

**FACULTY OF
ENGINEERING & TECHNOLOGY**

**SAURASHTRA UNIVERSITY,
RAJKOT.**

**SYLLABUS
OF
B.E. SEM III**

**COMPUTER ENGINEERING
ELECTRO. & COMM. ENGINEERING
INFORMATION TECHNOLOGY**

**C.U. SHAH COLLEGE OF
ENGINEERING & TECHNOLOGY
WADHWAN CITY**

SAURASHTRA UNIVERSITY, RAJKOT
SEMESTER III [CE/EC/IT]

| Code No | Subject | Teaching Scheme | | Examination Scheme | | | | |
|---------|---------------------------|-----------------|-----------|--------------------|------------|------------|------------|------------|
| | | Lect . | Pra . | Theor y | Paper Hrs. | Prac/ Oral | Term Work | Total |
| 301 | Applied Mathematics | 4 | - | 100 | 3 | - | - | 100 |
| 302 | Electronic Circuit - I | 4 | 2 | 100 | 3 | 25 | 25 | 150 |
| 303 | Control Systems | 4 | 2 | 100 | 3 | 25 | 25 | 150 |
| 304 | Computer Programming - II | 4 | 2 | 100 | 3 | 25 | 25 | 150 |
| 305 | Digital Electronics | 4 | 2 | 100 | 3 | 25 | 25 | 150 |
| 306 | Electronics Workshop | - | 2 | - | - | 25 | 25 | 50 |
| | TOTAL | 20 | 10 | 500 | - | 125 | 125 | 750 |

SAURASHTRA UNIVERSITY, RAJKOT.
B.E. SEM III (EC/CE/IT)
301 - APPLIED MATHEMATICS

| TEACHING SCHEME | | EXAMINATION SCHEME | | | | |
|-----------------|-----------------|--------------------|-------------|----------------------|----------------|-------------|
| THEORY Hours | PRACTICAL Hours | THEORY Marks | PAPER Hours | PRACTICAL/ORAL Marks | TERMWORK Marks | TOTAL Marks |
| 4 | - | 100 | 3 | - | - | 100 |

• **FOURIER SERIES:**

Definitions, Euler's formulae, Condition for a Fourier expansion, Functions having points of discontinuity, Change of interval, Odd and even functions, Half range series, Harmonic analysis.

• **LAPLACE TRANSFORMS :**

Definition, Transforms of elementary functions, Properties of Laplace transforms, Inverse transforms, Transforms of derivatives and integrals, Multiplication by T^n , Division by t , Convolution theorem, Applications of differential equations, Unit, step and impulse functions, Periodic functions.

• **ORDINARY DIFFERENTIAL EQUATIONS:**

Linear differential equations of higher order with constant coefficients, Methods of variation of parameters, Cauchy's and Legendre's Linear equations, Simultaneous linear equations with constant coefficients, Applications of linear differential equations, Solution of Bessel's and Legendre's equations by series method, Definition and properties of Bessel's function, Legendre's polynomials and properties like recurrence relations, Orthogonality.

• **PARTIAL DIFFERENTIAL EQUATIONS:**

Formation of differential equations, Directly integrable equations, Linear and nonlinear equations of first order, Homogeneous linear equations with constant coefficient, Applications of partial differential equations.

• **NUMERICAL METHODS:**

Solution of algebraic and transcendental equations by Newton-Raphson, False position, Iteration and extended iteration methods, Convergence of these methods.

REFERENCE BOOKS:

- Dr. B. S. Grewal, Khanna Publication, New Delhi. Higher Engineering Mathematics
- Kumbhojkar G. V. C. Jamnadas & Co. Engineering Mathematics Vol I, II, III, IV
- Prof. Wartikar & Wartikar Pune Vidyarthi grih, pune. Engineering Mathematics, Vol I, II
- N.P.Bali, Ashok Saxena & Iyenger Laxmi Publication Ltd. New Delhi. A Textbook On Engineering Mathematics
- Dhavan & Srivastav Dhanpat rai & Sons, New Delhi. Engineering Mathematics
- P. D.S. Verma Kalyani Publication, Ludhiana & Delhi Mathematics For Engineering Students
- Kandasamy, Thilanguavthi & Gunavthi S. Chand & Co. Pvt Ltd., New Delhi.

SAURASHTRA UNIVERSITY, RAJKOT.
B.E. SEM III (EC/CE/IT)
302 - ELECTRONICS CIRCUIT - 1

| TEACHING SCHEME | | EXAMINATION SCHEME | | | | |
|-----------------|--------------------|--------------------|----------------|-------------------------|-------------------|----------------|
| THEORY Hours | PRACTICAL Hours | THEORY Marks | PAPER Hours | PRACTICAL/ORAL Marks | TERMWORK Marks | TOTAL Marks |
| 4 | 2 | 100 | 3 | 25 | 25 | 150 |

• **DIODE APPLICATIONS:**

Clipping and clamping circuits, Comparators, Voltage multiplier circuits.

• **TRANSISTOR CHARACTERISTICS, OPERATING POINT AND THERMAL STABILISATION :**

Transistor characteristics, D.C. load lines, Factors affecting the Q- point stability, Analysis of biasing circuit, Stabilization factors, Comparison of stability of differently biased circuits, Bias compensation techniques, Thermal run-away, Transistor as a switch.

• **TRANSISTOR AMPLIFIERS:**

Transistor as amplifier, AC load line, Analysis of CB, CC, CE amplifiers, AC equivalent circuits.

• **TRANSISTOR AT LOW FREQUENCIES :**

Transistor hybrid model and h-parameters, their typical values, Analysis of transistor using h-parameters, Thevenins and Norton' theorms and its dual, Cascading transistor amplifier, Simplified small signal low frequency hybrid model, High input resistance circuits.

• **FIELD EFFECT TRANSISTORS:**

FET characteristics, Common-source and common-drain FET amplifiers, biasing the FET, FET small signal low frequency hybrid model, FET as VVR

• **INTEGRATED CIRCUITS:**

IC technology, Processing of semiconductor material, Transistor fabrication, Integrated circuits components, packing.

• **OPERATIONAL AMPLIFIERS:**

Basic differrntial amplifier circuits, constant current source, current mirror, Level translator, Block diagram, the ideal Op-amp, equivalent circuit, CMRR, PSRR, slew rate, gain-bandwidth product.

REFERENCE BOOKS :-

- | | |
|---------------------------------------|--|
| • David A. Bell | Electronics Devices and Circuits |
| • Ramakant A. Gayakwad | Op Amps and Linear Integrated Circuits |
| • A.P.Malvino | Electronic Principles |
| • Jacob Millman & Christos C. Halkias | Integrated Electronics |
| • Ramanan | Functional Electronics |

SAURASHTRA UNIVERSITY, RAJKOT.
B.E. SEM III (EC/CE/IT)
303 - CONTROL SYSTEMS

| TEACHING SCHEME | | EXAMINATION SCHEME | | | | |
|-----------------|--------------------|--------------------|----------------|-------------------------|-------------------|----------------|
| THEORY Hours | PRACTICAL Hours | THEORY Marks | PAPER Hours | PRACTICAL/ORAL Marks | TERMWORK Marks | TOTAL Marks |
| 4 | 2 | 100 | 3 | 25 | 25 | 150 |

- **Introduction to control Theory:**

Open & Closed loop control system, servomechanism, Linear, Nonlinear, Continuous, data Sampled data and multivariable control system. Illustration of some simple control systems.

- **Mathematical models of Physical Systems:**

Differential equations of physical systems(limited to Mechanical, Electrical systems 7 gear trains) transfer function, Block Diagram algebra, Signal flow graph analysis.

- **Feedback characteristics of control System:**

Feedback and nonfeedback systems, Use of feedback for reduction of parameter variation and effects of disturbance signals, Regenerative feedback.

- **Control system & components:**

Construction and operation of D. C. And A. C. Servomotor, potentiometers, Synchors, Techo generators, Amplidyne, A.C. and D. C. Position control system.

- **Time Domain annalysis:**

Standard test systems, Time response of first order systems, Time response of second order systems, stedy state error and error constants effects of adding to a system, Design specification of second order system , Design Considerations of higher order systems, performance indices.

- **Frequency domain analysis:**

Correlation between time and frequence response, polar plots, Bode plots, All pass and minimum phase systems, log magnitude versus phase plots.

- **Stability and Frequency Domain Analysis:**

Concept of stability, Necessary conditions for stability, Harwitz stability Criataria , Routh stability criataria, Nyquist stability Criataria relative stability closed loop frequency response performance, Specification and their determination using frequency response plots.

- **Root Locus Technique:**

Concept of root locus : Construction rules, root contours.

- **State Variable Analysis:**

Concept of state, state variable & state model, state Models for Linear Continuous time systems, diagonalisation, Solutiions of State Equations, Concept of Controllability & Observability.

REFERENCE BOOKS :

- | | | |
|-------------------|----------------------------|----------------------|
| • Nagrath & Gopal | Control System Engineering | (Wiley Estern) |
| • B.C.Kuo | Automatic Control System | (PHI) |
| • Ogata | Modern Control Engineering | (PHI) |
| • S.N.Verma | Automatic Control Systems | (Khanna Publication) |

SAURASHTRA UNIVERSITY, RAJKOT.
B.E. SEM III (EC/CE/IT)
304 - COMPUTER PROGRAMMING - II (New)

| TEACHING SCHEME | | EXAMINATION SCHEME | | | | |
|-----------------|-----------------|--------------------|-------------|----------------------|----------------|-------------|
| THEORY Hours | PRACTICAL Hours | THEORY Marks | PAPER Hours | PRACTICAL/ORAL Marks | TERMWORK Marks | TOTAL Marks |
| 4 | 2 | 100 | 3 | 25 | 25 | 150 |

- **Functions in C :**

Introduction, built in functions & needs for user defined functions, form of C functions, return values & their types, calling functions, category of functions, arguments & return values, nesting of functions, Recursion, function with arrays , scope of variables in functions,

- **Structures & Unions :**

Needs of structures, etc defination, giving values to a member, intialization of structure, array of structure, structure within structure, structure & functions, unions.

- **Pointers:**

The concept, understanding, pointers, declaring & initialization of pointers, pointer expressions, increment & scale factor, pointers & arrays, pointer & char. String, pts. & functions, pointers & structures and pointers to pointers.

- **File management :**

Defining, opening and closing file, input/output operations on files, error handling during I/O random access, file, command line argument.

- **Dynamic Memory Allocation, linked lists & preprocessor**

Introduction & importance of dynamic memory, function for DMA, concept & link lists, advantages & types of LL applications & LL use of preprocessor, Macro substitutions, file inclusion, compiler control directives.

- **Graphics Programming**

Line & Other Shape Functions, Drawing & Filling Images, Fill Patterns, Filling Regular & Non Regular Shapes, Pallets & Colors, Outputting & Justifying Text, Animation.

- **Mouse Programming**

Drawing With Mouse, Building Mouse Cursors, Freehand Drawing, Menus Using Mouse, etc.

- **Interaction with Hardware Through C**

Introduction, ROM-BIOS Philosophy, CPU Registers, Interrupts & Interrupt Vector Table, Invoking ROM BIOS Functions, Union of Structures, The *int86()* Function.

- **Study of Standard Library Functions**

REFERENCE BOOKS :

- | | |
|------------------------|--------------------|
| • Let Us C | Yashawant Kanetkar |
| • ANSI C | Balaguru Swamy |
| • Programming With “C” | Gottfried |

SAURASHTRA UNIVERSITY, RAJKOT.
B.E. SEM III (EC/CE/IT)
305 - DIGITAL ELECTRONICS

| TEACHING SCHEME | | EXAMINATION SCHEME | | | | |
|-----------------|--------------------|--------------------|----------------|-------------------------|-------------------|----------------|
| THEORY Hours | PRACTICAL Hours | THEORY Marks | PAPER Hours | PRACTICAL/ORAL Marks | TERMWORK Marks | TOTAL Marks |
| 4 | 2 | 100 | 3 | 25 | 25 | 150 |

- **Logic Circuits :**

Basic Logic gates, Boolean algebra, K-map, Minimization of a logic expression specified in Minterm/Maxterm or Truth Table, Don't care condition,

- **Combinational Circuit Design:**

Multiplexers, Demultiplexers, Decoder, Encoders, Magnitude comparator and their uses.

- **Number system and Codes:**

Binary, Octal, Hexadecimal, code conversion, BCD, Excess-3 code, Graycode, Reference to other multi-bit BCD codes ASCII.

- **Binary Arithmetic:**

Binary addition-subtraction, Signed and unsigned binary numbers, 2's complement representation, Half adder, and full adder circuits, half subtractor, full subtractor & Bit selector.

- **Sequential Circuits:**

Flipflops: SR, D, T, JK, MSJK, Truth tables Schmitt trigger, Clocks, Timers, Registers,

- **Semiconductor Memories:**

Classification & Characteristics of RAM, ROM, PROM, EPROM, Dynamic RAM, Charge coupled device memory.

REFERENCE BOOK:

- | | |
|-------------------|----------------------------------|
| • Malvino & Leach | Principle of digital Electronics |
| • R.P. Jain | Modern Digital Electronics |
| • Morris Mano | Digital Design |

SAURASHTRA UNIVERSITY, RAJKOT.
B.E. SEM III (EC/CE/IT)
306 - ELECTRONICS WORKSHOP

| TEACHING SCHEME | | EXAMINATION SCHEME | | | | |
|-------------------------|----------------------------|---------------------------|------------------------|---------------------------------|---------------------------|------------------------|
| THEORY Hours | PRACTICAL Hours | THEORY Marks | PAPER Hours | PRACTICAL/ORAL Marks | TERMWORK Marks | TOTAL Marks |
| - | 2 | - | - | 25 | 25 | 50 |

The workshop shall consist of the practical circuits, fabrication, soldering, testing and thereby study of actual circuit/ working model of circuits.

The preliminary Design/Components & selection/Layout and soldering etc. Shall be carried out by the students.

N.B.: Minimum 3 experiments shall be required.