

VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.- IV (Computer Engg.)

Semester - VIII

B.E.IV (CO) 8 th Semester		Teaching Scheme			Examination Scheme							
					Theory Exam		Practical/Quiz/Viva/T.W. etc.					Total Marks
Course	Course No.	L Hrs.	T Hrs.	P Hrs.	Duration Hrs.	Marks	Duration Hrs.	Marks	Tutorial	Cont. Evaluation	Total Marks	
Internet Technology & Application	ECC 801 CO	3	0	4	3	100	4	60	0	40	100	
Software Engineering	ECC 802 CO	3	0	2	3	100	3	30	0	20	50	
Information Technology & Management	ECC 803 CO	3	0	0	3	100	-	-	-	-	-	
Elective -I	ECC 8XX CO	3	1	0	3	100	4	-	25	-	25	
Elective-II	ECC 8XX CO	3	1	0	3	100	4	-	25	-	25	
Project	ECC 804 CO	-	-	8	-	-	-	120	-	80	200	
TOTAL:		15	2	14	-	500	-	210	50	140	400	
Total Contact Hours: 31							Total Marks: 900					

Elective-I ECC 811 to 816

Elective-II ECC 821 to 826

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ECC 801 CO : Internet Technology and Application

	Lecture	Tutorial	Practical
Teaching Hours	3	0	4
Examination Scheme Marks	100	00	Cont. Evaluation : 40 Examination : 60

1. Introduction – Internet Origin & Development – Internet Architecture frame work – Word Wide Web.
2. Script Language & Programming – Programming with PERL.
3. Introduction to CGI – Basics of CGI, SSI Commands – Active Server Pages - CGI Programming & HTML Forms – Use of CGI for the protection & security – CGI Programming using PERL.
4. Advanced Java Programming – Java Applets – CGI Programming using Java servlet – Java script – Applications – Integrating Java & Java script – Security in Java.
5. Extensible Markup Language (XML) – Introduction – Origin and Goals – XML Documents – Common syntactic constructs – XML tags – XML Processors.
6. Internet Application – interactive Web page Development – Interfacing with Data bases , internet Access and security – authentication.

Reference:

1. Michael : The web Programming Desktop Reference , PHI, 1998 ed.
2. Mark Gaither & ed Tittel: web Programming secrets with HTML, CGI & Perl, comdex IDG Books, 1996 ed.
3. Patric and Herbert :The Complete reference JAVA, TMH, Reprint 1997.

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ECC 802 CO : Software Engineering

	Lecture	Tutorial	Practical
Teaching Hours	3	0	4
Examination Scheme Marks	100	00	Cont. Evaluation : 20 Examination : 30

1. Introduction : software Process, Scope of software engineering, software development Life Cycle. Steps- Effort Distribution. Problems with software Production. Aspects of Estimation and scheduling.
2. Software Life – cycle Models : Build – and – Fix , Waterfall, Rapid Prototyping , Incremental spiral Comparison, ISO 9000.
3. 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.
4. Testing Principles: quality issues, Non-execution based testing, Execution based testing, Testing vrs Correctness Proofs.
5. Object Oriented Methodology: Introduction to Object, Module, Cohesion, coupling, Reuse, Reuse case studies. Object Oriented analysis and Design, examples of Object methodologies.
6. Requirements Phase : techniques, Feasibility analysis, Prototyping, Testing during this phase, CASE tools for this Phase.
7. Specifications Phase: The specification document, structured systems analysis, semiformal techniques, ER Modeling , finite-state Machines, Petri Nets, Comparison of various techniques and CASE tools for specifications Phase.
8. Object – Oriented Analysis Phase : OO Paradigm vrs Structured paradigm, OO Analysis, OO life-Cycle Models, CASE tools for object-oriented Analysis phase. Case Study.
9. Design Phase: Data flow data structured oriented Design strategies, Action-oriented design, Data oriented design, jackson System development, Object-oriented design, Comparison of Action –oriented, Data oriented and object-oriented design, Real-time Systems design techniques. CASE tolls for the design phase.
10. Implementation phase: Choice of a Programming Language, 4th generation languages, Coding standards, Team Approach, Scheduling, Portability and module Reuse , Module Test-case selection, Black-Box and Glass-Box Testing, Code walkthroughs, Testing objects. Issues in project management-team structure. CASE tools for the implementation.
11. Implementation and Integration Phase: Top-down, Bottom-up, sandwich, Implementation and Integration of Object- oriented products, Testing during R&I Phase Integration using a GUI, product, Acceptance Testing, CASE tools for I&I, CASE tools for complete Software process.

12. Maintenance Phase: Why maintenance is necessary, CASE tools for maintenance.
Practical Assignments shall be based on the theory above with JAVA as a test case.

References :

1. Stephen R Schach: Software engineering with JAVA, TMH, 1998 edition.
2. Roger S Pressman : Software engineering – A practitioner's Approach, 4th edition, 1996 McGraw-Hill.
3. J Martin : Rapid Application Development, prentice-Hall International.
4. B Meyer : Object Oriented software Construction, prentice-Hall.
5. G G Schulmeyer : Zero Defect software, McGraw – Hill ,1992.
6. J Rumbaugh et al : Object oriented Modeling and Design, Prentice-Hall, 1991.

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ECC 803 CO : Information Technology & Management

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

1. Information Technology : Models and Principles : Systems & Information Theory- Users / Machine Systems – Database Management – logical / physical design.
2. Information Storage and Retrieval – content analysis, indexing search systems, library automation.
3. Information Systems Applications : Office automation, Communication, Intranet/Internet – Web centric business.
4. Information interfaces and presentation- multimedia information systems, user interfaces.
5. Ethical and social Impact of Information Systems.
6. Information security – threats and counter measures.
7. Electronic Banking, Electronic publishing , Electronic Polling Systems – on line Exam / monitoring / evaluation systems.
8. Standards / patents / Copyrights.

References:

1. M. Cook, Building Enterprise Information Architectures : Reengineering Information Systems, Prentice – Hall-1996.
2. D. Tapscott (Editor), Blueprint to the Digital Economy : Wealth Creation in the era of E-Business, McGraw-Hill – 1998.
3. K. Laudon, J. Laudon, Management Information Systems : New approaches to organization and technology, Prentice Hall India, 1998.

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ELECTIVE GROUP – I

1. ECC 811 CO : Artificial Intelligence & Robotics

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Cont. Evaluation : 00 Examination : 00

Introduction to Artificial Intelligence – Problem Analysis and Representation – Basis Problem solving Methods and Best Search Methods – Structured Representation of Knowledge.

Fuzzy logic and applications – artificial neural networks – Expert systems and Robotics – Standards and Applications – Topics in Motion planning Algorithms and Complexity results for collision avoidance – the configuration space approach.

References:

1. Elaine Rich, K. Knight, Artificial Intelligence, Tata McGraw Hill.
2. Andrew C., Staugaard Jr., Robotics and AI : An Introduction to Applied machine Intelligence.
3. K. Boyer, L. Stsrk, H. Bunke, Applications of AI, Machine Vision and Robotics World Scientific Pub Co. – 1995.

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2. ECC 812 CO : Compilers for Advanced Architectures

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Cont. Evaluation : 00 Examination : 00

Introduction to Compiler structure – Intermediate Representations – Code generation – resources, templates – Flow Analysis – Control Flow, Data Flow – dependence analysis and dependence graph.

Code optimizations – redundancy elimination, loop optimizations, procedure optimizations, register allocation, code scheduling, low-level optimizations, register allocation, code scheduling, low-level optimizations – Instruction scheduling and parallelization techniques.

Compiler Design and implementation for parallel computer systems – Vector pipelined, superscalar, SIMD, MIMD machines – Compiling issues for novel architecture with fine grain parallelism.

References:

1. Aho, Sethi, Ullman, Compilers : Principles, Techniques, and Tools, Addison Wesley – (first publication 1985)
2. N. Writh, Compiler Construction, Addison Wesley – 1996.
3. S. Muchnick, Advanced Compiler design and Implementation, Academic press / Morgan Kaufmann – 1997.
4. M. Wolfe, L. Ortega, C. Shaklin, High performance Compiler for parallel Computing, Addison Wesley – 1996.

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3. ECC 813 CO : Image Processing Techniques & Architectures

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Cont. Evaluation : 00 Examination : 00

Introduction – Digital Image Processing – Applications – Image representation. Image file Formats – Review of Different Image File Structures. Image Transforms – 2-D Orthogonal & Unitary transforms – Convolution – DFT – FFT – DCT.

Image Enhancement – spatial Domain Methods & Frequency Domain Methods – Point Operation – Clipping and Thresholding – Digital Negative – Image Subtraction & Image Averaging – Histogram modeling – Spatial Operation – Low pass, High pass Median filtering & other filters – Magnification and Interpolation – Enhancement in Frequency Domain – Color Fundamentals & Models – Full – Color Image processing – Color Image Enhancement.

Image Filtering & Restoration – degradation Model – Circulant Matrices – Algebraic approach to Restoration – Inverse & Least mean square (Wiener) filtering – Filtering Using Image transforms – Constrained Least Squares Restoration.

Image analysis & Computer Vision – edge Detection – Boundary Extraction – Boundary Representation – Region Representation – Structure, Shape Features – Texture – Morphology – Scene Matching & Detection.

Image data Compression – Introduction – Image compression Models – Error free Compression Techniques – Standards – Transforms Coding Theory – Transform Coding of Image & different coding techniques.

References:

1. Rafael C. Gonzales and Richard E. Woods : Digital Image Processing, Addison Wesley Publishing Company, reprint 1993.
2. Anil K. Jain : Fundamental of Digital Image processing, PHI, EEE, 3rd Edition 1997.

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4. ECC 814 CO : Information Security & Applications

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Cont. Evaluation : 00 Examination : 00

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.

References:

1. William Stallings : Cryptography and Network security – Principles and Prentice Hall.
2. Bruce Schneier : Applied Cryptography, John wiley.

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5. ECC 815 CO : Natural Language Understanding

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Cont. Evaluation : 00 Examination : 00

Introduction to Natural Language Understanding – Linguistic background: An outline of English syntax – Grammars and Parsing – Features and Augmented Grammars – Grammars for Natural Language – Toward Efficient Parsing – ambiguity Resolution: Statistical Methods: semantics and logical Form – Linking syntax and Semantics – ambiguity Resolution – other Strategies for semantic Interpretation – scoping and the Interpretation of Noun phrases – Knowledge Representation and Reasoning – Local Discourse Context and Reference – Using World Knowledge – discourse structure.

Defining a Conversational Agent – A Basic Conversation Processor – The Processes in a Conversation processor – Knowledge in a Conversation Processor – Conversation processor and Natural language processors – Problems in Language Understanding for language Processors – Resolving Ambiguous Meaning – Resolving Grammar Problems – Semantic analysis of semantic Items – semantic analysis in natural language Processing – Generating Questions – semantic Contains Semantic Constraints in a Conversation Processor – handling Diverse Types of Input Sentences – Types of Sentences – Processing Texts in a natural Language Processor Processing Texts in a Conversation Processor – Incorporating Text Understanding in to Conversation Processor - Incorporating Text Understanding in to Conversations Processor – Debugging your Conversations Processor.

References:

1. James Allen : Natural Language Understanding, Addison-wesley Pub Co, 2nd edition 1995.
2. Jan Van Bakel automatic semantic Interpretation : A Computer Model of Understanding Natural Language.
3. Russell Suereth : Developing Natural Language Interfaces : Processing Human Conversations, McGraw Hill, 1997.

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6. ECC 816 CO : Parallel Processing & Architectures

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Cont. Evaluation : 00 Examination : 00

Introduction to parallel Processing – Generation of parallel Computers – Architectural Classifications schemes – parallel Processing applications – Memory sub Systems and Input output management – Pipelining and vector Processing – Interconnection Networks and array processors.

Multi – processor architecture and programming – parallel Programming language and Environment.

Data flow Computers – static data flow, Dynamic Dataflow architecture – advance topics.

References:

1. Kai Hwang, F. Briggs, Computer architecture and parallel Processing, Mc-Graw Hill .
2. M. Flynn, computer Architecture, Narosa Publishing.

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1. ECC 821 CO : Advanced Database Systems

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Cont. Evaluation : 00 Examination : 00

Introduction : Objectives and Review of the basic concepts – The Object – oriented data Model – Object oriented databases = ODMG – Nested Relation Model.

Database System architectures : Centralized systems – Client – Server systems – Parallel systems, Distributed systems – Network Types. Parallel Databases parallelism – Inter – query and Intra-query Parallelism – Inter – operation & Intra-operation parallelism – Design of parallel Systems. Distributed Databases_: Distributed DBMS Implementations. Features of Distributed client/server DBMS. Advanced RDBMS Features, RDBMS Reliability and Availability Robustness – Consistency fault Tolerance. RDBMS Administration. Distributed data storage-Distributed query Processing – Distributed Transaction model – Commit Protocols – Concurrency control – Deadlock handling. Multi – Database connectivity standards – Concept of the Middle – ware Product.

Web Enabled Applications: Review of 3-tier architecture – The middle – ware – Typical Middle – ware products and their usage. Architectural support for 3 – tier applications : technologies like RPC, CORBA, Com. Web Application server – WAS architecture – Concept of Data Cartridges – JAVA/HTML components. WAS security.

Special Topics: Security and Integrity, Standardization, Performance Benchmarks, Performance Tuning, time in Databases, User Interfaces, Active databases.

Data & web warehousing: data Ware house Definition and Characteristics data warehouse architecture, Client/Server Computing Model & data Warehousing. Query and Reporting Tools – Applications – OLAP & Tools – data Mining & Tools – data Visualization – Data Marts – Data Warehouse Administration and management. Data warehouse Design Considerations – Tools, performance Considerations – data Warehouse & DBMS Specialization – Mapping the Data Warehouse to a Multiprocessor architecture – data partitioning.

Multi-relational OLAP, MOLAP, ROLAP – Managed Query Environment (MQE), OLAP Tools and the Internet.

References:

1. A Silberschatz, Henry Korth, S Sudarshan : Database systems Concepts, McGraw Hill, 3rd Ed, 1997.
2. Alex Berson, Stephen J. Smith : Data warehousing, data Mining, and OLAP, (McGraw Hill series on data warehousing and data management 1998.
3. R Sigmore, M O Stegman, J Creamer : The ODBC solution, McGraw Hill 1995.
4. Mattison , Rob Mattison : Web Data Warehousing and Knowledge Management. (Data Management) McGraw Hill,1999.
5. Technical Notes and Literature on the Oracle Web – site.

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B. V. IV (Computer Engg) –8th semester (New scheme)

2. ECC 822 CO : Advanced Operating Systems

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Cont. Evaluation : 00 Examination : 00

Overview, Synchronization Mechanisms, Process Deadlocks, architecture of Distributed Systems, Theoretical Foundations. Distributed Mutual Exclusion – Distributed Deadlock Detection – Agreement protocols – Distributed File Systems Distributed Shared Memory – Distributed scheduling – Recovery – Fault Tolerance. Resource security and Protection : access and Flow Control.

Data security : Cryptography – Multiprocessor systems architecture – Multiprocessor Operating systems. Introduction to database Operating Systems – Concurrency Control : Theoretical Aspects – Concurrency Control algorithms. Micro-Kernel architecture based Operating Systems.

Operating Systems based on Object Oriented approach and their design.

References:

1. Mukesh Singhal, Niranjana G. Shivaratri (Contributor) : advanced Concepts in Operating Systems : Distributed database, and Multiprocessor Operating Systems, McGraw – Hill series in Computer science,1994.
2. Crawley : Operating systems : An Object oriented Approach, McGraw Hill, 1998.
3. A S Tanenbaum : Modern Operating Systems, Prentice – Hall, 1993.

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3. ECC 823 CO : Decision Support systems

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Cont. Evaluation : 00 Examination : 00

Overview of Management support Systems; Decision Making, systems, Modeling and Support; Overview of decision support systems; Modeling and Model Management; User Interface; types of Decision support Systems viz. Organization DSS, Enterprise Decision support systems, Executive Information and Support system; Constructing Decision Support Systems;. Knowledge-based DSS, knowledge management Techniques for decision support; Artificially Intelligent DSS, Expert Systems, Knowledge Representation; Artificial Neural Networks. Decision support and data & web warehousing.

References:

1. Efraim Turban, Jay E. Aronson : Decision support systems and Intelligent Systems, PHI, 5th Ed 1998.
2. Clyde W. Hosapple, Andrew B. Whinston : Decision Support Systems : A Knowledge – Based Approach, 1996.
3. Andrew P. Sage : Decision Support Systems Engineering , Wiley Series in Systems Engineering, 1991.

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4 ECC 824 CO : Distributed Programming Environment

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Cont. Evaluation : 00 Examination : 00

Introduction to Distributed Computing Distribution of Data and Control: Clock synchronization, distributed termination problem, load distribution, distributed elections, agreement problem. Deadlocks in distributed Systems. Introduction to Fault – tolerant computing.

High level language support for distributed computing: message passing primitives, atomic actions, RPC mechanisms. Implementation of These features. Case study of some distributed languages as well as distributed programming architectures like LINDA and CORBA, COM etc.

References:

1. G F Colouris and J Dollimore: Distributed Systems: Concepts & Design, Addison Wesley, 1988.
2. S Mullender (Ed): Distributed Systems, Addison Wesley, 1989.
3. Research papers from current journals.

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5 ECC 825 CO : Knowledge Based Management Systems

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Cont. Evaluation : 00 Examination : 00

Introduction to Knowledge –Based systems System and expert Systems – Structure of KBS – Knowledge- Centered problem Solving Strategies – Search Methods – Knowledge Representation. Logic and Automated Reasoning – Rule – Based Systems Forward & Backward-Reasoning Systems – Analogical and Case-Based Reasoning – Qualitative Reasoning. Associative networks – Frames, and Objects – Uncertainty management. Advanced Reasoning Techniques.

The Software Lifecycle in Knowledge – based systems. Feasibility Analysis. Requirements Specification and Design. Knowledge Acquisition and system Implementation. Practical Considerations in Knowledge Acquisition – alternative Knowledge Acquisition Means. Project management. Knowledge Based Management systems like The CLIPS Systems and The Personal Consultant shell Systems.

Impact of the web on the Knowledge management.

References:

1. Ram D. Sriram : Intelligent Systems for Engineering : A Knowledge – Based Approach, Spinger Verlag; August 1997)
2. Avelino J. Gonzalez, Douglas D : The Engineering of Knowledge – Based Systems : Theory and Practice Book and 2 Disks, Prentice-Hall, 1994.
3. Sabrina Sestito, Tharam S. Dillon : Automated Knowledge Acquisition, Prentice Hall.
4. International Series in Computer systems science and engineering, 1995.

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6 ECC 826 CO : Systems Analysis & Simulation

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Cont. Evaluation : 00 Examination : 00

Introduction - Systems, Models, and simulation – Random Number Generators – Discrete – event simulation – simulation of single – server Queuing system and simulation of Inventory System – distributed Simulation – Combined Discrete-Continuous simulation and Monte Carlo simulation – Complex systems Modeling – Time shared Computer Model, Job-Shop Model – Simulation software – General purpose and Specially designed software/Language – simulation simulation of manufacturing Systems – standards and Applications.

References:

1. Law A., Kelton W., Simulation Modeling & analysis, McGraw-Hill.
2. Gordon G., System simulation, Prentice Hall India.

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ECC 804 CO : Project

B. V. IV (Computer Engg) –8th semester (New scheme)

	Lecture	Tutorial	Practical
Teaching Hours	0	0	8
Examination Scheme Marks	-	-	Cont. Evaluation : 80 Examination 120
