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. Fourth Year Branch: Computer Science & Engg. SEM: Seventh

Course Code	Subject	Periods			EVALUATION SCHEME					Credits
		L	T	P	SESSIONAL EXAM			ESE	SUB TOTAL	
					TA	CT	TOTAL			
IT-17	Internet & Web Technology	3	1	-	10	20	30	70	100	4
CS-29	Compiler Design	3	1	-	10	20	30	70	100	4
CS-31	Advanced Computing Paradigm	3	1	-	10	20	30	70	100	4
CS-33	Data Warehousing & Mining	3	1	-	10	20	30	70	100	4
Refer Table	Elective – I	3	1	-	10	20	30	70	100	4
(PRACTICAL/DRAWING/DESIGN)										
IT-18L	Internet & Web Technology Lab	-	-	2	20	-	20	30	50	2
CS-30L	Compiler Design Lab	-	-	2	20	-	20	30	50	2
CS-32L	Advanced Computing Paradigm Lab	-	-	2	20	-	20	30	50	2
CS-35L	Major Project Planning	-	-	4	40	-	40	60	100	4
CS-36L	Industrial Training –II*	-	-	2	50	-	50	-	50	2
		15	5	12	200	100	300	500	800	32

*Students will go for Industrial Training after VI semester in the summer vacations and will be assessed in VII semester.

T.A. = Teachers Assessment, CT= Class Test, ESE= End Semester Examination

Total Marks= 800, Total Periods= 32, Total Credits= 32

Elective-I					
CS-034A	1. Advanced Computer Architecture	CS-034B	2. Mobile Computing	CS-034C	3. Real Time System

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	**INTERNET AND WEB TECHNOLOGY**	IT-17	Min "D"	Min "D"	5.0

INTERNET AND WEB TECHNOLOGY

Unit-I : An Introduction to Web Engineering, History of web Development, Time line, Motivation, Categories of Web Applications, Characteristics of Web Applications. Evolution and Need for Web Engineering, Web Engineering Models, Software Engineering v/s Web Engineering. Introduction to Browser and search engines, Search fundamentals, Search strategies, Directories search engines and Meta search engines, Working of the search engines, Miscellaneous Web Browser details.

Unit-II : Introduction to Web Servers: Features of web servers, caching, case study-IIS, Apache, Configuring web servers.

Unit-III : Technologies for Web Applications: HTML and DHTML, HTML Basic Concepts, Static and dynamic HTML, Structure of HTML documents, HTML Elements, Linking in HTML, Anchor Attributes, Image Maps, Meta Information, Image Preliminaries, Layouts, Backgrounds, Colors and Text, Fonts, Tables, Frames and layers.Database integration, CSS, Positioning with Style sheets. Introduction to JAVA SCRIPT, Cookies Creating and Reading Cookies Technologies for Web Applications: Introduction of XML, Validation of XML documents, DTD, Ways to use XML, XML for data files, HTML Vs XML, Embedding XML into HTML documents, Converting XML to HTML for Display, Displaying XML using CSS and XSL, Rewriting HTML as XML.

Unit-IV : Creating Cohesive Websites: Conceptual Overview of website Development, Website Design issues, Conceptual Design, High-Level Design, Indexing the Right Stuff, Grouping Content. Architectural Page Mockups, Design Sketches, Navigation Systems. Searching Systems Good & bad web design, Process of Web Publishing. Phases of Web Site development, enhancing your web-site, submission of website to search engines. Web security issues, security audit of websites, Web effort estimation, Productivity, Measurement, Quality usability and reliability.

UNIT-V : Requirements Engineering for Web Applications: Introduction, Fundamentals, Requirement Source, Type, Notations Tools. Principles Requirements Engineering Activities, Adapting RE Methods to Web Application. Introduction to http and https, http vs. https, Dynamic Web Content, Introduction of ASP.Net, PHP, Database connectivity (MySQL/Oracle)

TERM WORK

1. At least ten practical experiments based on above syllabus and a mini project is desirable to be completed by a group of three that cover following tools.
2. HTML DHTML XML Java Script

Recommended Books :

1. Roger S.Pressman, David Lowe, "Web Engineering", Tata Mcgraw Hill Publication, 2007
2. Achyut S Godbole and Atul Kahate, "Web Technologies", Tata McGraw Hill
3. Gopalan N P, Akilandeswari "Web Technology: A Developer s Perspective" , PHI
4. NEIL GRAY "Web server Programming" WIley
5. CHRIS BATES Web Programming: Building Internet applications Wiley
6. Moller, "An Introduction to XML and Web Technologies" , Pearson Education New Delhi, 2009
7. Beginning XML 4th Edition Hnter, Refter, Fawset Wiley India
8. Internet & World Wide Web How to Program, Pearson education, 3rd edition, by: H.M. Deitel, P.J. Deitel, A.B. Goldberg.
9. C. Xavier, "Web Technology & Design ", Tata McGraw Hill. 10 Ivan Bay Ross, "HTML, DHTML, Java script, Perl CGI", BPB

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	**COMPILER DESIGN**	CS-29	Min "D"	Min "D"	5.0

COMPILER DESIGN

UNIT-I :
Introduction: Compilers and Translators; The phases of the compiler – Lexical Analysis, Syntax Analysis, Intermediate Code Generation, Optimization, Code generation, Bookkeeping, Error handling.

UNIT-II :
Lexical Analysis: The role of the lexical analyzer, Tokens, Patterns, Lexemes, Input buffering, Specifications of a token, Recognition of a tokens, Finite automata: Regular expressions, NFA, DFA.Design of a lexical analyzer generator.

UNIT-III :
Syntax Analysis: The role of a parser, Context free grammars, Writing a grammar, Top down Parsing: Recursive decent parser, Predictive parser, Bottom up Parsing: Handles, Viable prefixes, Operator precedence parsing, LR parsers: SLR, LALR, CLR. Parser generator (YACC).Error Recovery techniques for different parsers.
Syntax directed translation: Syntax directed definitions, Synthesized and inherited attributes, Construction of syntax trees.

UNIT-IV :
Run time environments: Source language issues (Activation trees, Control stack, scope of declaration, Binding of names), Storage organization (Subdivision of run-time memory, Activation records), Storage allocation strategies, Symbol tables: storage, data structures used.

UNIT-V :
Intermediate code generation: Intermediate languages, Graphical representation, Three-address code, Implementation of three address statements (Quadruples, Triples, Indirect triples).
Code optimization and code generation: Introduction, Basic blocks & flow graphs, DAG, principle sources of optimization: loop optimization, eliminating induction variable, eliminating common sub-expression, loop unrolling, loop jamming etc. Peephole optimization, Issues in the design of code generator, a simple code generator, Register allocation & assignment.

Text Book:
1. Aho, Ullman : Principles of Compiler Design. Narosa Publication.

References:
1. Dhamdhere : Compiler Construction- Principles and Practice Macmillan, India 198
2. Holub : Compiler Design in C, PHI.

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	**ADVANCED COMPUTING PARADIGMS**	CS-31	Min "D"	Min "D"	5.0

ADVANCED COMPUTING PARADIGMS

Unit-I Grid and Cluster Computing

Introduction to Grid Computing , Types of grids ,Grid Activities , e governance , Grid Applications , Grid Computing Organizations and their roles , Grid Architecture ,Grid computing Applications.
Cluster Computing-Definition and Architecture of a cluster ,Cluster Programming Environment and Tools .

Unit-II Quantum Computing

History of molecular electronics , Molecular scale electronic , Quantum mechanic ,Quantum Gates and Circuits , Implementation of Quantum Computer , Quantum Algorithms .

Unit-III Nano Computing

Introduction to Nano Computing, Nano Computing Technology, Nano Information Processing, Physics of Nano Computing, Introduction to Molecular & Optical Computing.

Unit-IV Mobile and Pervasive Computing

Mobile computing , Adaptability , Mobility Management ,Context –Aware Computing and its applications , Introduction to Ad Hoc and Sensor Networks , Approaches to Security .

Unit-V Cloud Computing

Overview of Cloud Computing, Cloud Components , Applications ,Hardware and Infrastructure , Accessing the cloud , Cloud Storage ,Future of Cloud Computing .

BOOK REFERENCES :

1.Janakiram , Grid Computing ,TMH Pub 2.Prabhu ,
2.Grid and Cluster Computing PHI Pub
3 Vishal Sahani & Goswami, Nano Computing, TMH Pub
4.Bhunia , Introduction to Quantum Computing , New Age Int. Pub
5.Adelstein & Gupta , Fundamentals of Mobile and Pervasive Computing , TMH Pub 6.Velte , Cloud Computing , McGraw Hill 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	**DATA WAREHOUSING &MINING**	CS-33	Min "D"	-	5.0

DATA WAREHOUSING AND DATA MINING

UNIT I DATA WAREHOUSING

Data warehousing Components –Building a Data warehouse –- Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata.

UNIT II BUSINESS ANALYSIS

Reporting and Query tools and Applications – Tool Categories – The Need for Applications – Cognos Impromptu – Online Analytical Processing (OLAP) – Need – Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multirelational OLAP – Categories of Tools – OLAP Tools and the Internet.

UNIT III DATA MINING

Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues –Data Preprocessing.

UNIT IV ASSOCIATION RULE MINING AND CLASSIFICATION

Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining Various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Backpropagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods - Prediction

UNIT V CLUSTERING AND APPLICATIONS AND TRENDS IN DATA MINING

Cluster Analysis - Types of Data – Categorization of Major Clustering Methods – Kmeans – Partitioning Methods – Hierarchical Methods - Density-Based Methods –Grid Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data - Constraint – Based Cluster Analysis – Outlier Analysis – Data Mining Applications.

TEXT BOOKS:

1. Alex Berson and Stephen J. Smith, " Data Warehousing, Data Mining & OLAP", Tata McGraw – Hill Edition, Tenth Reprint 2007.
2. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Second Edition, Elsevier, 2007.

REFERENCES:

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, " Introduction To Data Mining", Person Education, 2007.
2. K.P. Soman, Shyam Diwakar and V. Ajay ", Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, " Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.
4. Daniel T.Larose, "Data Mining Methods and Models", Wile-Interscience, 2006.

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	**ADVANCE COMPUTER ARCHITECTURE**	CS-034A	Min "D"	-	5.0

ADVANCE COMPUTER ARCHITECTURE

Unit-I

Flynn's Classification, System Attributes to Performance, Parallel computer models Multiprocessors and multicomputers, Multivector and SIMD Computers. Data and resource dependences,Hardware and software parallelism,Program partitioning and scheduling, Grain size and latency, Control flow, data flow and Demand driven mechanisms. Static interconnection networks,Dynamic interconnection Networks: Bus Systems, Crossbar Switch, Multiport Memory,Multistage and Combining Networks.

Unit- II

Instruction set architecture, CISC Scalar Processors , RISC Scalar Processors, VLIW architecture,Memory Hierarchy, Inclusion, Coherence and Locality, Memory capacity planning. Interleavedmemory organization- memory interleaving, pipelined memory access, Bandwidth and Fault Tolerance. Backplane Bus System :Backplane bus specification, Addressing and timing protocols,Arbitration transaction and interrupt.

Unit-III

Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, pipeline hazards, Dynamic instruction scheduling - score boarding and Tomosulo's algorithm, Branch handling techniques, Arithmetic Pipeline Design, Static arithmetic pipeline, Multifunctional arithmetic pipelines. Superscaler pipeline design, Super pipeline processor design.

Unit-IV

Cache coherence, Snoopy protocols,Directory based protocols.Message routing schemes in multicomputer network, deadlock and virtual channel. Vector Processing Principles,Vector instruction types,Vector-access memory schemes. Vector supercomputer architecture, SIMD organization:distributed memory model and shared memory model. Principles of Multithreading:Multithreading Issues and Solutions, Multiple-Context Processors.

Unit-V

Parallel Programming Models, Shared-Variable Model, Message-Passing Model, Data-Parallel Model, Object-Oriented Model, Functional and Logic Models, Parallel Languages and Compilers, Language Features for Parallelism, Parallel Programming Environment, Software Tools and Environments.

Books Reference :

1. Kai Hwang, "Advanced computer architecture", TMH.
2. J.P.Hayes, "computer Architecture and organization"; MGH.
3. V.Rajaranam & C.S.R.Murthy, "Parallel computer"; PHI Learning.
4. Kain,"Advance Computer Architecture: - A System Design Approach", PHI Learning
5. M.J Flynn, "Computer Architecture, Pipelined and Parallel Processor Design"; Narosa Publishing.
6. Hwang and Briggs, "Computer Architecture and Parallel Processing"; MGH.
7. David E. Callav & Jaswinder Pal Singh Marge Kaufmann"Advance Computer Architecture",EIS India.
8. Sajjan G. Shiva, Taylar & Francis, "Advance Computer Architecture

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	**MOBILE COMPUTING**	CS-034B	Min "D"	-	5.0

MOBILE COMPUTING

Unit – I

Introduction, issues in mobile computing, overview of wireless telephony: cellular concept,GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs,channel allocation in cellular systems, CDMA, GPRS.48

Unit - II

Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting,Mobile IP, WAP: Architecture, protocol stack, application environment, applications.

Unit – III

Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.

Unit - IV

Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.

Unit – V

Adhoc networks, localization, MAC issues, Routing protocols, global state routing (GSR),Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA),QoS in Ad Hoc Networks, applications.

Books References:

1. J. Schiller, Mobile Communications, Addison Wesley.
2. Charles Perkins, Mobile IP, Addison Wesley.
3. Charles Perkins, Ad hoc Networks, Addison Wesley**.**
4. Upadhyaya, "Mobile Computing", Springer

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	**REAL TIME SYSTEM**	CS-034C	Min "D"	-	5.0

REAL TIME SYSTEM

UNIT-I: Introduction
Definition, Typical Real Time Applications: Digital Control, High Level Controls, Signal Processing etc., Release Times, Deadlines, and Timing Constraints, Hard Real Time Systems and Soft Real Time Systems, Reference Models for Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency.

UNIT-II: Real Time Scheduling
Common Approaches to Real Time Scheduling: Clock Driven Approach, Weighted Round Robin Approach, Priority Driven Approach, Dynamic Versus Static Systems, Optimality of Effective-Deadline-First (EDF) and Least-Slack-Time-First (LST) Algorithms, Offline Versus Online Scheduling, Scheduling Aperiodic and Sporadic jobs in Priority Driven and Clock Driven Systems.

UNIT-III: Resources Access Control
Effect of Resource Contention and Resource Access Control (RAC), Nonpreemptive Critical Sections, Basic Priority-Inheritance and Priority-Ceiling Protocols, Stack Based Priority-Ceiling Protocol, Use of Priority-Ceiling Protocol in Dynamic Priority Systems, Preemption Ceiling Protocol, Access Control in Multiple-Unit Resources, Controlling Concurrent Accesses to Data Objects.

UNIT-IV: Multiprocessor System Environment
Multiprocessor and Distributed System Model, Multiprocessor Priority-Ceiling Protocol, Schedulability of Fixed-Priority End-to-End Periodic Tasks, Scheduling Algorithms for End-to-End Periodic Tasks, End-to-End Tasks in Heterogeneous Systems, Predictability and Validation of Dynamic Multiprocessor Systems, Scheduling of Tasks with Temporal Distance Constraints.

UNIT-V: Real Time Communication
Model of Real Time Communication, Priority-Based Service and Weighted Round-Robin Service Disciplines for Switched Networks, Medium Access Control Protocols for Broadcast Networks, Internet and Resource Reservation Protocols, Real Time Protocols, Communication in Multicomputer System, An Overview of Real Time Operating Systems.

Books Reference :
1. Real Time Systems by Jane W. S. Liu, Pearson Education Publication.
2. Real-Time Systems: Scheduling, Analysis, and Verification by Prof. Albert M. K.
3. Hard Real Time Computing Systems Predictablle Scheduling Algorithms and applications by Giorgio C. Buttazzo
4. Real Time Design Patterns: Robust Scalable Architecture for Real Time System by Bruce Powel Douglass
5. Real Time System: Scheduling, Analysis and Verification by Albert M. K. Chengheng, John Wiley and Sons Publications

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	**INTERNET AND WEB TECHNOLOGY LAB**	IT-18L	Min "D"	Min "D"	5.0

INTERNET AND WEB TECHNOLOGY LAB

LIST OF EXPERIMENTS :

. At least ten practical experiments based on above syllabus and a mini project is desirable to be completed by a group of three that cover following tools.

.HTML

DHTML

PHP

XML

Java Script, CGI, PERL

ASP.Net

SQL Database connectivity through ASP.NET

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	**COMPILER DESIGN LAB**	CS-30L	Min "D"	Min "D"	5.0

COMPILER DESIGN LAB

LIST OF EXPERIMENTS :

1. Develop a lexical analyzer to recognize a few patterns.

2. Write a programme to parse using Brute force technique of Topdown parsing.

3. Develop LL (1) parser (Construct parse table also).

4. Develop an operator precedence parser (Construct parse table also)

5. Develop a recursive descent parser

6. Write a program for generating for various intermediate code forms

i) Three address code ii) Polish notation

7. Write a program to simulate Heap storage allocation strategy

8. Generate Lexical analyzer using LEX

9. Generate YACC specification for a few s

10. Given any intermediate code form implement code optimization techniques

11. Study of an Object Oriented Compiler

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	**ADVANCED COMPUTING PARADIGMS LAB**	CS-32L	Min "D"	Min "D"	5.0

ADVANCED COMPUTING PARADIGMS LAB

LIST OF Experiments:

1. Study of Grasim
2. Creation of Grid resources, machines and users
3. Submission of Grid lets to Resources
4. Study of Glob us.
5. Study experiment to explore overall view about

   A· Pervasive Computing Architecture

   B· Communication protocols

   C· Software infrastructure

   D· Security mechanisms.

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	**MAJOR PROJECT PLANNING**	CS-35L	-	Min "D"	5.0

MAJOR PROJECT PLANNING

The Major Project Work provides students an opportunity to do something on their own and under the supervision of a guide. Each student shall work on an approved project, which should be selected from some real life problem as far as possible, which may involve fabrication, design or investigation of a technical problem. The project work involves sufficient work so that students get acquainted with different aspects of manufacturing, design or analysis. The students also have to keep in mind that in final semester they would be required to implement whatever has been planned in the major project in this semester. It is possible that a work, which involves greater efforts and time, may be taken up at this stage and finally completed in final semester, but partial completion report should be submitted in this semester and also evaluated internally. At the end of semester, all students are required to submit a synopsis.

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 –II***	CS-36L	-	Min "D"	5.0

INDUSTRIAL TRAINING

SCHEME OF STUDIES

Duration: 4 weeks after the VI semester in the summer break, Assessment in VII semester.

1.1 OBJECTIVE OF INDUSTRIAL TRAINING

The objective of undertaking industrial training is to provide work experience so that student's engineering knowledge is enhanced and employment prospects are improved. The student should take this course as a window to the real World of Work and should try to learn as much as possible from real life experiences by involving and interacting with industry staff. Industrial training also provides an opportunity to students to select an engineering problem and possibly an industry guide for their Major Project in final semester. Industrial training of the students is essential to bridge the wide gap between the classroom and industrial environment. This will enrich their practical learning and they will be better equipped to integrate the practical experiences with the classroom learning process.

1.2 LEARNING THROUGH INDUSTRIAL TRAINING

During industrial training students must observe following to enrich their learning: - Industrial environment and work culture. - Organizational structure and inter personal communication. - Machines/ equipment/ instruments - their working and specifications. - Product development procedures and phases.
- Project planning, monitoring and control. - Quality control and assurance. - Maintenance system. - Costing system. - Stores and purchase systems. - Layout of Computer/ EDP/MIS centers. - Roles and responsibilities of different categories of personnel. - Customer services. - Problems related to various areas of Work etc. Faculty and TPO are supposed to plan industrial training in such a manner that students get exposure on most of the above arena in the field (world of work). Students are supposed to acquire the knowledge on above by -

1. Observation,
2. Interaction with officials at the workplace
3. Study of Literature at the workplace (e.g. User Manual, standards, maintenance schedules, etc.)
4. "Hand's on" experience
5. Undertaking / assisting project work.
6. Solving problems at the work place.
7. Presenting a seminar.
8. Participating in-group meeting/ discussion.
9. Gathering primary and secondary data/ information through various sources, Storage, retrieval and analysis of the gathered data.
10. Assisting officials and managers in their working.
11. Undertaking a short action research work.
12. Consulting current technical journals and periodicals in the library.
13. Discussions with peers.