GITAM UNIVERSTIY

(Declared as Deemed to be University U/S 3 of UGC Act, 1956)

REGULATIONS & SYLLABUS

Of

M.Tech. (Information Technology)

(w.e.f. 2012-13 admitted batch)

Gandhi Nagar Campus, Rushikonda
VISAKHAPATNAM – 530 045
Website: www.gitam.edu

REGULATIONS

(W.e.f. 2012-13 admitted batch)

1.0 ADMISSIONS

1.1 Admissions into M.Tech. (Information Technology) programme of GITAM University are governed by GITAM University admission regulations.

2.0 ELIGIBILTY CRITERIA

2.1 A pass in B E / B Tech / AMIE or equivalent in any branch of specialization or Masters Degree in Physics, statistics, Mathematics or Applied Mathematics, Applied Statistics, Applied Physics, Geo Physics or MSc. in Computer Science or Information Systems or MCA.

2.2 Admissions into M.Tech will be based on the following:

(i) Score obtained in GAT (PG), if conducted.
(ii) Performance in Qualifying Examination / Interview.

The actual weightage to be given to the above items will be decided by the authorities before the commencement of the academic year. Candidates with valid GATE score shall be exempted from appearing for GAT (PG).

3.0 STRUCTURE OF THE M.TECH. PROGRAMME

3.1 The Programme of instruction consists of :

(i) A core programme imparting to the student specialization of engineering branch concerned.

1. An elective programme enabling the students to take up a group of departmental courses of interest to him/her.

2. Carry out a technical project approved by the Department and submit a report.

3.2 Each academic year consists of two semesters. Every branch of the M.Tech programme has a curriculum and course content (syllabi) for the subjects recommended by the Board of Studies concerned and approved by Academic Council.

3.3 Project Dissertation has to be submitted by each student individually.

4.0 CREDIT BASED SYSTEM

4.1 The course content of individual subjects - theory as well as practicals – is expressed in terms of a specified number of credits. The number of credits assigned to a subject depends on the number of contact hours (lectures & tutorials) per week.

4.2 In general, credits are assigned to the subjects based on the following contact hours per week per semester.

One credit for each Lecture hour.

One credit for two hours of Practicals.

Two credits for three (or more) hours of Practicals.

4.3 The curriculum of M.Tech programme is designed to have a total of 70 -85 credits for the award of M.Tech degree. A student is deemed to have successfully completed a particular semester's programme of study when he / she earns all the credits of that semester i.e., he / she has no 'F' grade in any subject of that semester.

5.0 MEDIUM OF INSTRUCTION

The medium of instruction (including examinations and project reports) shall be English.

6.0 REGISTRATION

Every student has to register himself/herself for each semester individually at the time specified by the College / University.

7.0 CONTINUOUS ASSESSMENT AND EXAMINATIONS

1.1 The assessment of the student's performance in each course will be based on continuous internal evaluation and semester-end examination. The marks for each of the component

1.2 of assessment are fixed as shown in the Table 2.:

Table 2: Assessment Procedure

S.No.	Component of assessment	Marks allotted	Type of Assessment	Scheme of Evaluation
1	Theory	40	Continuous Evaluation	i)Thirty (30) marks for mid semester examination . Pre mid examination shall be conducted for 15 marks each/performance in best two shall be taken into consideration. ii) Ten (10) marks for quizzes, assignments and presentations.
		60	Semester-end examination	Sixty(60)marks for semester end examination.
	Total	100		
2	Practicals	100	Continuous Evaluation	i) Fifty (50) marks for regularity and performance, records and oral presentations in the labortatory.Weightage for each component shall be announced at the beginning of the semester ii) Ten(10) marks for case studies iii) Fourty (40) marks for two tests of 20 marks each (one at the mid term and other towards the end of semester) conducted by the concerned lab teacher.
3	Project Work (Interim evaluation	100	Continuous Evaluation	i) Forty (40) marks for periodic evaluation on originality, innovation, sincerity and progress of the work , assessed

	-III Semesters)			by the Project Supervisor ii) Thirty (30) marks for mid-term evaluation for defending the project , before a panel of examiners* iii) Thirty (30) marks for final Report presentation and Viva-voce , by a panel of examiners*
4	Project work (Final evaluation-Iv semester)	50	Continuous Evaluation	i) Twenty (20) marks for periodic evaluation on originality, innovation, sincerity and progress of the work , assessed by the Project Supervisor ii) Fifteen (15) marks for mid-term evaluation for defending the project , before a panel of examiners* iii) Fifteen (15) marks for interim Report presentation and Viva-voce
		50	Semester end Examination	Fifty(50) marks for final report presentation and viva-voce assessed by external examiners.

* Head of the Department concerned shall appoint two examiners for conduct of the examination.

8.0 REAPPEARANCE

8.1 A Student who has secured 'F' Grade in any theory course / Practicals of any semester shall have to reappear for the semester end examination of that course / Practicals along with his / her juniors.

8.2 A student who has secured 'F' Grade in Project work shall have to improve his report and reappear for viva – voce Examination of project work at the time of special examination to be conducted in the summer vacation after the last academic year.

9.0 SPECIAL EXAMINATION

9.1 A student who has completed the stipulated period of study for the degree programme concerned and still having failure grade ('F') in not more than 5 courses (Theory / Practicals), may be permitted to appear for the special examination, which shall be conducted in the summer vacation at the end of the last academic year.

9.2 A student having 'F' Grade in more than 5 courses (Theory/practicals) shall not be permitted to appear for the special examination.

10.0 ATTENDANCE REQUIREMENTS

10.1 A student whose attendance is less than 75% in all the courses put together in any semester will not be permitted to attend the end - semester examination and he/she will not be allowed to register for subsequent semester of study. He /She has to repeat the semester along with his / her juniors.

10.2 However, the Vice Chancellor on the recommendation of the Principal / Director of the University college / Institute may condone the shortage of attendance to the students whose attendance is between 66% and 74% on genuine medical grounds and on payment of prescribed fee.

11.0 GRADING SYSTEM

11.1 Based on the student performance during a given semester, a final letter grade will be awarded at the end of the semester in each course. The letter grades and the corresponding grade points are as given in Table 3.

Table 3: Grades & Grade Points

Grade	Grade points	Absolute Marks
O	10	90 and above
A+	9	80 – 89
A	8	70 – 79
B+	7	60 – 69
B	6	50 – 59
C	5	40 – 49
F	Failed, 0	Less than 40

11.2 A student who earns a minimum of 5 grade points (C grade) in a course is declared to have successfully completed the course, and is deemed to have earned the credits assigned to that course. However, a minimum of 24 marks is to be secured at the semester end examination of theory courses in order to pass in the theory course

12.0 GRADE POINT AVERAGE

12.1 A Grade Point Average (GPA) for the semester will be calculated according to the formula:

$$GPA = \frac{\Sigma [C \times G]}{\Sigma C}$$

Where

C = number of credits for the course,

G = grade points obtained by the student in the course.

12.2 Semester Grade Point Average (SGPA) is awarded to those candidates who pass in all the subjects of the semester.

12.3 To arrive at Cumulative Grade Point Average (CGPA), a similar formula is used considering the student's performance in all the courses taken in all the semesters completed up to the particular point of time.

12.4The requirement of CGPA for a student to be declared to have passed on successful completion of the M.Tech programme and for the declaration of the class is as shown in Table 4.

Table 4: CGPA required for award of Degree

Distinction	**≥ 8.0***
First Class	**≥ 7.0**

Second Class	**≥ 6.0**
Pass	**≥ 5.0**

* In addition to the required CGPA of 8.0, the student must have necessarily passed all the courses of every semester in first attempt.

13.0 ELIGIBILITY FOR AWARD OF THE M.TECH DEGREE

13.1 **Duration of the programme**:

A student is ordinarily expected to complete the M Tech. programme in four semesters of two years. However a student may complete the programme in not more than four years including study period.

13.2 However the above regulation may be relaxed by the Vice Chancellor in individual cases for cogent and sufficient reasons.

13.3 Project dissertation shall the submitted on or before the last day of the course. However, it can be extended up to a period of 6 months maximum, with the written permission of the Head of the Department concerned.

13.4 A student shall be eligible for award of the M.Tech degree if he / she fulfils all the following conditions.

a) Registered and successfully completed all the courses and projects.

b) Successfully acquired the minimum required credits as specified in the curriculum corresponding to the branch of his/her study within the stipulated time.

c) Has no dues to the Institute, hostels, Libraries, NCC / NSS etc, and

d) No disciplinary action is pending against him / her.

13.5 The degree shall be awarded after approval by the Academic Council.

NEW SYLLABUS FOR MASTER OF TECHNOLOGY (M.TECH) DEGREE
IN
INFORMATION TECHNOLOGY w.e.f 2012-2013
M.Tech. (IT)
Programme Code: EPRIT 200800
First Semester

Code	Course name	Credits	L	P	C	S	Total
EPRIT 101	Advanced Data Structures & Algorithms	4	4		40	60	100
EPRIT 102	Computer networks	4	4		40	60	100
EPRIT 103	Advanced Database and data mining	4	4		40	60	100
EPRIT 104	Advanced Computer Architecture	4	4		40	60	100
EPRIT 111	Advanced Data Structures & Algorithms lab	2		3	40	60	100
EPRIT 112	Advanced Database and data mining lab	2		3	40	60	100
		20			240	360	600

Second Semester

Code	Course name	Credits	L	P	C	S	Total
EPRIT 201	Distributed Operating Systems	4	4		40	60	100
EPRIT 202	Middleware Technologies	4	4		40	60	100
EPRIT 203	Mobile Computing and Ad-hoc Networks	4	4		40	60	100
EPRIT 204	Object Oriented Analysis &Design	4	4		40	60	100
EPRIT 211	Middleware Technology lab	2		3	40	60	100
EPRIT 212	Object Oriented Analysis &Design lab	2		3	40	60	100
		20			240	360	600

Third Semester

Code	Course name	Credits	L	P	C	S	Total
EPRIT 321-327	Elective I	4	4		40	60	100
EPRIT 321-327	Elective II	4	4		40	60	100
EPRIT 321-327	Elective III	4	4		40	60	100
EPRIT 311	Project I	2		3	40	60	100
EPRIT 312	Seminar	2		4	50		50
		16			210	240	450

ELECTIVE I/II/III (any three)

EPRIT 321 Cryptography and network security

EPRIT 322 Artificial neural networks

EPRIT 323 Bioinformatics

EPRIT 324 Ecommerce

EPRIT 325 Image Processing

EPRIT 326 Information Technology And Cyber Laws

EPRIT 327 Embedded and Real time Systems

Fourth Semester

Code	Course name	Credits	L	T	P	C	S	Total
EPRIT411	Project II	17			24	50	50	100

L–Lectures P–Practicals C–Continuous Evaluation S- Semester End Examination

Seminar: Each student will be allocated a topic of seminar at the beginning of the current semester. The student will have to submit a written presentation and give a seminar on that topic on the date and time announced.

Project I: At the end of 3rd Semester, assessment of the project work of each student will be made by the board of examiners including supervisors on the basis of a viva-voce examination and report submitted by the student.

Project II: At the end of 4th semester the thesis work of all assessed by a board of examiners consisting of supervisors and external examiners.

Total credits =73

M.Tech (Information Technology)
First Semester

Code No	Name of Course		Instruction Hours Per Week				Max Marks			Credits
			L	T	P	Tot	C	S	Tot	
EPRIT-101	Advanced Data Structures & Algorithms		3	1	-	4	40	60	100	4

Unit I
Algorithms, performance analysis-time complexity and space complexity,O-notation, Omega notation and Theta notation, Review of basic data structures - the list ADT, stack ADT, queue ADT, implementation using template classes in C++, sparse matrix representation.

UnitII
Dictionaries, linear list representation, skip list representation, operations- insertion, deletion and searching, hash table representation, hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing,extendible hashing, comparison of hashing and skip lists.

UnitIII
Search trees :Binary search trees, definition, ADT, implementation, operations-searching, insertion and deletion, Balanced search trees- AVL trees, definition, height of an AVL tree, representation, operations-insertion, deletion and searching.Introduction to Red –Black trees and Splay Trees, B-Trees-B-Tree of order m, height of a B-Tree, insertion, deletion and searching, Comparison of Search Trees.

UnitIV
Divide and Conquer- General method, applications – Binary search, merge sort, quick sort, Strassen's matrix multiplication Efficient non recursive tree traversal algorithms, Biconnected components. Disjoint set operations, union and find algorithms.

Unit V
Greedy method and Dynamic programming : General method (Greedy), Minimum cost spanning trees, Job sequencing with deadlines, General method (Dynamic Programming), Optimal binary search trees, 0/1 knapsack problem, Ordering Matrix Multiplications .

TEXTBOOKS:
1. Data Structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education, Third edition.
2. Data structures, Algorithms and Applications in C++,S.Sahni,University press (India) pvt ltd, 2nd edition, Orient Longman pvt.ltd.

REFERENCES:
1. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and D.Mount, Seventh Edition Wiley student edition, John Wiley and Sons.
2. Data Structures and Algorithms in C++, Third Edition, Adam Drozdek, Thomson
3. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.
4. C++, The Complete Reference, 4th Edition, Herbert Schildt, TMH.
5. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI/Pearson

M.Tech (Information Technology) Second Semester

Code No	Name of Course		Instruction Hours Per Week				Max Marks			Credits
			L	T	P	Tot	C	S	Tot	
EPRIT-102	Computer Networks		3	1	-	4	40	60	100	4

Unit-I

IEEE 802.x Standards Ethernet, Wireless LANS: 802.11 protocol stack, physical layer, MAC sub layer protocol, frame structure and services. Bluetooth, Data link Layer Switching: Bridges from 802.x to 802.y, Local Internetworking, Spanning tree bridges, Remote bridges, Repeaters, Hubs, Bridges, Switches, Routers and Gateways.

Unit-II

Network Layer: Design Issues: Store and forward packet switching, Services provided to the Transport Layer, Implementation of connection less and connection oriented services and comparisons. Routing Algorithms, Congestion Control Algorithms, The Network Layer in the Internet: IP, ICP and IPV6.

Unit-III

Transport Layer: Transport Services: Services provided to the upper layer, Primitives, Berkeley Sockets and examples. Elements of Transport Protocols: Addressing, Connection Establishment, Release, Flow control and Buffering, Multiplexing and crash Recovery. The Internet Transport Protocols: TCP, UDP.

Unit –IV

Application layer : Domain name system (DNS): The DNS Name Space, Resource Records, Name Servers. ELECTRONIC MAIL,: Architecture and Services, the User Agent, Message Formats, Message Transfer, Final Delivery. WWW: Architectural Overview, Static Web document ,Dynamic Web documents,HTTP--The HyperText Transfer Protocol, performance enhancement .

Unit - V

Overlay Networks, Distributed Hash Tables, DNS and the Web, Names, Identifiers, and Network architecture.

Text Books:

1. Computer Networks – Andrew S Tanenbum, 4th Edition. Pearson Education/PHI.

Reference Books:

1. Computer Networks: A Systems Approach, 4th Ed. (2007), by Larry Peterson and Bruce Davie.
2. Computer Networking: A Top-Down Approach Featuring the Internet, 4th Ed. (2007), by James F. Kurose and Keith W. Ross.
3. TCP/IP Illustrated, Volume 1: The Protocols by W. Richard Stevens.
4. Unix Network Programming: Networking APIs: Sockets and XTI (Volumeby W. Richard Stevens.
5. Advanced Programming in the Unix Environment by W. Richard Stevens,Addison-Wesley, 1993.
6. Computer Networks and Internets with Internet Applications, Third Edition, D.E. Comer,Prentice-Hall, 2001.
7. Communication Networks, Fundamental Concepts and Key Architecture, A. Leon-Garcia and I. Wadjaja, McGraw-Hill, 2000.
8. Data and Computer Communications, Sixth Edition, W.S. Stallings, Prentice-Hall, 1999.
9. Data Communications, Computer Networks and Open Systems, Fourth Edition, F. Halsall,

Addison-Wesley, 1995.
10. Data Networks, Second Edition, D. Bertsekas and R. Gallager, Prentice- Hall, 1992

M.Tech (Information Technology) First Semester

Code No	Name of Course		Instruction Hours Per Week				Max Marks			Credits
			L	T	P	Tot	C	S	Tot	
EPRIT-103	Advanced Database and data mining		3	1	-	4	40	60	100	4

UNIT I
Web database programming: Structured, Semi structured and unstructured Data- A simple PHP example- Overview of basic features of PHP- Overview of PHP and programming. **XML: Extensible markup language:** XML hierarchical data model- XML documents, DTD, and XML Schema- XML documents and databases- XML querying.

UNIT II
Enhanced Data Bases for Advanced Applications- Active Database Concepts and Triggers. Spatial Databases – Deductive databases- **Data warehousing**: Introduction, definitions and terminology- characteristics of Data warehouse- Building a data warehouse- Typical functionality of data warehouse- data warehouse versus views – problems and open issued in data warehouse.

UNIT III
Data mining techniques: Introduction- A Statistical perspective on data mining- Similarity measures- Decision trees- Neural networks- Genetic algorithms .**Classification**: Introduction – Statistical based algorithms- Distance based algorithms- Decision tree based algorithms- Neural network based algorithm- Rule based algorithms.

UNIT IV
Clustering: Introduction- Similarity and distance measures- Outliers- Hierarchal algorithms- Partitional algorithms- Clustering large data bases- Clustering with categorical attributes.**Association rules**: introduction – large item sets – Basic algorithms- parallel and distributed algorithms- comparing approaches- incremental rules- advanced association rule techniques- Measuring the quality of rules.

UNIT V
Web mining: Introduction- Web content Mining- Web structure mining- Web usage mining..**Spatial mining**: Introduction- spatial data overview spatial - spatial data mining primitives- generalization and specializationspatial rules- spatial classification algorithms- spatial clustering algorithms.

Text Books:
1. Ramez Elmasri & Shamkant B.Navathe, “Fundamentals of Databse Ssystems”, Fifth Edition, Pearson Education, 2009.
2. Margaret H.Dunham, “Data Mining: Introductory and Advanced Topics”, Pearson Education 2004.
Reference text Books:
1. Thomas M. Connolly, Carolyn E. Begg, “Database Systems- A Practical A Practical Approach oto Design, Implementation, and Management”, Third Edition, Pearson Education, 2003.
2. Sam Anahory, Dennis Murry, “Data Warehousing in the real World”, Pearson Education 2003.
3. W.H. Inmon, “Building the Data Warehouse”, 3rd Edition, Wiley , 2003.
4. J.Han, M. Kamber, “Data Mining: Concepts and Techniques”, Harcourt India/Morgan Kauffman, 2001.
5 .S.N.Sivanandan & S.Sumathi “Data mining concepts tasks and techniques

M.Tech (Information Technology) First Semester

Code No	Name of Course		Instruction Hours Per Week				Max Marks			Credits
			L	T	P	Tot	C	S	Tot	
EPRIT-104	Advanced Computer Architecture		3	1	-	4	40	60	100	4

Unit-I

Introduction to Parallel Processing: Trends towards Parallel Processing, Parallelism in Uniprocessors Systems, Parallel Computer Structures, Architectural Classification Schemes, Parallel Processing Applications.**Memory and Input-Output Subsystem:** Hierarchical Memory Architecture, Virtual Memory System, Memory Allocation and Management, Cache Memories and Managements, Input-Output Sub-systems.

Unit-II

Principles of Pipelining and Vector Processing: Pipelining operations, Principles of linear pipelining, Classification of pipeline processors, General pipelines and reservation tables, Interleaved Memory organization, Instruction and arithmetic pipe lines, Principles of designing pipelined processors, Vector Processing requirements.

Unit-III

Vector Processor: The Architecture of CRAY-1, Pipeline chaining and vector loops, The Architecture of CYBER-205, Vector Processing in CYBER-205.**Structures and Algorithms for Array Processors:** SIMD array processors, SIMD interconnection networks parallel algorithms for array processors, Associative array processing. case study :BSP system architecture.

Unit-IV

Multiprocessors Architecture and Programming: Functional structures, Interconnection networks, Parallel memory organization, Multiprocessors Operating system, Exploiting concurrency for multiprocessing.

Unit-V

Multiprocessing Controls and algorithms: Interprocess communication mechanism ,System dead locks and protections, Scheduling strategies, Case study: CRAY:XMP

Text Books:

1. Computer Architecture and Parallel Processing - Kai Hwang and Faye A. Briggs. Scalable Parallel Computing – K.Hwang, Tata McGra Hill.

REFERENCES :

1. Computer Organization. V. Carl Hamacher, Zvonko G. Vranesic, Safwat G. Zaky. McGraw-Hill, 2002
2. Computer Architecture A quantitative approach 3rd edition John L. Hennessy & David A. Patterson Morgan Kufmann (An Imprint of Elsevier).
3. Advanced Computer Architectures, Dezso Sima, Terence Fountain, Peter Kacsuk, Pearson.
4. Parallel Computer Architecture, A Hardware / Software Approach, David E. Culler, Jaswinder Pal singh with Anoop Gupta, Elsevier.

M.Tech (Information Technology) First Semester

Code	Name of Course		Instruction Hours Per Week				Max Marks			Credits
			L	T	P	Tot	C	S	Tot	
EPRIT-111	Advanced Data Structures & Algorithms lab		-	-	3	3	100	-	100	2

1. Write C++ programs to implement the following using an array.
a) Stack ADT b) Queue ADT.
2. Write C++ programs to implement the following using a singly linked list.
a) Stack ADT b) Queue ADT
3. Write C++ program to implement the deque (double ended queue) ADT using a doubly linked list.
4. Write a C++ program to perform the following operations:
a) Insert an element into a binary search tree.
b) Delete an element from a binary search tree.
c) Search for a key element in a binary search tree.
5. Write a C++ program to implement circular queue ADT using an array.
6. Write C++ programs that use non-recursive functions to traverse the given binary tree in
a) Preorder b) inorder and c) postorder.
7. Write a C++ programs for the implementation of bfs and dfs for a given graph.
8. Write C++ programs for implementing the following sorting methods:
a) Quick sort b) Merge sort c) Heap sort
9. Write a C++ program to perform the following operations
a) Insertion into a B-tree b) Deletion from a B-tree
10. Write a C++ program to perform the following operations
a) Insertion into an AVL-tree b) Deletion from an AVL-tree
11. Write a C++ program to implement Kruskal's algorithm to generate a minimum spanning tree.
12. Write a C++ program to implement Prim's algorithm to generate a minimum spanning tree.
13. Write a C++ program to implement all the functions of a dictionary (ADT) using hashing.

M.Tech (Information Technology) First Semester

Code	Name of Course		Instruction Hours Per Week				Max Marks			Credits
			L	T	P	Tot	C	S	Tot	
EPRIT-112	Advanced Database and data mining lab		-	-	3	3	100	-	100	2

1. To perform multi-dimensional data model using SQL queries. E.g. Star, snowflake and Fact constellation schemas.

2. To perform various OLAP operations such slice, dice, roll up, drill up, pivot etc.

3. Check whether the given data is positively or negatively skewed.

4. Eliminate noise from the data using binning techniques.

5. To perform the correlation analysis between the attributes for the given data set.

6. Normalize the given data using z-score normalization and min-max normalization

7. To perform the attribute relevance analysis on the given data using information gain measure.
8. To perform the experiment to predict the class using the Bayesian classification.
9. Write a program to find out a weight or bias updating using the back propagation in Neural Network. .
10. Cluster the given data using k-means algorithm and hierarchical algorithm.

11. Write a program to find frequent itemsets using Apriori algorithm.

12. To perform various data mining algorithms on the give data base using SPSS Clemenentine/Weka mining tool.

Tools: PL/SQL. Oracle 8i, .NET Framework 2.0, SPSS Clemenentine/Weka mining tool.

References

Reference books:

1. “Data warehousing in the real world”,
   Sam Anahory & Dennis Murray
2. “Information retrieval: Data structures and algorithms”,
   W.B.Frakes and R. Baeza-Yates, Eds., Prentice-Hall, New Jersey,(1992)
3. “Data mining techniques: For marketing, sales, customer support”,
   Michael J A Berry, & Gordon Linoff.
4. “Data mining”,
   Pieter Adriaans & Dolf Zantinge , Pearson Education Asia(2001).

M.Tech (Information Technology) First Semester

Code No	Name of Course		Instruction Hours Per Week				Max Marks			Credits
			L	T	P	Tot	C	S	Tot	
EPRIT-201	DISTRBUTED OPERTING SYSTEMS		3	1	-	4	40	60	100	4

UNIT-I

Introduction: Introduction to Distributed System, Goals of Distributed system, Hardware and Software concepts, Design issues. Communication in distributed system: Layered protocols, ATM networks, Client – Server model ,Remote Procedure Calls and Group Communication. Middleware and Distributed Operating Systems.

UNIT-II

Synchronization in Distributed System: Clock synchronization, Mutual Exclusion, Election algorithm, the Bully algorithm, a Ring algorithm, Atomic Transactions, Deadlock in Distributed Systems, Distributed Deadlock Prevention, Distributed Deadlock Detection.

UNIT-III

Processes and Processors in distributed systems: Threads, System models, Processors Allocation, Scheduling in Distributed System, Real Time Distributed Systems.

UNIT-IV

Distributed file systems: Distributed file system Design, Distributed file system Implementation, Trends in Distributed file systems. **Distributed Shared Memory: W**hat is shared memory, Consistency models, Page based distributed shared memory, shared variables distributed shared memory.

UNIT-V

Fault Tolerance: Concepts, Failure Models, Failure Masking by Redundancy.
Case Study: MACH, Process management, memory management, communication, UNIX emulation

Text Book:

1. Distributed Operating System – Andrew S. Tanenbaum, PHI.

Reference Books:

1.Distributed Systems: Principles and Paradigms :Andrew Tannenbaum and Maarten van Steen.
2. Distributed Operating Systems : Concepts and Design: Pradeep K. Sinha.
3. Distributed Operating Systems and Algorithm Analysis : Randy Chow, Theodore Johnson.

M.Tech (Information Technology) Second Semester

Code No	Name of Course	Instruction Hours Per Week				Max Marks			Credits
		L	T	P	Tot	C	S	Tot	
EPRIT-202	Middleware Technologies	3	1	-	4	40	60	100	4

UNIT-I

Introduction to client server computing: Evolution of corporate computing models from centralized to distributed computing, client server models. Benefits of client server computing, pitfalls of client server programming. CORBA with Java: Review of java concept like RMI, RMI API, JDBC. Client/Server CORBA- style, The object web: CORBA with Java.

UNIT-II

Introducing C# and the .NET Platform: Understanding .NET Assemblies: Object- Oriented Programming with C#: Callback Interfaces, Delegates, and Events. Building C# applications: Type Reflection, Late Binding, and Attribute- Based Programming: Object Serialization and the .NET Remoting Layer; Data Access with ADO.NET; XML Web Services.

UNIT_III

Core CORBA / Java: Two types of Client/ Server invocations-static, dynamic. The static CORBA, first CORBA program, ORBlets with Applets, Dynamic CORBA-The portable count, the dynamic count multicounty. Existential CORBA : CORBA initialization protocol, CORBA activation services, CORBAIDL mapping CORBA java-to-IDL mapping, The introspective CORBA/Java object.

UNIT-IV

Java Bean Component Model : Events, properties, persistency, Intrespection of beans, CORBA Beans.

UNIT-V

EJBS and CORBA: Object transaction monitors CORBA OTM's, EJB and CORBA OTM's, EJB container frame work, Session and Entity Beans, The EJB client/server development process. The EJB container protocol, support for transaction EJB packing EJB design Guidelines.

TEXT BOOKS:

1. Client/Server programming with java and CORBA Robert Orfali and Dan Harkey, John Wiley & Sons, SPD 2nd Edition.
2. Java programming with CORBA 3rd Edition, G.Brose, A Vogel and K.Duddy, Wileydreamtech, India John Wiley and Sons.

M.Tech (Information Technology) Second Semester

Code No	Name of Course		Instruction Hours Per Week				Max Marks			Credits
			L	T	P	Tot	C	S	Tot	
EPRIT-203	Mobile Computing and Ad-hoc Networks		3	1	-	4	40	60	100	4

UNIT-I

Introduction to Mobile Communications and Computing: Introduction to MC, novel applications, a simplified reference model, cellular systems .Introduction to adhoc and infrastructure networks and their comparison. Medium Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, comparison of S/T/F/CDMA.

UNIT – II

GSM : Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services. Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

UNIT-III

Mobile Network Layer : Mobile IP (Goals, assumptions, requirements entities and terminology, IP packet delivery, agent discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

UNIT –IV

Mobile Transport Layer : Traditional TCP(congestion control, slow start, Fast retransmit/fast recovery implications on mobility) Classical TCP Improvements (Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP).TCP over 2.5/3G wireless networks

UNIT-V

Wireless application Protocols: Architecture, wireless data gram protocol, wireless transport layer protocol, wireless transaction layer protocol, wireless session layer protocol, wireless application environment. IEEE802.11: system architecture, protocol architecture .

TEXTBOOKS:

1. JochenSchiller,"Mobile Communications". second edition, 2009.Pearson.

REFERENCES:

1. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, October. 2004,
2. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden , Schwiebert, Loren, "Fundamentals of Mobile and Pervasive Computing", ISBN: 0071412379, McGraw-Hill Professional, 2005.
3. Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", Springer, second edition, 2003.
4. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002, ISBN 0471419028.

M.Tech (Information Technology) Second Semester

Code No	Name of Course		Instruction Hours Per Week				Max Marks			Credits
			L	T	P	Tot	C	S	Tot	
EPRIT-204	Object Oriented Analysis &Design		3	1	-	4	40	60	100	4

UNIT – I
Introduction:Overview of object-oriented systems development, object basics Object-oriented system development life cycle.

UNIT – II
UML: Object-oriented methodologies, Unified modeling language.

UNIT – III
Project organization and communications: Introduction, an overview of Projects Project organization concepts, Project communication concepts, and organizational activities. Requirements: Requirements elicitation, concepts, activities and managing requirements elicitation. Analysis: Analysis overview, concepts, activities and managing analysis.

UNIT – 1V
System design: Decomposing the system an overview of System Design, System design concepts, System design activities . Object design: Object design overview, concepts, activities and managing object design ,Testing: Testing overview, concepts, activities and managing testing.

UNIT – V
Software configuration management: Configuration management overview, concepts, activities and managing configuration management. Project management: project management overview, concepts, activities and managing project management models and activities.

Text Book:

1. Ali Bahrami: Object-oriented systems Development, McGrawHill, 1999 .
2. Object-oriented Software engineering: Conquering complex and changing systems, Bernd Bruegge and Allen H. Dutoit. Pearson Education Asia.

Reference Book:

1. Object–oriented software engineering: Practical software development using Uml and Java Timothy C. lethbridge and Robert LanganiereMcgraw–Hill Higher Education.
2. Craig Larman : Applying UML and Patterns, Pearson Education, 2002 .
3. Grady Booch: Object-oriented analysis and design, Addison – Wesley, 1994 .

M.Tech (Information Technology) Second Semester

Code	Name of Course		Instruction Hours Per Week				Max Marks			Credits
			L	T	P	Tot	C	S	Tot	
EPRIT-211	Middleware Technology lab		-	-	3	3	100	-	100	2

PART-A

RMI PROGRAMMING

1. Communication: Create a server that accepts the requests from client and client displays the server system information
2. File transfer: Create a server that asks for a password, then opens a file and sends the file over the network connection. Create a client that connects to this server, gives the appropriate password, then captures and saves the file.
3. Calculator: Create a remote server that implements a calculator with basic functionalities like addition, subtraction, division, multiplication and client, which uses the remote calculator.
4. Stockmarket: Create a remote stock server that accepts the company name and gives the share value. Stock client that retrieves the company share value and displays by giving the company name.
5. Phone book server: Create a remote phone book server the maintains names and phone numbers. Phone book client should provide a user interface that allows the user to scroll through entries, add a new entry, modify an existing entry and delete an existing entry. The client and the server should provide proper error handling.

PART-B (8 Weeks)

1. Working with callbacks and delegates in C# : Demonstrates the use of delegates, callbacks, and synchronous and asynchronous method invocation, including how Microsoft .NET Framework classes provide explicit asynchronous support using the Begin XXXX and End XXXX naming conventions and how you can make use of this support in your own code.
2. Code access security with C# : Demonstrates the use of .NET Frame work Code Access Security, in which code can have permissions independent of the person executing the code.
3. Creating a COM+ component with C# : Demonstrates how to create a COM+ component, that takes advantage of Transaction management service within COM+ , then assign a strong name to the assembly, register the assemble in the Global Assembly Cache, and register the component with COM+.
4. Creating a Windows Service with C# : Demonstrates how to create a Microsoft Windows Service that uses a File System Watcher object to monitor a specific directory for changes in files.

M.Tech (Information Technology) Second Semester

Code	Name of Course		Instruction Hours Per Week				Max Marks			Credits
			L	T	P	Tot	C	S	Tot	
EPRIT-212	Object Oriented Analysis &Design lab		-	-	3	3	100	-	100	2

Mini-Project - I: A Point-of-Sale (POS) System
A POS system is a computerized application used to record sales and handle payments; it is
typically used in a retail store, it includes hardware components such as a computer and bar code scanner, and software to run the system. It interfaces to various service applications, such as a third-party tax calculator and inventory control. These systems must be relatively fault tolerant; that is, even if remote services are temporarily unavailable they must still be of capturing sales and handling at least cash payments. A POS system must support multiple and varied client-side terminals and interfaces such as browser, PDAs, touch-screens.

Mini-Project - II: Online Bookshop Example
Following the model of amazon.com or bn.com, design and implement an online bookstore.

Mini-Project - III: A Simulated Company
Simulate a small manufacturing company. The resulting application will enable the user to take out a loan, purchase a machine, and over a series of monthly production runs, follow the performance of their company.

Mini-Project - IV: A Multi-Threaded Airport Simulation
several Simulate the operations in an airport. Your application should support multiple aircrafts using runways and gates avoiding collisions/conflicts.
Landing: an aircraft uses the runway, lands, and then taxis over to the terminal. Take-Off: an aircraft taxies to the runway and then takes off

Mini-Project -V: An Automated Community Portal
Business in the 21st Century is above all BUSY. Distractions are everywhere. The current crop of "enterprise intranet portals" are often high noise and low value, despite the large capital expenditures it takes to stand them up. Email takes up 30 - 70% of an employee's time. Chat and Instant Messaging are either in the enterprise or just around the corner. Meanwhile, management is tasked with unforeseen and unfunded leadership and change-agent roles as well as leadership development and succession management. What is needed is a simplified, repeatable process that enhances communications within
an enterprise, while allowing management and peers to self-select future leaders and easily recognize high performance team members in a dynamic way. Additionally, the system should function as a general-purpose confent management, business intelligence and peer-review application. Glasscode's goal is to build that system. The software is released under a proprietary license, and will have the following features: Remote, unattended moderation of discussions However, it will have powerful discovery and business intelligence features, and be infinitely extendable, owing to a powerful API and adherence to Java platform standards. Encourages peer review and indicates for manage-ment potential leaders, strong team players and reinforces enterprise and team goals seamlessly and with zero administration.

Mini-Project -VI: A Content Management System

The goal is to enable non-technical end users to easily publish, access, and share information over the web, while giving administrators and managers complete control over the presentation, style, security, and permissions.

Features:

Robust Permissions System
Templates for easy custom site designs
Total control over the content
Search engine friendly URL's
Role based publishing system
Versioning control
Visitor profiling

Mini-Project-VII: An Auction Application

Several commerce models exist and are the basis for a number of companies like eBay.com, pricellne.com etc. Design and implement an auction application that provides auctioning services. It should clearly model the various auctioneers, the bidding process, auctioning etc.

Mini-Project -VIII: A Notes and File Management System

In the course of one's student years and professional career one produces a lot of personal notes and documents. All these documents are usually kept on papers or individual files on the computer. Either way the bulk of the information is often erased corrupted and eventually lost. The goal of this project is to build a distributed software application that addresses this | problem. The system will provide an interface to create, organize and manage personal notes through the Internet for multiple users. The system will also allow users to collaborate by assigning permissions for multiple users to view and edit notes.

Mini-Project - IX: A Customizable Program Editor

A programmer's editor which will be focused on an individual programmer's particular needs and style. The editor will act according to the specific language the current source file is in, and will perform numerous features, such as auto-completion or file summarization, on the file. These features will be able to be turned on or off by the programmer, and the programming style of the user will be used to create *as* efficient an editing environment as possible.

Mini-Project - X: A Graphics Editor

Design and implement a Java class collection that supports the construction of graph editing applications, i.e., applications that include the ability to draw structured and unstructured diagrams. E.g.,The goal of the GEF project is to build a graph editing library that can be used to construct many, high quality graph editing applications. Some of GEF's features are:

A simple, concrete design that makes the framework easy to understand and extend.

Node-Port-Edge graph model that is powerful enough for the vast majority of connected graph applications. Model-View-Controller design based on the Swing Java Ul library makes GEF able to act as a Ul to existing data structures, and also minimizing learning time for developers familiar with Swing. High-quality user interactions for moving, resizeing, reshaping, etc. GEF also supports several novel interactions such as the broom alignment tool and secltion-action-buttons. Generic properties sheet based on JavaBeans introspection. XML-based file formats based on the PGML standard.

Text Book(s):

1."Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and the Unified Process", Craig Larman, Pearson Education Asia, 2002, *2nd Edition.*

Reference(s):

1."Object Oriented Systems Analysis and Design using UML", Simon Sennet, Steve McRobb, and Ray Farmer, McGraw Hill, 2002, 2nd Edition.

2."Object-Oriented Analysis & Design," Andrew Haigh, Tata McGraw-Hill, 2001,

M.Tech (Information Technology) Third Semester

ELECTIVE I/II/III

Code No	Name of Course		Instruction Hours Per Week				Max Marks			Credits
			L	T	P	Tot	C	S	Tot	
EPRIT-311	**Cryptography and network security**		3	1	-	4	40	60	100	4

UNIT – I

Introduction: Security goals, Attacks, Services and mechanism, techniques. Symmetric key encipherment: Integer arithmetic, modular arithmetic. Traditional symmetric–key ciphers: substitution cipher, transposition cipher, stream and block cipher. Modern symmetric key cipher: modern block cipher and stream cipher.

Unit -II

DES structure , DES analysis, multiple DES, security of DES, AES, transformation, key expansion, cipher, analysis of AES. Encipherment using modern symmetric key ciphers: use of modern block cipher and stream cipher.RC4, key management, key generation.

Unit -III

Asymmetric key cryptography: Introduction, RSA cryptosystem, RABIN cryptosystem, ELGAMA cryptosystem, Message integrity, message authentication. Cryptographic hash functions: introduction, SHA-512.

Unit -IV

Digital signature: Comparison, process, services, digital process scheme: RSA Digital signature scheme, Elgamal Digital signature scheme, Digital signature standards (DSS).Key- management: symmetric key distribution, Kerberos, symmetric key agreement, Public key distribution.

Unit -V

Security at application layer: E-MAIL, PGP, S/ MIME .Security at transport layer: SSL architecture, handshake protocols, SSL message formats, Transport layer security. Security at network layer: IPsec, authentication header (AH)., ESP, IPv4,IPv6,AH versus ESP, security provided by IPsec, security association, security policy, internet key exchange, ISAKMP, .Firewalls

Text book:

1.Cryptography and Network Security Behrouz A. Forouzan, TMH
2. Cryptography and Network Security Third Edition, William Stallings, Pearson Education

M.Tech (Information Technology) Third Semester
ELECTIVE I/II/III

Code No	Name of Course		Instruction Hours Per Week				Max Marks			Credits
			L	T	P	Tot	C	S	Tot	
EPRIT-312	**Artificial Neural networks**		3	1	-	4	40	60	100	4

Unit I
Introduction to artificial neural networks :Biological neural networks,Pattern analysis tasks: Classification, Regression, Clustering, Computational models of neurons,Structures of neural networks. Learning principles.

UnitII
Linear models for regression and classification :Polynomial curve fitting. Bayesian curve fitting,Linear basis function models,Bias-variance decomposition. Bayesian linear regression,Least squares for classification,Logistic regression for classification. Bayesian logistic regression for classification.

Unit III
Feedforward neural networks :Pattern classification using perceptron. Multilayer feedforward neural networks (MLFFNNs). Pattern classification and regression using MLFFNNs,Error backpropagation learning,Fast learning methods: Conjugate gradient method,Autoassociative neural networks,Bayesian neural networks.

Unit IV
Kernel methods for pattern analysis. Statistical learning theory,Support vector machines for pattern classification,Support vector regression for function approximation,Relevance vector machines for classification and regression.

Unit V
Self-organizing maps :Pattern clustering ,Topological mapping . Kohonen's self-organizing map ,Feedback neural networks ,Pattern storage and retrieval,Hopfield model,Boltzmann machine,Recurrent neural networks

Text Books:
1. B.Yegnanarayana, Artificial Neural Networks, Prentice Hall of India, 1999
2. Satish Kumar, Neural Networks – A Classroom Approach, Tata McGraw-Hill, 2003
3. S.Haykin, Neural Networks – A Comprehensive Foundation, Prentice Hall, 1998
4. C.M.Bishop, Pattern Recognition and Machine Learning, Springer, 2006

M.Tech (Information Technology) Third Semester

ELECTIVE I/II/III

Code No	Name of Course		Instruction Hours Per Week				Max Marks			Credits
			L	T	P	Tot	C	S	Tot	
EPRIT-313	**Bioinformatics**		3	1	-	4	40	60	100	4

UNIT I

Introduction: Basic biology, Genetic material, genes, what molecules code for genes,structure of DNA,what carries information between DNA and proteins,Proteins, analysis of DNA,Why bioinformatics.

UNIT II

Exhaustive Search: Restriction mapping, impractical Restriction mapping algorithm , practical Restriction mapping algorithm, Regulatory motifs in DNA sequences, profiles, The motif finding problem, search trees, finding motifs , finding a median string.

UNIT III

Greedy algorithms: Genome rearrangement,Sorting by reversals, Approximation algorithm,breakpoints, greedy approach for motif finding.

UNIT IV

Dynamic programming algorithm:Edit distance and assignments, longest common subsequence, global sequence alignment, scoring alignment, local sequence alignment,
Alignment with gap penalties,Multiple alignment ,gene prediction,statistical approach to gene prediction, Similarity based approach to gene prediction

Unit V

Clustering and trees: Gene expression analysis,Hierarchical clustering, k-mean clustering, clustering and corrupted cliques,evolutionary tree,distance based tree construction, reconstructing tree for additive matrices, evolutionary tree and hierarchical clustering, character based tree clustering.

Text Books:

1. Jones, N. and Pevzner, P.(2004) An introduction to Bioinformatics Algorithms, MIT Press.

References:

1. Durbin, R., Eddy, S., Krogh, A., Mitchison, G. (1998) Biological Sequence Analysis: Probabilistic models of proteins and nucleic acids, Cambridge University Press.
2. Gusfield, D. (1997) Algorithms on Strings, Trees, and Sequences.Cambridge University Press.
3. Waterman, M. (1995) Introduction to Computational Biology: Maps,sequences and genomes. Chapman and Hall (CRC).
4. Aluru, S. (2006) Handbook of Computational Molecular Biology.Chapman and Hall (CRC).

M.Tech (Information Technology) Third Semester

ELECTIVE I/II/III

Code No	Name of Course		Instruction Hours Per Week				Max Marks			Credits
			L	T	P	Tot	C	S	Tot	
EPRIT-314	**E-Commerce**		3	1	-	4	40	60	100	4

UNIT I:
Electronic commerce environment and opportunities: back ground – The electronic commerce Environment Modes of electronic commerce: overview-EDI-Migration to open EDI-E commerce with WWW/internet- Commerce Net Advocacy –Web commerce going forward

UNIT II:
Approaches to safe electronic commerce-Overview-Secure-transport protocols-Secure Transactions-Secure Electronic Payment Protocol- Secure Electronic Transaction-Certificates for Authentication-Security on Web Servers and Enterprise networks.

UNIT III:
Electronic cash and electronic payment schemes-Internet Monitory payment and Security requirements- Payment and purchase order process-Online electronic cash.

UNIT IV:
Master card/visa secure electronic transaction: Introduction-Business requirements-concepts-payment processing.E-mail and Secure E-mail Technologies for Electronic Commerce: Introduction, The means of Distribution, A model for message handling and How does E-mail work.

UNIT V:
Internet and Web Site Establishment: Introduction-Technologies for Web Servers-Internet Tools Relevant to commerce-Internet Applications for commerce-Internet Charges-Internet Access and Architecture- Searching the internet.

Text Books:
Web Commerce Technology Hand Book, Daniel Minoli, McGraw Hill
Reference:
Frontiers of Electronic Commerce Ravi kalakotar, Andrew B. Whinston
Addison- Wesley

M.Tech (Information Technology) Third Semester

ELECTIVE I/II/III

Code No	Name of Course		Instruction Hours Per Week				Max Marks			Credits
			L	T	P	Tot	C	S	Tot	
EPRIT-315	**Image Processing**		3	1	-	4	40	60	100	4

UNIT-I

Introduction: What is Digital Image Processing, Examples of fields that use digital image processing, fundamental steps in digital image processing, components of image processing system.. Digital Image Fundamentals: A simple image formation model, image sampling and quantization, basic relationships between pixels.

UNIT-II
Image Enhancement In The Spatial Domain: Basic gray-level transformation, histogram processing, enhancement using arithmetic and logic operators, basic spatial filtering, smoothing and sharpening spatial filters.

UNIT-III
Image Restoration: A model of the image degradation/restoration process, noise models, restoration in the presence of noise–only spatial filtering, Weiner filtering, constrained least squares filtering, geometric transforms; Introduction to the Fourier transform and the frequency domain, estimating the degradation function.
Color Image Processing: Color fundamentals, color models.

UNIT-IV
Image Compression: Fundamentals, image compression models, Lossless Compression: Huffman coding, Run length coding contour coding, A brief discussion on Lossy Compression Image compression standards.
Morphological Image Processing: Preliminaries, dilation, erosion, open and closing, hit or miss transformation, basic morphologic algorithms.

UNIT-V
Image Segmentation: Detection of discontinuous, edge linking and boundary detection, threshold, region–based segmentation.

Text Book:
1. Digital Image Processing, Rafeal C. Gonzalez, Richard E. Woods, Second Edition, Pearson Education/PHI.

References:
1. Image Processing, Analysis, and Machine Vision, Milan Sonka, Vaclav Hlavac and Roger Boyle, Second Edition, Thomson Learning.
2. Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson Course Technology
3. Computer Vision and Image Processing, Adrian Low, Second Edition, B.S. Publications
4. Digital Image Processing using Matlab, Rafeal C.Gonzalez, Richard E.Woods,

Steven L. Eddins, Pearson Education.

M.Tech (Information Technology) Third Semester
ELECTIVE I/II/III

Code No	Name of Course		Instruction Hours Per Week				Max Marks			Credits
			L	T	P	Tot	C	S	Tot	
EPRIT-316	**Embedded & Real Time Systems**		3	1	-	4	40	60	100	4

Unit I Introduction: Time representation and temporal relations, real-time behavior pf programs, overview of current practices in real-time systems.**Overview of Real-Time Operating Systems:**Task Management, IPC facilities, real-time clock server, interrupt service.

Unit II Embedded Software Programming:
Never-ending tasks, inter-task communication, co-routines, overlapped I./O, data acquisition and device control, forked interrupt system, exception handling, timing calculation, and programming language support.

Unit III Scheduling and Synchronization:
Scheduling theory, scheduling in multiprocessor and distributed systems, rate-monotonic algorithm, EDF, scheduling of periodic and sporadic tasks, priority inversion, priority inheritance and priority ceiling protocol.

UnitIV Real-time kernel:
Kernel and microkernel structures, periodic and sporadic servers kernel implementation, time-driven resource management, and POSIX API.

Unit V Hardware / Software Co-design Principles:
Design model generation, Partitioning, interface and timing specification, integration and prototyping and design process management**Research topics:**Real-time communication, distributed embedded systems, and formal methods.

Reference Books
1. Jane Liu, “Real-time Systems”, Prentice Hall; 1st Edition, 2000
2. Rajkamal , “Embedded Systems”, Tata McGraw Hill, 2003

M.Tech (Information Technology) Third Semester
ELECTIVE I/II/III

Code No	Name of Course		Instruction Hours Per Week				Max Marks			Credits
			L	T	P	Tot	C	S	Tot	
EPRIT-317	**INFORMATION TECHNOLOGY AND CYBER LAWS**		3	1	-	4	40	60	100	4

UNIT I

Crimes of this millennium – checks and balances against arbitrary arrests –concept of cyber crime and the IT Act-Hacking – Teenage Web Vandals – Cyber Fraud and Cyber Cheating – Virus on the Internet-other IT Act offences – Network service providers-Criminal justice in India and Implications.

UNIT II
Contracts in the Infotech World – Click Wrap and Shrink Wrap contracts – contract formation under the Indian context – contract formation on the Internet – Terms and conditions of the Contract – jurisdiction and information technology act – foreign judgements in India – IPR disputes – misuse of the law of jurisdiction – jurisdictional disputes with respect to the internet in USA.

UNIT III
Concept of Domain Name and Reply to Cyber squatters – meta-tagging – copyright ownership and assignment – licence of copyright – copyright term and respect for foreign works – copyright infringement remedies and offences – copyright protection of content onthe Internet – computer software piracy.

UNIT IV
Concept of permanent Establishment – PE in cross border E-Commerce - the united nations model Tax treaty – law of double taxation avoidance agreements – Tax Agents of non-residents under the Income tax act and the relevance to E commerce – impact of the internet on customs duties – taxation policies in India.

UNIT V
Digital signatures – Digital signature certificate – certifying authorities and liability in the event of Digital signature compromise – status of Electronic records as Evidence –proving Digital signatures – proof of Electronic agreements – proving electronic messages –goods and services – consumer complaint – defect in goods and deficiency in services,restrictive and unfair trade –practices ,reliefs under CPA – consumer foras, jurisdictions and implications on cyber consumers in India .

Text book:
1.Cyberlaw Simplified – Vivek Sood, Tata McGraw Hill, 2001.

References:
1.Godbole,“ Information Systems Security”, Willey
2.Merkov, Breithaupt,“ Information Security”, Pearson Education
3.Yadav, “Foundations of Information Technology”, New Age, Delhi
4.Schou, Shoemaker, “ Information Assurance for the Enterprise”, Tata McGraw Hill
5.Furnell, “Computer Insecurity”, Springer IT Act 2000