

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)

B.E. Third Year

Branch : INFORMATION TECHNOLOGY

Sem : Fifth

Course Code	Subject	Periods			EVALUATION SCHEME					Credits
		L	T	P	SESSIONAL EXAM			ESE	SUB TOTAL	
					TA	CT	TOTAL			
IT-08	Computer Networks	3	1	-	10	20	30	70	100	4
IT-10	Information Theory & Coding	3	1	-	10	20	30	70	100	4
CS-13	Software Engineering	3	1	-	10	20	30	70	100	4
CS-17	Operating System	3	1	-	10	20	30	70	100	4
IT-11	I.T. Enabled Services, Ethics & Management	3	1	-	10	20	30	70	100	4
(PRACTICAL/DRAWING/DESIGN)										
IT-09L	Computer Networks Lab	-	-	2	20	-	20	30	50	2
CS-12L	Dot Net Lab	-	-	2	20	-	20	30	50	2
CS-14L	Software Engineering Lab	-	-	2	20	-	20	30	50	2
CS-18L	Operating System Lab	-	-	2	20	-	20	30	50	2
IT-12L	Industrial Training – I	-	-	2	50	-	50	-	50	2
IT-42L	Seminar/Group Discussion	-	-	2	50	-	50	-	50	2
	Total	15	5	12	230	100	330	470	800	32

T.A. Teachers Assessment, CT- Class Test, ESE - End Semester Examination, Total Marks 800 Total Periods : 32, Total Credits : 32

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	COMPUTER NETWORKS	IT-08	Min “D”	Min “D”	5.0

COMPUTER NETWORKS

Unit I Importance of computer networks, broadcast and point to point networks, Local area networks and Wide area networks , Introduction to ISO-OSI reference model, TCP/IP reference model , function of each layer, interfaces and services, Protocol data unit, connection oriented and connectionless services, service primitives, comparison of TCP/IP and ISO-OSI reference model, Novel Network, Arpanet ,X.25

Unit II Data-Link layer: - Data link layer design issues, framing , flow & error control , physical addressing, Stop & Wait protocol ,Go back N ARQ ,selective repeat ARQ, piggybacking and pipelining ,HDLC LAN Protocol stack-Logical link control and Media Access Control sub layer, IEEE 802.2 LLC Frame format Data link layer in the internet, Serial line IP and Pont to point protocol

Unit III MAC layer Protocols- , static and dynamic allocation , Pure and slotted ALOH A protocols, Carrier sense multiple access, Persistent and non persistent CSMA, IEEE standard 802.3 and Ethernet,802.3cabling, IEEE 802.4, IEEE 802.5, FDDI Wireless LAN , Comparison of wired and wireless LAN, WIMAX

Unit IV The Network layer- logical addressing, class full & classless addressing , address mapping ,packet delivery & forwarding. unicast routing protocols , multicast routing protocols, Routing algorithm- Least Cost, Dijkstra's, Bellman-ford, congestion control algorithms, Internetworking devices, Introduction to Internet protocol IPv4

Unit V Transport layer-Transport services , Process to process delivery, UDP ,TCP ,congestion control , quality of service , Integrated services, Differentiated services LAN-WAN Design and implementation-Configuring TCP/IP, using IP configure, ping command , study of structured LAN , study of internetworking devices and their configuration– switches, hubs, Bridges, routers and Gateways

References:-

1. “Local area networks ”, Forouzan, TMH, 1st edition
2. “Computer Networks” - Tanenblum ,PHI Learning.
3. “Computer Networks” ,N Olifer and V Olifer ,Wiley publication
- 4.“Computer Communications & Networking Technologies”-Michael A. Gallo & William M. Hancock - Cengage pearson publications.
- 5.”Computer Networks: Protocols, Standards and Interfaces”- By Black, PHI learning pub.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	SOFTWARE ENGINEERING	CS-13	Min “D”	Min “D”	5.0

SOFTWARE ENGINEERING

Unit I: The Software Product and Software Process:

Software Product and Process Characteristics, Software Process Models: Linear

Sequential Model, Prototyping Model, RAD Model, Evolutionary Process Models like Incremental Model, Spiral Model, Component Assembly Model, RUP and Agile processes. Software Process customization and improvement, CMM, Product and Process Metrics

Unit II: Requirement Elicitation, Analysis, and Specification

Functional and Non-functional requirements, Requirement Sources and Elicitation Techniques, Analysis Modeling for Function-oriented and Object-oriented software development, Use case Modeling, System and Software Requirement Specifications, Requirement Validation, Traceability

Unit III: Software Design

The Software Design Process, Design Concepts and Principles, Software Domain Modeling and UML, Architectural Design, Architectural Views and Styles, User Interface Design, Object-Oriented Design, Subsystem design, Object design, Function-oriented Design, Dataflow diagrams, Context diagram, SA/SD design method.

Unit IV: Software Analysis and Testing

Software Static and Dynamic analysis, Code inspections, Software Testing

Fundamentals, Software Test Process, Testing Levels, Test Criteria, Test Case Design, Test Oracles, Test Techniques, Black-Box Testing, White-Box Unit Testing and Unit Testing Frameworks, Integration Testing, System Testing and other Specialized Testing, Test Metrics, Testing Tools.

Unit V: Software Maintenance & Software Project Measurement

Need and Types of Maintenance, Software Configuration Management (SCM), Software Change Management, Version Control, Change control and Reporting, Program Comprehension Techniques, Re-engineering, Reverse Engineering, Tool Support. Project Management Concepts, Feasibility Analysis, Project and Process Planning, Resources Allocations, Software efforts, Schedule, and Cost estimations, Project Scheduling and Tracking, Risk Assessment and Mitigation, Software Quality Assurance (SQA). Project Plan, Project Metrics.

Practical and Lab work

Lab work should include a running case study problem for which different deliverables at the end of each phase of a software development life cycle are to be developed. This will include modeling the requirements, architecture and detailed design. Subsequently the design models will be coded and tested. For modeling, tools like Rational Rose products. For coding and testing, IDE like Eclipse, Net Beans, and Visual Studio can be used.

Text Book:

Pankaj Jalote, "An Integrated Approach to Software Engineering", 3rd Edition, Narosa Pub, 2005.

.Reference Books:

1. R S. Pressman, "Software Engineering: A Practitioner's Approach", Sixth edition 2006, McGraw-Hill.
2. Rajib Mall, "Fundamentals of Software Engineering" Second Edition, PHI Learning.
3. Sommerville, "Software Engineering", Pearson Education.
4. Richard H. Thayer, "Software Engineering & Project Managements", Willey India
5. Waman S. Jawadekar, "Software Engineering", TMH.
6. Schwalbe, "IT Project Managements", Cengage Learning.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	INFORMATION THEORY & CODING	IT-10	Min "D"	Min "D"	5.0

INFORMATION THEORY & CODING

Unit II

Introductory Concepts Information Theory: Entropy and Uncertainty; Information Content;

Information rate, classification of codes, Kraft McMillan inequality, Source coding theorem, Shannon-Fano coding, Huffman coding, Extended Huffman coding Joint and conditional entropies, Mutual information -Discrete memoryless channels – BSC, BEC – Channel capacity, Shannon limit.

Unit II

Compression Algorithms Optimal Compression; Compression Algorithms; Huffman Coding; Adaptive Huffman Compression; Statistical Modelling; Dictionary Based Compression; Sliding Window Compression; Speech Compression; LZW, RLE; Lossy Compression schemes; Image Compression using DCT.

Unit III

Error Control Coding Coding for reliable digital transmission and storage; Types of codes; Error Checking codes; Error Correcting Codes; Coding Schemes; Linear Block Codes; Cyclic Codes; Error Trapping; Decoding for cyclic codes; Convolution codes. Run length encoding, CCITT group 3-1D compression, CCITT group 3 2D compression, CCITT group 4 2D compression.

Unit IV

Video Image Compression: Requirement of full motion video compression. CITT H 261 Video coding algorithm, MPEG compression methodology. MPEG-2 compression, Audio (speech) compression.

Unit V

Cryptography: Encryption, Decryption, Cryptogram (hypertext). Concept of cipher, Crypto analysis. **Keys:** Single key (secret key) cryptography, two-key (public-key) cryptography. Single key cryptography **Ciphers:** Block cipher codes, Stream ciphers, Requirement for secrecy, The Data Encryption Standard Public Key Cryptography: Diffie-Hellman public key distribution, The Rivest-ShamirAdelman (R-S-A) system for public key cryptography. Digital signature.

Reference Books:

1. Error correcting codes by W.W Peterson and E.J. Welton, The Mit Press (1978) ISBN 0262160390
2. Multimedia System Design by P.K. Andleigh & Kiran Thapar, Prentice Hall PTR Upper Saddle River, NJC (1996)
3. Bruce Schneier, Applied Cryptography: Protocol Algorithms & Source Code in C, John Wiley & sons, NY, 1994
4. Network Security by Stalling, PHI
5. Communication Systems, 3/e by Simon Haykin, John Wiley & sons (1995)

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

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	OPERATING SYSTEM	CS-17	Min “D”	Min “D”	5.0

OPERATING SYSTEM

Unit I Introduction to Operating System: Evolution of Operating System Types of Operating system Batch Processing, Real Time, Multitasking & Multiprogramming, time-sharing system. Operating system services, Operating system structure, System Call & System Boots, Operating system design & Implementations, System protection, Buffering & Spooling.

Unit II Process Management: Basic concepts of CPU scheduling, Scheduling criteria, Scheduling algorithms, algorithm evaluation, multiple processor scheduling. Process concept, operations on processes, threads, inter process communication, precedence graphs, critical section problem, semaphores, classical problems of synchronization. Deadlock problem, deadlock characterization, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Methods for deadlock handling.

Unit III Memory Management: Concepts of memory management, logical and physical address space, swapping, Fixed and Dynamic Partitions, Best-Fit, First-Fit and Worst Fit Allocation. Virtual Memory Management- paging, segmentation, and paging combined with segmentation. Cache Memory Organization, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation.

Unit IV File Management: File systems: What is a file, user view of files, file types and file operations, file types in Unix and Microsoft, file operation commands, file access rights, file storage management, Inode or FAT structure, file control blocks, root file system, directory and file paths, blocks, impact of block size selection, contiguous allocation, chained and indexed allocations, Impact of allocation policy on fragmentation, mapping file blocks on the disk platter, cylinder, disk access control and scheduling

Unit V Input Output management & Security: Issues in human centric, device centric and computer centric IO management, input output modes, programmed IO, polling, interrupt mode of IO, various types of interrupts, interrupt servicing, priority interrupts, interrupt vectors, direct memory access (DMA) mode of transfer, setting up DMAs, device drivers, interrupt handling using device drivers, buffer management, device scheduling, disk scheduling algorithms and policies. Role of Operating System in Security, Security Breaches, System Protection, and Password Management

Text Book:

1. Tanenbaum “ Modern Operating System” PHI Learning.

Reference Books:

1. M. Flynn “ Operating Systems”. Cengage Learning.
2. Silberschatz ,”Operating system”, Willey Pub
3. Dhamdhare, ”System Programming and Operating System”,TMH.
4. Stuart,”Operating System Principles, Design & Applications”, Cengage Learning
5. Operating System : Principle and Design by Pabitra Pal Choudhury, PHI Learning

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	I.T. ENABLED SERVICES, ETHICS & MANAGEMENT	IT-11	Min "D"	Min "D"	5.0

I.T. ENABLED SERVICES, ETHICS & MANAGEMENT

Unit I: Business Strategy: Challenges and Opportunities for IT

Business Strategy: Challenges and Opportunities in the Globalized, Interconnected, Convergent World, Establish Principles before Practice, IT Strategy, Application Strategy, Technology Strategy for IT, IT Management Strategy, Developing IT Strategy for Competitive Advantage, Stages of IT Strategy Development and Implementation, Challenges of IT and Business Strategy Alignment, Inhibitors of Business and IT Strategy Alignment, Three-D Framework for Business and IT Strategy Alignment

Unit II : Strategic IT Planning

Business Implications for IT Strategic and Planning, Strategic IT Planning Motivations, SITP Process: Prevalent Planning Approaches, Difficulties in Developing and Executing SITP, Best Practices for Achieving Good SITP, SITP Approaches: Prevalent Researches, Defining EITA, Contents of a Typical Enterprise IT Architecture, Standard for Enterprise IT Architecture, Technology Management strategy Framework, Prevalent Technology Reference Architectures Framework and Standards, Program Management, Benefits of PMO, Desired Qualities of a Program Office Manager, Maturity of PMO, Implementation of PMO Strategy, Measuring PMO Performance, Success Factors for PMO, Project t Scope Management, PMO Dashboard and Reporting

Unit III : IT Service Management Strategy

Information Technology Infrastructure Library (ITIL), ITIL Overview, ITIL Service Support Processes, Incident Management, Problem Management, Service Delivery, Service Level Management, Financial Management, Capacity Management, IT Service Continuity Management (ITSCM), Availability Management, Imperatives for Outsourcing, IT Management Layers, Variants of Outsourcing, Business Process Outsourcing, In sourcing

Unit IV : Copyright and IPR

Understanding the concepts of Copyright, Intellectual Property Law, Patents, Indian Standards Institution and its role Indian copyright law of 1957 and its most important amendment from a software review point, Understanding Intellectual property, Caution with Internet, Email Etiquette, Spamming. Broadcasting.

Unit V : IT ethics

Theoretical basis of Computer Ethics, defining Computer Ethics, computer professional's behavior, and social conduct, ease of misuse, do and don'ts with proprietary data, Understanding computer crime, Social Networking, Understanding Software Compliance, Software Piracy, Understanding Professional responsibilities

References:-

1. IT strategy and Management by Sanjiva Shankar Dubey, PHI
2. Marketing of Information Technology, by K.Venkatesh, TMH

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
CS	SOFTWARE ENGINEERING LAB	CS-14L	Min "D"	Min "D"	5.0

SOFTWARE ENGINEERING LAB

Lab work should include a running case study problem for which different deliverables at the end of each phase of a software development life cycle are to be developed. This will include modeling the requirements, architecture and detailed design. Subsequently the design models will be coded and tested. For modeling, tools like Rational Rose products. For coding and testing, IDE like Eclipse, Net Beans, and Visual Studio can be used.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
CS	OPERATING SYSTEM LAB	CS-18L	Min "D"	Min "D"	5.0

OPERATING SYSTEM LAB

Suggested List of Experiment:-

1. Program to implement FCFS CPU scheduling algorithm.
2. Program to implement SJF CPU scheduling algorithm.
3. Program to implement Priority CPU Scheduling algorithm.
4. Program to implement Round Robin CPU scheduling algorithm.
5. Program to implement classical inter process communication problem(producer consumer).
6. Program to implement classical inter process communication problem(Reader Writers).
7. Program to implement classical inter process communication problem(Dining Philosophers).
8. Program to implement FIFO page replacement algorithm.
9. Program to implement LRU page replacement algorithm
10. Program to implement LFU page replacement.
11. Program to implement Optimal page replacement.

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

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
CS	DOTNET LAB	CS- 12L	Min “D”	Min “D”	5.0

DOTNET LAB

1. Overview of Web-Server, Web-Browser, Websites, Webpages, Html, DHTML
2. Net framework
3. Visual Studio IDE
4. Standard Controls
5. Data Control
6. ADO NET
7. Database Connectivity : Access/SqlServer/Oracle
8. Validation Controls
9. Navigation Controls
10. Login Controls
11. Crystal Report Controls
12. ASP.NET State Management
 - (a) Session Object
 - (b) Application Object
13. Working with Master Page
14. Working with CSS
15. AJAX Extensions
 - (a) Update Panel
 - (b) Update Progress
 - (c) Timer

(Suggested Exercise)

1. Working with call backs and delegates in C#
2. Code access security with C#.
3. Creating a COM+ component with C#.
4. Creating a Windows Service with C#
5. Interacting with a Windows Service with C#
6. Using Reflection in C#
7. Sending Mail and SMTP Mail and C#
8. Perform String Manipulation with the String Builder and String Classes and C#:
9. Using the System .Net Web Client to Retrieve or Upload Data with C#
10. Reading and Writing XML Documents with the XML Text-Reader/-Writer Class and C#
11. Working with Page and form s using ASP .Net
12. Data Sources access through ADO.Net,
13. Working with Data readers , Transactions
14. Creating Web Application

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
CS	COMPUTER NETWORKS LAB	IT-09L	Min "D"	Min "D"	5.0

COMPUTER NETWORKS LAB

Suggested List of Experiment:-

1. Establishment and configuration of LAN
2. Color coding standard of CAT 5,6,7 and crimping of cable in RJ-45
3. Study of WAN
4. Case study of STOP AND WAIT Protocols
5. Study of sliding window protocol
6. study of IEEE 802.3 , 802.4 ,802.5
7. Study of FDDI
8. Study of basic networking commands like ping, ipconfig, etc
9. Case study of various Routing Strategies
10. Case studies of various Network Topologies
11. Establishing & studying the various parameters of a home LAN Network
12. Study of IOS of routers
13. Configuring routers, bridges and switches and gateways

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	INDUSTRIAL TRAINING - I	IT- 12L	Min "D"	Min "D"	5.0

INDUSTRIAL TRAINING - I

The student shall go to an Industry at the end of Fourth Semester during summer and shall prepare a report on the Practical Training undergone there. He has to present the report in Fifth semester and assessment will be done by committee of two members (Headed by H.O.D. of the Department).

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	SEMINAR/GROUP DISCUSSION	IT-42L	Min "D"	Min "D"	5.0

Objectives of Group Discussion & Seminar is to improve the Mass Communication and Convincing/ understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves.

Evaluation will be done by assigned faculty based on group discussion and power point presentation.