

**CURRICULUM AND SYLLABUS (R2015)
CHOICE BASED CREDIT SYSTEM**

**M.TECH – INFORMATION TECHNOLOGY
FULL TIME
I - IV SEMESTERS**

SEMESTER-I							
SL.NO	SUB CODE	Category	SUBJECT NAME	L	T	P	C
Theory							
1	MMA107	PM	Operation Research	4	0	0	4
2	MCS101	PC	Data Structure and Algorithms	4	0	0	4
3	MIT101	PC	Computer Networks & Security	4	0	0	4
4	MCS102	PC	Advanced Computer Architecture	4	0	0	4
5	MIT102	PC	Advances in Database	4	0	0	4
Practical							
6	MIT1L1	PC	Networking Lab	0	0	3	2
7	MIT1L2	PC	Data Structures Lab	0	0	3	2
Total Credits-24							

SEMESTER-II							
SL.NO	SUB CODE	Category	SUBJECT NAME	L	T	P	C
Theory							
1	MIT201	PC	Object Oriented Software Engineering	4	0	0	4
2	MIT202	PC	Web Technology	4	0	0	4
3	MIT203	PC	Data Warehousing and Data Mining	4	0	0	4
4	MIT204	PC	UNIX Internals	4	0	0	4
5	MIT2E1	PE-I	Elective-I	3	0	0	3
Practical							
6	MIT2L1	PC	Web Technology Lab	0	0	3	2
Total Credits-21							

SEMESTER-III							
SL.NO	SUB CODE	Category	SUBJECT NAME	L	T	P	C
Theory							
1	MIT301	PC	Cloud Computing	3	0	0	3
2	MIT3E2	PE-III	Elective-II	3	0	0	3
3	MIT3E3	PE-III	Elective-III	3	0	0	3
3	MIT3E4	OE	Elective-IV	3	0	0	3
Project							
5	MIT3P1	PR	Project Phase-I	0	0	12	6
Total Credits-18							

SEMESTER-IV							
SL.NO	SUB CODE	Category	SUBJECT NAME	L	T	P	C
Project							
1	MIT4P2	PR	Project Phase-II	0	0	24	12

TOTAL NO. OF CREDITS FOR THE PROGRAMME : 75

SUMMARY OF CURRICULUM STRUCTURE AND CREDIT & CONTACT HOUR DISTRIBUTION

S.No	Sub Area	Credit per Semester				No. of Credit	% of credit
		I	II	III	IV		
1	Professional Mathematics(PM)	4	-	-	-	4	6.06
2	Professional Core (PC)	20	18	3		41	54.67
3	Professional Elective (PE)	-	3	6		9	13.63
4	Open Elective (OE)	-	-	3		3	4.55
5	Project Work, Seminar, Internship, Term Paper, etc. (PR)	-	-	6	12	18	27.28
	Total Credit	24	21	18	12	75	100%
	Total Contact Hour	26	22	24	24	96Hrs	

LIST OF ELECTIVES

SUB.CODE	SUBJECT NAME	L	T	P	C
PROFESSIONAL ELECTIVE-I					
MIT001	Network Protocols	3	0	0	3
MIT002	Distributed Computing	3	0	0	3
MIT003	Soft Computing	3	0	0	3
MIT004	Software Project Management	3	0	0	3
PROFESSIONAL ELECTIVE-II					
MIT005	High Speed Networks				
MIT006	Grid Computing	3	0	0	3
MIT007	Fuzzy and Genetic Algorithm	3	0	0	3
MIT008	Software Reliability	3	0	0	3
PROFESSIONAL ELECTIVE-III					
MIT009	Network Administration	3	0	0	3
MIT010	Cloud Computing	3	0	0	3
MIT011	Bio-Inspired Artificial Intelligence	3	0	0	3
MIT012	Software Metrics	3	0	0	3

OPEN ELECTIVE - I					
MST070	Research Methodology	3	0	0	3
MIT013	Virtualization Techniques	3	0	0	3
MBA067	Financial Project Management	3	0	0	3
MBA068	IT Service Management	3	0	0	3

Course Code	Course Name: OPERATIONS RESEARCH	L	T	P	C
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MMA107	Total Contact Hours:60		4	0	0	4
	Prerequisite:Engineering Mathematics					
	Course Designed by :Dept of Information Technology					
OBJECTIVES						
<ul style="list-style-type: none"> • Ability to understand and analyze managerial problems in industry so that they are able to use resources (capitals, materials, staffing, and machines) more effectively; • Knowledge of formulating mathematical models for quantitative analysis of managerial problems in industry; • Skills in the use of Operations Research approaches and computer tools in solving real problems in industry; • Mathematical models for analysis of real problems in Operations Research. 						
COURSE OUTCOMES (COs)						
CO1	Recognize the importance and value of Operations Research and mathematical modeling in solving practical problems in industry.					
CO2	Formulate a managerial decision problem into a mathematical model					
CO3	Understand Operations Research models and apply them to real-life problems;					
CO4	Use computer tools to solve a mathematical model for a practical problem.					
CO5	Identify and develop operational research models from the verbal description of the real system.					
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e
2	CO1	H	H	M	H	
	CO2	H	H	M	H	
	CO3	H	H	M	H	
	CO4	H	H		H	
	CO5	H	H	H	H	
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
		√				
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

COURSE OUTCOMES (COs)						
CO1	Upon completion of the subject, students will be able to: Professional/academic knowledge and skills					
CO2	Understand the properties of various data structures;					
CO3	Identify the strengths and weaknesses of different data structures;					
CO4	Design and employ appropriate data structures for solving computing problems;					
CO5	Possess the knowledge of various existing algorithms;					
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e
2	CO1	H	M	M	L	
	CO2	H				
	CO3	H	M	M	L	
	CO4	H				
	CO5	H		M		
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
			√			
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT – 1 INTRODUCTION

12

Basic concepts of objects oriented programming – Abstract data types – List – Implements – Arrays – Cursors, Pointers

UNIT – 2 BASIC DATA STRUCTURES

12

Stack, Queue- Implementation – Application Tress – Traversal – General – Binary – Expression Search Tree – AVL Trees – Splay Trees – B Trees

UNIT – 3 ADVANCED DATA STRUCTURES

12

Set – Basic Operation – Advanced Set Representation – Priority Queue – Applications – Graphs – Traversals- Representation

UNIT – 4 MEMORY MANAGEMENT

12

Issues – Storage allocation – Dynamic – Compaction, **Garbage collection – Buddy Systems.**

UNIT – 5 ALGORITHM ANALYSIS AND DESIGN

12

Algorithm Analysis – Sorting- Searching – design Techniques – Divide & Conquer – Greedy – Dynamic programming – Backtracking – **Branch And Bound Knapsack** – **Traveling Salesman Problem** – **Graph Coloring – Queens Problem**

References:

- 1.Aho, Hopcroft , Ullman ,”Data Structure & Algorithm “ , Pearson Education, 2005
- 2.SartajSahni,” Data Structure, Algorithm and Application in C++”, Second Edition, Universities Press.
- 3.Howrowitz, Sahni, Mehta, “Fundamental of Data Structure in C++”, Universities Press.
- 4.M.A Weis , “Data Structure &Algorithm & Algorithm Analysis in C++”, Benjamin Cummings , 112124
- 5.Sara Baase , “ computer Algorithm – Introduction To Design and Analysis “, Pearson Education , 2005
6. <http://lib.mdp.ac.id/ebook/Karya%20Umum/Dsa.pdf>

Course Code MIT101	Course Name: COMPUTER NETWORKS & SECURITY	L	T	P	C	
	Total Contact Hours: 60	4	0	0	4	
	Prerequisite: Computer Networks					
	Course Designed by :Dept of Information Technology					
OBJECTIVES						
<ul style="list-style-type: none"> • At the end of the course, the students will be able to: • Build an understanding of the fundamental concepts of computer networking. • Familiarize the student with the basic taxonomy and terminology of the computer networking area. • Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking. • Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks. 						
COURSE OUTCOMES (COs)						
CO1	Identify some of the factors driving the need for network security.					
CO2	Identify and classify particular examples of attacks.					
CO3	Define the terms vulnerability, threat and attack.					
CO4	Identify physical points of vulnerability in simple networks.					
CO5	Explain the implications of implementing encryption at different levels of the OSI reference model.					
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e
2	CO1	H	M			M

	CO2	H	H	L	H	M
	CO3	H	H	M	M	M
	CO4	H	H	M	M	
	CO5	M				
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
			√			
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT 1 COMPUTER NETWORKS

12

Introduction: the Uses of Computer Networks – Networks hardware – Network software Reference Models – Example of networks – **Network standardization**. -The physical layer: The theoretical basis for data communication – Guided Transmission media – Wireless transmission – PSTN – Mobile telephone –**Communication satellite**. **The Data Link layer: Data link layer design issue – Error detection and correction** – Elementary data link protocols – Sliding window protocols – Example of data link protocols – ETHERNET – 802.11, 802.16,**Bluetooth – data link layer switching**

UNIT II COMPUTER LAYERS

12

The Network layer: Network layer design issue- Routing algorithms- Congestion control algorithm- Internetworking – Networks layer in Internet. The Transport layer: Transport layer design issue – Transport protocols- Simple transport protocols – Internet transport protocols UDP, TCP.

UNIT III NETWORK SECURITY

12

The application layer: Domain name system- Electronic mail- **World Wide Web** – Multimedia – **Cryptography, digital signature** – Communication security. Attacks – services – Mechanisms- Conventional Encryption – **Classical and modern Techniques** – **Encryption Algorithm** – Confidentiality.

UNIT IV ENCRYPTION

12

PUBLIC KEY ENCRYPTION: RSA- Elliptic curve Cryptography – Number Theory Concepts MESSAGE AUTHENTICATION: Hash Functions – Digest Function – Digital Signature – Authentication Protocols,

UNIT V SYSTEM SECURITY

12

SYSTEM SECURITY: Intruders- Viruses –Worms -Firewalls: Design Principles and Types – Trusted System

References:

1. Andrew S. Tanenbaum, "Computer Networks", Pearson Education. 4th edition 2002.
2. William Stallings, "Data and computers communication", 7th Edition, Pearson Education, 2005.
3. Douglas E. Comer, "Internetworking with TCP/IP – Volume", 4th Edition, Pearson Education, 2005.
4. Forouson, "Data and Computer communication", Tata McGraw Hill.
5. William Stallings, "Cryptography & Network Security – Principle & Practice", Fourth Edition, Pearson Education, 2006.
6. <http://antoanthongtin.vn/Portals/0/UploadImages/kiennt2/Sach/Sach-CSDL4/Springer%20-%20Computer%20Network%20Security.pdf>

Course Code	Course Name: ADVANCED COMPUTER ARCHITECTURE				L	T	P	C
MIT102	Total Contact Hours: 60				4	0	0	4
Prerequisite: Computer Organization and Architecture								
Course Designed by :Dept of Information Technology								
OBJECTIVES								
The aim of this module is to emphasize on the concept of a complete system consisting of asynchronous interactions between concurrently executing hardware components and device driver software in order to illustrate the behavior of a computer system as a whole.								
COURSE OUTCOMES (COs)								
CO1	Understand the advanced concepts of computer architecture.							
CO2	Exposing the major differentials of RISC and CISC architectural characteristics.							
CO3	Investigating modern design structures of Pipelined and Multiprocessors systems.							
CO4	Become acquainted with recent computer architectures and I/O devices, as well as the low-level language required to drive/manage these types of advanced hardware.							
CO5	Preparing selected reports that imply some emergent topics supporting material essence.							
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low								
1	COs/Pos	a	b	c	d	e		
2	CO1	H	M	H	H	L		
	CO2	H	H	H	M	L		
	CO3	H	M	L	M	L		
	CO4	H	M	M	L	L		
	CO5	H				M		

3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
			√			
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT I PIPELINING AND ILP

12

Fundamentals of Computer Design - Measuring and Reporting Performance - Instruction Level Parallelism and Its Exploitation - Concepts and Challenges - Overcoming Data Hazards with Dynamic Scheduling – Dynamic Branch Prediction - Speculation - Multiple Issue Processors – Case Studies.

UNIT II ADVANCED TECHNIQUES FOR EXPLOITING ILP

12

Compiler Techniques for Exposing ILP - Limitations on ILP for Realizable Processors - Hardware versus Software Speculation - Multithreading: Using ILP Support to Exploit Thread-level Parallelism - Performance and Efficiency in Advanced Multiple Issue Processors - Case Studies.

UNIT III MULTIPROCESSORS

12

Symmetric and distributed shared memory architectures – Cache coherence issues - Performance Issues – Synchronization issues – Models of Memory Consistency - Interconnection networks – Buses, crossbar and multi-stage switches.

UNIT IV MULTI-CORE ARCHITECTURES

12

Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture – IBM cell architecture.- hp architecture.

UNIT V MEMORY HIERARCHY DESIGN

12

Introduction - Optimizations of Cache Performance - Memory Technology and Optimizations - Protection: Virtual Memory and Virtual Machines - Design of Memory Hierarchies - Case Studies.

REFERENCES

1. John L. Hennessy and David A. Patterson, “ Computer Architecture – A quantitative approach”, Morgan Kaufmann / Elsevier, 4th. edition, 2007.
2. David E. Culler, Jaswinder Pal Singh, “Parallel Computing Architecture : A hardware/ software approach” , Morgan Kaufmann / Elsevier, 11297.
3. William Stallings, “ Computer Organization and Architecture – Designing for Performance”, Pearson Education, Seventh Edition, 2006.
4. <http://cs.baylor.edu/~maurer/aida/courses/archintro.pdf>

Course Code MIT103	Course Name: ADVANCES IN DATABASE				L	T	P	C
	Total Contact Hours: 60				4	0	0	4
	Prerequisite: Database Management System							
	Course Designed by :Dept of Information Technology							
OBJECTIVES								
This course is devoted to new database technology with emphasis on object orientation. The focus is mainly on the data modeling aspect. Other aspects handled are, e.g., transaction management, active mechanisms, and heterogeneous database management systems. The course provides a picture of existing database systems and concrete perspectives and is intended for the potential user of new database systems.								
COURSE OUTCOMES (COs)								
CO1	Explain and evaluate the fundamental theories and requirements that influence the design of modern database systems							
CO2	Assess and apply database functions and packages suitable for enterprise database development and database management.							
CO3	Critically evaluate alternative designs and architectures for databases and data warehouses							
CO4	Discuss and evaluate methods of storing, managing and interrogating complex data							
CO5	Explain and critically evaluate database solutions for data exchange							
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low								
1	COs/Pos	a	b	c	d	e		
2	CO1	H	H	L				
	CO2	H	M	L	M	L		
	CO3	H	H	L	M	M		
	CO4	H	M	M	M	H		
	CO5	H	M	L				
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)		
			√					
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016						

UNIT- I OBJECT AND OBJECT RELATIONAL DATABASE 12

Object Based Databases: Overview, complex Data Types, Structured Types and Inheritance in SQL, table Inheritance, Array and Multiset Types in SQL, Object –Identity and Reference Types in SQL, Implementing O-R features, Persistent Programming Languages, ObjectRelational Mapping, Object – Oriented versus Object- Relational.

UNIT-II EMERGING TECHNOLOGIES 12

XML: Motivation, Structure of XML data, XML Document schema, Querying and Transformation, Application Program Interface to XML, Storage of XML data, XML applications.

UNIT-III DATABASE QUERY PROCESSING 12

Query processing: Overview, Measures of Query Cost, Selection operating, sorting, Join Operation, Other Operations, Evaluation of Expressions. Query Optimization: Overview, Transformation of Relational Expressions, Estimating Statistics of Expressing Results, Choice of Evaluation plans, Materialized Views.

UNIT-IV PARALLEL AND DIDTRIBUTED DATABASES 12

Parallel Databases: Introduction, I/O Parallelism, Interquery Parallelism, IntraqueryParallelism, Interoperation ParallelismQuery Optimization, Design of Parallel Systems. Distributed Databases: Homogenous and Heterogeneous Databases, distributed data storage, Distributed Transactions, Commit Protocols, concurrency Control in Distributed Databases, Availability, Distributed Query Processing, Heterogeneous Distributed Databases, cloud Based Databases, Directory systems.

UNIT-V ADVANCED DATA MODELS 12

Advanced Application development: Performance Tuning, Performance Benchmarks Other Issues in Application Development, Standardization Spatial and Temporal Data and Mobility:Motivation, Time in Databases, spatial and Geographical |Data, Multimedia Databases, Mobility and Personal databases

REFERENCES

1. Abraham Silbershatz, Henry F Korth, S Sudharshan, “Database System Concepts”, McGrawHill International Edition, Sixth Edition, 2010
2. ElmasriNavathe, Somayajulu, Gupta, “ Fundamentals of Database Systems”, Pearson Education, Fourth Edition, 2006.
3. CJ Date, A Kannan, S Swamynathan, “An Introduction to database Systems”, Pearson Education, Eight Edition, 2006
4. Ramakrishna, Gehrke, “Database Management, “International Edition, Third Edition, 2003
5. <http://aries.ektf.hu/~hz/pdf-tamop/pdf-xx/Radvanyi-hdbms-eng2.pdf>

Course Code MITILI	Course Name: NETWORKING LAB				L	T	P	C
	Total Contact Hours:60				0	0	4	2
	Prerequisite: Computer Networks							
	Course Designed by : Dept of Information Technology							
OBJECTIVES								
<ul style="list-style-type: none"> • be able to analyse a communication system by separating out the different functions provided by the network • understand that there are fundamental limits to any communications system; • understand the general principles behind multiplexing, addressing, routing, reliable transmission and other stateful protocols as well as specific examples of each; • understand what FEC is and how CRCs work; • be able to compare communications systems in how they solve similar problems; • have an informed view of both the internal workings of the Internet and of a number of common Internet applications and protocols. 								
COURSE OUTCOMES (COs)								
CO1	Understand computer network basics, network architecture, TCP/IP and OSI reference models.							
CO2	Identify and understand various techniques and modes of transmission							
CO3	Describe data link protocols, multi-channel access protocols and IEEE 802 standards for LAN							
CO4	Describe routing and congestion in network layer with routing algorithms and classify IPV4 addressing scheme							
CO5	Discuss the elements and protocols of transport layer							
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low								
1	COs/Pos	a	b	c	d	e		
2	CO1	H	M	H	M	M		
	CO2	H		H		M		
	CO3	M	H	M	L	M		
	CO4	H		L		L		
	CO5	M	M		L	L		
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)		

			√			
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

LIST OF EXPERIMENTS:

1. Socket Programming
 - a. TCP Sockets
 - b. UDP Sockets
 - c. Applications using Sockets
2. Simulation of Sliding Window Protocol
3. Simulation of routing Protocols
4. Development of application such as DNS/HTTP/E_mail/Multi_user Chat
5. Simulation of networking management protocols
6. Study of Networking Simulator Packages such as opnet, ns2, etc.

Course Code MIT1L2	Course Name: DATA STRUCTURE LAB	L	T	P	C
	Total Contact Hours:60	0	0	4	2
	Prerequisite: Programming in C and C++				
	Course Designed by : Dept. of Information Technology				

OBJECTIVES

- To develop skills to design and analyze simple linear and non linear data structures
- To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
- To Gain knowledge in practical applications of data structures.

COURSE OUTCOMES (COs)

CO1	Be able to design and analyze the time and space efficiency of the data structure
CO2	Be capable to identify the appropriate data structure for given problem
CO3	Have practical knowledge on the application of data structures
CO4	An understanding of the basic data structures.
CO5	The ability to estimate big-O timings.

Mapping of Course Outcomes with Program outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/Pos	a	b	c	d	e
2	CO1	M	H	H	H	L
	CO2	M	L	H	H	
	CO3	M		M	H	M
	CO4	H	M	L	M	
	CO5	H	H	L	M	M

3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
			√			
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

LIST OF EXPERIMENTS:

1. Min heap
2. Heaps
3. Leftist heap
4. AVL Tree
6. Tries
7. Quick sort
8. Convex hull
9. 0/1 Knapsack using Dynamic Programming
10. Graph coloring using backtracking

Course Code MIT201	Course Name: OBJECT ORIENTED SOFTWARE ENGINEERING	L	T	P	C
	Total Contact Hours:60	4	0	0	4
	Prerequisite: Unified Modeling Language				
	Course Designed by : Dept. of Information Technology				
OBJECTIVES					
<ul style="list-style-type: none"> • To learn about software prototyping, analysis and design • To learn UML and its usage • To estimate and scheduling of objects • To implement and test an object. 					
COURSE OUTCOMES (COs)					
CO1	Demonstrate the conceptual, practical and technical skills of planning and monitoring a project plan using an appropriate CASE tool				
CO2	Demonstrate an understanding of Agile Development				
CO3	Describe in detail the theory, concepts and methods pertaining to the Unified Modelling Language (UML).				
CO4	Create requirements using use case modelling concepts.				
CO5	Demonstrate conceptual and technical skills in the analysis, design and implementation of a software system using Object Oriented Concepts.				

Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e
2	CO1	H	M			H
	CO2	H	M	M	H	
	CO3	H	L			L
	CO4	H	L	L		
	CO5	H	H		H	L
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
			√			
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT I INTRODUCTION

12

Software Engineering Paradigms - Software Development process models - Project & Process - Project management – **Process & Project metrics - Object Oriented concepts & Principles.**

UNIT II PLANNING & SCHEDULING

12

Software prototyping - Software project planning – Scope – Resources - Software Estimation - **Empirical Estimation Models-Planning-Risk Management** - Software Project Scheduling – **Object Oriented Estimation & Scheduling.**

UNIT III ANALYSIS & DESIGN

12

Analysis Modeling - Data Modeling - **Functional Modeling & Information Flow Behavioral Modeling**-Structured Analysis - Object Oriented Analysis - Domain Analysis-Object Oriented Analysis process - **Object Relationship Model - Object Behavior Model. Design Concepts & Principles - Design Process - Design Concepts** - Modular Design – Design Effective Modularity - Introduction to Software Architecture - Data Design – Transform Mapping – **Transaction Mapping – OOD - Design System design process- Object design process - Design Patterns.**

UNIT IV IMPLEMENTATION & TESTING

12

Top-Down , Bottom-Up , object oriented product Implementation & Integration. **Software**

Testing methods-White Box, Basis Path-Control Structure –Black Box, Unit Testing- Integration testing Validation & System testing. Testing OOA & OOD models-Object oriented testing strategies.

UNIT V MAINTENANCE

12

Maintenance process-System documentation-program evolution dynamics Maintenance costs Maintainability measurement – Case Studies

TEXT BOOKS

- 1.Stephen R Schach, “Classical and Object-Oriented Software Engineering – With UML and C++”, McGraw Hill, New Delhi, 2002.
- 2.Ivar Jacobson, “Object Oriented Software Engineering”, Pearson Education, 1992

REFERENCES

- 1.Roger S.Pressman, Software engineering- A practitioner’s Approach, McGraw-Hill International Edition, Fifth Edition , 2001.
- 2.Ian Sommerville, Software engineering, Pearson education Asia, Sixth edition, 2000.
- 3.PankajJalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.
- 4.James F Peters and WitoldPedryez, “Software Engineering – An Engineering Approach”, John Wiley and Sons, New Delhi, 2000.
- 5.Ali Behforooz and Frederick J Hudson, “Software Engineering Fundamentals”, Oxford University Press, New Delhi, 1996.
- 6.http://www.uccs.info/ucc/ucc3/ucc_folder/cs3500/books/Prentice%20Object%20Oriented%20Softwar e%20Engineering%20Using%20UML%20Patterns%20and%20Java%203rd%202012.pdf

Course Code MIT202	Course Name: WEB TECHNOLOGY	L	T	P	C
	Total Contact Hours:60	4	0	0	4
	Prerequisite: Scripting Language				
	Course Designed by : Dept. of Information Technology				
OBJECTIVES					
<ul style="list-style-type: none"> • To understand the concepts and architecture of the World Wide Web. • To understand and practice mark up languages • To understand and practice embedded dynamic scripting on client side Internet Programming • To understand and practice web development techniques on client-side 					
COURSE OUTCOMES (COs)					
CO1	Acquire knowledge about functionalities of world wide web				
CO2	Explore markup languages features and create interactive web pages using them				

CO3	Learn and design Client side validation using scripting languages					
CO4	Acquire knowledge about Open source JavaScript libraries					
CO5	Able to design front end web page and connect to the back end databases					
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e
2	CO1	M	M	H	M	L
	CO2	M		H		
	CO3	M	M		M	M
	CO4	M		H		
	CO5	M	M	H	M	M
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
			√			
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT I INTRODUCTION

12

History of the Internet and World Wide Web – HTML 4 protocols –HTTP, SMTP, POP3, MIME, IMAP- Introduction to JAVA Scripts – Object Based Scripting for the web. Structures – Functions –Arrays – Objects.

UNIT II DYNAMIC HTML

12

Introduction – Object refers, Collectors all and Children. Dynamicstyle, Dynamic position, frames, navigator, Event Model – On check– On load – One nor – Mousier – Form process – Event Bubblers –Filters – Transport with the Filter – Creating Images – Addingshadows – Creating Gradients – Creating Motion with Blur – DataBinding – Simple Data Binding – Moving with a record set – Sortingtable data – Binding of an Image and table.

UNIT III MULTIMEDIA

12

Audio and video speech synthesis and recognition – ElectronicCommerce – E-Business Model – E- Marketing – Online Paymentsand Security – Web Servers – HTTP request types – SystemArchitecture – Client Side Scripting and Server side Scripting –Accessing Web servers – IIS – Apache web server.

UNIT IV DATABASE- ASP – XML

12

Database- Relational Database model – Overview, SQL – ASP –Working of ASP – Objects – File System Objects – Session tracking and cookies – ADO – Access a Database from ASP – Server side Active-X Components – Web Resources – XML – Structure in Data– Name spaces – DTD – Vocabularies – DOM methods.

UNIT V SERVLETS AND JSP

12

Introduction – Servlet Overview Architecture – Handling HTTPRequest – Get and post request – redirecting request – multi-tier applications – JSP – Overview – Objects – scripting – StandardActions – Directives.

TEXT BOOK

1. Deitel & Deitel, Goldberg, Internet and World Wide Web –How to Program, Pearson Education Asia, 2001.

REFERENCES

1. Eric Ladd, Jim O’ Donnel, Using HTML 4, XML and JAVA, Prentice Hall of India, QUE, 1999.
2. Aferganatel, Web Programming: Desktop Management, PHI, 2004.
3. Rajkamal, Web Technology, Tata McGraw-Hill, 2001.
4. [https://78d0cafdec1787a7bff1fbca7d10f12af8369dc8.googleusercontent.com/host/0Byp6EJD-1552LXRCaFgxWXpJSHM/KELAS_3KS3/Pemrograman%20Berbasis%20Web/Web%20Technologies%20-%20A%20Computer%20Science%20Perspective%20-%20J.%20Jackson%20\(Pearson,%202007\)%20BBS.pdf](https://78d0cafdec1787a7bff1fbca7d10f12af8369dc8.googleusercontent.com/host/0Byp6EJD-1552LXRCaFgxWXpJSHM/KELAS_3KS3/Pemrograman%20Berbasis%20Web/Web%20Technologies%20-%20A%20Computer%20Science%20Perspective%20-%20J.%20Jackson%20(Pearson,%202007)%20BBS.pdf)

Course Code MIT203	Course Name: DATA WAREHOUSING AND DATA MINING	L	T	P	C
	Total Contact Hours:	4	0	0	4
	Prerequisite: Database Management System				
	Course Designed by : Dept. of Information Technology				
OBJECTIVES					
Students will be enabled to understand and implement classical models and algorithms in data warehousing and data mining. They will learn how to analyze the data, identify the problems, and choose the relevant models and algorithms to apply. They will further be able to assess the strengths and weaknesses of various methods and algorithms and to analyze their behavior.					
COURSE OUTCOMES (COs)					
CO1	Design and security issues and architectures and network technologies for building, deploying and managing data.				
CO2	warehouses, data mining, data visualisation and decision support computing systems				
CO3	Distributed data management and practice for modern computer systems				

CO4	Advanced modelling techniques for building modern computer systems involving Data Warehouses.					
CO5	Business, industrial and commercial context of building data warehouses and data mining software systems					
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e
2	CO1	H	M			
	CO2	H		H	H	M
	CO3	H	M	L	H	M
	CO4	H		H	H	M
	CO5	H	L	L		L
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
			√			
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT I

12

Data Warehousing and Business Analysis: - 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 – reporting – Query tools and Applications – Online Analytical Processing (OLAP) – OLAP and Multidimensional Data Analysis.

UNIT II

12

Data Mining: - Data Mining Functionalities – Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation. Association Rule Mining: - Efficient and Scalable Frequent Item set Mining Methods – Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint-Based Association Mining.

UNIT III

12

Classification and Prediction: - Issues Regarding Classification and Prediction – Classification

by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

UNIT V

12

Cluster Analysis: - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High-Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.

UNIT V

12

Mining Object, Spatial, Multimedia, Text and Web Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects – Spatial Data Mining – Multimedia Data Mining – Text Mining – Mining the World Wide Web.

REFERENCES

1. Jiawei Han and Micheline Kamber “Data Mining Concepts and Techniques” Second Edition, Elsevier, Reprinted 2008.
2. Alex Berson and Stephen J. Smith “Data Warehousing, Data Mining & OLAP”, Tata McGraw – Hill Edition, Tenth Reprint 2007.
3. K.P. Soman, Shyam Diwakar and V. Ajay “Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2006.
4. G. K. Gupta “Introduction to Data Mining with Case Studies”, Easter Economy Edition, Prentice Hall of India, 2006.
5. Pang-Ning Tan, Michael Steinbach and Vipin Kumar “Introduction to Data Mining”, Pearson Education, 2007.
6. <http://www.essi.upc.edu/~aabello/publications/11.IGIBook1.pdf>

Course Code MIT204	Course Name: UNIX INTERNALS	L	T	P	C
	Total Contact Hours:60	4	0	0	4
	Prerequisite: Operating System				
	Course Designed by : Dept. of Information Technology				
OBJECTIVES					
To get thorough understanding of the kernel..					
To understand the file organization and management.					
To know the various system calls.					
To have a knowledge of process architecture, process control & scheduling and memory management.					
COURSE OUTCOMES (COs)					

CO1	Implementation of Unix process management and scheduling.					
CO2	Implementation of a virtual memory system.					
CO3	Implementation of some local and distributed file systems.					
CO4	Implementation of socket based intercrosses communication.					
CO5	Implementation of the internet protocols TCP and IP					
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e
2	CO1	M	M	H		L
	CO2	M		H	M	
	CO3	M	M	H		L
	CO4	M		M	M	
	CO5	L	H	L		M
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
			√			
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT IOVERVIEW

12

General Overview of the System: History – System structure – User perspective – Operating system services – Assumptions about hardware. **Introduction to the Kernel : Architecture of the UNIX operating system** – Introduction to system concepts. **The Buffer Cache: Buffer headers – Structure of the buffer pool – Scenarios for retrieval of a buffer– Reading and writing disk blocks – Advantages and disadvantages of the buffer cache.**

UNIT IIFILE SUBSYSTEM

12

Internal representation of files: Inodes – Structure of a regular file – Directories – Conversion of a path name to an Inode – **Super block – Inode assignment to a new file – Allocation of disk blocks.**

UNIT IIISYSTEM CALLS FOR THE FILE SYSTEM

12

Open – Read – Write – File and record locking – Adjusting the position of file I/O – Lseek – Close – File creation – Creation of special files – **Changing directory, root, owner, and mode – stat and fstat – Pipes – Dup – Mounting and unmounting file systems – link – unlink.**

UNIT IV PROCESSES**12**

Process states and transitions – Layout of system memory – The context of a process – Saving the context of a process – Manipulation of the process address space - Sleep. Process Control: Process creation – Signals – Process termination – Awaiting process termination – Invoking other programs – user id of a process – Changing the size of a process - Shell – System boot and the INIT process– Process Scheduling.

UNIT V MEMORY MANAGEMENT AND I/O**12**

Memory Management Policies : Swapping – Demand paging. The I/O Subsystem : Driver Interface – Disk Drivers – Terminal Drivers– Streams – Inter process communication.

TEXT BOOKS

1. Maurice J. Bach, “The Design of the Unix Operating System”, First Edition, Pearson Education, 1999.

REFERENCES

1. B. Goodheart, J. Cox, “The Magic Garden Explained”, Prentice Hall of India, 1986.
2. S. J. Leffler, M. K. McKusick, M. J. Karels and J. S. Quarterman., “The Design and Implementation of the 4.3 BSD Unix Operating System”, Addison Wesley, 1998.
3. http://www.tutorialspoint.com/unix/unix_tutorial.pdf

Course Code	Course Name: WEB TECHNOLOGY LAB	L	T	P	C
MIT 2L1	Total Contact Hours:45	0	0	4	2
Prerequisite:Scripting Language					
Course Designed by : Dept. of Information Technology					
OBJECTIVES					
<ul style="list-style-type: none"> • Choose best technologies for solving web client/server problems • Create conforming web pages • Use Javascript for dynamic effects • Use Javascript to validate form input entry • Use appropriate client-side or Server-side applications • Write Perl/CGI scripts • Write PHP scripts • Create adaptive web pages 					
COURSE OUTCOMES (COs)					
CO1	Explain the history of the internet and related internet concepts that are vital in understanding web development.				
CO2	Discuss the insights of internet programming and implement complete application over the web.				
CO3	Demonstrate the important HTML tags for designing static pages and separate design from content using.				
CO4	Cascading Style sheet.				
CO5	Utilize the concepts of JavaScript and Java Use web application development software tools i.e.Ajax, PHP and XML etc. and identify the environments currently available				

	on the market to design web sites.					
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e
2	CO1	M	H	M	M	
	CO2	M	H	M		L
	CO3	M	H	M	M	
	CO4	M	H	L		L
	CO5	L	L	M	L	
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
			√			
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

LIST OF EXPERIMENTS:

- 1.Client Server Scripting Programs
- 2.Simulation of Email and File Transfer Protocols.
- 3.Development of Web Services
- 4.XML and Databases.
- 5.Server Application
- 6.Web Customization.
- 7.Development of E- Business Application

Course Code MIT301	Course Name: CLOUD COMPUTING	L	T	P	C
	Total Contact Hours: 45	3	0	0	3
	Prerequisite: Computer Networks, Distributed Computing				
	Course Designed by : Dept. of Information Technology				
OBJECTIVES					
<ul style="list-style-type: none"> • the fundamental ideas behind Cloud Computing, the evolution of the paradigm, its applicability; benefits, as well as current and future challenges; • the basic ideas and principles in data center design and management; • different CPU, memory and I/O virtualization techniques that serve in offering software, computation and storage services on the cloud; 					

<ul style="list-style-type: none"> • about cloud storage technologies and relevant distributed file systems; • the variety of programming models and develop working experience in one of them. 						
COURSE OUTCOMES (COs)						
CO1	Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.					
CO2	Apply the fundamental concepts in data centers to understand the tradeoffs in power, efficiency and cost.					
CO3	Discuss system virtualization and outline its role in enabling the cloud computing system model.					
CO4	Illustrate the fundamental concepts of <i>cloud storage</i> and demonstrate their use in storage systems such as Amazon S3 and HDFS.					
CO5	Analyze various cloud programming models and apply them to solve problems on the cloud.					
Mapping of Course Outcomes with Program Outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e
2	CO1	H		M		M
	CO2	H	H	M	H	
	CO3	M		H	H	M
	CO4	H	M	L	M	M
	CO5	H		H	M	
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
				√		
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT I CLOUD ARCHITECTURE AND MODEL

9

Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture - **Cloud Models:- Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public vs. Private Cloud – Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.**

UNIT II VIRTUALIZATION

9

Basics of Virtualization - **Types of Virtualization** - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - **Virtualization of CPU, Memory, I/O - Devices** - Virtual Clusters and Resource management – **Virtualization for Data-center - Automation.**

UNIT III CLOUD INFRASTRUCTURE

9

Architectural Design of Compute and Storage Clouds – **Layered Cloud Architecture** – Development – Design Challenges - **Inter Cloud Resource Management** – Resource Provisioning and Platform Deployment – **Global Exchange of Cloud Resources.**

UNIT IV PROGRAMMING MODEL

9

Parallel and Distributed Programming Paradigms – MapReduce, Twister and Iterative Map Reduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - **Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim**

UNIT V SECURITY IN THE CLOUD

9

Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security overnance – **Risk Management – Security Monitoring** – Security Architecture Design – Data Security – Application Security – **Virtual Machine Security - Identity Management and Access Control – Autonomic Security.**

REFERENCES:

- 1.Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012.
2. John W.Rittinghouse and James F.Ransome, “Cloud Computing: Implementation, Management, and Security”, CRC Press, 2010.
3. Toby Velte, Anthony Velte, Robert Elsenpeter, “Cloud Computing, A Practical Approach”, TMH, 2009.
4. Kumar Saurabh, “Cloud Computing – insights into New-Era Infrastructure”, Wiley India,2011.
5. [http://cs.ecust.edu.cn/~yhq/course_files/cloud/Cloud Computing Bible.pdf](http://cs.ecust.edu.cn/~yhq/course_files/cloud/Cloud%20Computing%20Bible.pdf)

Course Code	Course Name: NETWORK PROTOCOLS	L	T	P	C
MIT001	Total Contact Hours: 45	3	0	0	3
	Prerequisite: Computer Networks				
	Course Designed by : Dept. of Information Technology				

OBJECTIVES						
This module introduces students to computer networks and concentrates on building a firm foundation for understanding Data Communications and Computer Networks. It is based around the OSI Reference Model which deals with the major issues in the bottom four (Physical, Data Link, Network and Transport) layers of the model. Students are also introduced to the areas of Network Security and Mobile Communications. This module provides the student with fundamental knowledge of the various aspects of computer networking and enables students to appreciate recent developments in the area.						
COURSE OUTCOMES (COs)						
CO1	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies;					
CO2	Have a basic knowledge of the use of cryptography and network security;					
CO3	Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols;					
CO4	Analyze, specify and design the topological and routing strategies for an IP based networking infrastructure.					
CO5	Have a working knowledge of datagram and internet socket programming					
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e
2	CO1	M	H	M	L	
	CO2	M	H	L	M	M
	CO3	M	H	M	M	M
	CO4	H	M	L		
	CO5	H	M	M		
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
				√		
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT-I BASIC PROTOCOLS

9

Window based protocols, HDLC-family, SDLC, LLC, LAPD, 802.X, protocol family 802.3, 8032.5 Compensation of data link protocols, Network Layer Protocol x.25 protocols, routing protocols, SPX and IPX protocols

UNIT-II INTERNET PROTOCOLS

9

IP-addressing schemes, address resolution protocol, IP_datagram and headers details, IP-routing schemes, route discovery protocol, SLIP and PPP protocols, Internet Control Message Protocol(ICMP),IP version 6,mobile IP

UNIT-III TRANSMISSION CONTROL PROTOCOLS

9

TCP protocol-option TCP and UDP,TCP segment structure-Interpretation of headers, window based flow and congestion control using TCP, socket abstraction, Berkeley socket and Winsock, Winsock programming,

UNIT-IV APPLICATION PROTOCOLS

9

Simple mail transfer protocol, FTP and TFTP, Remote Procedure call, Telnet, Network File system, Worldwide web, servers and browsers, Introduction to web design

UNIT-V NETWORK MANAGEMENT

9

General structure, information extraction and collection instruments, line monitors data scopes, network monitor, communication monitor. Security monitor.Configuration management,change management,fault management,security management,accuracy management,Network capacity planning fundamentals

REFERENCES

1. U.Black,TCP/IP and Related protocols,McGraw Hill,1995
2. Terplan,communication network managements,PHI,1992
3. D.E Corner,internetworking with TCP/IP_VOL1.Phd,3rd edition,1998
4. Udupa,network management system essentials,McGraw Hill,1995
5. <http://bkarak.wizhut.com/www/lectures/networks-07/NetworkProtocolsHandbook.pdf>

Course Code MIT002	Course Name: DISTRIBUTED COMPUTING	L	T	P	C
	Total Contact Hours: 45	3	0	0	3
	Prerequisite: Fundamentals of Computing and Programming, Inte Programming, Computer Networks.				
	Course Designed by : Dept. of Information Technology				
OBJECTIVES <ul style="list-style-type: none">• The differences among: concurrent, networked, distributed, and mobile.• Resource allocation and deadlock detection and avoidance techniques.• Distributed Transaction Processing system Cryptography and Domain Name system.					
COURSE OUTCOMES (COs)					
CO1	Explain the distributed environment				
CO2	Explain the functionalities of file management system.				
CO3	Organize processes in distributed systems.				

CO4	Demonstrate the access of remote objects for the service.					
CO5	Explain the Concept of Domain Name Distributed Locks.					
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e
2	CO1	M	H	M	L	
	CO2	M	H	L	M	M
	CO3	M	H	M	M	M
	CO4	H	M	L		
	CO5	H	M	M		
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
				√		
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT- I INTRODUCTION

9

Characterization of Distributed Systems – Examples – Resource Sharing and the Web – Challenges – System Models – Architectural and Fundamental Models – Networking and Internetworking – Types of Networks – Network Principles – Internet Protocols – Case Studies.

UNIT –II PROCESSES AND DISTRIBUTED OBJECTS

9

Inter-process Communication – The API for the Internet Protocols – External Data Representation and Marshalling – Client –Server Communication – Group Communication – Case Study – Distributed Objects and Remote Invocation – Communication Between Distributed Objects – Remote Procedure Call – Events and Notifications – Java RMI – Case Study.

UNIT- III OPERATING SYSTEM ISSUES

9

The OS Layer – Protection – Processes and Threads – Communication and Invocation – OS Architecture – Security – Overview – Cryptographic Algorithms – Digital Signatures – Cryptography Pragmatics – Case Studies – Distributed File Systems – File Service Architecture – Sun Network File System – The Andrew File System.

UNIT- IV DOMAIN NAME SYSTEM AND LOCKS

9

Name Services – Domain Name System – Directory and Discovery Services – Global Name Service – X.500 Directory Service – Clocks – Events and Process States – Synchronizing Physical Clocks – Logical Time And Logical Clocks – Global States – Distributed Debugging – Distributed Mutual Exclusion – Elections – Multicast Communication Related Problems.

UNIT –V DISTRIBUTED TRANSACTION PROCESSING

9

Transactions – Nested Transactions – Locks – Optimistic Concurrency Control – Timestamp Ordering – Comparison – Flat and Nested Distributed Transactions – Atomic Commit Protocols – Concurrency Control in Distributed Transactions – Distributed Deadlocks – Transaction Recovery – Overview of Replication And Distributed Multimedia Systems.

TEXT BOOKS

1. George Coulouris, Jean Dollimore and Tim Kindberg, “Distributed Systems Concepts and Design”, 3rd Edition, Pearson Education, 2002.
2. Andrew S. Tanenbaum, Maarten van Steen, Distributed Systems, “Principles and Paradigms”, Pearson Education, 2002.

REFERENCES

1. Sape Mullender, “Distributed Systems”, 2nd Edition, Addison Wesley, 1993.
2. Albert Fleishman, Distributed Systems, “Software Design and Implementation”, Springer, Verlag, 1994.
3. M. L. Liu, “Distributed Computing Principles and Applications”, Pearson Education, 2004.
4. Mughesh Singhal, Niranjana G Shivaratri, “Advanced Concepts in Operating Systems”, Tata McGraw Hill Edition, 2001.
5. [http://read.pudn.com/downloads119/ebook/506473/Distributed%20Computing%20Principles,%20Algorithms,%20and%20Systems%20-%20\[Cambridge%20University%20Press\].pdf](http://read.pudn.com/downloads119/ebook/506473/Distributed%20Computing%20Principles,%20Algorithms,%20and%20Systems%20-%20[Cambridge%20University%20Press].pdf)

Course Code	Course Name: SOFT COMPUTING	L	T	P	C
MIT003	Total Contact Hours: 45	3	0	0	3
Prerequisite: Computer Networks, Fuzzy Logic, Neural Networks					
Course Designed by : Dept. of Information Technology					
OBJECTIVES					
1. Soft computing refers to principle components like fuzzy logic, neural networks and genetic algorithm, which have their roots in Artificial Intelligence.					
2. Healthy integration of all these techniques has resulted in extending the capabilities of the Technologies to more effective and efficient problem solving methodologies.					
COURSE OUTCOMES (COs)					
CO1	Identify and describe soft computing techniques and their roles in building intelligent machines.				
CO2	Recognize the feasibility of applying a soft computing methodology for a particular problem				
CO3	Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems				

CO4	Apply genetic algorithms to combinatorial optimization problems					
CO5	Apply neural networks to pattern classification and regression problems					
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e
2	CO1	M	H	H	M	L
	CO2	M	H	H	M	
	CO3	H	H	H	M	L
	CO4	H	H	H	M	
	CO5	H	M	M	L	L
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
				√		
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT-1 INTRODUCTION TO SOFT COMPUTING ANF NEURAL NETWORKS

9

Evaluation of Computing- Soft computing constituents- From conventional AI to Computational intelligence- machine learning basics

UNIT-2 GENETIC ALGORITHMS

9

Introduction to Genetic Algorithms (GA)-Applications of GA Machine learning- Machine learning approach to knowledge acquisition

UNIT-3 NEURAL NETWORKS

9

Machine learning using Neural Networks- Adaptive Networks- Feed Forward networks- supervised learning neural networks- radial basis function networks- Reinforcement learning- Unsupervised learning neural networks- adaptive Resonance architecture- advance in neural networks

UNIT-4 FUZZY LOGIC

9

Fuzzy sets- Operations on fuzzy sets- Fuzzy relations- membership functions- Fuzzy rules and Fuzzy reasoning- Fuzzy interface systems- Fuzzy expert systems- Fuzzy decision making

UNIT-5 NEURO-FUZZY MODELING

9

Adaptive Neuro-Fuzzy Interface systems- coactive Neuro-Fuzzy Modeling- Classification and regression trees- Data Clustering algorithms- Rulebase Structure identification- Neuro-fuzzy Control- case studies

TEXT BOOKS:

- 1.Jyh-Shing Roger Jang, Chuen-Tsai Sun, EijiMizutani, Neuro-Fuzzy and Soft Computing, Prentice-Hall of India, 2003
- 2.George J Klir and Bo Yuan, Fuzzy Sets and Fuzzy Logic-Theory and Applications, Prentice Hall, 1995
- 3.James A Freeman and David M Skupura, Neural Network Algorithms, Applications and programming techniques, Pearson Education Press, 2003

REFERENCES:

- 1.Michel Melanie, An introduction to genetic Algorithmn, Prentice Hall, 1998
- 2.David E Goldberg, Genetic Algorithmns in search, optimization and machine learning, Addison Wesley, 1997
- 3.S, N Sivanandam, S. Sumathi and S N Deepa, Introduction To Fuzzy Logic using MATLAB, Springer, 2007
- 4.S, N Sivanandam, and S N Deepa , Introduction To Genetic Algorithmns, Springer, 2007
- 5.Jacek M Zurada, Introduction to artificial Neural Systems, PWS Publishers, 1992
- 6.<http://www2.cs.uh.edu/~ceick/6367/Soft-Computing.pdf>

Course Code MIT004	Course Name: SOFTWARE PROJECT MANAGEMENT	L	T	P	C
	Total Contact Hours: 45	3	0	0	3
	Prerequisite: Nil				
	Course Designed by : Dept. of Information Technology				
OBJECTIVES					
<ul style="list-style-type: none"> • Deliver successful software projects that support organization's strategic goals • Match organizational needs to the most effective software development model • Plan and manage projects at each stage of the software development life cycle (SDLC) • Create project plans that address real-world management challenges • Develop the skills for tracking and controlling software deliverables 					
COURSE OUTCOMES (COs)					
CO1	After completing the course Software Project Management a student is expected to be able to				
CO2	participate in a software development project as a project manager,				
CO3	take responsibility of a project team and project organization,				
CO4	apply theoretical knowledge on project management and software development into practice,				

CO5	be well aware on ethical issues related to software project management and can apply this ethical knowledge in practical situations,					
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e
2	CO1	M	H		H	H
	CO2	M		M		H
	CO3	H	M		M	M
	CO4	M		M		M
	CO5	H	M		M	L
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
				√		
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT-I

9

Introduction to software project management- software project versus other types of project-problems-management control- stake holders- requirement specification- information and control in organization .Introduction to stepwise project planning- select –Identity scope and objective-identity project infrastructure- analyses project characteristics = product and activities-estimate effort for each activity- identify activity risk- allocate resource- review/publicize plan- exam plan and lower level of planning- Project evaluation- introduction strategic assessments technical assessments- cost benefits analysis- cash flow forecasting- cost benefit evaluation technique- risk evaluation

UNIT-II

9

Selection of an appropriate project approach- choosing technologies- technical plan and content list- choice of process models- structured models- rapid application development- waterfall model-V-process model- spiral model- software prototyping- ways of categorizing prototypes-tools-Incremental delivery- selecting process model Software effort estimation introduction- Where problems with over and under estimates- basis for software estimating- software effort estimation techniques- expert judgement- Albrechi function point analysis- function points marks 2- object points procedural code oriented approach-COCOMO

Activity planning- objectives- project schedule- project and activities- sequencing and scheduling activities- network planning models- formulating a network model- using dummy activities- Representing lagged activities- adding time dimension- forward pass- backward pass- identifying the critical path- activity float- shortening project duration- identifying critical activities- precedence networks

UNIT-III

9

Risk management- nature of risk management- Identification- analysis- reducing evaluation Z values =Resource allocation- nature of resource- requirements- scheduling critical paths- counting the cost- Resource schedule- cost schedule- scheduling sequence-Monitoring and control crating the frame work- collecting the data- visualizing the progress cost monitoring- earned value- prioritizing monitoring- change control

UNIT-IV

9

Managing contracts- types of contracts- stages contract placements- terms of the contract management acceptance- managing people and organizing teams- organizational behavior background- selecting the right person for the job- instruction in the best methods-motivation decision making- leadership- organizational structures. Software quality- importance- defining-ISO9126- practical measures- product versus process quality management- external standards- techniques to help enhance software quality.

UNIT-V

9

Small projects- some problems- content of a project plan PRINCE 2- An overview- BS6079 1996 an overview- euro method- an overview”

TEXT BOOKS

1. Bob Hugles and Mikecoterrel- Software management 2nd edition-McGraw Hill
2. Walker Royce- Software project management- Addison Wesley
3. http://ceit.aut.ac.ir/~sa_hashemi/My%20Teachings/BS-CEIT-IT%20Project%20Management/Books&Resources/Software%20Project%20Management.pdf

Course Code MIT005	Course Name: HIGH SPEED NETWORKS	L	T	P	C
	Total Contact Hours: 45	3	0	0	3
	Prerequisite: Computer Networks				
	Course Designed by : Dept. of Information Technology				
OBJECTIVES					
To facilitate the students on the basis of ATM and Frame relay concepts and explain the various types of LAN's and to know about their applications.					
COURSE OUTCOMES (COs)					
CO1	List techniques used to achieve 100 and 1000 Mb/s in Ethernet				
CO2	Understand each field in IPv4 and IPv6				
CO3	Appreciate the challenges in design of Wireless Sensor Networks				

CO4	Suggest modification for protocols in Ad Hoc networks					
CO5	Categorize layers in ATM protocol					
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e
2	CO1	H	H	M	M	
	CO2	H	H	M	H	
	CO3	H	M	H	M	
	CO4	H	M	H	H	
	CO5	H	H			
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
				√		
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT-I HIGH SPEED LANS

9

Fast Ethernet technology, FDDI, SONET and SDH standards. Performance of HIGH SPEED LAN Throughput, delay and reliability, Wavelength division multiplexed LA-Routing and switching in WDM networks, Giga bit LAN

UNIT-II BISDN AND FAST PACKET SWITCHING

9

Overview of ISDN-User interface, architecture and limitation of narrow band ISDN (N-ISDN) and evolution of broad band ISDN (B-ISDN), Fast packet switching architecture- Batchier Banyan architectures and their performance analysis

UNIT-III ASYNCHRONOUS TRANSFER MODE NETWORKS

9

ATM protocol architecture. ATM adaptation layer, packet switching techniques VP/VC encapsulation. TM cells header interception, Source characteristics and source modeling.

UNIT-IV ATM TRAFFIC MANAGEMENT

9

Traffic management issue in ATM-Resource management, connection management policing, and reactive control principles. Fundamentals of Asynchronous multiplexing Markov modulated processes discrete time traffic modeling and queue analysis, application to CAC, leaky bucket and ECN/ICN.

UNIT-V ATM SIGNALLING AND DATA COMMUNICATION OVER ATM

9

ATM signaling fundamentals.TCP/IP over ATM-challenges and proposals.LAN emulator over ATM.Performance of Data communication over ATM

REFERENCES:

- 1.Craig partridge,gigabitnetworking,Addison Wesley,1997.
- 2.Stallings W,ISDN-BISDN with frame relay and ATM, P.H International,1995
- 3.R.Onvural,Asynchronous Transfer Mode Network_PerformanceIssue,Artech House,1995.
- 4.W.Stallings,High Speed Networks,TCP/IP and design principles,PHI,1998
- 5.<http://thebooksout.com/download/high%20speed%20networks%20and%20internet%20by%20william%20stallings%20free%20ebook.pdf>

Course Code MIT006	Course Name: GRID COMPUTING				L	T	P	C
	Total Contact Hours: 45				3	0	0	3
	Prerequisite: Computer Networks, Cloud Computing							
	Course Designed by : Dept. of Information Technology							
OBJECTIVES								
To understand the genesis of grid computing								
<ul style="list-style-type: none"> • To know the application of grid computing • To understanding the technology and tool kits to facilitated the grid computing 								
COURSE OUTCOMES (COs)								
CO1	be able to evaluate enabling technologies such as high-speed links and storage area networks for building computer grids;							
CO2	be able to utilise grid computing and clustering middleware, such as Parallel Virtual Machine (PVM), Message Passing Interface (MPI), HPC Portals, and Peer-to-Peer networks for implementing virtual super computing resources;							
CO3	be able to design a grid computing application in one of the key application areas e.g. Computer Animation, E-Research;							
CO4	be able to install a grid computing environment;							
CO5	develop communications skills and accept the code of professional conduct and practice through short presentations and group work.							
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low								
1	COs/Pos	a	b	c	d	e		
2	CO1	H	M	H			M	
	CO2	H	M	M	M			
	CO3	H	L	M				
	CO4	H	M	L				

	CO5	H	M	M	L	L
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
				√		
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT-I INTRODUCTION TO GRID COMPUTING

7

Introduction- the grid- Past, Present, and Future- Application of grid computing organizations and their roles

UNIT-II GRID COMPUTING ARCHITECTURE

8

Grid computing anatomy- Next generation grid computing initiatives- merging the Grid services architecture with Web services architecture

UNIT-III GRID COMPUTING TECHNOLOGIES

11

OGSA- sample use case that drives the OGSA platform components- OGSA and WSRF- OGSA Basic services- security standards for grid computing

UNIT-IV GRID COMPUTING TOOL KIT

10

Globus Toolkit- Versions- Architecture- GT Programming model- A sample grid services implementation

UNIT-V HIGH LEVEL GRID SERVICES

9

High level grid services- OGSA.NET middleware solution mobile OGSINET for grid computing on mobile devices

TEXT BOOKS:

1.Joshy Joseph & Craig Fellenstein, Grid Computing, Pearson/PHI PTR-2003

REFERENCES:

1.Fran Bernam, Geoffrey Fox, Anthony J G Hey, Grid Computing: Making the Global infrastructure a reality, John Wiley and sons , 2003

2.Ahman Abbas, Grid Computing : A Practical Guide to Technology and Applications, Charles River media, 2003

3.<https://www.redbooks.ibm.com/redbooks/pdfs/sg246778.pdf>

Course Code MIT007	Course Name: FUZZY AND GENETIC ALGORITHM	L	T	P	C
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		Total Contact Hours: 45	3	0	0	3
		Prerequisite: Engineering Mathematics				
		Course Designed by : Dept. of Information Technology				
OBJECTIVES						
<ul style="list-style-type: none"> To introduce the ideas of Neural Networks, fuzzy logic and use of heuristics based on human experience. To introduce the concepts of Genetic algorithm and its applications to soft computing using some applications. 						
COURSE OUTCOMES (COs)						
CO1	Learn the unified and exact mathematical basis as well as the general					
CO2	Principles of various soft computing techniques.					
CO3	Provide detailed theoretical and practical aspects of intelligent					
CO4	Modeling, optimization and control of non-linear systems.					
CO5	Prepare the students for developing intelligent systems through case					
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e
2	CO1	H	M	H		M
	CO2	H	M	M	M	
	CO3	H	L	M		
	CO4	H	M	L		
	CO5	H	M	M	L	L
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
				√		
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT-I INTRODUCTION:

9

Uncertainty and Imprecision-Statistics and Random process - Uncertainty in information - Fuzzy sets and Membership - Chance versus ambiguity, classical Sets and Fuzzy Sets : Classical Sets - Fuzzy sets - Sets as points in hypercube, Classical Relations and Fuzzy Relations Cartesian product -Crisp Relations - Fuzzy Relations - Tolerance and Equivalence Relations - Value Assignments.

UNIT-I I FUZZY MEMBERSHIP FUNCTION**9**

Membership Functions: Features of Membership function - Standard forms and boundaries – Fuzzification - Membership value assignments. -Fuzzy to Crisp conversions: Lambda cuts for fuzzy sets - Lambda cuts for fuzzy relations- Defuzzification Methods.

UNIT-III FUZZY ARITHMETICS**9**

Fuzzy Arithmetic, Numbers, Vectors and the Extension Principle: Extension Principle- Fuzzy numbers - Internal analysis in arithmetic - Approximate methods of extension. Classical logic and fuzzy logic: Classical predicate logic - Fuzzy logic - Approximate reasoning - Fuzzy Tautologies - Other forms of the implication & composition operation.

UNIT-IV FUZZY NATURAL LANGUAGE**9**

Fuzzy Rule Based Systems: Natural language - Linguistic hedges - Rule based systems - Graphical techniques of inference, Fuzzy Nonlinear Simulation: Fuzzy Relational Equations - Partitioning - Nonlinear Simulation using fuzzy rule based systems - FAMs. Fuzzy decision making.

UNIT-V FUZZY CLASSIFICATION**9**

Fuzzy Classification: Classification by equivalence relations- Cluster analysis - Cluster validity - Classification metric - Hardening the fuzzy - Partition, Fuzzy Pattern Recognition : Feature analysis-Partitions of the feature space - Single sample identification - Image processing syntactic recognition.

TEXT BOOKS

1. S. Rajasekaran and G.A.V.Pai, ,”Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI, 2011.
2. Timothy J.Ross, “Fuzzy Logic with Engineering Applications”, McGraw Hill International Edition 2009.

REFERENCE

1. J. Harris, ”An Introduction to Fuzzy Logic Applications”, Springer, 2001

Course Code MIT008	Course Name: SOFTWARE RELIABILITY	L	T	P	C
	Total Contact Hours: 45	3	0	0	3
	Prerequisite: Probability				
	Course Designed by : Dept. of Information Technology				
OBJECTIVES					
To provide knowledge in					
<ul style="list-style-type: none"> • Design principles for creating safe and reliable systems • Reliability modeling • Current trends in software reliability 					
COURSE OUTCOMES (COs)					
CO1	Understand common principles of software and system reliability engineering and				

		also system safety.				
CO2	Learn about software reliability measures.					
CO3	Study software test methodology.					
CO4	Learn about modeling software reliability growth.					
CO5	Analyze the reliability of multi-component systems.					
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e
2	CO1	H	M	H		M
	CO2	H	M	M	M	
	CO3	H	L	M		
	CO4	H	M	L		
	CO5	H	M	M	L	L
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
				√		
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT –I INTRODUCTION TO RELIABILITY ENGINEERING

9

Reliability - Repairable and Non Repairable systems - Maintainability and Availability - Designing for higher reliability - Redundancy - MTBF - MTTF MDT - MTTR- k out of in systems

UNIT -II SOFTWARE RELIABILITY

9

Software reliability - Software reliability Vs Hardware reliability - Failures and Faults - Classification of Failures - Counting - System Configuration - Components and Operational Models - Concurrent Systems - Sequential Systems - Standby Redundant systems

UNIT –III SOFTWARE RELIABILITY APPROACHES

9

Fault Avoidance - Passive Fault detection - Active Fault Detection - Fault Tolerance - Fault Recovery - Fault Treatment

UNIT- IV SOFTWARE RELIABILITY MODELING

9

Introduction to Software Reliability Modeling - Parameter Determination and Estimation - Model Selection - Markovian Models - Finite and Infinite failure category Models - Comparison of Models - Calendar Time Modeling

UNIT –V SPECIAL TOPICS IN SOFTWARE RELIABILITY

9

Management Techniques for reliability - Organization and Staffing - Programming Languages and Reliability - Computer Architecture and Reliability - Proving Program correctness & Reliability Design - Reliability Testing - Reliability Economics

TEXT BOOKS

1. John D. Musa, "Software Reliability", McGraw Hill, 2004.
2. Patric D. T.O Connor, "Practical Reliability Engineering", 4th Edition, John Wesley & sons, 2003.

REFERENCES

1. DoronPeled, "Software Reliability Methods", Springer,2011.
2. Alessandro Birolini, "Reliability Engineering", Springer ,2010.

Course Code	Course Name: NETWORK ADMINISTRATION	L	T	P	C	
MIT009	Total Contact Hours: 45	3	0	0	3	
Prerequisite: Computer Networks						
Course Designed by : Dept. of Information Technology						
OBJECTIVES This addresses key technology management issues as they are applied to information resourcerces management (IRM) for information centers and information services. It also inclu fundamentals of networking and telecommunications covering LAN's to "informa Superhighways." It covers techniques for management of communication resources and services information to oversee the network administration and network system management.						
COURSE OUTCOMES (COs)						
CO1	A basic understanding of management information system terminology.					
CO2	The components and the operations, managerial, and strategic roles of information systems within an organization.					
CO3	The major concepts, development, and managerial implications involved in computer hardware, software, database management, and telecommunications technologies.					
CO4	How information technology is used in modern information systems to support end-user applications, enterprise operations, e-Commerce, and managerial decision making.					
CO5	The development of information systems solutions for business problems and how to implement change.					
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e

2	CO1	M	H	M		H
	CO2	M	H	M	M	H
	CO3	L	H	H	M	M
	CO4	M	M	L		L
	CO5	L	M	M	L	
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
				√		
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT-I OPERATION PROCEDURES

9

Function of a system administrator hardware and software configuration of the system-Auto configuration of devices, **General operational guidelines running diagnostic Programs procedures for system control power down single/multi-user mode, Modify device configuration, recovery from system trouble reconfiguring the OS**

UNIT-II USER SERVICES

9

Login administration-Addind/Removing users-Setting up user environment and user communication procedure for user services

UNIT-III IDENTIFICATION AND SECURITY

9

System security-special administration-password, user id, group id-Formatting and partitioning disks, bad block handling-Disk, management procedures.

UNIT-IV FILE SYSTEM ADMINISTRATION

9

File system Organization-Super block-Free block-Mounting and unmounting file system checking in a file system, Back up and restore procedures-Try management-Spooler administration-System accounting procedures-Day to day operations-Setting up accounting system, recovery from failure-Daily reports.

UNIT-V

9

Hardware management-Basic Networking Procedures-Performance Management-**Finding problems and fittinproblems improvingperformance**-Performance-tools like sar, saf-System reconfiguration procedures.

REFERENCE:

- 1.SCO open server-Graphics environment Administration Guide,SCO Inc-1993
- 2.Super stack land Hun Management,User Guid,3 COM,1996
- 3,Acces Builder 2000,Installation giud,3COM,1996
- 4.Acces builder Remote Client user giud,1996
- 5.<https://eketab2.files.wordpress.com/2007/09/addisonwesleythepracticeofsystemandnetworkad ministration2ndeditionjul2007.pdf>

Course Code MIT011	Course Name: BIO-INSPIRED ARTIFICIAL INTELLIGENCE			L	T	P	C
	Total Contact Hours: 45			3	0	0	3
	Prerequisite: Bio Inspired Computing						
	Course Designed by : Dept. of Bio Informatics						
OBJECTIVES							
<ul style="list-style-type: none"> • To appreciate the use of biological aspects in building intelligent systems • To understand the algorithms, programming and applications of Evolutionary and genetic algorithms and neural and fuzzy systems • To appreciate the adaptation of cellular and developmental systems • To focus on the understanding of artificial immune systems and its applications • To understand issues in developing collective and behavioural systems. 							
COURSE OUTCOMES (COs)							
CO1	Use existing open source tools to build an application using genetic approaches						
CO2	Identify different applications suitable for different types of neural networks giving justifications						
CO3	Critically analyze the use of cellular systems						
CO4	Differentiate the different models of immune systems						
CO5	Do a literature survey on applications of artificial immune systems						
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low							
1	COs/Pos	a	b	c	d	e	
2	CO1	H		M		M	
	CO2	H	H	M	H		
	CO3	M		H	H	M	
	CO4	H	M	L	M	M	
	CO5	H		H	M		

3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper/ Seminar/ Internship (PR)
				√		
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT –I EVOLUTIONARY SYSTEMS

9

Evolutionary Systems – Artificial Evolution - Genetic Representations - Evolutionary Measures - Types of Evolutionary Algorithms - Schema Theory. Evolutionary Computation-Representation- Selection- Reproduction. Genetic Algorithms - Canonical Genetic Algorithm – Crossover- Mutation - Control Parameters – Applications. Genetic Programming - Tree-Based Representation – Building Block Genetic Programming –Applications. Evolutionary Programming – Basics –Operators –Strategy Parameters -Evolutionary Programming Implementations

UNIT- II NEURAL AND FUZZY SYSTEMS

9

Neural Networks - Biological Nervous Systems - Artificial Neural Learning - Architecture.Unsupervised Learning - Self-Organizing Feature Maps. Supervised Learning – Types- Learning Rules. Radial Basis Function Networks. Reinforcement Learning – Model Free - Neural Networks and Reinforcement Learning. Fuzzy Systems- Fuzzy Sets – Logic and Reasoning – Controllers- Rough Sets.

UNIT -III CELLULAR AND DEVELOPMENT SYSTEMS

9

Cellular Systems - The Basic Ingredients - Cellular Automata -Modelling - Classic Cellular Automata – Other Cellular Systems – Computation - Artificial Life - Complex Systems - Analysis and Synthesis of Cellular Systems. Developmental Systems - Potential Advantages of a Developmental Representation -Rewriting Systems - Synthesis of Developmental Systems - Evolution and Development – Defining Evolutionary Developmental Systems -Evolutionary Rewriting Systems –Developmental Programs and Processes

UNIT- IV IMMUNE SYSTEMS AND COLLECTIVE SYSTEMS

9

Natural Immune systems - Classical View -Working -Constituents of Biological Immune Systems - Immunity Types - Learning the Antigen Structure - The Network Theory - The Danger Theory –Artificial Immune Systems - Algorithms - Classical View Models - Clonal Selection Theory Models – Network Theory Models - Danger Theory Models - Applications and Other AIS models Applications- Biological Self-Organization - Particle Swarm Optimization - Basics - Social Network Structures – Variations - Basic PSO Parameters - Optimization - Applications.

Ant Colony Optimization – Cemetery Organization and Brood Care - Division of Labor – Application.

UNITV BEHAVIORAL SYSTEMS

9

Behavioral Systems - Behavior in Cognitive Science - Behavior in Artificial Intelligence – Behavioral Systems – Behavior Based Robots –Evolution - Co-evolution - Learning and Self Reproduction of Behavioral Systems. Cultural Algorithms - Culture and Artificial Culture - Cultural Algorithm – Belief Space – Fuzzy Cultural Algorithms – Applications. Co-evolution – Types - Competitive and Cooperative Co-evolution.

TEXT BOOKS:

1. Claudio Mattiussi, Dario Floreano "Bio-Inspired Artificial Intelligence: Theories, Methods, and Technologies" (Intelligent Robotics and Autonomous Agents series), MIT Press, 2008.

REFERENCES:

1. Andries P. Engelbrecht, “Computational Intelligence: An Introduction”, 2nd Edition , Wiley; 2007.
2. Russell C. Eberhart, Yuhui Shi “Computational Intelligence: Concepts to Implementations”, Morgan Kaufmann; first edition 2007.

Course Code MIT012	Course Name: SOFTWARE METRICES	L	T	P	C
	Total Contact Hours: 45	3	0	0	3
	Prerequisite: Software Engineering				
	Course Designed by : Dept. of Information Technology				
OBJECTIVES					
1.knowledge of how software metrics can be used for controlling, managing and predicting the software development processes					
2.a framework for software metrics activities					
3.an understanding of the value of a scientific approach to software measurement					
4.an awareness of problems related to applying software measurement					
5. experiences in setting up metrics and models.					
COURSE OUTCOMES (COs)					
CO1	present and discuss the fundamentals of software measurement				
CO2	professionally present, argue, discuss how software measures can be used during the software processes and be able to professionally apply them				
CO3	discuss the state-of-the-art in software measurement process models and CMMI’s measurement requirements				
CO4	professionally present, argue, discuss the issues related to applying software measurement and how to set up measures and models				
CO5	Focus on the results of student learning, not on the learning process or on teaching				
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low					

1	COs/Pos	a	b	c	d	e
2	CO1	M	M	H		
	CO2	M		H	M	M
	CO3	M	H	H		L
	CO4	M		H	M	L
	CO5	M	H	M		L
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
				√		
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT- I MEASUREMENTS THEORY

9

Fundamentals of Measurement- Measurements in software engineering- scope of software matrices- measurements theory- goal based framework- software measurement validation

UNIT-II DATA COLLECTION AND ANALYSIS

9

Empirical Investigation- planning experiments- software metrics data collection- analysis methods- statistical methods

UNIT-III PRODUCTS METRICS

9

Measurements of internet product attributes- size and structure- external product attributes- measurements of quality

UNIT-IV QUALITY METRICS

9

Software quality metrics- product quality- Process quality- Metrics for software Maintenance- case studies of metrics program- Motorola- Hp and IBM

UNIT-V MANAGEMENT MATRICS

9

Quality management models- Rayeigh Model- Problem tracking report (PTR) model- Reliability Growth model- Model Evaluation- Orthogonal classification

REFERENCES:

- 1.Norman E- Fentar, Share Lawrence Pfler, Software Metrics, International Thomson Computer Press, 1997
- 2.Stephen H Kin, Metric and Model in Software Quality Engineering, Addison Wesley, 1993
- 3.<http://www.imperial.ac.uk/media/imperial-college/research-centres-and-groups/centre-for-bio-inspired-technology/7291000.PDF>

Course Code	Course Name: RESEARCH METHODOLOGY				L	T	P	C
MST070	Total Contact Hours: 45				3	0	0	3
	Prerequisite: Professional Courses							
	Course Designed by :Department of civil							
OBJECTIVES To know the various types of Formulation of Research Task,modeling and simulation, analysis of reports and report writing.								
COURSE OUTCOMES (COs)								
CO1	To understand the basic concept of Formulation of Research Task.							
CO2	To have knowledge about mathematical modeling and simulation							
CO3	To understand experimental modeling.							
CO4	To know about of analysis of report.							
CO5	To know about of concept of report writing.							
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low								
1	COs/Pos	a	b	c	d	e		
2	CO1	M	M					
	CO2	H	M		L			
	CO3	H	M					
	CO4	M	M		L	L		
	CO5	M	M	M				
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)		
					√			
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016						

UNIT-I RESEARCH CONCEPTS 9

Concepts, meaning, objectives, motivation, types of research, approaches, research (Descriptive research, Conceptual, Theoretical, Applied & Experimental).

Formulation of Research Task – Literature Review, Importance & Methods, Sources, quantification of Cause Effect Relations, Discussions, Field Study, Critical Analysis of Generated Facts, Hypothetical proposals for future development and testing, selection of Research task.

UNIT-II MATHEMATICAL MODELING AND SIMULATION 9

Concepts of modeling, Classification of Mathematical Models, Modeling with Ordinary differential Equations, Difference Equations, Partial Differential equations, Graphs, Simulation, Process of formulation of Model based on Simulation.

UNIT-III EXPERIMENTAL MODELING 9

Definition of Experimental Design, Examples, and Single factor Experiments, Guidelines for designing experiments. Process Optimization and Designed experiments, Methods for study of response surface, determining optimum combination of factors, Taguchi approach to parameter design.

UNIT-IV ANALYSIS OF RESULTS 9

Parametric and Non-parametric, descriptive and Inferential data, types of data, collection of data (normal distribution, calculation of correlation coefficient), processing, analysis, error analysis, different methods, analysis of variance, significance of variance, analysis of covariance, multiple regression, testing linearity and non-linearity of model.

UNIT-V REPORT WRITING 9

Types of reports, layout of research report, interpretation of results, style manual, layout and format, style of writing, typing, references, tables, figures, conclusion, appendices.

TEXT BOOKS

1. Willkinton K. L, Bhandarkar P. L, „Formulation of Hypothesis“, Himalaya Publication.
2. Schank Fr., „Theories of Engineering Experiments“, Tata McGraw Hill Publication.

REFERENCE BOOKS

1. Douglas Montgomery, „Design of Experiments“, Statistical Consulting Services, 1990.
2. Douglas H. W. Allan, „Statistical Quality Control: An Introduction for Management“, Reinhold Pub Corp, 1959.
3. Cochran and Cocks, „Experimental Design“, John Willy & Sons.
4. John W. Besr and James V. Kahn, „Research in Education“, PHI Publication.
5. Adler and Granovsky, „Optimization of Engineering Experiments“, Meer Publication.
6. S. S. Rao, „Optimization Theory and Application“, Wiley Eastern Ltd., New Delhi, 1996.

Course Code MIT013	Course Name: VIRTUALIZATION TECHNIQUES	L	T	P	C
	Total Contact Hours: 45	3	0	0	3
	Prerequisite: Computer Networks, Distributed Computing				

Course Designed by : Dept. of Information Technology						
OBJECTIVES						
<ul style="list-style-type: none"> • Introduce Virtualization and Cloud Computing concepts and technologies • Provide information on networked storage for virtualization infrastructure needs • Provide hands-on laboratory exercises on storage and virtualization 						
COURSE OUTCOMES (COs)						
CO1	Outline the fundamental concepts and techniques of layer 2 switching including Virtual LANs (VLANS).					
CO2	Configure, verify, and troubleshoot VLANs.					
CO3	Configure and deploy Advanced IP services such as NAT, PAT and DHCP.					
CO4	Implement and configure network, access, and resource monitoring and data protection tasks in a virtualised environment.					
CO5	Discuss the benefits and requirements for achieving scalability and high availability in data centrevirtualisation solutions.					
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e
2	CO1	M	H	M		
	CO2	M	M	L	L	L
	CO3	M	M	M	M	
	CO4	H	H	M		L
	CO5	M	M	L	M	M
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
					√	
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT I OVERVIEW OF VIRTUALIZATION

9

Basics of Virtualization – Types of Virtualization Techniques – Merits and demerits of Virtualization – Full Vs Para-virtualization – Virtual Machine Monitor/Hypervisor - Virtual Machine Basics – Taxonomy of Virtual machines – Process Vs System Virtual Machines – Emulation: Interpretation and Binary Translation - HLL Virtual Machines

UNIT II SERVER AND NETWORK VIRTUALIZATION

9

Server Virtualization: Virtual Hardware Overview - Server Consolidation – Partitioning Techniques -Uses of Virtual server Consolidation – Server Virtualization Platforms, Network Virtualization: Design of Scalable Enterprise Networks – Layer2 Virtualization – VLAN - VFI - Layer 3 Virtualization – VRF - Virtual Firewall Contexts - Network Device Virtualization - Data- Path Virtualization - Routing Protocols

UNIT III STORAGE, DESKTOP AND APPLICATION VIRTUALIZATION

9

Storage Virtualization: Hardware Devices – SAN backup and recovery techniques – RAID – Classical Storage Model – SNIA Shared Storage Model – Virtual Storage: File System Level and Block Level, Desktop Virtualization: Concepts - Desktop Management Issues - Potential Desktop Virtualization Scenarios - Desktop Virtualization Infrastructures,

UNIT IV APPLYING VIRTUALIZATION

9

Practical Virtualization Solutions: Comparison of Virtualization Technologies: Guest OS/ Host OS – Hypervisor – Emulation – Kernel Level – Shared Kernel, Enterprise Solutions: VMWare Server – VMWare ESXi – Citrix Xen Server – Microsoft Virtual PC – Microsoft Hyper-V – Virtual Box, Server Virtualization: Configuring Servers with Virtualization – Adjusting and Tuning Virtual servers – VM Backup – VM Migration, Desktop Virtualization: Terminal services – Hosted Desktop – Web-based Solutions – Localized Virtual Desktops, Network and Storage Virtualization: Virtual Private Networks – Virtual LAN – SAN and VSAN – NAS

UNIT V CLOUD COMPUTING

9

Cloud Computing Basics - Cloud Computing Definition – Evolution of Cloud Computing - General Cloud Environments – Cloud Services – Service Providers – Google – Amazon – Microsoft – IBM – EMC –NetApp - Salesforce – Tools for building private cloud - Open Issues in Cloud Computing – Cloud security challenges, Cloud Programming: Hadoop - MapReduce – HDFS – Hadoop I/O – Developing a MapReduce Application

REFERENCES:

1. Danielle Ruest, Nelson Ruest - Virtualization: A Beginner's Guide, TMH, 2009
2. James E. Smith, Ravi Nair, - Virtual Machines: Versatile Platforms for Systems and Processes, Elsevier/Morgan Kaufmann, 2005.
3. David Marshall, Wade A. Reynolds, - Advanced Server Virtualization: VMware and Microsoft Platform in the Virtual Data Center, Auerbach Publications, 2006.
4. Kumar Reddy, Victor Moreno, - Network virtualization, Cisco Press, July, 2006.
5. Chris Wolf, Erick M. Halter, - Virtualization: From the Desktop to the Enterprise, APress 2005.
6. <https://131c0c0518c8b955a6aeebc8f060a9a209a36ce1.googledrive.com/host/0BxFbv-5Vt8ikb0RMVkp3V0N3dHc/Virtualization-Techniques-Systems-Multimedia-Applications-3319057405.pdf>

Course Code MBA067	Course Name: FINANCIAL PROJECT MANAGEMENT			L	T	P	C
	Total Contact Hours:45			3	0	0	3
	Prerequisite: Software Project Management						
	Course Designed by : Dept. of Management						
OBJECTIVES							
<ul style="list-style-type: none"> • Present financial management as an analytical process. • Understand ratio analysis and the importance of EVA and FCF's. • Introduce risk and rates of return in decision-making. • Understand the time value of money. • Learn to calculate the cost of funds to an organization. • Introduce and understand the capital budgeting process. • Learn to forecast the amount of funds a firm requires to operate. 							
COURSE OUTCOMES (COs)							
CO1	Ethical & Professional Judgment						
CO2	Information Literacy and Computer Skills						
CO3	Creative and Critical Thinking						
CO4	Field Specific Knowledge and Experience						
CO5	Creation of Value						
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low							
1	COs/Pos	a	b	c	d	e	
2	CO1	M	M	L	H	L	
	CO2	M	M	M	M		
	CO3	L	L	M	M	L	
	CO4	M	M	L	M		
	CO5	L	M	M	L	L	
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)	
					√		
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016					

UNIT I COST AND CAPITAL MANAGEMENT

9

Values- Cost and capital Investment Foundations- Fundamentals of Value Driven Software Engineering- Identifying and Assessing Customer Valued Features

UNIT II CONCURRENT DEVELOPMENT

9

Understanding Software Architecture Economics, Specifying Value Maximizing Chronology, Incorporating Concurrent Development Strategies ,

UNIT III VALUE DRIVEN SOFTWARE ENGINEERING

9

Managing & Accounting For Intangibles, Enhancing the Unified Process, Fundamentals Of Value Driven Software Engineering, Identifying &Assessing Customer Valued Features, Understanding Software Architecture Economics,

UNIT IV UNIFIED PROCESS

9

Specifying Value Maximizing Chronology, Incorporating Concurrent Development Strategies, Managing & Accounting For Intangibles, Enhancing the Unified Process.

UNIT V CASE STUDY

9

CA 1 Case Study Assignment Presentation, Crafting The Business Case(Dave), CA2 M.Tech Project Assignment Presentation, Value, Cost &Capital Investment Foundations,

Reference Books :

1. Software Engineering as a Business
2. Value Based software Engineering
3. Value Based Software Engineering: Reinventing “Earned Value Monitoring & Control”
4. Business Driven Product Planning Using Feature Vector and Increments
5. Making Architecture Design Decisions: An Economic Approach.
6. <http://www.free-management-ebooks.com/dldebk-pdf/fme-project-principles.pdf>

Course Code MBA068	Course Name: IT SERVICE MANAGEMENT	L	T	P	C
	Total Contact Hours:45	3	0	0	3
	Prerequisite: Financial Management				
	Course Designed by : Dept. of Management				
OBJECTIVES <ul style="list-style-type: none">• To understand the meaning of project management• To understand the difference between operations and projects• To understand the importance of project management as it effects strategy and business success• To be aware of past performance on projects• To be familiar with project management history					

<ul style="list-style-type: none"> To be familiar with the planning and execution phases of a project 						
COURSE OUTCOMES (COs)						
CO1	A deep preparation in the disciplines necessary for developing solid managerial strategies					
CO2	Quantitative methods and techniques for assessing competition and market dynamics, for developing effective strategies (in terms of cost and value) and measuring their outcomes.					
CO3	capability to identify critical aspects and solve problems in international operations					
CO4	A critical approach to the most recent service management issues and tools					
CO5	Ability to work in team and to assess practical business cases					
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low						
1	COs/Pos	a	b	c	d	e
2	CO1	M	M	M	H	M
	CO2	M	M	M	M	H
	CO3	M	H	L	H	M
	CO4	L	H	M	L	H
	CO5	H	L	M	H	M
3	Category	Professional Mathematics (PM)	Professional Core (PC)	Professional Elective (PE)	Open Elective (OE)	Project/ Term Paper Seminar/ Internship (PR)
					√	
4	Approval	37 th , 38 th & 39 th Meeting of Academic Council, May 2015, Jan 2016 & April 2016				

UNIT 1 INFORMATION SYSTEMS

9

Information systems components - Organizations and management -The information system as a sociotechnical system -The strategic use of Information Technology -management information systems -Informational needs of organizations -Capabilities of information systems from an organizational perspective -Information requirements for management -Levels of planning and control with MIS - MIS support for business functions -Management reporting systems and transaction processing systems

UNIT II SYSTEMS AND MANAGEMENT CONCEPTS

9

Systems approach, organizational design, MIS in organizational control -Management theory and management functions -Concepts of planning -Role of information systems in the planning - Using MIS to enhance management control: performance reports, break-even analysis, calculation of financial ratios- managerial decision making -Decision-making -Components of Decision Support Systems -Types of DSS-Building a DSS -Executive Information Systems - Organizational aspects of DSS and EIS

UNIT III CULTURAL DIMENSION OF INFORMATION SYSTEMS DEVELOPMENT 9

Factors of organizational complexity in relation to information systems development -Human aspects of information systems - Contribution of system development approaches (such as Soft Systems Methodology -Measures of performance to cover performance factors and service level agreements - Departmental and project budgets, including specific reference to training costs

UNIT IV PRINCIPLES OF PROFESSIONALISM 9

Professional concepts in relation to professional practices- Business ethics. acquisition of software, hardware, media and consumables -Specification of hardware and software configurations and systems - Implications of throughput, resilience and reliability -Alternatives, costs and solutions -Selection criteria, acquisitions, purchase, hire or lease, facilities management -installation and site planning, security and external threats -Planning, scheduling and co-ordinating contractors, suppliers and services -Progress control and monitoring -Installation, test planning, acceptance criteria and trials-Implications of throughput, resilience and reliability - Workload -External threats and strategies to limit their effect
Security

UNIT V APPLICATIONS AND SYSTEM REQUIREMENTS 9

Distributed, intelligent systems, electronic mail -Communication Networks -Intelligent office - Characteristics of telecommunication systems -Software production -Control of data - Operating system facilities

References:

1. McNurlin & Sprague, Information Systems Management in Practice, Prentice Hall (7thEd), 2005, ISBN: 0131968777
2. Fidler C. & Rogerson S., Strategic Management Support Systems, Financial Times Management, 1996, ISBN: 0273614185
3. Bott M. F., Professional Issues in Information Technology, The British Computer Society, 2005, ISBN: 1902505654 and 9781902505657
4. Holt, J and Newton, J., A Manager's Guide to IT Law, BCS, 2004, ISBN: 1902505557 and 9781902505558
5. BS ISO/IEC 17799 Information Technology, Security Techniques: Code of Practice for Information Security Management, British Standards Institute, ISBN: 0580462625
6. <http://www.bcs.org/upload/pdf/itsm-guide-foundation.pdf>