VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE

[Autonomous Institute affiliated to University of Mumbai]

SYLLABUS

FOR

T.Y. B. TECH.
(INFORMATION TECHNOLOGY)

[V.J.T.I.]

[YEAR 2011-2012]

Veermata Jijabai Technological Institute

Scheme of Teaching and Evaluation
T Y B Tech (Information Technology)
(Semester V)

Theory Courses

Course Code	Course Name	Hr/Week			Credits	Examination Scheme (Evaluation in % Weightage)				
		L	T	P		TA	IST	ESE	Total	ESE (W) (hrs)
IT0301	Software Engineering	3	-	-	3	10	30	60	100	3
IT0302	Computer Networks	3	-	-	3	10	30	60	100	3
IT0303	Automata Theory	3	1	-	4	10	30	60	100	3
IT0304	Operating System with UNIX	3	1	-	4	10	30	60	100	3
IT0305	Data Base System	3	1	-	4	10	30	60	100	3
	Total	15	3	-	18					

Laboratory Courses

Course Code	Course Name	Hr/Week			Credits	Examination Scheme (Evaluation in % Weightage)			
		L	T	P		TA	ESE (O / P)	Total	ESE (P) (hrs)
IT1301	Computer Networks Lab	-	-	3	1.5	50	50	100	2
IT1302	Operating System Lab	-	-	3	1.5	50	50	100	2
IT1303	Software Engineering and Database System Lab	-	-	3	1.5	50	50	100	2
HM1321	Communication & Presentation Skills	-	-	3	1.5	50	50	100	-
	Total	-	-	12	6				

Co-curricular Activities

Course Code	Course Name	Hr/Week			Credits					
		L	T	P						
CC4051	Industry-Academia Interaction	-	-	2	A/NA					
CC4052	E-Library/ Internet	-	-	3	-					
	Total	-	-	5	-					

Total for Semester	L	T	P	Total Hours	Credits
	15	3	17	35	24

Abbreviations:
L: Lectures, **T**: Tutorial, **P**: Practical, **TA**: Teacher Assessment, **ESE (P)**: End Semester Practical Examination, **ESE (O)**: End Semester Oral Examination, **IST**: In Semester Test/s, **ESE (W)**: End Semester Written Examination, **ESE (W) (hrs)**: End Semester Written Examination duration, **ESE (O) (hrs)**: End Semester Practical Examination (duration), **A/NA**: Attended/Not Attended

Notes:
TA for Theory and Laboratory courses shall carry 25 marks.
IST: One mid semester test (40 marks of two hour duration) and two surprise Tests/Quizzes (5% weightage each). ESE (W) shall be of 100 marks of 3 hours, ESE (P) and ESE (O) shall be decided as per course requirement. ESE (O) and ESE (P) shall together carry 25 marks.
Industry - Academia Interaction: Wednesday afternoon slot will be used. Module or broad subject outline will be decided by the course coordinator. Lectures as per module in the defined areas of eminent personalities from industry or academia will be arranged. Assessment will be done on the attendance of the students for the module. More than 60%: Attended, otherwise: Not Attended.
E- Library/ Internet: Every theory course must have at least one assignment or case-study which requires exhaustive internet search/support.

Veermata Jijabai Technological Institute

Scheme of Teaching and Evaluation
T Y B Tech (Information Technology)
(Semester VI)

Theory Courses

Course Code	Course Name	Hr/Week			Credits	Examination Scheme (Evaluation in % Weightage)				
		L	T	P		TA	IST	ESE	Total	ESE (W) (hrs)
IT0306	Software Project Management	3	-	-	3	10	30	60	100	3
IT0307	Mobile Computing	3	-	-	3	10	30	60	100	3
IT0308	Web Technology	3	1	-	4	10	30	60	100	3
IT0309	Object Oriented Software Engineering	3	1	-	4	10	30	60	100	3
-	Elective I	3	1	-	4	10	30	60	100	3
	Total	**15**	**3**	**-**	**18**					

Laboratory Courses

Course Code	Course Name	Hr/Week			Credits	Examination Scheme (Evaluation in % Weightage)			
		L	T	P		TA	ESE (O / P)	Total	ESE (P) (hrs)
IT1304	Software Project Management Lab	-	-	3	1.5	50	50	100	2
IT1305	Mobile Computing and Elective Lab	-	-	3	1.5	50	50	100	2
IT1306	Web Technology and Object Oriented Software Engineering Lab	-	-	3	1.5	50	50	100	2
IT1307	Programming Lab - III	-	-	3	1.5	50	50	100	2
	Total	**-**	**-**	**12**	**6**				

Co-curricular Activities

Course Code	Course Name	Hr/Week			Credits					
		L	T	P						
CC4061	Industry-Academia Interaction	-	-	2	A/NA					
CC4062	E-Library/ Internet	-	-	3	-					
	Total	**-**	**-**	**5**	**-**					

Total for Semester	L	T	P	Total Hours	Credits
	15	**3**	**17**	**35**	**24**

Abbreviations:
L: Lectures, **T**: Tutorial, **P**: Practical, **TA**: Teacher Assessment, **ESE (P)**: End Semester Practical Examination, **ESE (O)**: End Semester Oral Examination, **IST**: In Semester Test/s, **ESE (W)**: End Semester Written Examination, **ESE (W) (hrs)**: End Semester Written Examination duration, **ESE (O) (hrs)**: End Semester Practical Examination (duration), **A/NA**: Attended/Not Attended

Notes:
TA for Theory and Laboratory courses shall carry 25 marks.
IST: One mid semester test (40 marks of two hour duration) and two surprise Tests/Quizzes (5% weightage each). ESE (W) shall be of 100 marks of 3 hours, ESE (P) and ESE (O) shall be decided as per course requirement. ESE (O) and ESE (P) shall together carry 25 marks.

Industry - Academia Interaction: Wednesday afternoon slot will be used. Module or broad subject outline will be decided by the course coordinator. Lectures as per module in the defined areas of eminent personalities from industry or academia will be arranged. Assessment will be done on the attendance of the students for the module. More than 60%: Attended, otherwise: Not Attended.

E- Library/ Internet: Every theory course must have at least one assignment or case-study which requires exhaustive internet search/support.

LIST OF ELECTIVES	
Elective – I	
IT0801	Artificial Intelligence
IT0802	Enterprise Resource Planning
IT0803	Bioinformatics
IT0804	Real Time Systems
IT0805	Advanced Database Management System
IT0806	Machine Learning
IT0807	Software Architecture
IT0808	Unix System Administration
INSTITUTE LEVEL ELECTIVS	
HM0901	Entrepreneurship Development
MA0901	Applied Statistics

Veermata Jijabai Technological Institute

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – V
Course Code	:	IT 0301	
Course Title	:	Software Engineering	

Course Contents:

1 **Process:**
Introduction, Processes, Methodology and Tools. Processes Model: Classic Life Cycle; Prototyping; Spiral; Incremental; RAD and Object Oriented Model.

2 **Software Project Planning:**
Project Initiation. Defining a Problem. Developing Solution Strategy. Feasibility Study.

3 **Project Management:**
Risk Analysis: Identification; Projection; Assessment; Monitoring and Managing the Risk. Project Scheduling: Task Definition; Project Tracking and Control.

4 **Project Estimation:**
LOC Based Technique. FP Based Estimation. COCOMO Model. Effort Estimation. Empirical Model. Delphi Method of Cost Estimation.

5 **Requirement Engineering:**
Requirement Gathering for small / medium /large Scale Projects. Requirement Elicitation. Requirement Tractability. Characteristics and Components of SRS: format of SRS (IEEE STD.)

6 **Software Configuration Management:**
Baselines. Version Control. Change Control. Configuration Audit.

7 **Analysis: Principles of Analysis:**
Elements of Analysis Model; Data Modeling; Function Modeling; Information Flow. DFD.CFD for Real Time Systems. Data Dictionary.

8 **Design-concepts:**
Design Principles and Modular Approach: Coupling & Cohesion.

9 **Data Design:**
ERD. File Design. File Organization and Access Method for Different Applications.

10 **Interface design:**
User Interface Design: Input Validations; Form Design; Menu Design

11 **Architectural Design:**
Structured Chart. Design Metrics.

12 **Testing:**
Explain Dynamic and Static Testing Methods, Test Plan, Libraries and Test Cases, Defect Tracking System. Exception Handling. Testing Batch Processing System Identification and Experiment with White Box Testing; Black Box Testing. Limitations of Testing Methods, Testing Web Based Systems.

13 **Maintenance:**
Factors to Reduce Maintenance Cost. Maintainability. Metrics.

14 **Software Reliability and Quality assurance:**
Reliability Matrices. Fault Avoidance Exception Handling. Quality Metrics. Quality Reviews. Software Standards. Documentation Standards. Process Quality SEI's CMM Levels.

15 **Security Engineering:**
Security risk management, Design for security, System survivability

Text Books:
1 Roger Pressman, Software Engineering, McGraw Hill, 6th edition. 2010
2 Ian Sommerville, Software Engineering, Pearson Education, 8th Edition. 2009

Reference Books :
1 Pankaj Jalote, Software Engineering, Narosa Publishing House Pvt Ltd, Darya Ganj, New Delhi, 3rd Edition , 2005
2 Douglas Bell, Software Engineering For Students, Pearson Education India, 4th Edition, 2007

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – V
Course Code	:	IT 0302	
Course Title	:	Computer Networks	

Course Contents:

1 **Introduction:**
Network Applications. Network Hardware. Network Software. Reference Models.

2 **The Physical Layer:**
Guided Transmission Media. Wireless Transmission. Communication Satellites. The Public Switched Telephone Network. The Mobile Telephone System. Cable Television.

3 **The Data Dink Layer:**
Data Link Layer Design Issues. Elementary Data Link Protocols. Sliding Window Protocols. Example of Data Link Protocols: HDLC: High-Level Data Link Control, The Data Link Layer In The Internet.

4 **The Medium Access Sub-layer:**
The Channel Allocation Problem. Multiple Access Protocols. Ethernet. Wireless LANS. Broadband Wireless. Blue Tooth. Data Link Layer Switching.

5 **The Network Layer:**
Network Layer Design Issues. Routing Algorithms. Congestion Control Algorithms. Quality Of Service. Internetworking. The Network Layer In The Internet: The IP Protocol, IP Addresses, Internet Control Protocols, The Interior Gateway Routing Protocol: OSPF. The Exterior Gateway Routing Protocol: BGP, Internet Multicasting, Mobile IP, Ipv6.

6 **The Transport Layer:**
The Transport Service. Elements Of Transport Protocols. A Simple Transport Protocol. The Internet Transport Protocols: UDP; TCP: Introduction To TCP, The TCP Service Model, The TCP Protocol The TCP Segment Header, TCP Connection Establishment, TCP Connection Release, Modeling TCP Connection Management, TCP Transmission Policy, TCP Congestion Control, TCP Timer Management, Wireless TCP And UDP, Transactional TCP. Performance Issues: Measuring Network Performance, System Design For Better PERFORMANCE, FAST TPDU Processing, Protocols For Gigabit Networks.

7 **The Application Layer:**
DNS: The Domain name system; Electronic Mail; SNMP.

Text Book :

1 Behrouz A. Forouzan, Data communication and Networking, Tata McGraw-Hill 2nd edition, 2006.
A. S. Tanenbaum, Computer Networks, Prentice Hall, 5th edition, 2011.

Reference Books:

1 Prakash C. Gupta, Data communication and Networks, PHI, 2009.
2 Peterson & Davie, Computer Networks, 3rd Edition, Morgan Kaufmann,2003
3 Leon-Garcia And Widjaja, Communication Networks, Tata Mcgraw Hill, 2nd edition, 2004
Kurose, Ross, Computer Networking, Addison Wesley,5th edition ,2010
4 S. Keshav, An Engg. Approach To Computer Networking, Addison Wesley.
5 W. Richard Stevens, TCP/Ip Volume1, 2, 3, Addison Wesley.
6 D. E. Comer, Computer Networks And Internets, Prentice Hall

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – V
Course Code	:	IT 0303	
Course Title	:	Automata Theory	

Course Contents:

1 **Chomsky Hierarchy and Parsing:**

Types of grammars: Chomsky hierarchy Types 0, 1,2and 3; Classification of Languages. Parsing: Parse trees and Ambiguity; Top down parsing (recursive descent parser); Bottom up parsing (SLR); Operator precedence parser.

2 **Regular sets and Automata Theory:**
Regular Sets Regular Grammars and Languages: Regular Expressions, Grammars and Languages; Pumping Lemma; Closure properties. Finite Automata and Finite State Machines: NFA, DFA, FSM, Moor and Mealy machines; Converting NFA to DFA; Minimization of Automata and FSM.

3 **Context Free Grammars and Push down Automata:**
Context Free Grammars and Languages: CNF and GNF; Pumping Lemma; Closure properties. Push Down Automata: Concept of Stack; PDA for CFG.5. The Scope Management Plan: Introduction, scope planning, project scope definition, project scope verification, scope change control.

4 **Turing Machine:**
Construction of Turing Machine for problem solving. TM as Acceptors and Generators.

5 **Complexity:**
Time and Space Complexity of a problem. Notations Ω and O. Definition, Understanding and Classification of P, NP, NP Hard and Co-NP problems.

Text Book :

1 J.C. Martin, Introduction to Languages and Theory of Computation, McGraw   Hill., Third Edition,2002
   Peter Linz, Introduction Formal Languages and Automata, Narosa Publication, 3rd Edition, 2002.
2

Reference Books :

1 Michael Sipser, Introduction to the Theory of Computation, Thompson Learning, 2nd Edition
2 J. E. Hopcroft, J. D. Ullman, Introduction to Automata Theory, Languages and Computation, Addison - Wesley. 2nd edition, 2001

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – V
Course Code	:	IT 0304	
Course Title	:	Operating System With UNIX	

Course Contents:

1 **Introduction:**
Computers and Software, General System software, Resource abstraction & Sharing, Operating system strategies (Batch, Timesharing, real time, embedded etc)Concept of Multiprogramming Operating system organization, Basic functions-Implementation considerations, Computer organization, bootstrapping the machine, Mobile computers, Multiprocessors and parallel computers, Device Management-Device controllers & Device drivers – I/O strategies (direct I/O with polling, Interrupt driven I/O, DMA), Buffering, Disk scheduling strategies

2 **Process and Threads Management:**
Process & Threads- Implementing process & Threads – Process address space- process state transition diagram- Process manager responsibilities- concept of Linux process & thread descriptors-Process scheduler organization- different scheduling strategies(non preemptive & preemptive)- Process synchronization- critical section- semaphore & its implementation – classical synchronization problems and its solutions (Producer-consumer, readers-writers, dining philosopher)- Deadlock-prevention-avoidance-bankers algorithm-detection-reduced resource allocation graph- Inter process communication(Pipes, message passing etc)-concept of process management in Linux and widows NT.

3 **Memory Management:**
Memory management- address space abstraction-address binding-memory allocation-Fixed partition & variable partition memory strategies-dynamic address binding-swapping-paging-virtual memory address translation-dynamic paging-static paging algorithms-dynamic paging algorithm-working set algorithm-segmentation-implementation-memory mapped files-concept of memory management in Linux & Windows NT/XP.

4 **File Management:**
File Management – Low level files and Structured files- Low level file implementation – different approaches to Block management- Structured sequential file-Indexed sequential file-different directory structures-file systems-Mounting file systems- Protection and Security-security and Policy – Authentication , authorization and cryptography- Kerberos authentication- General protection model- Access matrix-Access control list – Capability list – Concept of File management in Linux and Windows NT.

5 **I/O Management:**
I/O Devices , Organization of the I/O Function , Operating System Design Issues , Buffering

6 **Architecture of the UNIX:**
Introduction to system concepts ,Kernel data structures ,System administration

7 **Buffer Cache:**
Structure of the buffer pool, Advantages and disadvantages of the buffer cache. Internal representation of files: I-nodes. Structure of a regular file. Directories – Conversion of a path name to an I-node . Super block. Other file types.

Text Book :
1 Gary Nutt, Nebendu Chaki, and Sarmistha Neogy, Operating Systems(3rd edition), Pearson Education, 2009
2 Jerry D. Peek, Grace Todino, John Strang, Learning the Unix Operating System, 5th edition, O'Reilly & Associates Publication 2002

Reference Books :
1 Silberschatz & Galvin, Operating system concepts, 7th edition, Addison Wesley
2 William Stallings, Operating Systems: Internals and Design Principles, Prentice Hall, 2008
3 Crowley C., Operating Systems – A Design oriented Approach, TMH
4 Tanenbaum A.S, Modern Operating Systems, Prentice hall, Pearson Education 3rd edition, 2008

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – V
Course Code	:	IT 0305	
Course Title	:	Data Base System	

Course Contents:

1 **The Extended Entity Relationship Model And Object Model:**
The ER model revisited, Motivation for complex data types, User Defined Abstract Data Types And Structured Types, Subclasses, Super classes, Inheritance, Specialization and Generalization, Constraints and Characteristics of Specialization and Generalization. Relationship Types of Degree Higher Than Two.

2 **Object-Oriented Databases:**
Overview of Object-Oriented Concepts. Object Identity, Object Structure, and Type Constructors, Encapsulation of Operations, Methods, and Persistence, Type Hierarchies and Inheritance, Type extents and Queries, Complex Objects

3 **Database Schema Design for OODBMS:**
OQL, Persistent Programming Languages; OODBMS Architecture And Storage Issues. Example of ODBMSs

4 **Object Relational and Extended Relational Databases:**
Database Design for ORDBMS - Nested Relations and Collections; Storage And Access methods

5 **Query processing and Optimization:**

An Overview of SQL3, Implementation Issues for Extended Type; Systems Comparison Of RDBMS, OODBMS, ORDBMS

6 **Transaction Management:**
Concurrency control, Crash Recovery, Database Security

7 **Data Warehousing and OLAP:**
   a) Data Warehouse Basics: Data Warehouse(DW) Introduction& Overview; Data Marts, DW components; Data warehouse architecture; ETL – Data Transformation-Extracting, Conditioning, cleansing, Scrubbing, Merging, etc.,
   b) OLAP: Multi-dimensional modeling - Fact table, dimensions, measures, examples; Schema Design - Star and Snowflake; OLAP - OLAP Vs OLTP, ROLAP,MOLAP, HOLAP; tools. OLAP Operations- Rollup, Drill-down, Dice, slice, pivot.

8 **Advances in Database Technology:**
Parallel Database, Distributed Database, Spatial Database, Temporal Database

Text Book :

1 Elmasri and Navathe, Fundamentals of Database Systems , 4th Edition , Pearson Education, 2004
2 Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems, Second Edition, McGraw-Hill, 2002

Reference Books :

1 Korth, Silberchatz, Sudarshan Database System Concepts, 5th Edition, McGraw-Hill, 2006
2 Peter Rob and Coronel, Database systems, Design, Implementation and Management, 5th Edition, Thomson Learning,2001
3 PaulRaj Poonniah, Data Warehousing Fundamentals, Wiley India Edition, 2010.

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Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – V
Course Code	:	IT1301	
Course Title	:	Computer Networks Lab	

Course Contents:

1 Introduction to different devices like switch, routers, cables, Network Interface Card etc. of computer network.
2 Study of different networking commands.
3 Implementations of Star Topology using switch.
4 Implementation of Hamming code and CRC in C/Java.
5 Introduction to Concepts of Simulation and Different Simulation Software.
6 Simulation of different network topology.
7 Study of different protocol.
8 Introduction to ns2.
9 Implementation of following protocol using ns2
        a) Slotted aloha.
        b) Stop and wait ARQ.
10 Implement Packet Sniffer.

Text Books:

1 Behrouz A. Forouzan, Data communication and Networking, Tata McGraw-Hill, 2nd edition, 2006.
2 A. S. Tanenbaum, Computer Networks, 5th edition, Prentice Hall, 2011.

Reference Books:

1 B. F. Forouzan, Data and Computer Communication, Tata McGraw Hill , 2nd edition, 2004
2 Prakash C. Gupta, Data communication and Networks, 5th edition, PHI, 2009.

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – V
Course Code	:	IT1302	
Course Title	:	Operating System Lab	

Course Contents:

1 Installation of Linux Operating System
2 Study of different linux commands
3 Simulate LS command using C.
4 Introduction to shell programming and Write shell programme to use different linux commands.
5 Write a shell programme to create chessboard and different designs
6 Write a shell programme to create user interface
7 Simulate the following CPU scheduling algorithms
        a) Round Robin
        b) SJF
        c) FCFS
        d) Priority
8 Simulate Bankers Algorithm for Dead Lock Avoidance
9 Write a C program to create a child process and allow the parent to display "Hello" and the child to display "Welcome" on the screen.
10 Simulate all page replacement algorithms
        a) FIFO
        b) LRU
        c) LFU
10 Simulate Producer- Consumer problem with help of Semaphore
11 Write C programs that make a copy of a file using
        a)standard I/O and
        b) System calls.
12 Write program to implement IPC through pipe and fork system calls

Text Book :

1 Gary Nutt, Nebendu Chaki, and Sarmistha Neogy, Operating Systems (3rd Edition), Pearson Education, 2009
2 Jerry D. Peek, Jerry Peek, Grace Todino, John Strang, Learning the Unix Operating System, 5th edition O'Reilly & Associates Publication 2002

Reference Books :

1 Siberschatz & Galvin, Operating System Concepts (5th edition), Addison Wesley,1998
2 Crowley C., Operating Systems – A Design Oriented Approach, TMH ,1st edition ,2001

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – V
Course Code	:	IT1303	
Course Title	:	**Software Engineering and Database System Lab**	

Course Contents:

1 Define a Problem statement for the database application.
2 Develop the Feasibility Study for the above Problem statement.
3 Write Software Project Plan for the above Problem statement.
4 Write Software Requirements Specification for the above Problem statement.
5 Draw Extended ER Diagram and Class Diagram for the above Problem statement
6 Write Data Flow Diagram for the above Problem statement
7 Develop Use Case Diagram for the above Problem statement
8 Write Sequence diagram for the above Problem statement
9 Develop State Chart Diagram for the above Problem statement.
10 Write System Implementation for the above Problem statement
11 Develop Graphical User Interface and report for the above Problem statement
12 Write Database solutions for the above Problem statement

Text Book :

1 Roger Pressman, "Software Engineering", McGraw Hill, 6th edition. 2010
2 Elmasri and Navathe, "Fundamentals of database systems", 4th Edition , Pearson   Education, 2004

Reference Books :

1 Raghu Ramakrishnan, Johannes Gehrke, database management systems, 3rd Edition, McGraw-Hill, 2003
   Ian Sommerville, Software Engineering, Pearson Education, 8th Edition. 2009
2 Pankaj Jalote, Software Engineering, Narosa Publishing House Pvt Ltd, Darya Ganj, New Delhi, 3rd Edition
3 , 2005
4 Douglas Bell, Software Engineering For Students, Pearson Education India, 4th Edition 2007

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER –V
Course Code	:	HM 1321	
Course Title	:	Communication & Presentation Skills Lab	

Course Contents:

1   Communication in an organization: process, types, barriers
2   Speaking Skills: Voice modulation, pronunciation, speaking with confidence, prepared and extempore speeches, video-conferencing
3   Listening, Note-making and Minutes of Meeting
4   Technical Writing: Vocabulary building, effective sentences and paragraph, organizational pattern, and summarizing
5   Special Types of Technical writing: Business Letter, E-mail, Brochure, Report, Memo, Proposal, Research paper, Conference Paper
6   Interview skills: Resume and job application, preparation for interviews, Interview questions and answers, Group Discussion
7   Presentation Skills: Planning, preparing, organizing and delivering an oral presentation

Assignments:

Communication: Analysis of cases on communication in an organization with students' presentation in groups
Speaking Skills:
i) Each student gives a prepared speech on any topic (current affair / news analysis / film review)
ii) Demonstration of a simulated video-conference
Listening and Note-making: Participating in role-play of a business meeting and making notes of the meeting (minutes)
Technical Writing: Solving excises in vocabulary building, effective sentences and paragraph, organizational pattern, and summarizing
Special Types of Technical writing: Each student has to submit 2 written assignments of 1500 words each on any two types of writing, selecting an industry related communication problem.
Interview skills: every students has to compulsorily participate in a mock interview or Group discussion
Presentation: Group of 5-7 students will select a topic and make a formal power point presentation and submit a formal report.

Text Books:

1   Effective Technical Communication, Ashraf Rizvi, Tata McGraw Hill
2   Technical Communication, Meenakshi Raman, Sangeeta Sharma, OUP

Reference Books:

1   Business communication- process and product, Mary Ellen Guffey, Thomson
2   Report writing for Business, Raymond Lesikar, John Petit, Irwin McGraw hill
3   Basic Business Communication, Raymond Lesikar, John Petit, Irwin McGraw hill
4   Guide to Presentation, Mary Munter, Lynn Russell, Prentice hall
5   Speaking Effectively; Jeremy Comfort, Pamela Rogerson et al, CUP
6   Effective Technical Communication, Anne Eisenberg, Mc GrawHill.

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – VI
Course Code	:	IT0306	
Course Title	:	Software Project Management	

Course Contents:

1 **An overview of IT Project Management:**
Introduction, the state of IT project Management, context of project management, need of project management, project goals, project life cycle and IT development, extreme project management, PMBOK.

2 **Conceptualizing and Initializing the IT Project:**
An information technology project Methodology (ITPM), project feasibility, request for proposal (RFP), the business case, Project selection and approval, project contracting, IT governance and the project office.

3 **The Human Side of Project Management:**
Introduction, organization and project planning, project team, the project environment.

4 **Developing the Project Charter and Project Plan**
Introduction, project management process, project integration management, the project charter, project planning framework, the contents of a project plan, the planning process, The Work Breakdown Structure (WBS), the linear responsibility chart, multidisciplinary teams.

5 **The Scope Management Plan:**
Introduction, scope planning, project scope definition, project scope verification, scope change control.

6 **The Project's Schedule, Budget and Risk Management:**
Introduction, developing the project schedule, project management software tools, methods of budgeting, developing the project budget, improving cost estimates, finalizing the project schedule and budget. Evaluation

7 **Resources Allocation:**
Allocating Resources to the Project: Resource loading, resource leveling, allocating scarce resources to projects and several projects, Goldratt's critical chain.

8 **The Project Communication Plan:**
Introduction, monitoring and controlling the project, the project communications plan, project metric, project control, designing the control system, the plan-monitor-control cycle, data collection and reporting, reporting performance and progress, information distribution.

9 **Managing Change, Resistance and Conflicts:**
Introduction, the nature of change, the Change management plan, dealing with resistance and conflicts.

10 **Managing Project Procurement and Outsourcing:**
Introduction, project procurement, Management, outsourcing.

11 **Project Leadership and Ethics:**
Introduction, project leadership, ethics in projects, Multicultural projects.

12 **The Implementation Plan and Project Closure:**
Introduction, project implementation, Administrative closure, project evaluation & audit.

Text Book:

1 Information Technology Project Management, Jack T. Marchewka, 3rd edition, Wiley India, 2009.
S. J. Mantel and J. R. Meredith, Project Management, 1st edition, Wiley India, 2009.

2

Reference Books :

1 John M. Nicholas, Project Management for Business and Technology, 2nd edition, Pearson Education. ,2001

2 Joel Henry, Software Project Management, A real-world guide to success, 1st edition, Pearson Education, 2008.

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – VI
Course Code	:	IT0307	
Course Title	:	Mobile Computing	

Course Contents:

1 **Introduction:**
Applications, A short history of wireless communication

2 **Wireless Transmission:**
Frequency for radio transmission, Signals, Antennas, Signal propagation, Multiplexing, Modulation, Spread spectrum, Cellular systems.

3 **Medium Access Control:**
Motivation for a specialized MAC: Hidden and Exposed terminals. Near and Far terminals; SDMA, FDMA, TDMA: Fixed TDM, Classical Aloha, Slotted Aloha, Carrier sense multiple access, Demand assigned multiple access, packet reservation multiple access, Reservation TDMA, Multiple access with collision avoidance, Polling, Inhibit sense multiple access; CDMA: Spread Aloha multiple access.

4 **Telecommunication Systems:**
GSM: Mobile services, System architecture, Radio interface, Protocols, Localization And Calling, Handover, Security, New data services; DECT: System architecture, Protocol architecture; TETRA, UMTS and IMT-2000: UMTS Basic architecture, UTRA FDD mode, UTRA TDD mode

5 **Satellite Systems:**
History, Applications, Basics: GEO, LEO, MEO; Routing, Localization, Handover, Examples

6 **Wireless LAN:**
Infrared vs. Radio transmission, Infrastructure and Ad hoc Networks, IEEE 802.11: System architecture, Protocol architecture, Physical layer, Medium access control layer, MAC management, Future development; HIPERLAN: Brief Overview; Bluetooth: Brief Overview; IEE 802.15.

7 **Mobile Network Layer:**
Mobile IP: Goals, assumptions and requirements, Entities and Terminology, IP packet delivery, Agent advertisement and discovery, Registration, Tunneling and Encapsulation , Optimizations, Reverse tunneling, Ipv6; Dynamic host configuration protocol, Ad hoc networks: Routing, Destination sequence distance vector, Dynamic source routing, Hierarchical algorithms, Alternative metrics

8 **Mobile Transport Layer:**
Traditional TCP: Congestion control, Slow start, Fast retransmit/fast recovery, Implications on mobility; Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission/time-out freezing, Selective retransmission, Transaction oriented TCP

9 **Support for Mobility:**
File systems: Consistency, Examples; World Wide Web: Hypertext transfer protocol, Hypertext markup language, Some approaches that might help wireless access, System architectures; Wireless application protocol: Architecture, Wireless datagram protocol, Wireless transport layer security, Wireless transaction protocol, Wireless session protocol, Wireless application environment, Wireless markup language, WML script, Wireless telephony application, Examples Stacks with Wap, Mobile databases, Mobile agents

10 Advances in Mobile Computing

Text Books:
1 Jochen Schiller, "Mobile communications", Addison wisely, Pearson education, 2nd Edition, 2002.
2 Wiiliam Stallings, "Wireless Communications and Networks" Prentice Hall, 2nd edition ,2005

Reference Book :
1 Rappaort, "Wireless Communications Principals and Practices" , 2nd Edition, Pearson Education Pvt. Ltd, 2003.

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – VI
Course Code	:	IT0308	
Course Title	:	Web Technology	

Course Contents:

1 **Software life cycle models;**
Introduction to Web Technology. World Wide Web. Web Server. Client-Server Model. Categories of Web Applications, Characteristics of Web Applications, Product-related Characteristics, Usage related Characteristics, Development-related Characteristic. Web architectures; Three Tier architectures; Intranets & Internet architecture; Protocols

2 **Client Side Programming:**
Client-side Forms; JavaScript; Incorporating JavaScript in HTML; JavaScript expressions; Control flow and functions; String and Arrays; JavaScript objects; JavaScript Forms: Managing frames in JavaScript; Cookies; history; location.

3 **XML:**
Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX, XSL

4 **Java Beans:**
Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizes, Java Beans API, Introduction to EJB's

5 **Web Servers and Servlets:**
Tomcat web server, Introduction to Servelets: Lifecycle of a Serverlet, JSDK, The Servelet API, The javax.servelet Package, Reading Servelet parameters, Reading Initialization parameters. The javax.servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues

6 **Introduction to JSP:**
The Problem with Servelet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat, Introduction to AJAX technology

7 **JSP Application Development:**
Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations

8 **Database Access:**
Database Programming using JDBC, Studying Javax.sql.* package, Accessing a Database from a JSP Page, Application – Specific Database Actions, Deploying JAVA Beans in a JSP Page, Introduction to struts framework.

9 **Application:**
Introduction to E-Commerce; Business Strategy; Business to Business Electronics Commerce (B to B); Transactions; Electronics Data Interchange (EDI); Business to Consumers Electronics Commerce (B to C); Element of E-commerce; E-Business; Establishing a Secure business on the Web; Web store; Online Payment; e-business; Internet Banking.

10 **Security :**
Electronic Commerce security issues. Cryptography. Digital Signature & Authentication protocol. Digital Certificates. Online Security: Secure Socket Layer (SSL); Web Security; Payment System Security;

Secure Electronics Transaction (SET)

Text Books:

1 Web Programming, Building Internet Applications, Chris Bates, 2nd edition, Wiley, 2002
2 The complete Reference Java 2, Fifth Edition by Patrick Naughton and Herbert Schildt. TMH, 2002

Reference Books :

1 Sebesta, Programming World Wide Web, Pearson, 5th edition, 2009
2 Marty Hall and Larry Brown, Core Servlets And java server Pages, Volume 1: Core Tech. By Pearson, 2nd edition, 2003
3 Internet and World Wide Web – How to program by Dietel and Nieto, PHI/Pearson Education Asia. Second edition ,2001

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – VI
Course Code	:	IT0309	
Course Title	:	Object Oriented Software Engineering	

Course Contents:

1 **Software life cycle models:**

Iteration and Incrementation SDLC, risks and other aspects of, Managing Iteration and Incrementation. Life cycle model: Code and Fix Model, Waterfall Life cycle model, Rapid prototype model, RAD, Spiral life cycle model, Open-source Life cycle model ,synchronize- and Stabilize model, Agile process, Comparison of life cycle model.
Software process:, Object oriented paradigm, Test Workflow, Design workflow, Implementation workflow ,Process metric, Phases of the Unified process ,one –verses two dimensional Life cycle model, Improving the software process, Capability Maturity Model, Cost and benefits of software Process model.

2 **Planning ,Estimation & Project Management:**

Planning & Estimation: Planning and the software process, Product Matrices, Techniques of cost estimation, Estimation- LOC, FP, COCOMO models.
Project Management: Software project management framework, IEEE software project management, planning and testing, planning object oriented project, Training requirement, Documentation standard, Testing software project management tool, Scheduling, Tracking.

3 **Workflow:**

Requirement Workflow: Functional, Nonfunctional, Determine the client need, understanding the domain, Business model, , Characteristics of Requirements, Requirement Elicitation Techniques, Initial requirement, Classical requirement phase, Rapid prototype, Human factor, Reusing rapid prototype, matrices of requirement workflow, Challenges of requirement.
Analysis of workflow: Static Analysis, Classical Analysis, Object –oriented analysis: Identifying Object – Methods of identifying objects, and types - Boundary, Control, Entity, Dynamic Analysis: Identifying Interaction – Sequence and Collaboration diagrams, State chart diagram
Design workflow: System Design Concept – Coupling and Cohesion, Data Encapsulation, Abstract Data Type, Information Hiding, Objects, Inheritance, Polymorphism, and Dynamic Binding, Architectural Styles, Identifying Subsystems and Interfaces, Design Patterns, Implementation.

4 **UML:**

Requirement Document: use case Diagram, activity diagram, Class Diagrams, stereotypes, Interaction Diagrams, State charts, Packages, Component Diagrams, and Deployment Diagram

5 **Implementation, Testing, Software quality:**

Implementation: Implementation Workflow, choice of programming language, Good programming practice, Coding Standards, Mapping models to Code, Mapping Object Model to Database Schema, code reuse, Integration, matrix of implementation workflow, challenges of the implementation workflow.
Testing: Test case selection, Walkthrough and Inspection, Black-Box Unit Testing, Glass–Box unit testing, comparison of unit testing techniques, potential problem when testing objects, Management aspect of unit testing Clean room, Integration testing, product testing, Acceptance testing, Case tool of Implementation, , System and Regression.
Software quality: Quality Standards, Quality Matrices, Testing & SQA: FTR, unit testing, integration testing, product testing, and acceptance testing.

6   **Software Configuration Management:**

Managing and controlling Changes, Managing and controlling version.

7   **Post delivery Maintenance:**

Development and maintenance, Management of post delivery maintenance, Types of maintenance, maintenance of Object –oriented software, maintenance of log defects reports, post delivery maintenance versus Development skills, Reverse engineering, re-engineering, Matrix of postdelivery maintenance, challenges of post delivery maintenance.

Text Books:

1   Stephan R. Schach, Object Oriented Software Engg. ,6th edition, MC-GRAW Hill, 2006
2   Roger Pressman, Software Engineering, McGraw Hill, 6th edition. 2010

Reference Books :

1   Timothy C. Lethbridge, Robert Laganiere, Object-Oriented Software Engineering - Practical Software Development Using UML AND JAVA, Tata McGraw-Hill Education, 2004

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – VI
Course Code	:	IT1304	
Course Title	:	Software Project Management Lab	

Course Contents:

1 Define a Problem statement for the database application
2 Develop the Feasibility Study for the above Problem statement.
3 Write Project Proposal for the above Problem statement.
4 Write Software Project Plan for the above Problem statement.
5 Write Project Activity Planning for the above Problem statement.
6 Analyzing the project network diagram for the above Problem statement.
7 Analyzing the project Cost estimation and budgeting for the above Problem statement
8 Analyzing the Risk management for the above Problem statement
9 Analyzing the Performance analysis of for the above Problem statement
10 Analyzing Project evaluation and closure for the above Problem statement

Text Book :

1 Information Technology Project Management, Jack T. Marchewka, 3rd edition, Wiley India, 2009.
 S. J. Mantel, J. R. Meredith and etl. Project Management, 1st edition, Wiley India, 2009.
2

Reference Books :

1 John M. Nicholas, Project Management for Business and Technology, 2nd edition, Pearson Education. ,2001
2 Joel Henry, Software Project Management, A real-world guide to success, 1st edition, Pearson Education, 2008.

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – VI
Course Code	:	IT1305	
Course Title	:	Mobile Computing & Elective Lab	

Course Contents:

Mobile Computing:

1 Installation and Configuration of NS2 for study of wireless Environment
2 To build and execute some simple wireless scenarios
3 To create and study a simple script for AODV over TCP
4 To create and study a simple script for DSR over TCP
5 To create and study a simple script for TORA over TCP
6 Study of node-movement/traffic-pattern files and other features in wireless simulations
7 Creating Wired-cum-Wireless and Mobile IP Simulations in ns
8 Study of Trace Support in NS2
9 Study and Implementation of Ad_ Hoc Network
10 J2ME May be used for lab assignments

Elective – Bioinformatics:

1 Write a simple Perl program on a computer running the Unix operating system
2 Access and search data from a number of biological databases available on the Internet
3 Critically evaluate data obtained from biological databases and tools on the Internet
4 Recognize and describe the importance and potential applications of bioinformatics,
5 Visualize Protein Sequences &Alignments

Elective – ERP:

1 Implement OLAP Queries
2 Implement OLTP
3 Implement various Reports In ABAP
   - Sales
   - Purchase
   - Finance

Elective –AI:
1 Problem Formulation Problems
2 Programs for Search
3 Constraint Satisfaction Programs
4 Game Playing Programs
5 Building a knowledge Base and Implementing Inference

Elective –RTS:
1 To implement Scheduling Algorithms
2 To implement Priority driven scheduling algorithm
3 Simulate Real time operating system

Elective –Machine Learning:
1 To implement Gibbs algorithm
2 To implement Heuristic Space Search.
3 To implement EM Algorithms

Elective –Software Architecture:
1 To implement Common Object Request Broker Architecture

2   To implant entity Bean
3   To implement session Bean

Elective –ADBMS:

1   Implement /Simulate the Mobile database
2   Implement /Simulate parallel database
3   Implement /Simulate distributed database
4   Case Study on
        1.   Mobile database
        2.   Parallel database
        3.   Distributed database
        4.   Temporal database
        5.   Spatial Database
        6.   Web Database

Elective – Unix System Administration:

1   Shell scripts
2   Simulate Net stat tool
3   Simulate Tcpdump tool
4   Backup

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – VI
Course Code	:	IT 1306	
Course Title	:	Web Technology and Object Oriented Software Engineering Lab	

Course Contents:

1 Design an application using OOAD
2 Draw use case Diagram for OOAD application
3 Draw activity diagram for OOAD application
4 Draw Interaction Diagrams for OOAD application
5 Draw Interaction Diagrams for OOAD application
6 Draw Component Diagrams for OOAD application
7 **HTML:**
   a) Create a personalized web page using HTML. The web page must include links about yourself, your curriculum vitae (forms), album (img tags), tutorials and contacts. All types of hyper-links should be used.
   b) Create a web page using frames, ordered and unordered list.
8 **XML:**
   Develop a simple application using XML
9 **JAVA SCRIPT:**
   a) Perform client side validation for an e-mail registration form using Java Script.
   b) Create a simple quiz application with timer using Java Script.
   c) Perform client side validation for an e-mail registration form using AJAX.
   d) Develop an application to fetch information from a database with AJAX
10 **JAVA – APPLETS:**
   a) Create an applet application and load an image in the applet.
   b) Create a Java application to show how mouse events are handled.
11 **Java Beans:**
   a) Use of Java Beans in Web Application
   b) Use of EJB in Web Application
12 **Server lets:**
   a) Create a servlet that access data from database
   b) Create a servlet which act as arithmetic calculator
13 **JSP:**
   a) Create a JSP that access data from database
   b) Create a JSP Browse the any item offered for sale
14 Create application in strut framework

15 Introduction to HTML5 and Web2.0 technologies for web site creation
16 Miniproject.

Text Books:

1 Web Programming, building internet applications, Chris Bates 2nd edition, WILEY
2 Timothy C. Lethbridge, Robert Laganiere, Object-Oriented Software Engineering - A Practical. Approach.

Reference Books :

1 Sebesta, Programming World Wide Web, Pearson, 5th edition, 2009
2 Marty Hall and Larry Brown, Core Servlets And java server Pages, Volume 1: Core Tech. By Pearson , 2nd edition, 2003
3 Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education Asia. Second edition, 2001

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Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – VI
Course Code	:	IT1307	
Course Title	:	Programming Lab - III	

Course Contents:

1 A program to illustrate arithmetic operations
2 A program that computes the real roots of a quadratic equation.
3 Program to compute the factorial of a number Using FOR Loop
4 Program to implement List Operations
5 Program to implement String Operations
6 Program to implement Converting Numbers to Strings
7 Program to create two circles in graphics.
8 Program to convert Celsius to Fahrenheit using a graphical interface.
9 Program for exception handling
10 Program to generate random (actually pseudorandom) numbers.
11 Program to generate Classes and objects.
12 Program to implement Widget Objects
13 Program to implement compute the mean (average) of a set of numbers entered by the user.

Text Books:

1 Paul Barry, Head First Python, O'Reilly Media, 1st edition ,November 2010,
2 Mark Lutz, Programming Python, Fourth Edition O'Reilly Publication,   4th edition, 2010

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – VI
Course Code	:	IT0801	
Course Title	:	Artificial Intelligence (Elective- I)	

Course Contents:

1 **Introduction:**
Introduction to AI, History of AI, Emergence Of Intelligent Agents

2 **Intelligent Agents:**
PEAS Representation for an Agent, Agent Environments, Concept of Rational Agent, Structure of Intelligent agents, Types of Agents.

3 **Problem Solving:**
Solving problems by searching, Problem Formulation, Uninformed Search Techniques- DFS, BFS, Iterative Deepening, Comparing Different Techniques, Informed search methods .heuristic Functions, Hill Climbing, Simulated Annealing, A*,Performance Evaluation.

4 **Constrained Satisfaction Problems:**
Constraint Satisfaction Problems like, map Coloring, Crypt Arithmetic, Backtracking for CSP, Local Search.

5 **Adversarial Search:**
Games, Minimax Algorithm, Alpha Beta pruning.

6 **Knowledge and Reasoning:**
Knowledge Based Agent, Introduction To Logic, Propositional Logic, Reasoning in Propositional logic, First Order Logic: Syntax and Semantics, Extensions and Notational Variation, Inference in First Order Logic, Unification, Forward and backward chaining, Resolution.

7 **Knowledge Engineering:**
Ontology, Categories and Objects, Mental Events and Object

8 **Learning:**
Learning from Observations, General Model of Learning Agents, Inductive learning, learning Decision Trees, Introduction to neural networks, Perceptrons, Multilayer feed forward network, application of ANN, Reinforcement learning: Passive& Active Reinforcement learning.

Text Books:

1 Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 2nd Edition, Pearson Publication,2005
2 George Lugar, .AI-Structures and Strategies for Complex Problem Solving., 4/e, Pearson Educations , 2002 ,

Reference Books :

1 Robert J. Schalkolf, Artificial Intelligence: an Engineering Approach, McGraw Hill, 2nd Edition, 1990.
2 Nils J. Nilsson, Principles of Artificial Intelligence, Narosa Publication., 2nd Edition,2002

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – VI
Course Code	:	IT0802	
Course Title	:	Enterprise Resource Planning (Elective- I)	

Course Contents:

1 **ERP: Enterprise Perspective:**

Features of ERP, MIS Integration, ERP drivers, Trends in ERP, ERP in India. An Overview,

2 **ERP: System Perspective:**

Management Information System, Operations Support System, DSS, Transaction Processing System, Network Structure of ERP System, ERP Work flow, Process modeling for ERP Systems, Communication in ERP Systems, OLTP, (On Line Transaction Processing), OLAP (On Line Analytical Processing), Enterprise Integration Application Tools for ERP.

3 **ERP: Resource Management Perspective:**

Business Modules in ERP Packages, Finance, Production, Human Resource, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution, Resource Management, Business Process Reengineering, Relationship between ERP & BPR, ERP Implementation Life Cycle, Implementation methodology, ERP Project Management & Monitoring.

4 **ERP: Key Issues**

 ERP and E-Commerce, ERP Culture, ERP and CRM, ERP and SCM, ERP

5 **Selection Issues:**

ERP in Public Sector Enterprises, Pre and Post Implementation Issues, ERP Vendors, Key ERP Consultants in India, Future Directions in ERP.

Text Books:

1 Alexis, Leon (1st Edition, 2000). ERP Demystified. Tata McGraw Hill.
2 Garg, V.K. and Venket, Krishna, N.K., (1st edition, 1997). ERP Concepts and Practices, PHI Publications.
3 Sadagopan, S. (1st Edition, 1999). ERP: A Managerial Perspective. Tata McGraw Hill.

Reference Books:

1 Langenalter, A. Gary (1st Edition, 2000). Enterprise Resources Planning and Beyond. St. Lucie Press, USA.
2 Imhoff, C. Loftis Lisa & Geiger, G. Jonathan (1st Edition, 2001). Building the Customer Centric Enterprise. John Wiley & Sons.
3 Shankar, Ravi & Jaiswal, S. (1st Edition, 1999). Enterprise Resource Planning. Galgotia Publications.

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – VI
Course Code	:	IT0803	
Course Title	:	Bioinformatics (Elective- I)	

Course Contents:

1 **Introduction:**
Introduction to Genomic data and Data Organization

2 **Sequence Data Banks:**
Introduction to sequence date banks - protein sequence data bank. NBFR-PIR, SWISSPROT, Signal peptide data bank, Nucleic acid sequence data bank - GenBank, EMBL nucleotide sequence data bank, AIDS virus sequence data bank. RRNA data bank, structural data banks - protein Data Bank (PDB), The Cambridge Structural Database (CSD) : Genome data bank - Metabolic pathway data :Microbial and Cellular Data Banks.

3 **Introduction to MSDN(Microbial Strain Data Network):**
Numerical Coding Systems of Microbes, Hibridoma Data Bank Structure, Virus Information System Cell line information system; other important Data banks in the area of Biotechnology/life sciences/biodiversity.

4 **Sequence analysis:**
Analysis Tools for Sequence Data Banks; Pair wise alignment -NEEDLEMAN and Wunsch algorithm, Smith Waterman, BLAST, FASTA algorithms to analyze sequence data: Sequence patterns motifs and profiles.

5 **Secondary Structure predictions :**
Prediction algorithms; Chao-Fasman algorithm, Hidden-Markov model, Neural Networking. Tertiary Structure predictions; prediction algorithms; Chao-Fasman algorithm, Hidden-Markov model, Neural Networking

6 **Applications in Biotechnology :**
Protein classifications, Fold libraries, Protein structure prediction: Fold recognition (threading), Protein structure predictions: Comparative modeling (Homology), Advanced topics: Protein folding, Protein-lig and interactions, Molecular Modeling & Dynamics, Drug Designing.

Text Books:

1 Introduction to Bioinformatics, Atwood, Pearson Education ,1st edition, 2002
2 Bioinformatics: A practical Guide to the Analysis of Genes and Proteins, Baxevanis, A.D., Quellette, B.F.F., John Wiely & Sons., 2005

Reference Books :

1 Developing Bioinformatics Computer Skills, Cynthia Gibas and Per Jambeck, 2001 SPD
Biocomputing: Informatics and Genome Project, Smith, D.W., 1994, Academic Press, NY

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – VI
Course Code	:	IT0804	
Course Title	:	Real Time Systems (Elective- I)	

Course Contents:

1 **Introduction:**

Introduction to real time systems, structure, issues, task classes, performance measures for real time of program run time-source code analysis, accounting for pipelining and caches systems-their properties, traditional measures, cost functions and hard deadlines. Estimation.

2 **Task Assignment and Scheduling:**

Rate monotonic scheduling algorithm, Preemptive earliest, deadline first algorithm, Using primary and alternative tasks. Task Assignment-Utilization balancing algorithm, next fit for RM(Rate monitoring) scheduling, Bin packing assignment algorithm for EDF, Myopic offline scheduling(MOS) algorithm, Focused addressing and bidding(FAB) algorithm, Buddy strategy, Assignment with precedence conditions

3 **Programming Languages & Tools:**

Desired language characteristics,, data typing, control structures, hierarchical decomposition, packages, run time error handling, Overloading and genetics, Multitasking, Low level   programming, Fex ,Euclid ,Run time support.

4 **Real time Communication:**

Communication media, network topologies. Protocols-Contention based, Token based, Stop-and-Go, Polled bus, Hierarchical round robin, deadline based.

5 **Fault Tolerance Techniques:**

Fault, fault types, fault detection, fault and error containment, hardware and software redundancy time redundancy, information redundancy. Reversal checks, Malicious or Byzantine failures, Integrated failure handling.

Text Books:

1 C.M Krishna and Kang G. Shin, Real Time Systems, TMH, 2nd edition, 2006
2 Stuart Bennelt, Real Time Computer Control and Introduction, Pearson education, 2003

Reference Books :

1 Jane W.S Liu, Real Time Systems, Mc-Graw Hill , 1st edition, 2003

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – VI
Course Code	:	IT0805	
Course Title	:	Advanced Database Management System (Elective- I)	

Course Contents:

1 **Parallel databases:**

Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures –Parallel Systems-– Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism, Case Studies.

2 **Distributed Databases:**

Distributed Systems – Distributed Database Concepts - Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Three Tier Client Server Architecture- Case Studies.

3 **Mobile Databases:**

Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management – Location Dependent Data Distribution - Mobile Transaction Models - Concurrency Control - Transaction Commit Protocols- Mobile Database Recovery Schemes

4 **Databases on the Web and Semi Structured Data:**

Web interfaces to the Web, Overview of XML; Structure of XML data, Document schema, Querying XML data; Storage of XML data, XML applications; The semi structured data model, Implementation issues, Indexes for text data, Case Studies.

5 **Enhanced Data Models for Advanced Applications:**

Active database concepts. Temporal database concepts. Spatial databases, Concepts and architecture; Deductive databases and Query processing; Mobile databases, Geographic information systems. Case Studies.

6 **Multimedia Databases:**

Multidimensional Data Structures – Image Databases – Text/Document Databases- Video Databases – Audio Databases – Multimedia Database Design. Case Studies.

Text Books:
1 Elmasri.R., Navathe. S .B, Fundamentals of Database Systems, 5th Edition, Pearson Education/Addison Wesley, 2007.
2 Thomas Cannolly and Carolyn Begg, Database Systems, A Practical Approach to Design, Implementation and Management, 3rd Edition, Pearson Education, 2007.

Reference Books:
1 Henry F Korth, Abraham Silberschatz, S. Sudharshan, Database System Concepts, 5th Edition, McGraw Hill, 2006.
2 Date C J, Kannan A and Swamynathan S, An Introduction to Database Systems, 8th Edition, Pearson Education, 2006.

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – VI
Course Code	:	IT0806	
Course Title	:	Machine Learning (Elective- I)	

Course Contents:

1 **Introduction:**

Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

2 **Neural Networks And Genetic Algorithms:**

Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evaluation and Learning.

3 **Bayesian And Computational Learning:**

Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

4 **Instant Based Learning:**

K- Nearest Neighbour Learning – Locally weighted Regression – Radial Bases Functions – Case Based Learning.

5 **Advanced Learning:**

Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm –Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning

Text Books:

1 Tom M. Mitchell, Machine Learning, McGraw-Hill, 1st edition, 1997
2 Ethem Alpaydin, Introduction to Machine Learning (Adaptive Computation & Machine Learning), The MIT Press 2004

Reference Books:

1 Hastie. T, Tibshirani. R, Friedman. J. H, The Elements of Statistical Learning, Springer,1st edition, 2001

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – VI
Course Code	:	IT0807	
Course Title	:	Software Architecture (Elective- I)	

Course Contents:

1 **Introduction:**

The architecture Business Cycle (ABC) – Roots of Software architecture - Software architecture definitions and importance – Architectures and quality attributes -Architectural Styles - Architectural views: Need for multiple views – Some representative views – Conceptual View – Module view – Process view – Physical view – Relating the views to each other – The Software Architecture analysis Method (SAAM)

2 **Architecture Frameworks:**

Technical Architecture Framework for Information Management (TAFIM) - The Common Object Request Broker Architecture (CORBA)

3 **Architecture based development:**

Architecture based activities for software development – Understanding the domain requirements Developing (selecting) the architecture – Representing and Communicating the architecture - Architecture Description Language (ADL) - Software architecture evaluation – Implementing based on architecture and assuring conformance

4 **Case Study:**

Architecture-based development Product lines - Case study of J2EE/EJB - Future of software architecture

5 **Design Patterns:**

Patterns vs. Frameworks – advantages of patterns – using patterns to solve problems – review of pattern families – Categories of patterns: Creational, Structural, Behavioral patterns – Future work

Text Book:

1 Software Architecture in Practice(2nd Ed): Len Bass et al, AW (1998)
2 Evaluating Software Architectures: Methods and Case Studies: Clements et al, AW (2001) Documenting Software Architectures: Views and Beyond : Clements et al, AW (2002)

Reference Books:

1 Design and Use of Software Architectures: Adopting and Evolving a Product-Line Approach, Bosch et al, AW (2000)
2 Design Patterns: Elements of reusable Object Oriented Software – Erich Gamma et al, AW, (1994)

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – VI
Course Code	:	IT0808	
Course Title	:	Unix System Administration (Elective- I)	

Course Contents:

1 **Introduction to UNIX:**
History of the UNIX System, UNIX Timeline ., Versions of UNIX , Roles of the UNIX System Administrator

2 **SCRIPTING AND THE SHELL:**
Shell basics ., Command editing , Pipes and redirection , Common filter commands, Control flow., Loops, Arrays and arithmetic

3 **System Administration Tools:**
Manage Linux Accounts with User conf., Add a New User, Modifying a User   Delete an Existing User , Adding a New Group

4 **Access Control:**
Traditional UNIX access control File system , access control , Process ownership   The root account, Setuid and setgid execution, Modern access control, Role-based access control, SELinux: security-enhanced Linux, POSIX capabilities (Linux), PAM: Pluggable Authentication Modules, Kerberos: third-party cryptographic authentication, Access control lists

5 **Controlling Processes:**
Components of a process, PID: process ID number, PPID: parent PID , UID and EUID: real and effective user ID , GID and EGID: real and effective group ID , Control terminal , The life cycle of a process

6 **File System:**
Pathnames , Absolute and relative paths, File system mounting and unmounting , The organization of the file tree, File types , Directories Character and block device files , sockets, Named pipes, File attributes , The permission bits , Access control lists

7 **System Security:**
Security Policy , System Patches, Security Tools –nmap , Secure Shell Facility

8 **Backup and Restore;**
Backup Elements : User Perspective , Density and Form Factor, Network Bandwidth, Remote Sites , Backup Methods , Explore Backup Tools : dump, dd, restore

9 **Network Tools:**
Network Address Table on a UNIX System Using arp ,Control Network Interfaces Using Ifconfig, Monitor Network Operations using Netstat, Verify Network Connectivity Using Ping, Monitor Network Traffic with the tcpdump Tool

10 **Domain Name System:**
Need of DNS , Managing your DNS , Working of DNS, DNS Server and Client Components

11 **WEB HOSTING:**
Web hosting basics , Resource locations on the web , Uniform resource locators , How HTTP works , Content generation on the fly Embedded interpreters , Fast CGI , Script security, Application servers , Load balancing , HTTP server installation

Text Book:

1 Evi Nemeth , Garth Snyder, Trent R. Hein, Ben Whaley, UNIX and Linux System Administration Handbook, (4th Edition) , Prentice Hall , 2010
2 Steve Maxwell, UNIX System Administration : A Beginner's Guide, McGraw-Hill/ Osborne Media; 1st edition ,2002

Reference Books:

1 Tom Adelstein, Bill Lubanovic, Linux System Administration By O'Reilly Media March 1st Edition ,2007

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER –VI
Course Code	:	HM 0901	
Course Title	:	Entrepreneurship Development (Elective- I)	

Course Contents:

1 **Entrepreneurship Awareness**

Entrepreneurship: Need for entrepreneurship and self employment, scope and trends of small enterprises, role of Small business in national growth.
Small business enterprise: Types of small enterprises, Entrepreneur Self assessment

2 **Business Opportunities**
Identifying and evaluating business opportunities: Ideas and opportunities, ideas into opportunities.
Quick start methods: franchise, turn-key or packaged business, multi-level marketing scheme, buying an existing business.
International business: Pricing a product foe export sale.

3 **Planning**
The business planning process: Need for a good business plan, benefits of a business plan, contents and format of a business plan.
Refining your business idea: Description of a business idea.
Business financing: Need for planning the finance of business, start-up and operating capital needs, Sources of finance.
Market research: Identification of market, determination of market segment, identifying competition.
Developing a marketing plan: Image, location, pricing, promotion and advertising, channels of distribution, selling skills, credit and collections.
Inventory: Types of inventory.

4 **Managerial and legal considerations**
Forms of ownership: sole proprietor, partnership.
Government policies and facilities for small enterprise:
Elements of contract law
Selling your venture: planning for succession, valuation of business.

Methodology:
1. *Theory will be supplemented with case studies.*
2. *Students will be required to make field visits to entrepreneurs and also prepare a business plan.*
3. *Workshops will be arranged for opportunity identification, idea generation and evaluation and writing business plan.*
4. *Interaction with entrepreneurs, venture capitalists and mentors may be arranged.*

Text book:
1. Entrepreneurship Development, (prepared by: Colombo plan staff college for technician education. Adapted by: Centre for research and industrial staff performance. ISBN 0-07-463329-5) Tata McGraw-Hill publishing company 1998.
2. A handbook for new entrepreneurs, (sponsors: Department of Science and Technology, Govt. of India, New Delhi) Published by: Entrepreneurship Development Institute of India, Ahmadabad. First ed, 1986.

Reference books:
1. Innovation and entrepreneurship, Drucker Peter F, Heinemann, London, 1st edition, 1985.
2. Entrepreneurship, Holt David H, Prentice Hall India, 2005.
3. The successful Entrepreneur's Guidebook: Colin Barrow, Robert Brown and Liz Clarke(Kogan Page India)

Programme Name	:	T.Y. B. Tech. (Information Technology)	SEMESTER – VI
Course Code	:	MA0901	
Course Title	:	Applied Statistics (Elective- I)	

Course Contents:

1   **Probability:**
Classical and axiomatic definitions of probability, addition rule, and multiplication rule, conditional probability, total probability, Baye's theorem.

2   **Random Variables:**
Discrete and continuous random variables, Probability mass, probability density and cumulative distribution functions and their properties, Mathematical expectation, Moments, Moments generating functions, characteristic functions, Chebyshev's inequality.

3   **Distributions:**
Uniform, Binomial, Geometric, Poisson, Exponential, Gamma and Normal distribution with their properties.

4   **Joint Probability Distributions:**
Joint, Marginal and Conditional distributions, Product moment correlation, Independence of random variables, Bivariate normal distribution.

5   **Sampling Distribution:**
Types of sampling, The central limit theorem ,Distribution of sample mean and sample variance ,Chi square, t and F distributions, Estimation ,confidence intervals for the means and variances of normal populations.

6   **Testing of Hypothesis:**
Null and alternative Hypothesis, Critical and acceptance region, two types of errors, Pearson fundamental Lemma, large and small samples.
Testing of significance for large sample and small sample:
   a)   Test of significance of the difference between sample mean and population mean.
   b)   Test for significance between mean of two large samples test and proportion.
   c)   Test for significance between mean of two small samples.
   d)   Paired t-test.
   e)   The test for variance of two small samples using F test. Test of Goodness and independence of attributes using Chi square distribution.

7   **Correlation and regression :**
Simple linear regression and correlation

8   **Analysis of single factor experiments:**
Designing engineering experiments completely randomized single factor experiments and Latin square design, Analysis of variance.

9   **Non Parametric tests:**
Sign test, Signed rank test, Ranksum test

Text Books:
1   Applied Statistics for Engineers by Montgomery and John Wiley