WITH EFFECT FROM THE ACADEMIC YEAR 2003-2004

SCHEME OF INSTRUCTION & EXAMINATION

B.E IV YEAR (REGULAR)

(INFORMATION TECHNOLOGY)

SEMESTER - II

Sl. No.	Syllabus Ref.No	SUBJECT	Scheme of Instructions		Scheme of Examination		
			Periods per Week		Dura-tion in Hrs	Maximum Marks	
			L/T	D/P		Univ. Exam	Sessi-onals
		THEORY					
1.	BIT 451	Embedded System	**4**	**-**	**3**	**75**	**25**
		ELECTIVE -IV					
2.	BIT 453	Distributed Systems	**4**	**-**	**3**	**75**	**25**
3.	BIT 454	Design & Analysis of Algorithms					
		ELECTIVE – V	**4**	**-**	**3**	**75**	**25**
4.	BIT 461	Advanced Computer Structures					
5.	BIT 462	Software Reuse Techniques					
		PRACTICALS					
1.	BIT 481	Embedded Systems Practicals	**-**	**3**	**3**	**50**	**25**
2.	BIT 482	Main Project	**-**	**3**	**Viva Voce**	**Gr***	**25**
3.	BIT 483	Seminar	**-**	**3**	**-**	**-**	**25**
		TOTAL	**12**	**9**	**-**	**275**	**175**

* Excellent/ Very Good/ Good/Satisfactory/Unsatisfactory

BIT 451

EMBEDDED SYSTEMS

Instruction	4 Periods per Week
Duration of University Examination	3 Hours
University Examination	80 Marks
Sessional	20 Marks

Unit – I

Introduction to Embedded systems, Processor and memory organization, devices and buses for device networks

Unit – II

Device drivers and interrupts servicing mechanism, Programming concepts and embedded programming in C & C++

Unit – III

Program modeling concepts in single and multiprocessor systems software development process, software engineering practices in the embedded software development process.

Unit – IV

Interprocess communication and synchronization of processes, task and threads. Real time operating systems, Real time operating systems, Real time operating system programming tools: Micro C/OS-II and VxWorks.

Unit – V

Case studies of Programming with RTOS, Hardware-Software Co-design in an Embedded system.

Suggested Reading:

1. Raj kamal, "Embedded Systems Architecture, Programming & Design", Tata McGraw Hill, 2003.'

BIT 453

DISTRIBUTED SYSTEMS

Instruction	4 Periods Per Week
Duration Of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Unit-I

Architecture of distributed systems: Types, distributed Os, Issues in distributed operating systems, theoretical foundations: global clock, Hemport's logical clock, vector clocks, global state, termination detection.

Unit – II

Distributed mutual exclusion. Distributed detection. Agreement protocols

Unit – III

Distributed file system. Distributed shared memory. Distributed scheduling.

Unit – IV

Failure recovery, fault tolerance, Protection and security

Unit – V

Multiprocessor operating system, Database operating systems.

Case study: Windows NT, Solaris

Suggested Reading:

1. Singhal M, Shivaratri N.G, "Advanced concepts in Operating Systems", McGraw Hill International, 1994
2. Custer Helen: "Inside Windows NT", Microsoft Press, 1992

BIT 454

DESIGN AND ANALYSIS OF ALGORITHMS

Instruction	4 Periods per Week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Unit-I

Introduction & Elementary Data Structures: Order notation, Analysis of algorithm review of elementary data structures- Heaps and Heap sort. Hashing. Sets representation, UNION, FIND.

Unit-II

Divide- and Conquer: The general method, binary search, finding maximum minimum. Merge sort, quick sort and selection.

Greedy Method: Knapsack problem, Optimal Storage on Tapes, Job sequencing with Deadlines, Optimal Merge Pattern, Minimum Spanning Trees and Single Source shortest Paths.

Unit-III

Dynamic programming and Traversal Techniques: Multistage Graphs, All Pairs shortest Paths, Optimal Binary Search Trees, 0/1 Knapsack, Reliability Design Travelling Salesman Problem, Biconneected Components and Depth First Search.

Unit-IV

Backtracking and Branch and Bound: 8-Queens Problem, Graph Colouring Hamiltonian cycles, Knapsack Problem. 0/1 Knapsack Problem, Traveling Salesperson problem, Lower-Bound Theory.

Unit-V

NP-Hard and NP-Completeness: Basic concepts, Cook's theorem, NP-hard graph problems and scheduling problem.. N P-hard code generation problems. Decision problem. Node covering problem.

Suggested Reading:

1. Horowitz E. Sahni S: "Fundamentals of Computer Algorithms", Galgotia Publications, 1984.
2. Aho, Hopcroft: OIlman, *The Design and Analysis of Computer Algorithms* Pearson Education, 2000.

BIT 461

ADVANCED COMPUTER STRUCTURES

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT–I

Parallel computer Models: Multiprocessors and Multi-computers, Multi-vector and SIMD Computers, IRAM and VLSI models, Architectural Development tracks.

Program and Network Properties: Condition of Parallelism, program partitioning and scheduling, system interconnects architectures.

UNIT –II

Processor and memory hierarchy: Advanced processor Technology, Super Scalar and Vector Processor.

Pipelining and Superscalar Techniques.: Linear Pipeline processors, Non-linear Pipeline Processors.

UNIT–III
Multiprocessor and Multicomputers: Multiprocessor System interconnects, Cache Coherence, latency Hiding Techniques, Principles of Multithreading.

UNIT – IV
Parallel Modes, Languages and Compilers: Parallel programming models, parallel languages and compilers, Code optimization and scheduling, Loop parallelization and Pipelining.

UNIT -V
Parallel Program Development and Environments: parallel programming environments, Synchronization and multiprocessing models, Message passing program Development, Mapping Programs on to multicomputers.

Suggested Reading:

1. Kai Hwang, Advanced Computer Architecture, McGraw Hill, 1993
2. Dezso Simha, Terence Fountain, Peter Kascuk, Advanced Computer Architectures, Pearson Education Asia, 2002.

BIT 462

SOFTWARE REUSE TECHNIQUES

Instruction	4 Periods per Week
Duration of University Examination	3 Hours
University Examination	80 Marks
Sessional	20 Marks

Unit –I
Software reuse factors
Reuse driven software engineering business
Object oriented software engineering.
Applications and Components subsystems
Use case components.
Object components.

Unit –II

Design Patterns- Introduction
Creational Patterns- Factory, factory method, abstract factory, singleton, builder, prototype.

Unit -III

Structural Patterns – Adapter, bridge, composite, decorator, façade, flyweight, proxy
Behavioral Patterns- Chain of responsibility, command, interpreter.

Unit –IV

Behavioral Patterns- Iterator, mediator, memento, observer, state, strategy, template, visitor, other design patterns – Whole –part, master-slave, view handler, forwarder-receiver, client-dispatcher-server, publisher- subscriber.

Unit –V

Architectural Patterns- Layers, pipes and filters, black boar, broker, model-view controller, presentation- abstraction – control, micro kernel, reflection.

Suggested Reading:

1. Ivar Jacobson, Martin Griss, Partick Johsson- Software Reuse: Architecture, process and Organization for Business Success, ACM Press 1977.
2. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides- Desing Patterns- Pearson Education 1995.
3. Frank Buschmann etc. – Pattern Oriented Software Architecture- Volume1, Wiley 1996.
4. James W Cooper – Java Design Patterns, A Tutorial, Pearons Education 2000.

BIT 481

EMBEDDED SYSTEM PRACTICALS

Instruction	3 Periods per Week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks

1. Embedded Systems Practical involves development of an application controller using either VHDL or a Micro Controller(such as 8051, Z80

Tools Required:

(a) Xilinx or Max synthesizer tool
(b) 8051 or Z80 emulator

References:

1. David E. Siman, “An Embeded Software Primer”, Pearson Education, 1999
2. Myke Predko, “Programming and Customizing the 8051 Micro Controller”, Tata McGraw Hill, 1999
3. Mohammed Ali Mazidi, Janiece Gillispie Mazidi, “8051 Micro Controller and Embedded Systems”, Pearson 2000.
4. Doughlas L. Rerry, “VHDL programming by example”, Tata McGraw Hill, Fourth edition, 2003

BIT 482

PROJECT

Instruction	6 Periods per week
Duration of University Examination	Viva voce

University Examination Grade*
Sessional 50Marks

Solving a real life problem should be the focus of U.G projects. Faculty members' should propose the projects brief (scope and references) well in advance which should be made available to the students through department library. The project could be classified as Hardware, Software, Modeling, Simulation etc., It should involve one or many elements of techniques such as Analysis, Design and Synthesis. The Department will appoint a Project coordinator who will coordinate the following

- Grouping of students (Max. 3 in group)
- Allotment of Projects and Project Guides
- Project monitoring at regular intervals

All Projects allotment will be completed by the 4th week of the 4the year I semester, so that students get sufficient time for completion of the project.

All Projects will be monitored Atleast twice in a semester through students presentation. Sessional marks should be based on the grading/marks awarded by monitoring committee of faculty members and marks given by the supervisers.

Effort should be made that some of the projects are carried out in industries with the help of industry co-coordinators. Problems can also be invited from the industries to be worked out through UG projects.

Common norms will be established for final documentation of the project report by the respective departments.

*Excellent/Good/Satisfactory/Unsatisfactory

Note: 3 periods of contact load will be assigned to each project guide.

Curricula and Syllabi for the B.E. Programmes as approved by the University