations of Signals and Systems**

Energy and power spectral density spectrum, Distortion less transmission, Causality and Physical realizability, pre-envelope and canonical representation of band pass signals.

### **Module 3: Amplitude Modulation Systems**

Basics of Amplitude modulation, Square law modulator, Switching modulator, Square law demodulator, Envelope Detector, Double side band suppressed carrier modulation. Balanced and Ring Modulators, Coherent modulator, Quadrature Amplitude Modulation.

### **Module 4: Amplitude Modulation Systems (Continued)**

Single side band modulation, Frequency Discrimination and Phase Discrimination modulators, Coherent detection of SSB, Introduction to Frequency Division Multiplexing and Time Division Multiplexing, Superheterodyne AM receiver and its characteristics.

### **Module 5: Angle Modulation Systems**

Basics of Frequency and phase modulation, Single tone frequency modulation, NBFM, WBFM, Transmission bandwidth of FM wave, Indirect and direct methods of FM generation, Frequency Discriminator, Phase Locked Loop demodulator, Superheterodyne F.M. receiver.

### **Module 6: Pulse Modulation Systems**

Introduction to PAM and other forms of analogue Pulse Modulation.

### **Module 7: Noise in Communication Systems**

Noise, Shot noise, Thermal noise, White noise, Noise Equivalent Bandwidth, Signal to Noise Ratio for coherent detection of DSBSC, SNR for coherent reception with SSB modulation, SNR for AM receiver using envelope detection, Noise in FM reception, FM threshold effect, Pre Emphasis & de-emphasis in FM.

### **Reference Text Books:**

1. "Communication Systems", 2/e, S. Haykin
2. "Communication Systems", B. P. Lathi, 1968.

<b>EC 5101</b>	<b>MICROPROCESSOR AND INTERFACING</b>	<b>1.0 UNIT</b>	<b>BE – SEM V</b>
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**Module 1:**

Revision of logic circuits with emphasis on control lines, SAP concepts with stress on timing diagrams, Microinstructions, Microprogramming, Variable machine cycle, Architecture of 8085 Processor, Functions of all signals, Bus concepts, Multiplexed and De-multiplexed Bus, Minimum system.

**Module 2:**

Instruction set, Addressing modes, Stack operation, Timing diagrams, Programming examples like Time delay, Looping, Sorting, Code conversions like BCD to Binary, Binary to BCD, HEX to ASCII, ASCII to HEX, BCD Arithmetic etc.

**Module 3:**

8085 based Microcomputer system, Memory Organization, Memory Interfacing, Memory Mapped I/O, I/O Mapped I/O, Interrupts, Hardware and Software Interrupts, Interrupt instructions, Programmed I/O, Interrupt driven I/O, DMA.

**Module 4:**

Architecture of 8255 I/O peripheral chip, Modes of operation, Hand shake mode operation, BSR mode, ADC 0801 and ADC 0808 Interfacing with microprocessor, Analogue multiplexed ADC, DAC 0808 specifications, DAC Interfacing, Programming examples for Generation of square wave, positive and negatives ramps, triangular and sine waves, Sample and Hold circuit, LF 398 and its applications in Data Acquisition.

**Module 5:**

8253 timer, Modes of operation, Applications, 8279 Keyboard/Display Interface, Different modes of operation, Interfacing, Programming examples, 8237 DMA Controller

**Module 6:**

Evolution of Microprocessors, Introduction (Architecture and Instruction set only) of 8086 and 8088, Evolutionary steps and Additional features of 80186, 80286, 80386, 80486 and Pentium Processors, Concept of CISC and RISC processors

**Module 7:**

Introduction to Microcontrollers, 8051 Microcontroller, Memory Organization, Programming techniques, Addressing modes, Instruction set, Interrupt structure, Port structure, Different modes of operation, Programming examples

**Reference Text Books:**

1. "Advanced Microprocessors and Microcontrollers" by S. K. Venkata Ram.
2. "Microprocessor, Microcomputer and their Applications", 2/e. by A. K. Mukhopadhyay.
3. "Advanced Microprocessors" by Y. Rajasree.
4. "Microprocessor and Peripherals" by S. P. Chowdhury and Sunetra Chowdhury
5. "The INTEL 8086/8088 Microprocessor, Architecture, Programming, Design and Interfacing", 3/e. by Bhupendra Singh Chhabra
6. "Microprocessor and Interfacing, Programming of Hardware" by Douglas Hall
7. "Digital Computer Electronics", 2/e. by A. P. Malvino.
8. "Microprocessor Architecture, Programming and Applications with 8085". by R. S. Gaonkar.

<b>MB 8101</b>	<b>PRINCIPLES OF MANAGEMENT</b>	<b>1.0 UNIT</b>	<b>BE – SEM VIII</b>
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**Module 1: Concept of Management**

Definition, Nature, and scope, and overall view of Management, Relation with other social sciences and industry, Evolution of Management thought: (A) Classical theory of Management, (A1) Bureaucracy - Introduced by Max Weber, (A2) Scientific Management - F.W. Taylor and his followers, (A3) Process Management - Introduced B.H. Fayol and others, (B) Neo-classical theory of Management; (B1) Human Relations - B.E. Mayo and Roethlisberger, (B2) Behavioural Science approach - By McGregor, Maslow & others, (C) Modern Management theories : Peter Drucker

**Module 2: Management Functions**

Planning, Organizing, Staffing, Directing, and Controlling.

**Module 3: Executive Functions**

Production, Marketing, Finance, Personnel

**Module 4: Planning:**

Concept, Nature, Importance, Objectives, Policies, Procedure, Strategies, and Method of Decision Making

**Module 5: Organisation:**

Definition, Theories of Organisation, Forms of organisation, Formal and Informal Organisation, Types of Formal Organisations, Departmentation, Line and Staff Relationship, Span of Management, Authority, Responsibility, Delegation, Centralisation, Decentralisation, Committees

**Module 6: Staffing:**

Selection, Recruitment, Training, Development and Welfare

**Module 7: Directing**

Leadership and Supervision, Motivation and Communication

**Module 8: Controlling**

The Elements, Process and style of Control, Techniques of control, Social Responsibility of business.

**Reference Text Books:**

1. D.F. Drucker - Management - Task and Responsibility.
2. P.F. Drucker - The Practice of Management.
3. Newman and Warren - Process of Management.
4. E.F.L. Beach - The Principles and Practical Management.
5. H.F. Merrill - Classics in Management - Preface.
6. Mee J.E. - Management Thought in a Dynamic Economy.
7. Daniel A. Wren - The Evolution of Management - Thought.
8. S. N. Banerjee - Principles of Management
9. "Principles of Management, Essentials of Management", Koontz and O'Donnel
10. "Management Theory and Practice", Theo Haiman

<b>CP 4103</b>	<b>SCIENTIFIC COMPUTING</b>	<b>1.0 UNIT</b>	<b>BE – SEM IV</b>
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### **A – NUMERICAL COMPUTING**

#### **Module 1:**

High Speed Computation: Introduction, Computer Arithmetic, Errors, Machine Computation.  
 Transcendental and Polynomial Equations: Introduction, Bisection Method, Iterative Methods, Rate of Convergence, Methods for Complex Roots, Polynomial Equations.

#### **Module 2:**

System of Linear Algebraic Equations and Eigenvalue Problems: Introduction, Direct Methods, Error analysis, Iteration Methods, Eigenvalues and Eigen Vectors.  
 Interpolation and Approximation: Introduction to Lagrange and Newton Interpolations, Finite difference operators, Interpolating polynomial using finite differences, Hermite interpolations, Piecewise and spline interpolation.

#### **Module 3:**

Differentiation and Integration: Introduction, Numerical differentiation, Numerical integration, Methods based on interpolation.  
 Ordinary Differential Equations: Introduction, Euler methods, Single and Multistep methods, Predictor-corrector methods.

### **B – STATISTICAL COMPUTING**

#### **Module 4:**

Empirical and Probability Distributions : Basic Concepts, The Mean Variance, and Standard Deviation, Continuous-Type Data, Exploratory Data Analysis, Graphical Comparisons of Data Sets, Probability Density and Mass Functions.  
 Probability: Properties of Probability, Methods of Enumeration, Conditional Probability, Independent Events, Bayes Theorem.

#### **Module 5**

Discrete, Continuous & Multivariable Distributions : Random Variables of the Discrete Type, Mathematical Expectation, Bernoulli Trials and the Binomial Distribution, The Moment-Generating Function, The Poisson Distribution, Random Variables of the Continuous Type, The Uniform and Exponential Distributions, The Gamma and Chi-Square Distributions, The Normal Distribution, Distributions of Functions of a Random Variable, Distributions of Two Random Variables.  
 Sampling Distribution Theory : Independent Random Variables, Distributions of Sums of Independent Random Variables, Random Functions Associated with Normal Distributions, The Central Limit Theorem, Approximations for Discrete Distributions, The t and F Distributions.

#### **Module 6:**

Estimation & Tests of Statistical Hypotheses : Point Estimation, Confidence Intervals for Means, Confidence Intervals for Difference of Two Means, Sample Size,  
 Tests About Proportions, Tests of the Equality of Two Normal Distributions, Chi-Square Goodness of Fit Tests, Contingency Tables, Tests of the Equality of Several Means.

#### **Reference Text Books:**

1. Jain, M.K., et al : Numerical Methods for Scientific and Engineering Computation, 3<sup>rd</sup> Edn. New Age Publication, New Delhi, 1999
2. Hogg, R.V. & Tanis E. A. : Probability and Statistical Inference, 6<sup>th</sup> Edn., Pearson Education, New Delhi , 2004.
3. Sastry, S.S. – Introductory Methods of Numerical Analysis, 4<sup>th</sup> Edn., PHI, New Delhi, 2005
4. Hines, W.W. et al – Probability and Statistics in Engineering, 4<sup>th</sup> edn., John Wiley, Singapore (Indian Reprint), 2003.
5. Veerarajan, T. – Probability, Statistics and Random Processes, 2<sup>nd</sup> Edn., TMH, New Delhi, 2003.