VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.- IV (Information Technology)

Semester - VII

SCHEME FOR TEACHING AND EXAMINATION

B.E.IV (IT) 7th Semester		Teaching Scheme			Examination Scheme						
					Theory Exam		Practical/Quiz/Viva/T.W. etc.				
					University Exam.		University Exam.		Tutorial	Cont. Evaluation	Total Marks
Course	Course No.	L Hrs.	T Hrs.	P Hrs.	Duration Hrs.	Marks	Duration Hrs.	Marks			
Graphical User Interfaces	IT 701 IT	3	1	2	3	100	3	30	25	20	75
Data Base Management Systems	ECC 702 CO/IT	3	0	2	3	100	3	30	0	20	50
Software Engineering	IT 703 IT	3	1	2	3	100	3	30	25	20	75
Information Security and Applications	IT 704 IT	2	1	0	3	100	0	0	25	0	25
Operating Systems	IT 705 IT	3	1	2	3	100	3	30	25	20	75
Project Preliminaries	IT 706 IT	0	0	3	-	-	0	30	0	20	50
Seminar	IT 707 IT	0	0	2	-	-	0	30	0	20	50
		14	**4**	**13**	**-**	**500**	**-**	**180**	**100**	**120**	**400**
Total Contact Hours: 31								**Total Marks: 900**			

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GRAPHICAL USER INTERFACES – IT 701 IT

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	Cont. Evaluation : 10 Examination : 15	Cont. Evaluation : 20 Examination : 30

(A) THEORY:

Introduction – Graphical User Interface concepts and Architecture – Visual Programming – User Interface Development – Painting Text – Drawing Graphics

Advanced User Interface – Memory Management & File I/O – Multitasking & Multithreading – Printing graphics & Text – Clipboard – Dynamic Data Exchange – Multi Document Interface – Dynamic Link Libraries – Object Linking & Embedding – Component Object Model Interface – Creating Help File.

Multimedia Interfaces – File formats for various media – sound Blaster Card – Image and Fonts Handling – Image File Formats – Viewing Images – Printing Images – Font & Texture manipulation.

Fundamentals of GUI Programming and its Components: Windows Programming Basics-Message Processing Architecture–Message Boxes and Menus –Introducing Dialog Boxes- More controls- Class Hierarchy – The mouse and the keyboard Related Windows Messages – Common Controls

The Document/View Architecture Of GUI Programming: Document, views and Single Document Interface- Multiple Documents and Multiple Views. Creating Document/View Applications Overview of traditional style programming.

(B) PRACTICALS:

Based up on the syllabus prescribed above.

(C) TUTORIAL ASSIGNMENTS:

Based up on the syllabus prescribed above.

(D)

TEXTBOOKS/REFERENCES:

(1) Jim Conger: Windows programming Primer Plus, Galgotia Publication Pvt. Ltd.(published 2002)

(2) Michael Young: Master Visual C++, 2nd Edition, 1997, BPB publication.

(3) MFC Programming From the Ground UP: 2nd Edition by Herbert, Schildt, TMH publication.

(4) Programming Windows with MFC by Jeff Prosise, 2nd Edition, Microsoft Press

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DATABASE MANAGEMENT SYSTEMS: ECC 702 CO/IT

	Lecture	Tutorial	Practical
Teaching Hours	3	0	2
Examination Scheme Marks	100	Cont. Evaluation: 00 Examination: 00	Cont. Evaluation: 20 Examination : 30

(A) THEORY

Introduction: Basic Concepts; Data Processing Techniques; Traditional Data Processing & Data Base Processing Techniques; DBMS; Data Independence; Shared Data - Advantages of DBMS; advantages; architecture and purpose of database management system; View of data; Data Models; Database languages: DDL & DML; Transaction Management; Storage Management; DBA; Database Users.

Entity-Relationship Model: Basic Concepts; Design Issues; Mapping Constraints; Keys; E-R Diagrams; Entity sets; Design of an ER database schema

Relational Model: Relations; Structure of relational databases; domains and attributes; integrity rules; Relational Algebra; tuple relational calculus, Domain relational calculus; Extended relational algebra operation; views

SQL Concepts: Basic Structure; Set operations; Aggregate functions; null values; DDL & DML statements (queries); nested queries; sub queries; derived relations; joined relations; types of joins; embedded SQL.

Integrity Constraints: Domain Constraints; Referential Integrity; Assertions; Triggers; Functional Dependencies

Relational database design: Pitfalls in relational Database Design; Decomposition & Desirable properties; Anomalies; Normalization using Functional Dependencies; Normalization using Multi-valued dependencies; Join dependencies; DKNF.

Query Processing: Overview; General Strategies; Catalog information; Estimated size of relations; Measures of Query cost; selection, sort operations.

Transactions, Concurrency Control & Recovery system: Transaction Concepts and states; Properties ; concurrent executions; Serializability; Recoverability; The problems in concurrency; Locking scheme; Deadlock; Insert-Delete operations; Recovery with Concurrent Transactions; storage structure; recovery and atomicity; log based recovery.

Database System Architectures: Centralized systems; client-server systems; parallel systems; distributed systems; brief introduction to Object Oriented Database.

(B) PRACTICALS:

Based upon the theory course prescribed above.

(C) TEXT BOOKS:

(1) Database System Concepts By Silberschatz, Henry Korth, S Sudarshan , McGraw Hill, 3rd ED, 1997.

(2) Intrduction to Database systems , By C J Date, Narosa, 2nd Ed. 1997.

(3) Oracle Developer 2000, By Ivan Bayross, BPB publications

(D) REFERENCE BOOKS:

(1) Fundamental of Database Systems , Ramez Elmasri and Shamkant B Navatha, The Benjamin/ Cummungs Publishing Co., 2nd Edition, 1994

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Semester - VII

SOFTWARE ENGINEERING: IT 703 IT

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	Cont. Evaluation : 10 Examination : 15	Cont. Evaluation : 20 Examination : 30

(A) THEORY

Introduction: Software Process, Scope Of Software Engineering, Software Development Life Cycle. Steps – Effort Distribution. Software Qualities. Problems with Software Production. Aspects Of Estimation and Scheduling.

Software Life-Cycle Models: Build-and-Fix, Waterfall, Rapid Prototyping, Incremental, Spiral, CMU's CMM, ISO 9000.

Requirements and Analysis Phase: Techniques, Feasibility analysis, Requirements elicitation, validation, Rapid Prototyping, Requirements management – System Models. Testing during this phase. OO Programming vrs Structured paradigm, OO Analysis CASE tools for this phase.

Specification Phase: The Specification Document, Specification qualities, uses, classification. Operational (behavioral) – DFD, UML, FSM, Petrinets descriptive specifications – ER diagrams, Logic, Algebraic specifications. Comparison of various techniques and CASE tools for Specification Phase. Formal specifications. Model checking - modeling concurrent systems.

Object Oriented Methodology: Introduction to Objects, Module, Cohesion, Coupling, Reuse, Reuse Case Studies. Object Oriented Paradigm.

Object-Oriented Design Phase : Architectural, Distributed, Data-oriented design & Object-Oriented design. Real-time Systems design techniques. CASE tools for the design phase.

Stepwise Refinement, CASE and other tools: Step-wise refinement, Cost-Benefit Analysis, CASE, Scope Of CASE, Software Versions and Configuration Control, Productivity gains with CASE.

Testing Principles : Verification & validation – Non-execution based testing – Software inspections, code reviews, code walkthroughs, - automated static analysis - cleanroom software development. Quality issues. Execution based testing - Module Test-case selection, Black-Box and Glass-Box Testing, Testing Objects. Testing vrs correctness proofs.

Maintenance Phase: Why maintenance is necessary , CASE tools for maintenance. *Practical assignments shall be based on the theory above with UML modeling tools like Rational Rose, Bell-labs' model checker & verifier SPIN etc.*

(B) PRACTICALS:

Based upon the theory course prescribed above.

(C) TUTORIAL ASSIGNMENTS:

Based upon the theory course prescribed above.

(D) REFERENCES :

(1) Ghezzi, Jazayeri, Mandrioli: *Fundamentals of Software Engg*, 2003 ed, Pearson EDU

(2) Sommerville: *Software Engineering*, 2001 ed, Pearson Edu

(3) Stephen R Schach: *Software Engineering with JAVA*, TMH, '98 ed

(4) Roger S Pressman: *Software Engineering – A practitioner's Approach*, 5th edition, 2001, McGraw-Hill.

(5) G G Schulmeyer : Zero *Defect Software*, McGraw Hill, 1992

(6) J Rumbaugh et al: *Object Oriented Modeling and Design*, Prentice-Hall, 1991.

(7) Grumberg, Clarke, Peled: *Model Checking*, The MIT Press, 2001.

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INFORMATION SECURITY & APPLICATIONS: IT 704 IT

	Lecture	Tutorial	Practical
Teaching Hours	2	1	0
Examination Scheme Marks	100	Cont. Evaluation : 10 Examination : 15	Cont. Evaluation : 00 Examination : 00

(A) THEORY

Introduction – Security Attacks on data / software, Hardware, Network.
Classical Encryption Techniques – Caesar Cipher, Monoalphabetic Ciphers, Polyalphabetic Classical Encryption techniques – Caesar Cipher, Monoalphabetic Ciphers, Polyalphabetic Ciphers, Transposition techniques – private key cryptography and Diffie – Hellman key exchange – Hashing and Digital Signatures – Authentication Protocols.

Network Security – firewall Design principles, IP security – security policy.

Introduction to E-Commerce – Electronic Voting / Polling systems – Standards and applications.

(B) TUTORIAL ASSIGNMENTS:
Based upon the syllabus prescribed above.

(C) TEXTBOOKS:

(1) William Stallings: Cryptography and Network security – Principles , 2nd Edition,PHI publication ,
(2) Bruce Scheneir : Applied Cryptography, John Wiley publication.,1996.

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OPERATING SYSTEMS: IT 705 IT

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	Cont. Evaluation: 10 Examination : 15	Cont. Evaluation: 20 Examination : 30

(A) THEORY

Introduction & Overview: - Operating Systems Objectives, Formal Definition Evolution of operating systems, Types of operating systems, Introduction to the examples of contemporary operating systems.

Process Scheduling and Management: The Process Concept, Processes & Threads, Process Management Systems Calls, CPU Scheduling, Various process scheduling algorithms and their performance evolution. System calls related to processes

Interprocess Communication: Concurrent Processes , The critical section problem , Algorithms for mutual exclusion ,Semaphores, Critical Region, Monitors, Messages : Synchronous v/s Asynchronous. Classical Process Co-ordination problems: Dining Philosophers, Sleeping Barber, Readers and Writers. Examples of IPC in Contemporary Operating Systems .

Deadlocks: Characterization, Prevention, Avoidance, Detection, Recovery. Bankers Algorithm for single and multiple resources. Deadlock handling in contemporary operating systems.

Memory management : Overview of swapping , Multiple Partitions ,Paging: Principle of Operation, Page Allocation, H/W support for Paging, multiprogramming with fixed number of tasks , Multiprogramming with variable , number of tasks, Segmentation, Virtual memory: Concept , Demand Paging Performance, Page replacement algorithms, Thrashing, Locality, Fragmentation & Compaction. Page replacement algorithms, Memory Allocation algorithms, Memory Protection, Memory management system calls.

Device Management: Terminals & Capability Database – Emulators – Virtual Terminals – Disk devices Independence – RAID devices – devices Driver Interface. Disk Drive Access Techniques – Free space management – Performance and reliability improvements – Storage hierarchy.

File Systems: File Naming, File Structure, File Types, File Access, File Attributes, File Operations, Memory Mapped Files. Directories : Hierarchical Directory System, Pathnames, Directory Operations, File System Implementation. Implementing Files: Contiguous Allocation, Linked List Allocation, Linked list using index, Inodes, Implementing Directories in C, MS-DOS, Unix. Shared Files, Disk Space

Management, File System Reliability, File System Performance. Security: Security Environment, Design Principles of Security, User Authentication. Protection Mechanism: Protection Domain, Access Control List.-System calls related to File system

Principles of Input/Output hardware: I/O Devices, Device Controllers, Direct Memory Access, Principles of Input/Output s/w, Goals of the I/O s/w, Interrupt handler, Device Driver, Device Independent I/O software. Disks: Disk arm scheduling algorithms, Error Handling.

Modern Operating systems: Thread scheduling – Client server architecture – Ordinary File sharing vrs network Operating Systems – real-time systems – Comparative survey/study of architecture of contemporary operating systems – Introduction to Micro-Kernel based operating systems – The development towards a Distributed operating systems.

(B) PRACTICALS:

Based upon the syllabus prescribed above based on the Command interface and Programmer's interface of the Operating System.

(C) TUTORIAL ASSIGNMENTS:

Based upon the syllabus prescribed above

(D) TEXT BOOKS:

(1) Modern Operating Systems: Andrew S. Tanenbaum, 2nd Edition, EEE, PHI Publication.

(2) Operating System Concepts: Silberschatz and Galvin, 6th Edition, John Wiley pub.

(E) REFERENCES:

(1) Operating System-Design and Concepts : Milan Milenkovic, McGraw-Hill International.

(2) Operating System Internals: William Stallings,4th Edition, Pearson publication.

(3) Advanced Unix ;A Programmer's Guide : Stephen Prata,BPB publication,reprint

(4) The Unix Programming Environment: Kernighan & Pike, EEE, PHI publication.

(5) Unix System Concepts and Applications : Sumita Bha Das, Pub. TMH Publication.

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Project Preliminaries: IT 706 IT

	Lecture	Tutorial	Practical
Teaching Hours	0	0	3
Internal Examination Scheme Marks	-	Cont. Evaluation : 00 Examination : 00	Cont. Evaluation : 20 Examination : 30

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Seminar – IT 707 IT

	Lecture	Tutorial	Practical
Teaching Hours	0	0	2
Internal Examination Scheme Marks	-	Cont. Evaluation : 00 Examination : 00	Cont. Evaluation : 20 Examination : 30

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LIST OF ELECTIVE SUBJECTS

Sr. No.	Elective-I	Sr. No.	Elective-II
1.	Data Warehousing and Data Mining	**1.**	Parallel Processing and Architecture
2.	Knowledge Based Management System	**2.**	Compilers for Advanced Architectures
3.	Enterprise Resource Planning	**3.**	Advanced Operating System
4.	E-commerce, Data Encryption and Security	**4.**	Image Processing and Pattern Recognition
5.	Information Technology and Management	**5.**	Mobile Computing
6.	Advanced Database Management System	**6.**	Digital Signal Processing
7.	Decision Support System	**7.**	Software Reliability
		8.	Cluster Computing