Rajiv Gandhi Proudhyogiki Vishwavidyalaya, Bhopal
Computer Application (MCA- Dual Degree) IV Semester

Subject Code	Subject Name	Periods per week			Credits	Maximum Marks (Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
		L	T	P		End Sem. Marks	Test (Two)	Assign. /Quiz	End Semester Practical/Viva	Practical Record /Assign./Quiz/ Presentation	
MCA DD -401	Operating System	5		-	5	70	20	10	-	-	100

MCADD-401 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 system, 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 namely, 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. Input/output: 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, I/O 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.

BOOKS

1. Deitel, H.M. "An Introduction to Operating Systems". Addison Wesley Publishing Company 1984.
2. Milenkovic, M., "Operating Systems - concepts and Design" McGraw Hill International EditionComputer Science series 1992.
3. Galvin P., J.L. Abraham Silberschatz. "Operating System Concepts". John Wiley & Sons Company, 1989.
4. Tanenbaum, A.S. "Modern Operating System", Prentice Hall of India Pvt. Ltd.1995.
5. William Stallings “Operating Systems” , Prentice Hall of India Pvt. Ltd.
6. Joshi R.C. “Operating System” Wiley India. Note : Paper is to be set unit wise with internal choice

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MCA DD -402	Fundamental of Computer Networks	5		-	5	70	20	10	-	-	100

MCADD-402 Fundamental of Compuet Networks

Unit I

Introductory Concepts: Goals and Applications of Networks, Network structure and architecture, the OSI reference model, network services, networks topology: Bus, Star, Ring, Mesh, Tree, and Hybrid Topology. Delay Analysis, Back Bone Design, Local Access Network Design Physical Layer- transmission media: Guided ,Unguided Twisted pair, Coaxial cable, Optical Fiber, switching methods: circuit ,packet, Message Switching, Integrated services digital networks, terminal handling,

Unit II

Medium access sub layer: Channel allocations, LAN protocols, ALOHA Protocols- Pure ALOHA, slotted ALOHA, Carrier Sense Multiple Access Protocols, CSMA with Collision Detection, Collision free Protocols, , switched and fast Ethernet, token ring, FDDI, IEEE standards, Data Link Layer- basic design issues, error correction & detection algorithms, elementary data link layer protocols, sliding window protocols, error handling, High Level Data Link Control

Unit III

Network Layer: Point-to Point networks, concept of virtual circuit and LAN, Network routing, Routing Tables, Types of routing, Dijkstra's Algorithm, Bellman-Ford Algorithm, Link state routing, Open shortest path first, Flooding, Broadcasting, Multicasting, congestion, Congestion Detection, congestion control algorithms: The Leaky Bucket, The Token Bucket, Choke Packets , internetworking: Repeaters, Bridges, routers, gateways, IP addresses: IPv4, IPv6.

Unit IV

Transport Layer: Design issues, connection management session Layer-Design issues, remote procedure call. Presentation Layer-Design issues, Data compression techniques, cryptography, Internet Transport Protocol (UDP), Ethernet transport Protocol, Transmission Control Protocol (TCP).

Unit V

Application Layer: File Transfer, Access and Management, Electronic mail,Virtual Terminals, Domain Name System, Simple Network Management Protocol, Electronic

mail, File Transfer Protocol, Hyper Text Transfer Protocol, Example Networks - Internet and Public Networks.

Books

1. Computer Networks by A. S Tanenbaum, 4 th , Edition", Pearson education
2. Data and Computer Communication by W. Stallings, Macmillan Press
3. Computer Networks & Internet with Internet Applications by Comer Pearson Education
4. Internetworking with TCP/IP by PHI
5. Data Communication and Networking by Forouzan TMH
6. Computer Networks with Internet Protocols by W Stallings, Pearson Education
7. Local and Metropolitan Area Networks by W Stallings, VIth edition, Pearson Education

Note: Paper is to be set unit wise with internal choice.

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MCA DD -403	System Analysis and Design	5		-	5	70	20	10	-	-	100

MCADD-403 System Analysis and Design

Unit-1

System Concept-System Concept , Elements Of The System, Types Of System. The System Development Life Cycle- Introduction , Consideration For Candidate Systems, Prototyping. The Role Of The System Analyst – Introduction , Multi Faceted Role Of The Analyst, The Analyst/ User Interface, Rising Position In System Development .

Unit-2

System Planning & The Initial Investigation- Introduction , Base For Planning In System Analysis, Initial Investigation.

Information Gathering-Introduction , Information Gathering Tools. The Tools Of Structured Analysis - Introduction , The Tools Of Structured Analysis, Pros & Cons Of Each Tool.

Feasibility Study- Introduction, System Performance Definition, Feasibility Study.

Unit-3

Cost Benefit Analysis - Introduction, Data Analysis, Cost Benefit Analysis, Procedure For Cost Benefit Determination.

System Design –Introduction, The Process Of Design , Design Methodology, Major Development Activities , Audit Considerations

I/P And O/P And Form Design- Introduction, I/P Design , O/P Design, Form Design.

Unit-4

File Organization & Data Base Design- Introduction , File Structure , File Organization , Database Design, Data structure , Normalization And The Role Of Database Administrator.

System Implementation & Software Maintenance- Introduction, Conversion , Post Implementation Review, Software Maintenance.

Unit-5

Hardware/ Software Selection & The Computer Contract-

Introduction , The Computer Industry, A Procedure For Hardware/ Software Selection, Financial Considerations In Selection, The Computer Contracts.
Project Scheduling & Software - Introduction, Project Management
Security , Disaster/ Recovery- Introduction , System Security, Disaster/ Recovery Planning, Ethics In System Development.

Books

1. System Analysis and Design, Awad
2. System Analysis & Design, Shelly Cashman Series, 4th
3. Analysis and Design of Information Systems, Senn, TMH Ed., Thomson Press
4. System Analysis and Design Methods, Whitten, Bentley
5. Systems Analysis and Design, Howryskiewycz, PHI
6. Analysis and Design of Information Systems, Rajaraman,PHI

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MCA DD -404	Accounting and Financial Management	5		-	5	70	20	10	-	-	100

MCADD-404 Accounting and Finacial Management

UNIT-I
Meaning and objects of accounting, accounting concepts and conventions, accounting equations, rules of Journalizing; Cash-book, Ledger posting, preparation of trial balance,

UNIT-II
Trading and profit and loss account and balance sheet with adjustments relating to closing stock , outstanding expenses, prepaid expenses , accrued income depreciation, bad debts, provision for bad debts, provision for discount on debtors and creditors .

UNIT-III
Inventory pricing , FIFO and LIFO methods; Simple problems of funds flow statement, cost volume, profit analysis.

UNIT-IV
Standard costing, computation of material and labour variances, budgetary control, preparation of cash budget and flexible budget.

UNIT-V
Management control and its characteristics, goals and strategies, structure and control. Responsibility centers and control centers: concepts of Responsibility centers, revenue centers, profit centers and investment centers, transfer pricing, Responsibility reporting.

BOOKS

1. Bhattacharya S.K. and Deardan John “Accounting for Management” PHI
2. Chadwick “The essence of financial accounting” PHI
3. Chadwick “The essence of Management accounting” PHI
4. Grewal “Introduction to Book – keeping”
5. Subhash Sharma “Management control systems” TMH

Note : Paper is to be set unit wise with internal choice.

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MCA DD -405	Computer Oriented Optimization Techniques	5		-	5	70	20	10	-	-	100

MCADD-405 Computer Oriented Optimization Techniques

UNIT-I

Introduction of operation research. LP Formulations, Graphical method for solving LP's with 2 variables, Simplex method, Duality theory in linear programming and applications, Integer linear programming, dual simplex method,

UNIT-II

Transportation problem, Assignment problem. Dynamic Programming : Basic Concepts, Bellman's optimality principles, Dynamics programming approach in decision making problems, optimal subdivision problem. Sequencing Models: Sequencing problem, Johnson's Algorithm for processing n jobs through 2 machines, Algorithm for processing n jobs through 3 or more machines, Processing 2 jobs through n machines.

UNIT-III

Project Management : PERT and CPM : Project management origin and use of PERT, origin and use of CPM, Applications of PERT and CPM, Project Network, Diagram representation, Critical path calculation by network analysis and critical path method (CPM), Determination of floats, Construction of time chart and resource labelling, Project cost curve and crashing in project management, Project Evaluation and review Technique (PERT).

UNIT-IV

Queuing Models : Essential features of queuing systems, operating characteristics of queuing system, probability distribution in queuing systems, classification of queuing models, solution of queuing M/M/1 : ∞ /FCFS,M/M/1 : N/FCFS, M/M/S : ∞/FCFS, M/M/S : N/FCFS

UNIT-V

Inventory Models : Introduction to the inventory problem, Deterministic Models, The classical EOQ (Economic Order Quantity) model, Inventory models with deterministe demands(no shortage & shortage allowed), Inventory models with probabilistic demand, multiitem determinise models.

BOOKS

1. Gillet B.E. : Introduction to Operation Research, Computer Oriented Algorithmic approach - Tata McGraw Hill Publising Co. Ltd. New Delhi.
2. P.K. Gupta & D.S. Hira, "Operations Research", S.Chand & Co.
3. J.K. Sharma, "Operations Research: Theory and Applications", Mac Millan.
4. S.D. Sharma, "Operations Research", Kedar Nath Ram Nath, Meerut (UP).
5. S.S. Rao "Optimization Theory and Application", Wesley Eastern.
6. Tata Hamdy, A "Operations Research - An Introduction", Fifth Edition, Prentice Hall of India Pvt. Ltd., New Delhi.
7. Taha H.A. "Operations Research an Introduction" McMillan Publication.

Note : Paper is to be set unit wise with internal choice & emphasis is to be given on computerized implementation