

JABALPUR ENGINEERING COLLEGE, JABALPUR (MP)
(An Autonomous Institute of Govt. of M.P.)

Affiliated to Rajiv Gandhi Technological University, Bhopal (MP)

Scheme of Study and Examination

(w.e.f. July 2010)

MCA IInd Semester

Course Code	Subject	Periods			EVALUATION SCHEME					Credits
		L	T	P	SESSIONAL EXAM			ESE	SUB TOTAL	
					TA	CT	TOT			
<u>CA-107</u>	Operating System	3	1	-	10	20	30	70	100	4
<u>CA-108</u>	Data Base Management System	3	1	-	10	20	30	70	100	4
<u>CA-109</u>	Data Structure	3	1	-	10	20	30	70	100	4
<u>MA-106</u>	Computer Oriented Numerical And Statistical Techniques	3	1	-	10	20	30	70	100	4
<u>CA-110</u>	Accounting And Financial Management	3	1	-	10	20	30	70	100	4
(PRACTICAL/DRAWING/DESIGN)										
<u>CA-111L</u>	Programming Lab in RDBMS	-	-	4	40	-	40	60	100	4
<u>CA-112L</u>	Data Structure Lab	-	-	3	30	-	30	45	75	3
<u>CA-113L</u>	Computer Oriented Numerical And Statistical Techniques Lab	-	-	3	30	-	30	45	75	3
Total		15	5	10	150	100	250	500	750	30

T.A. Teachers Assessment, CT- Class Test, ESE - End Semester Examination,
Total Marks 750 Total Periods : 30 Total Credits : 30


Dr. SHAILJA SHUKLA
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COURSE CONTENT & GRADE**(w.e.f. July 2010)**

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	OPERATING SYSTEM	CA-107	Min "D"	Min "D"	5.0

OPERATING SYSTEM

UNIT- I : Introduction: Evolution of Operating Systems (History of evolution of OS with the generations of computers), Types of Operating Systems, Multitasking , Timesharing, Multithreading , Multiprogramming and Real Time Operating Systems, Different Views of the Operating Systems, System Programmer's View, User's View, Operating System Concepts and Structure, Layered Operating Systems, Monolithic Systems, Processes: The Process Concept, The Process Control Block, Systems Programmer's View of Processes, Operating System Services for Process Management, Scheduling Algorithms, First Come First Serve, Round Robin, Shortest Run Time Next, Highest Response Ratio Next, Multilevel Feedback Queues, Performance Evaluation of Scheduling Algorithms stated above.

UNIT- II : Memory Management: Memory Management without Swapping or Paging , Concepts of Swapping and Paging, Page Replacement Algorithms: Least Recently Used, Optimal Page Replacement, Most Recently Used, Clock Page Replacement, First in First out (This includes discussion of Belady's Anomaly and the Category of Stack Algorithms), Modeling Paging Algorithms, Design issues for Paging System, Segmentation, Segmented Paging, Paged Segmentation.

UNIT- III : Inter-Process Communication and Synchronization: The need for Inter-Process Synchronization, Concept of Mutual Exclusion, Binary and Counting Semaphores, Hardware Support for Mutual Exclusion, Queuing Implementation of Semaphores, Classical Problems in Concurrent Programming, Dining Philosopher's Problem, Bounded Buffer Problem, Sleeping Barber Problem, Readers and Writers Problem, Critical Section, Critical Region and Conditional Critical Region, Monitors and Messages, Deadlocks: Concepts of Deadlock Detection, Deadlock Prevention, Deadlock Avoidance, Banker's Algorithm.

UNIT-IV : File System: File Systems, Directories, File System Implementation, Security Protection Mechanisms, Principles of I/O Hardware: I/O devices, Device Controllers, Direct Memory Access, Principles of I/O Software: Goals Interrupt Handlers, Device Drivers, and Device Independent I/O Software , User Space I/O Software, Disks: Disk Hardware, Disk Scheduling Algorithms (namely First Come First Serve, Shortest Seek Time First, SCAN, C-SCAN, LOOK and C-LOOK Algorithms), Error Handling, Track-at-a-Time Caching, RAM Disks, Clocks: Clock Hardware, Memory-Mapped Terminals, Input/Output Software.

UNIT-V : Processes and Processors in Distributed Systems: Threads, System Models, Processor Allocation, Scheduling, Distributed File Systems: Design, Implementation and Trends, Performance Measurement, Monitoring and Evaluation Introduction, Important Trends Affecting Performance Issues, Why Performance Monitoring and Evaluation are needed, Performance Measures, Evaluation Techniques, Bottlenecks and Saturation, Feedback Loops, Case Studies: WINDOWS and LINUX/UNIX Operating System.

Text Books And References

1. Deitel, H.M. "An Introduction to Operating Systems" Pearson.
2. Milenkovic, M., "Operating Systems- Concepts and Design" Mc Graw Hill International Ed. Computer Science Series 1992.
3. Galvin P., J.L. Abraham Silberschatz. "Operating System Concepts" John Wiley and Sons Company, 1989.
4. Tanenbaum, A.S. "Modern Operating System" Pearson.
5. William Stallings "Operating Systems", Pearson.
6. Joshi R.C. "Operating System" Wiley India.


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COURSE CONTENT & GRADE

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Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	DATA BASE MANAGEMENT SYSTEM	CA-108	Min "D"	Min "D"	5.0

DATA BASE MANAGEMENT SYSTEM

UNIT-I : Introduction: Advantage of DBMS Approach, Various View of Data, Data Independence, Schema and Sub-Schema, Primary Concepts of Data Models, Database Languages, Database Administrator and Users, Data Dictionary, Overall System Architecture, Network and Hierarchical Models: Basic Idea, Data Structure Diagrams, DBTG Model, Implementations, Tree Structure Diagram, Implementation Techniques, Comparison of the Three Models, Domains, Relations and Keys: Domains, Relations, Kind of Relations, Relational Database, Various Types of Keys, Candidate, Primary, Alternate and Foreign Keys.

UNIT-II : Relational Algebra and SQL: The Structure, Relational Algebra with Extended Operations, Modifications of Database, Idea of Relational Calculus, Basic Structure of SQL, SET Operations, Aggregate Functions, Null Values, Nested Sub Queries, Derived Relations, Views, Modifications of Database, JOIN Relations, DDL in SQL, ER Model: Basic Concepts, Design Issues, Mapping Constraints, Keys, ER Diagram, Weak and Strong Entity Sets, Specialization and Generalization, Aggregation, Inheritance, Design of ER Schema, Reduction of ER Schema to Tables, Database Integrity: General Idea, Integrity Rules, Domain Rules, Attribute Rules, Relation Rules, Database Rules, Assertions, Triggers, Integrity and SQL.

UNIT-III : Functional Dependencies and Normalization: Basic Definitions, Trivial and Non Trivial Dependencies, Closure Set of Dependencies and of Attributes, Irreducible set of Dependencies, Introduction to Normalization, Non Loss Decomposition, FD Diagram, First, Second, Third Normal Forms, Dependency Preservation, BCNF, Multivalued Dependencies and Fourth Normal Form, Join Dependency and Fifth Normal Form.

UNIT-IV : Transaction, Concurrency and Recovery: Basics Concepts, ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions, Basic Idea of Serializability, Basic Idea of Concurrency Control, Basic idea of Deadlock, Failure Classification, Storage Structure Types, Stable Storage Implementation, Data Access, Recovery and Atomicity-Log Based Recovery, Deferred Database Modification, Immediate Database Modification, Checkpoints, RAID.

UNIT-V : Object Oriented And Distributed Databases: Object Oriented Databases-Basic Idea and the Model, Object Structure, Object Class, Inheritance, Multiple Inheritance, Object Identity, Distributed Database, Data Warehousing- Terminology, Definitions, Characteristics, Data Mining and its Overview, Database on WWW, Multimedia Databases-Difference with Conventional DBMS, Issues, Similarity Based Retrieval, Continuous Media Data, Multimedia Data Formats, Video Servers.

Text Books And References

1. A Silberschatz, H.F Korth, Sudersan "Database System Concepts"-MGH Publication.
2. C.J. Date "An Introduction to Database Systems"-6th Ed.
3. Elmasri & Navathe "Fundamentals of Database Systems" Pearson.
4. B.C. Desai "An Introduction to Database Systems" BPB.
5. Raghurama Krishnan "Database Systems" TMH.



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	DATA STRUCTURE	CA-109	Min "D"	Min "D"	5.0

DATA STRUCTURE

UNIT-I : Stack and Queue: Definition, Contiguous Implementation of Stack, Various Operations on Stack, Various Polish Notations-Infix, Postfix, Prefix, Conversion from one to another using Stack, Evaluation of Infix, Postfix and Prefix Expressions, Contiguous Implementation of Queue, Various Operations on Queue, Drawback of Linear Queue, Circular Queue, Various Operations on it, Linked Implementation of Stack and Queue.

UNIT-II : General List: List and its Contiguous Implementation, its Drawback, Singly Linked List- Operations on it, Circular Linked List, Doubly Linked List- Operations on it, Link List using Arrays.

UNIT-III : Trees: Definition, Height, Depth, Order, Level, Degree, Parent and Child Relationship etc., Binary Trees- Complete Binary Tree, Almost Complete Binary Tree, Binary Search Tree, Operations on Binary Search Tree, Tree Traversals- Inorder, Postorder, Preorder Traversals, Their Recursive and Non-Recursive Implementations, Expression Tree Evaluation, Array and Linked Representation of Binary Tree, Threaded Binary Tree, Forests, Conversion of Forest into Tree, Heap Definition.

UNIT-IV : Searching, Hashing and Sorting: Requirements of Search Algorithm, Sequential Search, Binary Search, Indexed Sequential Search, Interpolation Search, Hashing-Basics, Collision, Resolution of Collision, Different Collision Techniques, Internal Sorting- Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort on Linked and Contiguous List, Shell Sort, Heap Sort, Tree Sort.

UNIT-V : Graphs: Related Definitions, Graph Representations- Adjacency Matrix, Adjacency List, Adjacency Multilist, Graph Traversals- Depth First Search, Breadth First Search, Minimum Spanning Tree, Shortest Path Algorithms-Kruskal & Dijkstras Algorithm, Miscellaneous features: Basic Idea of AVL Tree- Definition, Insertion & Deletion Operations, Basic Idea of 2-3 Tree- Definition, Insertion and Deletion Operations, Basics Idea of B-Tree- Definition, Order, Degree, Insertion and Deletion Operations, B+ Tree- Definition, Comparison with B-Tree.

Text Books And References:

1. Kruse R.L. "Data Structures and Program Design in C:"PHI.
2. Aho"Data Structure & Algorithms".
3. Trembly "Introduction to Data Structures with Applications".
4. Horowitz and Sawhaney:"Fundamentals of Data Structure",Galgotia Publishers.
5. Tennenbaum A.M. & others: "Data Structures using C and C++",PHI.
6. Yashwant Kanetkar, "Understanding Pointers in C" BPB.
7. N. Kasiviswanath: "Data Structures using C++".



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			T	P	
	COMPUTER ORIENTED NUMERICAL AND STATISTICAL TECHNIQUES	MA-106	Min "D"	Min "D"	5.0

COMPUTER ORIENTED NUMERICAL AND STATISTICAL TECHNIQUES**UNIT I**

Numerical Approximation, Representation of Integers and Real Numbers in Computer, Fixed and Floating Point Arithmetic, Normalized Floating Point Numbers, Error in Numerical Computation, Iterative method: Solutions of Algebraic and Transcendental Equations using Bisection Method, Iteration Method, Regula-Falsi Method, Newton-Raphson Method, Secant Method, Rate of Convergence of Iterative Methods.

UNIT II

Simultaneous Linear Equations: Solution of System of Simultaneous Linear Equations, Gauss Elimination Partial and Complete Pivoting, Ill conditioned System of Equation, Refinement of Solution, Jacobi's Iterative Method, Gauss Seidal Iterative Method, Rate of Convergence, Interpolation and Finite Differences: Difference Tables, Newton's Forward and Backward Formula, Gauss Forward and Backward Formula, Stirling's, Bessel's Formula, Lagrange's Interpolation, Newton Divided Difference Formula.

UNIT III

Numerical Differentiation and Integration: Numerical Differentiation, Numerical Integration, Trapezoidal rule, Simpson's Rules, Boole's Rule Weddle's Rule, Euler-Maclaurin Formula, Solution of Ordinary Differential Equations: Picard's Method, Taylor's Method, Euler's Method, Runge-Kutta Methods, Predictor-Corrector Method.

UNIT IV

Curve Fitting: Method of Least Squares, Fitting of Straight Lines, Polynomials, Exponential Curves, Regression Analysis: Linear and Non-Linear Regression, Multiple Regression, Distribution: Binomial, Poisson and Normal Distribution.

UNIT-V

Time Series and Forecasting: Moving Averages, Smoothing of Curves, Forecasting Models and Methods, Statistical Quality Control Methods, Testing of Hypothesis: Chi-square Test, t-test, F-Test.

Text Books And References

1. Rajaraman V.; Computer Oriented Numerical Methods, PHI.
2. Numerical Methods by E. Balagurusamy, TMH.
3. Jain Iyengar and Jain; Numerical Methods for Scientific and Engineering Computations, New age Int.
4. Grewal, B.S.; Numerical methods in Engineering and Science; Khanna Publishers, Delhi.
5. Krashn murthy, E.V. & S.K sen; Computer based Numerical Algorithms.
6. Gupta, S.P.; Statistical Methods, Sultan and Sons.


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	ACCOUNTING AND FINANCIAL MANAGEMENT	CA-110	Min "D"	Min "D"	5.0

ACCOUNTING AND FINANCIAL MANAGEMENT

UNIT-I Accounting Frame Work Accounting and its Framework, Accounting Concepts and Standard, Accounting Information and its Applications, Accounting and its Branches, Rules of Double Entry System, Preparation of Journal, Ledger and Trial Balance, Sub-Divisions of Journal.

UNIT-II Understanding of Financial Statements Construction and Analysis of Trading Account, Profit and Loss Account, Balance Sheet with Adjustments Relating to Closing Stock, Fund Flow Statements, and Cash Flow Statements.

UNIT-III Cost Management Cost- Meaning, Definition and Types, Absorption and Marginal Costing, Cost -Volume Profit Analysis, Variance Analysis.

UNIT-IV Financial and Investment Analysis Ratio Analysis, Leverage Analysis, Budgeting and Budgetary Control, Capital Budgeting and its Appraisal.

UNIT-V Financial Decisions Management of Working Capital, Managing Cash Needs, Capital Structure, Dividend Decisions.

Text Books And References

1. Jain and Narang, "Financial Accounting", Kalyani Publications.
2. Chadwick, "The Essence of Financial Accounting", PHI.
3. Chadwick, "The Essence of Management Accounting", PHI.
4. M. L. Agrawal, "Cost Accounting", Sahitya Bhawan, Agra.
5. I.M. Pandey, "Financial Management", Vikas Publishing House, New Delhi.
6. Khan and Jain, "Management Accounting", Tata McGraw Hills Co.


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	PROGRAMMING LAB IN RDBMS	CA-111L	Min "D"	Min "D"	5.0

PROGRAMMING LAB IN RDBMS

The exercises in this component shall be designed to demonstrate the basic principles outlined in different units of the theory paper. After completing the exercises the student should have developed a good grasp of the practical utilities of the theory content.

(Suggested Exercise)

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	DATA STRUCTURE LAB	CA-112L	Min "D"	Min "D"	5.0

DATA STRUCTURE LAB

The exercises in this component shall be designed to demonstrate the basic principles outlined in different units of the theory paper. After completing the exercises the student should have developed a good grasp of the practical utilities of the theory content.

(Suggested Exercise)**Dr. SHAILJA SHUKLA****DEAN****Academics****Jabalpur Engineering College
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Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	COMPUTER ORIENTED NUMERICAL AND STATISTICAL TECHNIQUES LAB	CA-113L	Min "D"	Min "D"	5.0

COMPUTER ORIENTED NUMERICAL AND STATISTICAL TECHNIQUES LAB

The exercises in this component shall be designed to demonstrate the basic principles outlined in different units of the theory paper. After completing the exercises the student should have developed a good grasp of the practical utilities of the theory content.

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