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 : COMPUTER SCIENCE & ENGINEERING**   **Sem : Fifth**

Course Code	Subject	L	T	P	TA	CT	TOTAL	ESE	SUB TOTAL	Credits
			Periods		SESSIONAL EXAM			EVALUATION SCHEME		
IT-08	Computer Networks	3	1	-	10	20	30	70	100	4
CS-13	Software Engineering	3	1	-	10	20	30	70	100	4
CS-15	Principle of Programming Languages	3	1	-	10	20	30	70	100	4
CS-17	Operating System	3	1	-	10	20	30	70	100	4
EC-29	Microprocessor & Microcontroller	3	1	-	10	20	30	70	100	4
(PRACTICAL/DRAWING/DESIGN)										
CS-14L	Software Engineering Lab	-	-	2	20	-	20	30	50	2
CS-18L	Operating System Lab	-	-	2	20	-	20	30	50	2
EC-30L	Microprocessor & Microcontroller Lab	-	-	2	20	-	20	30	50	2
IT-09L	Computer Networks Lab	-	-	2	20	-	20	30	50	2
CS-19L	Industrial Training – I	-	-	2	50	-	50	-	50	2
CS-47L	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 Netware, 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 an d their configuration– switches, hubs, Bridges, routers and Gateways

References:-
1. "Local area networks ", Forouzan, TMH, 1st edition
2. "Computer Networks" - Tanenblaum ,PHI Learning.
3. "Computer Networks" ,N Olifer and V Olifer ,Wiley publication
4. "Computer Communications & Networking Technologies"-Michael A. Gallo & William M. Hancock - Cengage pearsen 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 Enginerring",Pearson Education.
4. Richard H.Thayer,"Software Enginerring & Project Managements",Willey India
5. Waman S.Jawadekar,"Software Enginerring", 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	PRINCIPLE OF PROGRAMMING LANGUAGES	CS-15	Min "D"	Min "D"	5.0

PRINCIPLE OF PROGRAMMING LANGUAGES

UNIT-I

Language Evaluation Criteria, influences on Language design, Language categories, Programming Paradigms – Imperative, Object Oriented, functional Programming , Logic Programming. Programming Language Implementation – Compilation and Virtual Machines, programming environments. Issues in Language Translation: Syntax, Semantics, Stages, analysis and synthesis, Parse Tree, CFG and BNF grammar.

UNIT-II

Data types: Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names ,Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization. Sequence control with Expressions, Conditional Statements, Loops, Exception handling.

UNIT-III

Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic subprograms, design issues for functions overloaded operators, co routines.

UNIT-IV

Abstract Data types: Abstractions and encapsulation, introductions to data abstraction, Static and Stack-Based Storage management. heap based storage management. Garbage Collection. object oriented programming in small talk, C++, Java, C#, PHP, Perl. Concurrency: Subprogram level concurrency, semaphores, monitors, massage passing, Java threads, C# threads.

UNIT – V

Exception handling, Exceptions, exception Propagation, Exception handler in C++ and Java. Logic Programming Language : Introduction and overview of logic programming, basic elements of prolog, application of logic programming. Functional Programming Languages: Introduction, fundamentals. Introduction to 4GL.

Text Book:

1. Sebesta,"Concept of programming Language", Pearson Edu.

Reference Books:

1. Louden, "Programming Languages: Principles & Practices" , Cengage Learning
2. Tucker, " Programming Languages: Principles and paradigms ", Tata McGraw –Hill
3. Terrance W Pratt, "Programming Languages: Design and Implementation" Pearson Edu.
4 Cavlo Ghezzi & Mehdi Jazayeri " Programming Languages Concepts", Willey India
5 E Horowitz, "Programming Languages", 2nd Edition, Addison Wesley

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 Lea rning.

Reference Books:
1. M. Flynn " Operating Systems". Cengage Learning.
2. Silberschatz ,"Operating system", Willey Pub
3. Dhamdhere, "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	MICROPROCESSOR & **MICROCONTROLLER**	EC-29	Min "D"	Min "D"	5.0

ADVANCED MICROPROCESSOR & INTERFACING

Unit I

Salient features of advanced microprocessors. RISC & CISC processors. Review of evolution of advanced microprocessors : 8086 8088 186 / 286 / 386 / 486 / Pentium. Super scalar architecture of Pentium. Architecture of Intel 8086 and assembly language programming with Intel 8086 microprocessors.

Unit II

Introduction to the various interfacing chips like 8255 and interfacing keyboards, printers, LEDS, motors, ADC, DAC, and stepper motors.

Unit III

General purpose programmable peripheral devices (8253) 8254 programmable interval timer, 8259A Programmable interrupt controller & 8257 DMA controller.

Unit IV

Memory Design and Interfacing. Serial I/0: RS 232C standards, USART chip 8251

Unit V

Introduction to micro controller 8051, Its architecture, pin description, I/o configuration, interrupts, addressing modes, an overview of 8051 instruction set.

Books

1. B.B. Brey (PHI), "The Intel Microprocessors, Architecture, Programming and Interfacing".
2. A Triebel & Avtar Singh (PHI), "The 8088 & 8086 Microprocessor".
3. D. Hall (Mc-Graw Hill), "Advanced Microprocessor and Interfacing".

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 LAB	CS- 14L	Min "D"	Min "D"	5.0

SOFTWARE ENGINEERING LAB

Suggested Guidelines :

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**	
BE	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**	
BE	MICROPROCESSOR & **MICROCONTROLLER** LAB	EC-30L	Min "D"	Min "D"	5.0

MICROPROCESSOR & **MICROCONTROLLER** LAB

List of Experiments (Expandable):

1. BYTE MULTIPLICATION.
2. WORD MULTIPLICATION
3. PACKED BCD FROM ASCII
4. BCD MULTIPLICATION
5. BCD DIVISION
6. BCD SUBTRACTION
7. SIGNED BYTE TO WORD
8. SCAN STRING FOR CHARACTER
9. IF THEN ELSE IMPLIMENTATION
10. BCD TO HEX (REGISTER PARAMETER).

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 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 va rious 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	CS-19L	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**	CS-47L	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.