

**SAURASHTRA UNIVERSITY, RAJKOT**  
**SEMESTER V (IT)**

Code	Subject	Teaching Scheme		Exam Scheme				
		Lect.	Pract.	Theory	Paper Hrs.	Prac. Oral	Term Work	
501	Operating Systems-I	4	2	100	3	50	25	175
502	Data Structure & Algorithms	4	2	100	3	50	25	175
503	Computer Graphics	4	2	100	3	50	25	175
504	Advanced Microprocessors Interfacing & Programming	4	2	100	3	50	25	175
505	Economics & Business Management	4	-	100	3	-	-	100
506	Seminar	--	2	---	--		50	
<b>Total</b>			<b>08</b>	<b>500</b>	<b>-</b>	<b>200</b>	<b>150</b>	<b>850</b>

**SAURASHTRA UNIVERSITY, RAJKOT**  
**B.E. SEMESTER V (IT)**

**501 OPERATING SYSTEMS - I**

TEACHING SCHEME		EXAMINATION SCHEME				
THEORY Hours	PRACTICAL Hours	THEORY Marks	PAPER Hours	PRACTICAL/ORAL Marks	TERMWORK Marks	TOTAL Marks
4	2	100	3	50	25	175

1. Introduction. Functions of operating systems. Basic terms - processes, files, command interpreter. Operating System interface. Operating system structure - monolithic, layered, virtual machine and client - server. Real - time systems and distributed systems.
2. Processes and their implementation. Interprocess communication - critical sections, mutual exclusions, semaphores, monitors, and message passing. Need for Test - and - Set instruction.
3. Process scheduling. Objectives. First come first serve, round - robin, shortest job first, and priority - based scheduling. Examples.
4. Deadlocks. Definition and simple examples. Deadlock detection, recovery, prevention and avoidance.
5. Input and output. Basic concepts - interrupt handlers, device drivers, and device - independent input/output. Examples of disk and terminal handling software.
6. Memory management. Fixed and variable size partitions. Protection of user address space. Swapping. Virtual memory systems. Demand paging. Working set. Page replacement strategies. Examples.
7. File system. Files, directories and special files. Access methods. Disk space management and file space allocation methods. File system security, reliability and performance. Examples.
8. Study of operating system UNIX. File system and process management. Common commands. Shell structure and programming.

**REFERENCE BOOKS:**

1. Operating Systems Design and Implementation, Andrew S. Tanenbaum  
Prentice Hall International.
2. Operating System Concepts, James Peterson and Abraham Silberschatz  
Addison Wesley World Student Series
3. The design of the Unix operating system, Maurice J. Bach
4. Unveiling windows'95, Roger Jennings and Matthew Harris
5. Operating Systems Basics, Alpa J. Vora, Akshat Publication
6. The Unix programming environment, Brian W. Kernighan and Rob Pike

**SAURASHTRA UNIVERSITY, RAJKOT**  
**B.E. SEMESTER V (CE/IT)**

**502 DATA STRUCTURE AND ALGORITHMS**

TEACHING SCHEME		EXAMINATION SCHEME				
THEORY Hours	PRACTICAL Hours	THEORY Marks	PAPER Hours	PRACTICAL/ORAL Marks	TERMWORK Marks	TOTAL Marks
4	2	100	3	50	25	175

- **INTRODUCTION TO DATA STRUCTURES:**  
Data Management Concepts: Data types (Primitive, Compound), Data Structures (Simple, Linear, Non-linear), File structures, Program Development Process, Program Testing, Development & Verifications of Algorithm, Time & Space Analysis.
- Array , Stack, Queue (Simple, Circular), Linked Lists ( Singly & Doubly), Implementation of Stack & Queue using Static & Dynamic structure, Recursion & Iteration in Algorithms, Binary Trees, Search trees (Binary & m-way search, B-trees), Graph Structure (Mapping & Traversal, Application of Graph).
- **SORTING & SEARCHING ALGORITHMS :**  
Insertion sort, selection sort, shell sort, quick sort, merge sort
- **FILE STRUCTURES :**  
Concept of fields, Records and files, File organization (Sequential, Indexed, Relative/random), Hashing, Multi-key file organization and access methods.

**REFERENCE BOOKS:**

- 1) An Introduction to Data Structure with Applications By Trembly & Sorenson, McGraw-Hill.
- 2) Data Structure Using C by Tanenbaun, Prentice Hall.
- 3) Data Structure Using C (Labwork Book) By R.Y. Shukla, BPB Publication.

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**B.E. SEMESTER V (IT)**

**503 COMPUTER GRAPHICS**

TEACHING SCHEME		EXAMINATION SCHEME				
THEORY Hours	PRACTICAL Hours	THEORY Marks	PAPER Hours	PRACTICAL/ORAL Marks	TERMWORK Marks	TOTAL Marks
4	2	100	3	50	25	175

- **Introduction:** What is graphics, History of Computer Graphics, Elements of Graphics, Application of Computer Graphics, Graphic monitors and workstations, Introduction to Graphics Standards.
- **Graphics Input Devices:** Logical Classification of Input Devices, Input device handling, Key Board, Mouse, Track Board, Data Glows, Light Pens, Touch Panels, Scanner, Digital Cameras.
- **Graphics Output Devices :** Liquid Crystal Display, Plasma Panel Display, Field Emission Display Video display devices, Refresh cathode ray tube, Raster scan display, Random scan display, Color CRT monitor, Direct View Storage tubes, Flat panel display, Raster scan systems, 3D Viewing Devices, Display Processing, Frame Buffer, Graphics Adaptors, Hard Copy Devices,
- **Graphics Primitives : Line Drawing :** Scan Conversion, Basic Concepts in Line drawing, Line segments and vectors, Pixels and frame buffers, Line drawing algorithms, Direct Scan Conversion using Slope-Intercept Equation DDA algorithms, Bresenham's line algorithm,  
**Circle Drawing :** Circle Drawing using polynomial and trigonometric equations, Bresenham's Algorithm, Mid-point circle algorithms  
**Ellipse Drawing :** Ellipse Drawing using polynomial and trigonometric equations, Mid-point ellipse Algorithm  
**Text generation**  
**Polygons :** Representations, inside outside test, interfacing algorithm, polygon filling, filling with pattern.
- **Primitive graphic operations :** Display files, concept of device independence, Normalized device coordinates, Display file structure & algorithms, Text graphics standards.
- **2D Transformation :** 2D geometric transformation, Scaling, Rotation, Translation, Co-ordinate transformation, Homogeneous Coordinates, Inverse transformation, Transformation routines.
- **2D Windowing and clipping :** Viewing transformation, Window to viewpoint co-ordinate transformation, Cohen-Sutherland line clipping, Liang Barsky line clipping, interior & exterior clipping, polygon clipping,
- **3D Geometry :** Representative of 3D objects, 3D primitives and transformations, Parallel projection, perspective projection, Viewing parameters.
- **Color Models :**
- **Animation :**

**REFERENCE BOOKS :**

1. Computer Graphics: A Programming Approach -By Steven Harrington (Mc. Graw Hill)
2. Computer Graphics by Donald Hearn & M Paulin Baker (Prentice Hall of India)
3. Computer Graphics – Foley & Vandam (TMH)
4. Fundamental of Computer Graphics(C Version) N. N. Jani, K. H. Wandra & J. B. Pandya
5. Computer Graphics for scientist and engineers by R.G.S. Asthana & N.K. Sinha new age international Pvt. ltd.

**SAURASHTRA UNIVERSITY, RAJKOT**  
**B.E. SEMESTER V (CE/IT)**  
**504 ADVANCED MICROPROCESSORS INTERFACING & PROGRAMMING**

TEACHING SCHEME		EXAMINATION SCHEME				
THEORY Hours	PRACTICAL Hours	THEORY Marks	PAPER Hours	PRACTICAL/ORAL Marks	TERMWORK Marks	TOTAL Marls
4	2	100	3	50	25	175

**[A] Architecture & Interfacing :**

- (1). Microprocessor, Microcomputer & Languages :  
Introduction of microprocessor & microcomputer, High level & low level languages, Introduction of large computer, Medium size computer, Microcomputers & different terms related to microprocessor.
- (2). Overview of 8085 - Microprocessor Architecture :  
8085 pin out & internal (functional) block diagram, 8085 pin signals.

**[B] Architecture of 8086 :**

- (1) Architecture :  
Introduction to 16-bit microprocessor, Comparison of 8085 & 8086, Internal block dia. (BIU, EU etc...), GPRS, Index & Pointers etc..., Memory Segmentation concepts & its advantages.  
Pinout diagram & its signal details  
Clock generator (8284A), 8086 minimum mode module details  
Bus controller (8288), Bus arbiter (8289), 8086 Maximum mode module details, Multiprocessor Bus systems.
- (2) 8086 interrupts & service routines :  
Introduction, 8086 interrupt & actions, working of interrupt, Interrupts & ROM – BIOS service, Hardware or exception interrupts, Software (System calls) interrupt, Interrupt vectors to store Pointers, Interrupt service routines.
- (6) Advanced microprocessors  
Introduction of 80186, 80286, 80386, 80486 & Pentium Processor, RISC, CISC, Real & Protected Virtual mode of each processor.
- (7) Overview of general purpose periferal chips like 8255,8254,8279.

**[C] Programming :**

- (1) Various addressing modes, overview of various registers & pointers, classification of instructions & its details.
- (2) Assembler directives  
Introduction, classifications & details study of all assembler directives.
- (3) Program development tools & debug commands  
Introduction, details of different program development tools (Text editors, assemblers, Linker, Loader etc ...)  
Program development process with flowchart, different debug commands
- (4) Programming using 8086 instructions.
- (5) DOS interrupts  
DOS system call (INT 21H) and its sub functions

## **REFERENCE BOOKS :**

- (1) Microprocessor architecture, Programming & its appl. – R.S. Gaonkar (PRI)
- (2) Microprocessor X86 programming - K.R. Venugopal (BPB)
- (3) Microcomputer System : The 8086 / 8088 family Archi., program. & design -Liu & Gibson (PHI)
- (4) Microcomputers & microprocessor – John Uffenbeck (PHI)
- (5) Microprocessor & interfacing - Douglas V. Hall (TMH)
- (6) Advanced Microprocessor Interfacing & Programming – K. Wandra & H. Wandra
- (7) Advanced microprocessor & Interfacing - B. Ram (TMH)
- (8) Intel Micro processor – Brey (PHI).
- (9) Advance Microprocessors & Peripherals – A.K.Ray & K.M.Bhurchadi (TMH)

**SAURASHTRA UNIVERSITY, RAJKOT**  
**B.E. SEMESTER V (CE/IT)**

**505: ECONOMICS & BUSINESS MANAGEMENT**

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

**ECONOMICS**

1. Nature of Economics  
Definations, Scope of Economics.
2. Utility analysis& Demand Analysis  
Law of Demand, Elasticity of Demand, Law of Diminishing Marginal Utility.
3. Nature & Factors of Production  
Land, Labor, Capital, Entrepreneurs.
4. Scale of Production
5. Cost Analysis, Law of Returns.
6. Price Determination under Different Markets.
7. Public finance.

**MANAGEMENT**

1. Organization  
Concept-Principles, Line &Staff Structure, Parkinson's Law-Peter's Law.
2. Management  
Concept- development Thought Approaches to Managerial Analysis, Functions of Management.
3. Personnel Management  
Concept, Man Planning Assessment, Recruitment, Training.
4. Humanized of Management  
Leadership, Motivation, Group Cohesiveness.
5. Financial Management  
An Overview, Indian Financial System, Derivatives &Cooperate Finance Corporate Risk Management,  
Break Even Analysis.

**REFERENCE BOOK:**

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| 1. Industrial Engg. & Management         | by O. P. Khanna.    |
| 2. Management Analysis, Concepts & Cases | by Haynes & Massie. |
| 3. Principles of Economics               | by Devett & Verma.  |
| 4. Economics                             | by Stonier & Hague. |