



**BHARATI VIDYAPEETH UNIVERSITY,
Pune.**

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COURSE STRUCTURE & SYLLABUS
M. Tech. (IT) (Semester - I to IV)



COURSE STRUCTURE & SYLLABUS

BHARATI VIDYAPEETH UNIVERSITY, PUNE

M. Tech. (IT) (Sem. I to IV)



HIGHLIGHTS

Bharati Vidyapeeth University College of Engineering is the largest engineering college in Maharashtra with an intake of 700 students in each academic year. Imparting quality technical education from undergraduate to doctorate Level, BVUCOE is probably the only engineering college in India with an accreditation from both NAAC as well as NBA. The faculty at BVUCOE boasts of highly qualified academicians, a quality that is further emphasized by the fact that 15 of them are presently pursuing their Ph.D. degree.

BVUCOE has been ranked 29th amongst the Top50 Technical Schools of India in survey conducted by DATAQUEST-IDC. We have Enjoyed a ranking in this list for the last 4 years. Research is of utmost importance in all our programs. A total of 113 research papers were published in 2007-2008.

Currently we have 12 outgoing research projects. The infrastructure BVUCOE is state-of-the-art with 62 classrooms, 59 laboratories and a well-stocked library that currently holds 27,130 titles. The college has an international presence with MOUs signed with the North Carolina A&T State University (Greensboro, USA), University of Venice (Italy), Actel Corporation (USA). Corporate interaction is also inculcated in our programs through our association with Oracle India Ltd., Infosys Ltd. and Tata Consultancy Services.

SALIENT FEATURES

Information Technology deals in study, design, development, implementation, support and management of software. The department runs an under-graduate programme viz. B.Tech. (IT) and one post-graduate programme viz. M.Tech. (IT). The department has incorporated all the latest facilities for the benefit of the students. The department has well-equipped laboratories. The latest software and hardware equipments are provided to the students. The department has specialized laboratories in Software Engineering, Linux Operating System, Multimedia.

The Association of Computer & Information Technology Engineering Students (ACIES) organizes various events and expert lectures on different technologies. The syllabi of the department are revised regularly so as to match the needs of the industry. Apart from giving thorough technical knowledge using the state-of-art technology, the students are taught communication skills and are given experience in working in groups on live projects.

MAJOR GROUPS/AREAS

Operating Systems, Multimedia, Image Processing, Computer Networks, Software Engineering, System Programming

EXPERTISE IN RESEARCH AND CONSULTANCY

The department of Information Technology has received fund from UGC for Modernization of Research Laboratory "Object Oriented Modeling and Design".

ON GOING RESEARCH PROJECTS

High Non Stationary EEG Analysis, Brain-Computer Interface, Hidden Relation Finder, Video Steganography

COMPLETED PROJECTS

Visual Modeling of Real Time System, NeTailor- A Network Patch Management Solution, Voice Message Transform, Artillery Command Post Execution Software, MAFCOG 1.0 Mathematical Formula Analysis and Generator, Object Oriented Learning Environment Using ASP, Real Time Complex System, Implementation of Sniffers, EEG Analysis using Time Domain, Steganographic System.

MAJOR EQUIPMENTS

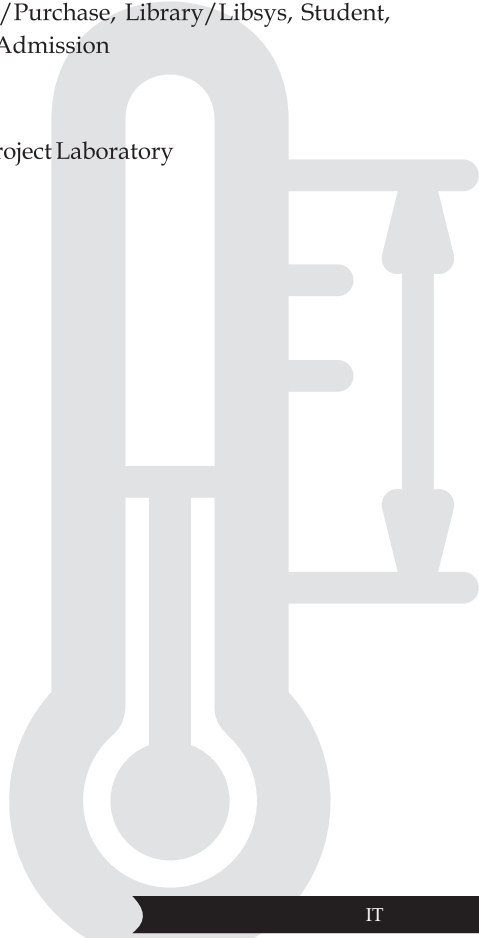
Pentium - IV 2.46 GHz - 100, Microprocessor Kits, Microcontroller Kits

SOFTWARES

- Operating Systems** : MS-DOS, Windows 95, Windows 98, SCO Xenix 2.1, Linux 7.0, Microsoft OS/2 SDK Ver 1.02, Sun Solaris 7.1
- RDBMS** : Oracle 8, Oracle 8i, Oracle 9i, SQL Ver 7.0 & 8.0
- Developing Softwares** : Visual Studio 6.0, Microsoft Office-2000, Turbo C ++ For Dos 4.5, Microsoft C 6.0, Microsoft Fortran, Turbo Pascal, Microsoft COBOL, Turbo C, Visual Studio MS.Net, Developer 2000, MS Project 2003
- Web Designing Softwares** : Adobe Photoshop, PageMaker, Corel Draw
- Customized Softwares** : Payroll, Stores/Purchase, Library/Libsys, Student, Exam Section, Admission

LABORATORIES

- IT Lab I - Software Engineering Laboratory & Project Laboratory
- IT Lab II - Programming Laboratory
- IT Lab III - Linux Laboratory
- Microprocessor Laboratory





STRUCTURE & EXAMINATION PATTERN

M. Tech. - IT

Semester I								
Subject Code	Subject	Teaching Scheme (Hrs.)		Examination Scheme (Marks)				Total (Marks)
		L	P	Theory	Unit Test	TW	Oral	
K30501	Software Testing	04	02	70	30	25	25	150
K30502	Data Warehousing and e-commerce	04	02	70	30	25	25	150
K30503	Mobile Networks and communication	04	-	70	30	-	-	100
K30504	Parallel Programming and Algorithms	04	-	70	30	-	-	100
	Total	16	04	280	120	50	50	500
	Grand Total	20		400		100		500

Semester II								
Subject Code	Subject	Teaching Scheme (Hrs.)		Examination Scheme (Marks)				Total (Marks)
		L	P	Theory	Unit Test	TW	Oral	
K30505	Component Engineering	04	02	70	30	25	25	150
K30506	Information System Management	04	02	70	30	25	25	150
K30507	Web Engineering	04	-	70	30	-	-	100
K30508	Information Technology Enabled Services	04	-	70	30	-	-	100
	Total	16	04	280	120	50	50	500
	Grand Total	20		400		100		500



STRUCTURE & EXAMINATION PATTERN

M. Tech. - IT

Semester III								
Subject Code	Subject	Teaching Scheme (Hrs.)		Examination Scheme (Marks)				Total (Marks)
		L	P	Theory	Unit Test	TW	Oral	
K30601	Elective I	04	02	70	30	25	25	150
K30602	Elective II	04	02	70	30	25	25	150
K30603	Seminar I	-	01	-	-	25	25	50
K30604	Dissertation stage I	-	02	-	-	25	-	25
	Total	08	07	140	60	100	75	375
	Grand Total	15		200		175		375

Semester IV								
Subject Code	Subject	Teaching Scheme (Hrs.)		Examination Scheme (Marks)				Total (Marks)
		L	P	Theory	Unit Test	TW	Oral	
K30605	Dissertation Stage II	-	04	-	-	150	75	225
	Total	-	04	-	-	150	75	225
	Grand Total	04		-		225		225

Elective - I

- Real time Systems
- Machine Learning and Data Mining
- Natural Language Processing and Understanding
- Computer Forensics and Cyber Laws
- Advanced MIS

Elective II

- Bioinformatics
- VLSI System Design
- Interactive User Interface
- Remote Sensing and GIS
- Simulation And Modeling

Dissertation Stage I:

Identification of Problem, Preparation of Synopsis, Literature survey and formulation of problem.

Dissertation Stage II:

System, Analysis System Modeling, System Design and Testing, Submission of the Final Report.

Seminar I:

Seminar topic should not be the Same as dissertation topic.



RULES FOR CONDUCTING TESTS

Mode of the test

- Three unit tests per subject shall be conducted in each semester. The schedule for the same will be declared in the academic calendar of each term.
- Each unit test shall carry 30 marks.
- University examination pattern has given weightage of 30 marks for unit tests and 70 marks for theory examination
- To calculate final marks of the unit test following procedure is followed:
 - i) Out of the three unit tests conducted during the semester, the marks of only two unit tests in which the candidate has shown his/her best performance shall be considered, to decide the provisional marks in each subject
 - ii) Average marks obtained in two unit tests in which students have performed well shall be considered as provisional marks obtained by the student.
 - iii) If the candidate appears only for two unit tests conducted during the semester, he/she will not be given the benefit of the best performance in the tests.
 - iv) If the candidate appears only for one unit test conducted during the semester, to calculate the marks obtained in the unit tests it will be considered that the candidate has got 0(zero) marks in other unit tests.
 - v) There is separate passing in theory examination. A candidate has to secure minimum 28 marks(i.e.40%) out of 70 marks to declare him/her pass. Provisional marks obtained by the candidate in unit tests should reflect as proportional to the marks obtained in theory examination. In case of disparity of more than 15% it will be scaled down accordingly. These marks will be final marks obtained by the student. No scaling up is permitted.
 - vi) Unit test marks will be added in theory examination marks only after passing of candidate in theory examination in respective subject.
- Paper pattern for the unit tests:
- All questions are compulsory with weightage as following:

Question 1	-	10 marks
Question 2	-	10 marks
Question 3	-	10 marks
- For granting the term it is mandatory to appear for all the three unit tests conducted in each semester.
- Roll numbers allotted to the students shall be the examination numbers for the unit tests.



SEMESTER - I





TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 70 Marks

Duration : 03 Hours

Unit Test : 30 Marks

Termwork : 25 Marks

Oral : 25 Marks

Unit-I

(10 Hours)

Principles of Measurement:

Representation Theory of Measurement, Measurement and models, Measurement Scales, Classification of Software Measures, Determining what to measure, Applying Framework, Software Measurement Validation, Four principles of Investigation, Planning Formal Experiments, What is a good data, How to define/collect data, How to Store and Extract data.

Unit-II

(06 Hours)

Internal Product attributes Measurement:

Size: Aspects of software size, length, reuse, functionality, complexity,
Structure: Types of structural measures, control-flow structures, Modularity and information flow attributes, Object-oriented metrics, Data structure, Difficulties with general complexity measures, Halstead's Software Science.

Unit-III

(10 Hours)

Software Measurement Programs and Principles of Testing:

What is a metric plan?, Goal-Question-Metric model, Measurement tools, Measurement in small, Measurement in Large systems.

Defects:

Origins of Defects, Defect Classes, Defect repository and Test Design, Developer/Tester support for Defect Repository

Test Case Design I [White-Box]:

Test Adequacy criteria, Static testing by humans, Static analysis tools,

Structural Testing, Code Complexity testing, Mutation Testing.

Test Case Design II [Black-Box]:

Test case Design Criteria, Requirement based testing, Positive and negative testing, Boundary Value analysis, Equivalence Partitioning, State-based or Graph-based Testing, Compatibility Testing, User Documentation Testing, Domain Testing.

Unit-IV

(06 Hours)

Software Testing:

Test plan, Management, Execution and Reporting, GUI testing, Validation testing, Integration testing, System and Acceptance testing, Scenario testing, Regression testing, Specification-based testing, Performance Testing, Ad hoc Testing, Usability and Accessibility Testing, Software Test Automation.

Unit-V

(08 Hours)

Software Quality Metrics and Tools:

Quality concepts, Software Quality Assurance, Six Sigma principles, Malcolm Baldrige Assessment, ISO 9000, Edward Deming's principles, Total Quality Management, Product Quality Metrics, In process Quality Metrics, Software maintenance, Ishikawa's 7 basic tools, Checklists, Pareto diagrams, Histogram, Run Charts, Scatter diagrams, Control chart, Cause Effect diagram. Defect Removal Effectiveness & Process Maturity Level.

Unit-VI

(08 Hours)

Software Maintenance:

Problem Reporting: Customer side Preliminary activities, Defects reported by Internal Customers, Logistics and Tooling, Challenges and Best Practices.

Problem Resolution: Overview of Problem Resolution, Categorizing and Identifying problem, Making the Fix and Testing it, Challenges and Best Practices. Fix Distribution: Overview of Fix Distribution, Choosing method of Fix Distribution, Composing Fixes, Preparing and Testing Shipment unit.

Text Books/References

- Fenton, Fleegeer, “ Software Metrics: A Rigourous and Practical Approach”, Thomson, ISBN 981-240-385-X
- Stephen H. Kan, “Metrics & Models in Software Quality Engineering”, Pearson Education, ISBN 81-297-0175-8
- Ramesh, Bhattiprolu, “ Software Maintenance”, Tata McGraw Hill, ISBN 0-07-048345-0
- Desikan, Ramesh, “Software Testing : Principles and Practices”, Pearson Education, ISBN 81-7758-121-X
- Burnstein, “Practical Software Testing”, Springer International Edition, ISBN 81-8128-089-X

Syllabus for Unit Test

Unit Test 1	Units I & II
Unit Test 2	Units III & IV
Unit Test 3	Units V & VI



K30502: DATA WAREHOUSING AND E-COMMERCE

TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 70 Marks

Duration : 03 Hours

Unit Test : 30 Marks

Termwork : 25 Marks

Oral : 25 Marks

Unit-I

(08 Hours)

Types of Decision Support System:

The DSS hierarchy, Generalising the categories, Matching the DSS to the Decision type, Individual and group DSS. Matching the DSS to the user Community, Matching DSS to the decision Maker's Psychological type, User modes institutional Vs ad-hoc DSS.

DSS Architecture, Hardware and Operating Systems Platform:

Defining the DSS Arch. The major options, the internet and client-server computing in DSS, DSS using shared data on separate system, DSS on stand alone system, Open system and DSS, DSS user interface.

DSS Software Tools:

DSS software categories, standard packages, Specialized tools and generators, programming languages for DSS, DSS user interfaces.

Unit-II

(08 Hours)

Building & Implementing Decision Support System:

The DSS development process, DSS development project particulars. The implementation stage, system conversion. Overcoming resistance to change, DSS implementation issues, using the list of issues, Ethical issues in DSS.

Unit-III

(08 Hours)

Data Warehousing & Executive Information System Fundamentals:

Definitions uses & necessity of a data warehousing, Data warehouse concepts, Executive information systems.

The Data Warehouse Database:

Contents of the data warehouse database, database structures, and Getting data into data warehouse, Media.

Unit-IV

(08 Hours)

E-Commerce & The Role of Independent Third Parties:

Introduction, consulting parties & accountant's independence, CPA version project, New assurance project, New assurance services undefined by the AICTE the Elliot committee 7 the Cohen Committee, three views of E-Commerce. E-commerce integrity & security assurance, internal control framework, competition, risk assessment assurance, impact of e-commerce on the traditional assurance function, continuous auditing, third party assurance of web based e-commerce, security of data, business plitics, transactions processing integrity, privacy of data, web-site seal options, better business bearu. Trustee, veri-sign, ACSA, AICPA/CICA web trust, business practices, transaction integrity, information protection, report issuance, implication for the accounting, professional skill sets, expansion of assurance services, consulting and international services.

Unit-V

(08 Hours)

E-Commerce & Internet:

Introduction, traditional EDI system, the origin of EDI, non-EDI systems, value added network(VANS) and pre-established trading partners, partially integrated EDI systems, benefits of EDI systems, Data transfer and standards, Department of Defense transaction,. Examples, financial EDI, EDI systems and Internets, Security concerns, security of data during transmission, audit trials and acknowledgements, authentication, interact trading relationship; consumer to business, business to business, government to citizen benefits, EDI web browser transaction, software, insights EDI and internet systems. Real time EDI inventory links with suppliers, integrated delivery links with federal express, web based sales, Impact of EDI internet applications on the accounting profession, Increased complexity of auditing through the computer, integrity of reliance in the VANS, Extension of audit to trading partners systems, increased technological skill of smaller accounting firms.

Unit-VI

(08 Hours)

Risk of Insecure Systems:

Introduction, Overview of risks associated with internet transactions, internet associated risks, risks of customers, false or malicious web sites,

stealing visitor's hard id, & passwords, stealing visitor's credit card and information, spying on visitor's hard drive, theft of customer data from selling agents and ISPs, Privacy and use of cookies, risk to selling agents, customer impersonation, denial of service attacks, data theft, internet associated risks, sabotage by former employees, sniffers, financial fraud, down loading of data, emails proofing, social engineering, risks associated with business transaction data transferred between trading partners, intranet extranet and internet relationship, data interception, message origin authentication, proof of delivery, message integrity & unauthorized viewing of messages, timely delivery of messages, risk associated with viruses and malicious code overflows, viruses, Trojan Horses, hoaxes, buffer overflows, implication for the accounting profession, intranet internet controls web site assurance.

E-Commerce Payment Mechanism:

Introduction, the SET protocol. SET v/s SSI, version 1.0, payment gateway, Certificate Insurance, Certificate trust chain, Cryptography methods, Dual signature, the set logo, Compliance testing, Status of software implementation, version 2.0, and intermediate releases, magnetic strip cards, smart cards, Electronic cheques, The FSTC's electrons cheques, the FSTC's BIPS specification, audit implications, Electronic bill presentation & payment system.

Text Books/References

- Efreem G. Mallach, "Decision support & data warehouse system", MGH International
- Green Stein, FeinMan, "Electronic Commerce", MGH International
- W.S.Jawadekar, "Management Information System", MGH International
- Daniel Minoli, "Web Commerce technology handbook", MGH International
- Mathews Leon, "The E-biz Primer- Alexis Leon", MGH International

Syllabus for Unit Test

Unit Test 1	Units I & II
Unit Test 2	Units III & IV
Unit Test 3	Units V & VI



K30503: MOBILE NETWORKS AND COMMUNICATION

TEACHING SCHEME

Lectures : 04 Hrs/week

EXAMINATION SCHEME

Theory : 70 Marks

Duration : 03 Hours

Unit Test : 30 Marks

Unit-I

(08 Hours)

Introduction to Mobile Communication :

Cellular mobile architecture overview and cellular system design , Frequency management and channel assignment, Frequency reuse channels, concepts of cell splitting, handover in cellular system, handoff algorithms and dropped calls.

Unit-II

(08 Hours)

Multiple Access Schemes:

SDMA, FDMA, TDMA, CDMA, comparison of S/T/F/CDMA based on terminals signal separation and advantages and disadvantages; IEEE 802.11 & 802.16 wireless standards, System architecture.

Unit-III

(08 Hours)

Propagation Path Loss and Propagation Models:

Co-channel & Non-co-channel interference: Exploring co-channel interference areas in system, reduction of co channel interference, Different types of non-co channel interferences, different ways to reduce interference and in turn improve cell coverage.

Unit-IV

(08 Hours)

Switching and traffic:

General description, Special features for handling traffic, Small switching systems, systems enhancement, resource allocation and mobility management.

Unit-V

(08 Hours)

Practical Cellular Mobile system-GSM:

Cellphone generations 1G, 2G, 3G, Standards for wireless communication system UMTS etc; GSM architecture and interfaces, GSM subsystems, mapping of GSM layers on to OSI layers.

Unit-VI

(08 Hours)

CDMA:

Major attributes IS-95 system architecture, air interface, physical and logical channel and call processing.

Text Books/References

- William C.Y.Lee, "Mobile cellular Telecommunication", 2nd Ed. McGraw-Hill
- Jochen Schiller, "Mobile Communication" Pearson Education
- V. K. Garg, J. E. Wilkes, "Principle and Application of GSM", Pearson Education
- V. K. Garg, "IS-95 CDMA & CDMA 2000", Pearson Education

Syllabus for Unit Test

Unit Test 1	Units I & II
Unit Test 2	Units III & IV
Unit Test 3	Units V & VI



K30504: PARALLEL PROGRAMMING AND ALGORITHM

TEACHING SCHEME

Lectures : 04 Hrs/week

EXAMINATION SCHEME

Theory : 70 Marks

Duration : 03 Hours

Unit Test : 30 Marks

Unit-I

(10Hours)

Introduction to Parallel Processing:

Introduction trends towards parallel processing, architectural classification, SIMD, MIMD classifications Principle of pipelining and vector processing, scalar and vector pipeline, Evolution of parallel processors, future trends.

Vector and Pipelined Processors:

Scalar & vector pipelines, classification of pipelined processors, performance evaluation factors, performance Evaluation factors, performance modeling. Vector processing concepts, pipelined vector processors, carry type vector processor design example. Associative memory processors issues and solutions Multithreaded architecture-latency hiding techniques principles of multithreading.

Unit-II

(06 Hours)

Interconnection Networks:

Various Topologies like crossbar, Multistage interconnection network, static & dynamic type of network loosely coupled 7 tightly coupled architectures. Network topologies for MIMD system like star, mesh tree, hypercube etc.

Unit-III

(06 Hours)

Distributed Memory Architecture:

Loosely coupled systems connected to network topologies like hyper cubes, bus or switches. Cluster Computing case study of parallel Computer ANUPAM PIII.

Unit-IV

(10 Hours)

Systolic Architectures :

Systolic arrays and their applications Wave front arrays.

Data Flow Architecture:

Concept of data flow computing, static and dynamic data flow architecture, reduction and demand driven data flow architecture.

Unit-V

(08 Hours)

Programmability Issues:

Types of parallelism. Parallel Programming models-Shared memory, message passing, data parallel, object oriented model Master slave model, manager-worker model Data dependency analysis, concurrency analysis, bernstein's conditions.

Unit-VI

(08 Hours)

Parallel Programming Languages:

Introduction to HPF, C-Linda, Message passing libraries like PVM, MPI .

Parallel Algorithms:

Developing simple parallel programs using message passing libraries like MPI.

Text Books/References

- Kai Hwang and Briggs, "Computer Architecture and Parallel Processing", MGH
- Kai Hwang, "Advanced Computer Architecture: Parallelism, Scalability and Programmability"
- M.J. Quinn, "Parallel computing- Theory and Practice", TMGH
- Wilkinson, Allen, "Parallel Programming"
- Pacheco, Morgan Kauffen, "Parallel Programming with MPI"
- Quinn M. J., Parallel Programming in C with MPI, TMH

Syllabus for Unit Test

Unit Test 1	Units I & II
Unit Test 2	Units III & IV
Unit Test 3	Units V & VI





SEMESTER - II



TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 70 Marks

Duration : 03 Hours

Unit Test : 30 Marks

Termwork : 25 Marks

Oral : 25 Marks

Unit-I

(08 Hours)

Client/Server Computing:

Client/Server Concepts. Client/Server Architecture Models. Distributed Computing and Concurrent Computing. Summary.

Object Technology:

A Typical OO System. Object-Oriented Concepts. Advantages of the Object Model. Summary.

Integrating Object Technology with Enterprise Systems:

Objectifying Individual Modules. Objectifying the Conventional Architecture Model. Using an OO Language in an OO Architecture Model. Objectifying an Entire System. Summary.

Unit-II

(08 Hours)

Object-Oriented Clients:

A Historical View of Clients. Fat and Slim Clients. Objects in Client Development. Summary.

Object-Oriented Services:

Types and Characteristics of Servers. Transaction Servers. Database Servers. Native Servers. Pathways to OOServers. Summary.

Object-Oriented Glue:

The Plumbing. Different kinds of Glue. Local Glues. Distributed Glues. Summary.

Unit-III

(08 Hours)

Object Persistence and Sharing:

Object persistence Concepts. Basic Tool Support. Transaction Models.

Performance. Reasonable Expectations. Databases. Summary.

Objects Across the Internet:

The Impact of the World Wide Web. An Architecture View of the Web. The Internet and OO Client/Server Computing. Summary.

End-to-End OO Enterprise Development:

The Development Models. OO Enterprise Development Tools. Summary.

Unit-IV

(06 Hours)

Performance:

Throughput and Response Time. Optimization. Client Performance. Server Performance. Glue Performance. Data Performance. Load Balancing. Summary.

The Scalable OO Enterprise System:

Reliability and Fault Tolerance. System Management. Maintenance and Legacy System Integration. Summary.

Security:

An Overview of Client/Server Security. Risk Assessment. Risk Prevention. Security in an OOC/S Environment. Summary.

Unit-V

(10 Hours)

Business Systems:

Group Ware. Business System Engineering and Realization. Summary.

CORBA Architecture and Services:

OMG and standards, CORBA's Objective and design criteria, CORBA Architecture : Stubs, Skeletons, static and dynamic invocation, Interface repository, Implementation repository, ORB Core, CORBA Library, CORBA Objects, CORBA Facilities, CORBA services Overview, BOA, POA. New features in CORBA 3.0 (concepts only on CORBA

Component Object Model (COM) Introduction:

COM as better C++, S/W distribution, Dynamic linking, separating interface from implementation, Run time polymorphism, Introduction to D COM. 3.0).

Unit-VI

(10 Hours)

Interfaces in COM/DCOM:

Introduction to interfaces, Interface definition language(IDL), interfaces and IDL, Using COM interface pointers, Optimizing query interface, Code sharing and reuse.

Classes and objects in COM/DCOM:

Introduction, Classes and servers, Optimization, Classes and IDL, Class emulation, Query interface types and properties, object services and dynamic composition, Apartments : Cross apartments access, Life cycle management.

Distributed COM:

Fundamental programming architecture of DCOM: Parallel processing, Advantages of distributed computing. Threading models and apartments: Apartments, Apartments interaction, Implementing multithreaded local components, facilities : Connection points and type information, Connectable objects objects. Remoting: DLL surrogates and executable components.

Case Study :

Design Patterns and Frameworks.

Text Books/References

- Yen-Ping Shan, Ralph H. Earle, Marie A. Lenzi, "Enterprise Computing With Objects", Addison-Wesley object Technology Series
- Peter Coad, Mark Mayfield, "Object Models : Strategies, Patterns and Applications", Yourdon Press Computing Series
- Booch Jacobson, Rumbaugh, "Essential com", Addison Wesley
- Guy Eden and Henry eden, "DCOM", Microsoft Press
- Jhon Siegle, "CORBA fundamentals and programming", Jhon Wiely and Sum's 96
- Mowbray and Zahavi, "Essential CORBA", Addison Wesley
- Orfali, "The Essential Distributed Object Survival Guide"

Syllabus for Unit Test

Unit Test 1	Units I & II
Unit Test 2	Units III & IV
Unit Test 3	Units V & VI



TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 70 Marks

Duration : 03 Hours

Unit Test : 30 Marks

Term Work : 25 Marks

Oral : 25 Marks

Unit-I

(06 Hours)

Foundations of Information Systems and Management:

Why Information systems? Components and resources of information systems, Information system activities, Types of information systems: Operations support systems and Management support systems.

Management Information Systems:

Definition, role and impact of MIS, Introduction to Management, Approaches to Management, Functions of the managers: Management effectiveness, planning, organizing, staffing, coordinating and directing, MIS as a support to the management and a tool for management Process, Organization structure and theory: Organization structure, behavior, organization as a system, MIS: Organization.

Strategic Management of Business:

Concept of Corporate Planning, Essentiality of strategic planning, development of business strategies, types of strategies, MIS for Business Planning.

Infrastructure Management:

Selection, maintenance of hardware, communication equipments and software as per MIS needs of the organization. Ensure uptime of hardware resources, database management and end user training.

Unit-II

(08 Hours)

Applications of MIS:

Manufacturing Sector: Introduction, Personal Management, Marketing Management, Accounting and Finance Management, Production Management, Materials Management and Marketing Management, MIS Applications in Banking and Insurance Sector.

Service Sector: Introduction, MIS applications in service industry.

Cross-Functional Enterprise Systems: Introduction, Collaboration systems in Manufacturing, Enterprise application Integration, Transaction Processing systems.

Implementation Challenges: Integration, implementing IT, End user Resistance and Involvement, Change Management.

Unit-III

(08 Hours)

Enterprise Management Systems(EMS):

Introduction, Enterprise Resource Planning (ERP) systems: Basic features, benefits, selection, implementation, EMS and MIS

Business Process Re-engineering (BPR):

Introduction, Business process, Process and Value stream model of the organization, MIS and BPR

Business Process Outsourcing (BPO):

What is BPO? Voice BPO i.e. Call center, non-voice BPO, Scope of BPO, challenges in BPO management

Unit-IV

(08 Hours)

Customer Relationship Management(CRM):

Introduction, What is CRM? Three phases of CRM, Benefits, challenges and trends in CRM

Supply Chain Management(SCM):

What is SCM? Role of SCM, Benefits, challenges and trends in SCM

Electronic Commerce Systems(eCommerce):

Introduction, scope, B2C, B2B and C2C, Essential e-Commerce processes, Electronic Payment Processes, e-Commerce Applications

Unit-V

(08 Hours)

Decision Support Systems (DSS):

Concept and philosophy, Using Decision Support systems: What-if analysis, sensitivity analysis, Goal-seeking analysis, Optimization analysis, Introduction to Data Warehouse: Architecture, Organization and Management of Data Warehouse, Implementation, Data Mining for Decision support, Executive Information systems, Enterprise Information

portal and knowledge management systems, Introduction to Artificial Intelligent Systems, Knowledge Based Expert systems, GIS

Unit-VI

(08 Hours)

Security and Ethical Challenges:

Introduction, Ethical responsibility of Business Professionals, Computer Crime, Hacking, Cyber Theft, Software Piracy, Privacy issues, Health issues

Security Management:

Introduction, Tools, Encryption, Firewalls, e-Mail monitoring, biometric security, disaster recovery, fault-tolerant systems, system controls and audits, Contingency management and solutions

Global Management of Information Technology:

Cultural, political and Geo-economic challenges, global business/it strategies, applications, platforms and Data access issues

Text Books/References

- O'Brien J., "Management Information Systems: Managing Information Technology in the Business Enterprise", 6th Edition, Tata McGraw-Hill Publishing Company Limited, 2004, ISBN 0-07-058739-6
- Jawadekar W., "Management Information Systems", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, 2002, ISBN 0-07-044575-3
- Post G., Anderson D., "Management Information Systems", 3rd Edition, Tata McGraw-Hill Publications, ISBN 0-07-049940-3
- Gupta U., "Management Information Systems: A Managerial Perspective", Galgotia, ISBN 81-7515-085-8

Syllabus for Unit Test

Unit Test 1	Units I & II
Unit Test 2	Units III & IV
Unit Test 3	Units V & VI



TEACHING SCHEME

Lectures : 04 Hrs/week

EXAMINATION SCHEME

Theory : 70 Marks
Duration : 03 Hours
Unit Test : 30 Marks

Unit-I

(08 Hours)

XML:

An Xml primer History of xml, Benefits of xml, components of xml, Parsing XML: Parsing methodology, SAX API, Java API for XML parsing, Document object Model : Defining DOM, DOM core level-I, creating document object, Node interface, Document interface, Element Interface, Attr interface, additional interfaces, Dom level –II XSL extensible stylesheet Language The XSL language, Format of stylesheet, working with xsl : template, working with xsl: output using xsl processors, pattern matching, expressions, precedence rule, Advances of XSL.

Unit-II

(08 Hours)

Java Servlet and Cookies:

Introduction to servlet, servlet, the advantages of servlet, Basic servlet structure, compiling and installing, servlet, invoking servlet, The servlet lifecycle, Initialization parameters, web clients, Handling the client request, The roll of form data, Reading form data from servlet, Reading request headers from servlet, HTTP 1.1, request headers, Accessing the standard CGI variables, Generating the server response HTTP response header, setting response header from servlet, HTTP 1.1 response header and their meaning, persistent servlet state and auto reloading pages, Handling cookies, Benefits of cookies, problems of cookies, The servlets cookies API, Basic cookies utilities, Session tracking The need for session tracking session tracking API.

Unit-III

(08 Hours)

JDBC and JSP:

JDBC and database connection pooling Basic step in using JDBC, some

JDBC utilities connection pooling, sharing connection pool, Introduction to JSP, Purpose of jsp, Scripting elements JSP expressions, JSP scriptlets, JSP, declaration preclefired variables, JSP page directives, the import attribute, the context attribute, session attribute, XML syntax for directives.

Unit-IV

(08 Hours)

ASP:

Introduction to ASP, Benefits of ASP, How to use ASP , What ASP can do, How ASP request differs from HTML request. Intrinsic ASP objects: The response object: Introduction to ASP object, response objects, sending text with embedded quotes, using variables, mixing HTML and response code, writing HTML with script, The response cookies collection, response add header response redirect. The request objects Obtaining information from browser, request server variables collection, Request cookies collection, Request query string collection, introduction to HTML forms form collection , working with forms. Application and server objects Introduction to threads, application variables, application lock/unlock methods, How to use application variables, The server object. Session objects What is session? global.ASA file, session and global.asa file, session variables. Accessing database with ASP and ADO Introduction to ADO, Connection object, recordset object, The field object, ADO data types, accessing data with ADO.

Unit-V

(08 Hours)

Web Services:

Introduction to web services, Background, Services, web services, web services application opportunities, service oriented architecture and web services, web services application scenario. Simple object access protocol (SOAP) SOAP introduction, interaction, SOAP modeling SOAP Encoding, SOAP binding.

Unit-VI

(08 Hours)

Web Services Description Language:

What is WSDL?, Web services invocation & WSDL, Web services Description details, Service Description through WSDL. Registers Universal description, Discovery and Inteqratron, What is UDDI, UDDI

nomenclature, care UDDI, Services publication, services discovery. Remote procedure call & messaging Synchronous, Web services, Asynchronous, web services.

Text Books/References

- Michal Daconta, "XML development with Java 2", AI saqanich SAMS Tech media publication
- Charls F., "The XML Handbook", Goldfarb Addison Wesley, Pearson Education
- "Core Servlet and Java Server Pages", Marrty Hall, sun publication
- Russell Jones, "Mastering Active server pages 3", BPB sybex publication
- B.V. Kumar, S. V. Subrahmanya, "Web Services – An Introduction", Tata McGraw Hill Publication

Syllabus for Unit Test

Unit Test 1	Units I & II
Unit Test 2	Units III & IV
Unit Test 3	Units V & VI



K30508: INFORMATION TECHNOLOGY ENABLED SERVICES

TEACHING SCHEME

Lectures : 04 Hrs/week

EXAMINATION SCHEME

Theory : 70 Marks

Duration : 03 Hours

Unit Test : 30 Marks

Unit-I

(06 Hours)

Introduction:

What is ITES?, Objectives of ITES, ITES Services and applications, Medical Transcription, Document Processing, Data Entry and Processing, Data Warehousing, IT Help Desk Services, Application Development, Enterprise Resource Planning, Telecommunication Services.

BPO Services:

Financial & Accounting Services, Insurance Services, Taxation, Legal Services, Health Care Services, Document Management Services, Content Writing, Multimedia & Design Services, Web Promotion, E-Publishing, Software Testing Services, Inbound Call Center Services, Outbound Call Center Services.

Unit-II

(10 Hours)

Call Center Technology:

Answering Service Software, Automatic Call Distribution (ACD), Call Center PBX, Call Recording and Call Monitoring Solution, Call Track Software, Communication Software, Computer Telephony Integration (CTI), Contact Management Software, CRM Solutions, Digital Call Recording, E-CRM, Emergency Alert Systems, Help Desk Software, Interactive Voice Response (IVR) Technology, Open IVR Software, Phone System Auto Dialers, Predictive Dialing, Programmable / Soft Switches, Remote Access Software, Soft Phone, Telecommuting Software, Text to Speech (TTS) Software, Voice Messaging, Voice Recognition, VOIP, Windows Over Web.

Unit-III

(08 Hours)

Inbound Call Center Services:

Answering Service, Catalog Orders, Consumer Response, Customer

Service, Dealer Locators, Direct Mail Response, Direct TV Response, Distribution Management, Email Management Services, Help Desk Solutions, Inquiry Handling, Interactive Voice Response, Order Processing, Print Media Response, Product Technical Information, Sales Lead Qualification, Seminar Registration, Technical Support, Toll Free Services, Web Management, Website Response.

Unit-IV

(08 Hours)

Outbound Call Center Services:

Appointment Scheduling, Customer Satisfaction, Database Selling, Debt Collection Services, Decision Maker Contacts, Direct Mail Follow-up, Info & Literature Fulfillment, Lead Generation / Qualification / Management, Market Intelligence Services, Product Promotion, Seminar Population, Surveys, Telephone and Web Based Business Development, Up Sell/Cross Sell Campaigns.

Unit-V

(08 Hours)

Financial and Legal Services:

Financial & Accounting Services: Accounts Payable Processing, Assets / Equipment Ledgers, Bank Reconciliation, Billings, Bookkeeping, Budgeting, Credit Card Processing, Financial Analysis, Financial Reporting, Financial Statements, General Ledger Maintenance, Mortgage Processing Services, Payroll Processing, Preparation of Tax Returns; Taxation: Tax Processing and Tax Preparation; Insurance Services : Application Processing, Policy Administration, Claims Adjudication, Claims Processing; Legal Services: Legal Coding, Legal Documentation, Legal Transcription.

Unit-VI

(08 Hours)

Other Services:

Document Management Services: Business Transcription, Data Capture Services, Data Conversion Services, Data Encoding Services, Data Entry Services, Data Warehousing Services; Multimedia and Design Service : 2D and 3D Animation Services, Multimedia and Content Development, Web Development Service; Web Promotion: Domain Name Registration

Service, Redesigning and Maintenance Service, Web Designing Service, Web Hosting Service; Health Care Services: Medical Billing, Medical Claims Filing, Medical Claims Processing, Medical Coding, Medical Transcription; Content Writing: Copy Writing Service, Editing- Proof Reading, Speech Writing, Technical Writing, Translation Service ; E-Publishing: Data Harvesting, Digitization; Software Testing Services : Compatibility Testing, Functional Testing, Performance Analysis Testing, Regression Testing.

Text Books/References

- BrendanB. Read, “Designing the Best Call Center for Your Business”, 2nd Edition
- Keith Dawson, “The Call Center Handbook”
- Madeline Bodin & Keith Dawson, “The Call Center Dictionary”
- Andrew J. Waite, “A Practical Guide to Call Center Technology”
- Brendan B. Read, “Designing the Best Call Center for Your Business”, 2nd Edition
- Becki Hack, et al, “Call Center Operations: A Guide for Your Journey to Best-Practice Processes”

Syllabus for Unit Test

Unit Test 1	Units I & II
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SEMESTER - III



K30601 ELECTIVE I: REAL TIME SYSTEMS

TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 70 Marks

Duration : 03 Hours

Unit Test : 30 Marks

Termwork : 25 Marks

Oral : 25 Marks

Unit-I

(08 Hours)

Issues in real time computing, structure of real time system, Task classes. Characterizing real time systems and tasks Performance measures for real time machines, estimating program run times.

Unit-II

(08 Hours)

Task assignment and scheduling Classical uni-processor scheduling algorithms, uni-processor scheduling of IRIS tasks, task assignment, mode changes, fault tolerant scheduling.

Unit-III

(08 Hours)

Programming languages and tools, Desired languages characteristics, data typing, control structures, facilitating hierarchical decomposition, packages, run time errors handling, overloading and generic, multitasking, low level programming, task scheduling, timing specification, some experimental languages, programming environments, run time support.

Unit-IV

(08 Hours)

Real time databases, Basic definitions, real time vs. general purpose databases, main memory databases, transaction priorities, transaction aborts, concurrence control issues, disk scheduling algorithms, a two phase approach to improve predictability, maintaining serialization consistency, databases for hard real time systems. Real time communication network topologies, protocols.

Unit-V

(08 Hours)

Fault tolerance techniques Fault types, fault detection, fault and error containment, redundancy, Data diversity, Reversal checks, Malicious or Byzantine failures, Integrated failure handling. Reliability evaluation techniques Reliability models for hardware redundancy, software error models, taking time into account.

Unit-VI

(08 Hours)

Clock synchronization Clocks, no-fault tolerant synchronization algorithm, impact of faults, fault tolerant, Synchronization in hardware, synchronization in software. Operating Systems Capabilities of real time O. S. Latest trends and applications for real time systems.

Text Books/References

- C. M. Krishna, Kang G. Shin, "Real Time Systems", McGraw Hill International Edition
- W. S. Liu, "Real Time Systems", Pearson Education Asia

Syllabus for Unit Test

Unit Test 1	Units I & II
Unit Test 2	Units III & IV
Unit Test 3	Units V & VI



K30601 ELECTIVE I: MACHINE LEARNING AND DATA MINING

TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 70 Marks

Duration : 03 Hours

Unit Test : 30 Marks

Termwork : 25 Marks

Oral : 25 Marks

Unit-I

(08 Hours)

Overview of machine learning methods, Classification, Regression, Logical relations, Equations, Clustering, reinforcement learning. History of machine learning: Symbolic rule learning, Neural networks, reinforcement learning, Genetic algorithms, statistical methods, Formal learning theory. Applications of machine learning: Diagnosing the production process, Medical diagnosis, Risk evaluation of insurance and loan applicants, Image classification, Game playing, Predicting the structure of chemical compounds.

Unit-II

(08 Hours)

Data mining tools and standards, Learning and Intelligence, What is learning, Natural learning, Learning, intelligence, consciousness, Machine Learning Basics, Measures for performance evaluation, Estimating performance: Reliability of quality estimations, Confidence interval, Cross validation.

Unit-III

(08 Hours)

Comparing performance of ML algorithms: Two algorithms on a single domain, Two algorithms on several domains, and several algorithms on several domains.

Unit-IV

(08 Hours)

Learning as Search: Exhaustive search – BFS, DFS, Interactive deepening, Bounded exhaustive search (branch and bound) – Bounded BFS, Bounded DFS. Best-first search, Greedy Search, Beam Search, Gradient search.

Unit-V

(08 Hours)

Attribute Quality Measures, Measures for classification, Measures for regression, Data Preprocessing, Representation of complex structures, Discretization of continuous attributes, Attribute binarization, Transforming discrete attributes into continuous. Dimensionality reduction.

Unit-VI

(08 Hours)

Constructive Induction, constructive Constructive induction without pre-defined operators induction with pre-defined operator, Symbolic Learning: Learning of decision trees, Learning of decision rules, Learning of association rules. Statistical Learning, Artificial Neural Networks Cluster Analysis, Learning Theory.

Text Books/References

- Igor Kononenko, "Machine Learning And Data Mining: Introduction to Principles and Algorithms", Horwood Publishing
- Michael Berry & Gordon Linoff, "Mastering Data Mining", John Wiley & Sons
- Patricia Cerrito, "Introduction to Data Mining Using SAS Enterprise Miner"
- K. Cios, W. Pedrycz, R. Swiniarski, L. Kurgan, "Data Mining: A Knowledge Discovery Approach", Springer
- Margaret Dunham, "Data Mining Introductory and Advanced Topics", PHI

Syllabus for Unit Test

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K30601 ELECTIVE I: NATURAL LANGUAGE PROCESSING AND UNDERSTANDING

TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 70 Marks

Duration : 03 Hours

Unit Test : 30 Marks

Termwork : 25 Marks

Oral : 25 Marks

Unit-I

(08 Hours)

Introduction and Overview:

Introduction, Overview and Linguistics, Grammars and Languages, Basic Parsing Techniques, Semantic analysis and Representation Structures, Natural Language Generation, Natural Language Systems, What is Natural Language Processing, Ambiguity and Uncertainty in language.

Unit-II

(08 Hours)

String Edit Distance and Alignment:

Key algorithmic tool: dynamic programming. First a simple example, then its use in optimal alignment of sequences. String edit operations, edit distance, and examples of use in spelling correction, and machine translation.

Context Free Grammars:

Constituency, CFG definition, use and limitations. Chomsky Normal Form. Top-down parsing; Bottom-Up Parsing, and the Problems with each.

Non-probabilistic Parsing:

Efficient CFG parsing with CYK, another dynamic programming algorithm. Designing a little grammar and parsing with it on some test data.

Unit-III

(08 Hours)

Information Theory:

What is information? Measuring it in bits. The "noisy channel model." The "Shannon game"--motivated by language! Entropy, cross-entropy, information gain. Its application to some language phenomena.

Language modeling and Naïve Bayes:

Probabilistic Language modeling and its applications. Markov models.

grams. Estimating the Probability of a Word, and Smoothing. Generative models of language and their Application

Unit-IV

(08 Hours)

Part of Speech Tagging and Hidden Markov Models :

The concept of Parts-of-speech, Examples, usage. The Penn Treebank and Brown Corpus. Probabilistic (weighted) finite state automata. Hidden Markov models (HMMs), definition and use.

Viterbi Algorithm for Finding Most Likely HMM Path :

Dynamic programming with Hidden Markov Models, and its use for part-of-speech tagging, Chinese Word Segmentation, Prosody, information extraction, Weighted Context Free Grammars. Weighted CYK. Pruning and Beam Search.

Unit-V

(08 Hours)

Maximum Entropy Classifiers:

The maximum entropy principle, and its relation to maximum likelihood. The need in NLP to integrate many pieces of weak evidence. Maximum entropy classifiers and their application to document classification, sentence segmentation, and other language tasks.

Maximum Entropy Markov Models & Conditional Random Fields:

Part-of-speech tagging, Noun-phrase segmentation and information extraction models that combine maximum entropy and finite-state machines. State-of-the-art models for NLP.

Unit-VI

(08 Hours)

Machine Translation:

Probabilistic models for Translating any Language into English. Alignment, translation, Language generation.

Text Books/References

- Jurafsky, D. and Martin, "J. H. Speech and Language Processing", Prentice Hall
- Allen, "J. Natural Language Understanding", The Benajmins Cummings Publishing Company

- Dan W. Patterson, "Artificial Intelligence and Expert Systems"

Syllabus for Unit Test

Unit Test 1	Units I & II
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K30601 ELECTIVE I: COMPUTER FORENSICS AND CYBER LAWS

TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 70 Marks

Duration : 03 Hours

Unit Test : 30 Marks

Termwork : 25 Marks

Oral : 25 Marks

Unit-I

(08 Hours)

Overview:

Concept of Computer Forensic, Types of Forensic Science, Storage device, Storage device characteristics, types of storage device.

Forensic Investigator:

Role of Computer Forensic Investigator, line of investigation, investigation steps, responsibilities of Computer Forensic Investigator.

Unit-II

(08 Hours)

Evidence:

Definition of evidence, life cycle of evidence, types of evidence, rules for evidence, evidence.

Storage and its Security Incident Response:

Introduction, Investigations, Pre-Incident Preparations, Formation of Incident Response Team, Role of Incident Response Team.

Data Recovery:

Definition of data recovery, data recovery mechanism, techniques for recovering data, tools used for recovery.

Unit-III

(08 Hours)

Investigating Logs:

Audit logs and security, system log, remote logging, configuring Windows, logging, setting up remote logging in Windows, event reporter and Application Logs.

Unit-IV

(08 Hours)

Forensic Tools:

WinHex, X-Ways, Index.dat Analyzer, Data Doctor.

Disaster Recovery:

Preparing for disaster recovery, backing up data, scheduling backup jobs, restoring data, recovering from server failure, selecting disaster recovery methods.

Unit-V

(10 Hours)

Battling Cyber Squatters and Copyright Protection in the Cyber World :

Concept of domain name and reply to cyber squatters, meta-tagging, legislative and other innovative moves against cyber squatting, freedom and control on the internet, works in which copyright subsists and meaning of copyright, copyright ownership and assignment, license of copyright, copyright term and respect for foreign works, copyright infringement, offences and remedies, copyright protection and content on the internet, copyright notice, disclaimer and acknowledgment, downloading for viewing contents, hyper-linking and framing, liability of ISPs for copyright, violation in the cyber world, legal developments in the US, Napster and its cousins, computer software piracy.

Unit-VI

(06 Hours)

Digital Signature, Certifying Authorities and E-Governance :

Digital signature, digital signature certificate, certifying authorities and liabilities, digital signature Governance in India.

Text Books/References

- Jay A. Siegel, "Forensic Science: The Basics "
- Joe Nickell and John F. Fischer, "Crime Science: Methods of Forensic Detection"
- Anthony J. Bertino, "Forensic Science: Fundamentals and Investigations"
- Stuart H. James and Ph. D., Jon J. Nordby, "Forensic Science: An Introduction to Scientific and Investigative Techniques", 2nd edition
- Colin Evans, "The Casebook of Forensic Detection: How Science Solved 100 of the World's Most Baffling Crimes"
- Edward Amoroso, "Cyber Security, Computer Network Security and Cyber Ethics", 2nd edition by Joseph Migga Kizza

- Robert McCrie, “Security Operations Management”, Second Edition
- Andy Jones and Debi Ashenden, “Risk Management for Computer Security: Protecting Your Network & Information Assets”

Syllabus for Unit Test

Unit Test 1	Units I & II
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K30601 ELECTIVE I: ADVANCED MIS

TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 70 Marks

Duration : 03 Hours

Unit Test : 30 Marks

Termwork : 25 Marks

Oral : 25 Marks

Unit-I

(08 Hours)

Foundation of Information System :

Introduction to Information System and MIS, Decision support and decision making systems, systems approach, the systems view of business, MIS organization within company, Management information and the systems approach.

Information Technology:

A manager's overview, managerial overviews, computer hardware & software, DBMS, RDBMS and Telecommunication.

Unit-II

(08 Hours)

Conceptual System Design:

Define the problems, set systems objective, establish system constraints, determine information needs determine information sources, develop alternative conceptual design and select one document the system concept, prepare the conceptual design report.

Unit-III

(08 Hours)

Detailed System Design:

Inform and involve the organization, aim of detailed design, project management of MIS detailed design , identify dominant and trade of criteria, define the sub systems, sketch the detailed operating sub systems and information flow, determine the degree of automation of each operation, inform and involve the organization again, inputs outputs and processing, early system testing, software, hardware and tools propose and organization to operate the system, document the detailed design, revisit the manager user.

Unit-IV

(08 Hours)

Implementation Evaluation and Maintenance of the MIS:

Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train the operating personnel, computer related acquisitions, develop forms for data collection and information dissemination, develop the files test the system, cut-over, document the system, evaluate the MIS control and maintain the system. Pitfalls in MIS development.

Unit-V

(08 Hours)

Advanced Concepts in Information Systems:

Enterprise Resources Management(ERP), Supply Chain Management, CRM, Procurement Management System. Applications of MIS in Manufacturing sector, Service sector.

Unit-VI

(08 Hours)

Design of business systems using contemporary tools and methods such as SQL, CASE tools, OOD tools, etc. Advanced Case Studies in MIS.

Text Books/References

- Kenneth C. Laudon, "Management Information Systems", Eighth Edition, PHI
- James O'Brien and George Marakas, "Management Information Systems"
- Effy Oz, "Management Information Systems", Course Tech

Syllabus for Unit Test

Unit Test 1	Units I & II
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K30602 ELECTIVE II: BIOINFORMATICS

TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 70 Marks

Duration : 03 Hours

Unit Test : 30 Marks

Termwork : 25 Marks

Oral : 25 Marks

Unit-I

(08 Hours)

Bioinformatics Basics:

Basic concepts, Protein and amino acid , DNA & RNA, Sequence, structure and function. Bioinformatics databases: Introduction, Motivation, Type of databases, Nucleotide sequence databases, Protein sequence databases, Sequence motif databases, Protein structure databases, Other relevant databases.

Unit-II

(08 Hours)

Sequence Alignment and Database Searching:

Single sequence alignments, Biological motivation, Pairwise alignments, Scoring matrix, Gap penalty, Dynamics programming, Needleman-Wunsch, Smith-Waterman, Heuristic methods, FASTA, BLAST, Statistics of sequence alignment score, E-Value, P-Value, Multiple sequence alignments, ClustalW, Profile, Profile-sequence alignment, Profile-profile alignment, PSI-BLAST, Hidden Markov Models.

Protein structure alignments :

Structure superposition, structure alignment, Different structure alignment algorithms.

Unit-III

(08 Hours)

Protein Structure:

Protein secondary structure predictions:

Protein secondary structure, Hydrogen bond, secondary structure element, Methods for predicting secondary structure.

Protein tertiary structure modeling:

Basic concepts Protein folding and dynamic simulation, Comparative modeling, Threading, Ab initio modeling, Combined modeling

approaches, CASP: A blind protein structure prediction competition.

Experimental methods for protein structure determination:

X-ray crystallography, Nuclear magnetic resonance (NMR).

Unit-IV

(08 Hours)

Protein-protein Interactions:

Experimental identification of protein-protein interactions, Yeast two-hybrid assay, High-throughput mass spectrometry, Interaction networks and system biology.

Protein quaternary structure modeling:

Basic concepts, Degrees of freedom, Presentation of protein conformations, Hydrophobicity factor, Shape complementary, Docking Scoring function, Protein-protein docking algorithms, Protein-ligand docking algorithms, Drug design, Multiple-threading algorithms, Homology modeling of protein-protein interactions, Protein and ligand binding, CAPRI.

Unit-V

(08 Hours)

Biomolecular Simulations:

Basic concepts, Units and derivatives, Force field and energy landscape, Truncation of nonbonded interactions.

Conformational Sampling:

Introduction, Minimization and algorithms, Molecular dynamics, Ensembles (statistical mechanics), Monte Carlo simulations. Solvation: Introduction, Periodic boundary condition, Ewald summation, Implicit solvent model and continuum electrostatics, Monte Carlo simulation on parallel computers. Advanced Techniques: Introduction, Replica-exchange simulations, Restraint potentials, Free energy calculations, Membrane simulations.

Unit-VI

(08 Hours)

Biological Membranes:

Introductions, Biological roles, Structural features, Membrane lipids, General structures, Aggregation states, Polymorphism, Thermal transitions, Electrostatic effects, Molecular dynamics, Membrane proteins, MD simulation of Membrane proteins.

Protein function:

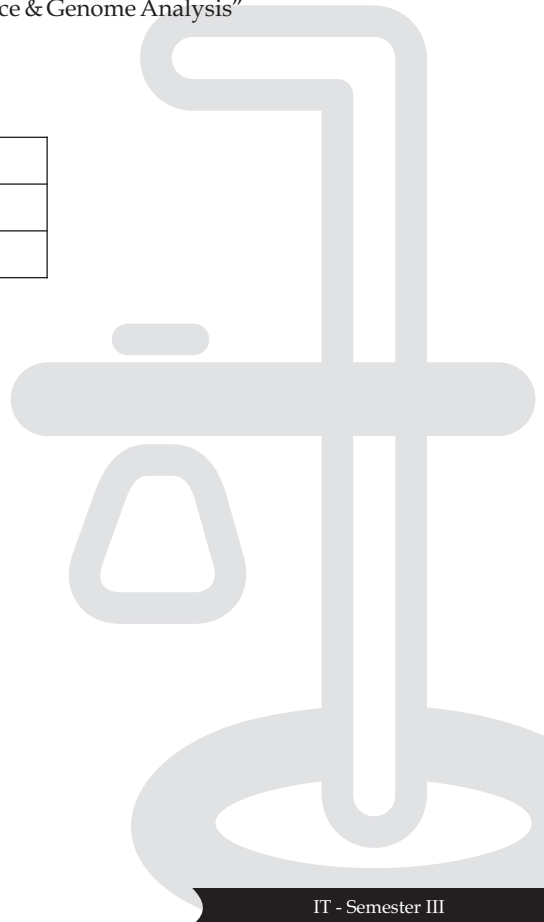
Sequence to function, Structure to function, Protein function identification methods and databases. Phylogenetics, Sequence-based taxonomy, Models, assumptions, and interpretations, From multiple alignment to phylogeny, Computer tools for phylogenetic analysis.

Text Books/References

- David Mount, "Bioinformatics", Cold Spring Harbor Press
- James Jisdall, "Beginning Perl for Bioinformatics"
- David W. Mount, "Bioinformatics- Sequence & Genome Analysis"

Syllabus for Unit Test

Unit Test 1	Units I & II
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K30602 ELECTIVE II: VLSI SYSTEM DESIGN

TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 70 Marks

Duration : 03 Hours

Unit Test : 30 Marks

Termwork : 25 Marks

Oral : 25 Marks

Unit-I

(08 Hours)

Basics of VLSI, Introduction to CMOS Circuits:

MOS transistors, CMOS combinational logic gates, multiplexers, latches and flip-flops. CMOS fabrication and layout. VLSI design flow.

MOS Transistor Theory:

DC transfer characteristics. Switch level RC delay models. CMOS technologies. Layout design rules. CMOS process enhancement. Technology related issues.

Circuit Characterization and Performance Estimation:

Delay estimation. Logical effort and transistor sizing. Power dissipation. Interconnect design margin. Reliability. Scaling.

Circuit Simulation:

Device models, Device and circuit characterization. Interconnect simulation.

Unit-II

(08 Hours)

Analog VLSI, Advanced MOS modeling, BJT modeling, CS, CD and CG amplifiers. Current mirrors – active loads. High input impedance current mirrors. BJT gain stages. CMOS operational amplifiers- compensation. Comparators. Sample and hold circuits MOS, CMOS and Bi CMOS S/H circuits. Switched capacitor filters, operation, analysis and applications. Nyquist rate. D/A converters. A/D converters. Over sampling techniques, filter design.

Unit-III

(08 Hours)

Modeling and Synthesis with the Verilog HDL, Hardware modeling with the verilog HDL. Encapsulation, modeling primitives, different types of

description. Logic system, data types and operators for modeling in verilog HDL. Verilog Models of propagation delay and net delay path delays and simulation, inertial delay effects and pulse rejection. Behavioral descriptions in verilog HDL. Synthesis of combinational logic. HDL-based synthesis- technology-independent design, styles for synthesis of combinational and sequential logic, synthesis of finite state machines, synthesis of gated clocks, design partitions and hierarchical structures. Synthesis of language constructs, nets, register variables, expressions and operators, assignments and compiler directives. Switch-level models in verilog. Design examples in verilog. VLSI testing tools.

Unit-IV

(10 Hours)

Electronic Design Automation Tools, An overview of OS commands. System settings and configuration. Introduction to Unix commands. Writing Shell scripts. VLSI design automation tools. An overview of the features of practical CAD tools. Modelsim, Leonardo spectrum, ISE 8.1i, Quartus II, VLSI backend tools. Synthesis and simulation using HDLs- Logic synthesis using verilog and VHDL. Memory and FSM synthesis. Performance driven synthesis, Simulation- Types of simulation. Static timing analysis. Formal verification. Switch level and transistor level simulation. Circuit simulation using Spice - circuit description. AC, DC and transient analysis. Advanced spice commands and analysis. Models for diodes, transistors and opamp. Digital building blocks. A/D, D/A and sample and hold circuits. Design and analysis of mixed signal circuits. Mixed signal circuit modeling and analysis using VHDL -AMS, System design using systemC- SystemC models of computation. Classical hardware modeling in system C. Functional modeling. Parametrized modules and channels. Test benches. Tracing and debugging. Designing with ASICs.

Unit-V

(08 Hours)

Low Power VLSI Circuits, Evolution of CMOS technology, Shallow trench isolation. Lightly-doped drain. Buried channel. BiCMOS and SOI CMOS technologies. Second order effects and capacitance of MOS devices. CMOS inverters, static logic circuits of CMOS, pass transistor, BiCMOS, SOI

CMOS and low power CMOS techniques. Basic concepts of dynamic logic circuits. Various problems associated with dynamic logic circuits. Differential, BiCMOS and low voltage dynamic logic circuits. Different types of memory circuits. Adder circuits. Multipliers, advanced structures. PLA. PLL. Processing unit.

Unit-VI

(08 Hours)

VLSI Technology, Electron grade silicon. Crystal growth. Water preparation. Vapour phase and molecular beam epitaxy. SOI. Epitaxial evaluation. Oxidation techniques, systems and properties. Oxidation defects. Optical, electron, X-ray and ion lithography methods. Plasma properties, size, control, etch mechanism, etch techniques and equipments. Deposition process and methods. Diffusion in solids. Diffusion equation and diffusion mechanisms. Ion implantation and metalisation. Process simulation of ion implementation, diffusion, oxidation, epitaxy, lithography, etching and deposition. NMOS, CMOS, MOS memory and bipolar IC technologies. IC fabrication. Analytical and assembly techniques. Packaging of VLSI devices.

Text Books/References

- N. H. E. Weste et al, "CMOS VLSI Design", (3/e), Pearson, 2005
- S. M. Sze, "VLSI Technology", (2/e), McGraw Hill, 1988
- W. Wolf, "Modern VLSI Design", (3/e), Pearson, 2002
- J. B. Kuo & J. H. Lou, "Low-voltage CMOS VLSI Circuits", Wiley, 1999
- P. J. Ashenden et al, "The System Designer's Guide to VHDL-AMS", Elsevier, 2005
- M. Abramovici et al, "Digital System Testing and Testable Design", Computer Science
- M. D. Ciletti, Modeling, "Synthesis and Rapid Prototyping with the Verilog HDL", Prentice Hall, 1999
- M. G. Arnold, "Verilog Digital – Computer Design", Prentice Hall (PTR), 1999
- S. Palnitkar, "Verilog HDL – A Guide to Digital Design and Synthesis", Pearson, 2003
- D. A. John & K. Martin, "Analog Integrated Circuit Design", Wiley, 1997

Syllabus for Unit Test

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K30602 ELECTIVE II: INTERACTIVE USER INTERFACE

TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 70 Marks

Duration : 03 Hours

Unit Test : 30 Marks

Termwork : 25 Marks

Oral : 25 Marks

Unit-I

(08 Hours)

Principles Of User Interaction:

Introduction, UI types, UI standards, UI Theory, Levels of Design, Visual design, Color, icons and graphics, Murphy's law of GUI design, Levels of UI Functionality, Knowledge and understanding of concepts such as: cognition, usability, ergonomics and hypertext, Keystroke-Level-Model (KLM), Characteristics Of Good Design, Knowledge and understanding of: characteristics such as: learn-ability, robustness, flexibility, usability, performance and accessibility.

Unit-II

(08 Hours)

Goal:

Goal directed design, software design, the three models, Golden Rules of UI Design, Errors, User Centered Design: Awareness of concepts such as: target users, user modelling, user scenarios, localization and globalization
Technological Constraints: Awareness of issues such as: screen resolution, design for printing.

Unit-III

(08 Hours)

Form and Behavior:

Idioms and affordances, files, storage and retrieval, choosing platforms, Flow, posture and state, overhead and idiocy, interface design.

Interaction:

Mouse, selection, manipulation, drag and drop.

Cast and Gizmos:

Menus, dialog boxes, toolbars, Imperative and selection Gizmos, entry and display Gizmos, new gizmos.

Guardian:

Error elimination, exceptions, undo.

Unit-IV

(08 Hours)

HMI:

Introduction, Applications, types, Applications of HMI/HCI in software industry.

Case Study:

Case studies related to impact of GUI/HMI/HCI in software industry should be considered with a great depth, Interactive Devices.

Interaction Device:

Categorization, Degrees of Freedom, Transfer Function Control-to-Display (C:D) Ratio.

Interaction Tasks Keyboard:

QWERTY, Linotype, DSK, Half-QWERTY, Locator, Soap Three State Model, Mouse, Stylus, Touch-tablet Analyzing input devices, Fitt's Law, Steering Law Contemporary. Interactive Technologies:

Knowledge and Understanding of:

Mobile computing, PDAs, screen readers, voice recognition, touch screens and game peripherals (joysticks, light guns, dance mats etc).

Unit-V

(08 Hours)

Java Swing GUI Framework:

Problems with AWT, Introduction to SWING, Features, MVC Design Pattern Swing Concepts, Declarations, Containers-JFrame, Extending JFrame, Components, Layout Managers, GroupLayout, Events, Swing and Threads.

Java IDEs:

Eclipse IDE 3.4, Eclipse Visual Editor (VE), Netbeans, JBuilder Java 2D, Graphics2D Rendering, Geometric Transformations, Other Tools : Flash, Flash Application Development, Flex, Flex capabilities, Flex Applications, MXML, ActionScript.

Unit-VI

(08 Hours)

UI Development and Evaluation:

Formal Development Frameworks, LUCID, Obtaining User Feedback: Surveys, Ethnographic Observation, Participatory Design, Persona, Usability Labs, Experimental Design, Confounds, Choosing dependent/independent variables, Design Issues, Discount Usability Engineering, Heuristic Evaluation, Ten Usability Heuristics

Text Books/References

- Dix, Finlay, Abowd & Beale, "Human Computer Interaction", PHI
- Preece, Rogers & Sharp, "Interaction Design", Paperback 544 pages (January 21, 2002) Publisher: John Wiley
- David Benyon, Phil Turner, Susan Turner, "Designing Interactive Systems: People, Activities, Contexts, Technologies"
- Ben Shneiderman, "Designing the User Interface", fourth edition, Addison Wesley
- U. Maryland, "Guide to Usability for Software Engineers"
- Alan Cooper, "About Face (3rd edition) The Essentials of Interaction Design", Wiley
- Norman D. A., "The Design of Everyday Things" New York, NY: Doubleday, 1990, ISBN: 0385267746
- Nielsen J. "Usability Engineering", Burlington, MA: Academic Press, 1994, ISBN: 0125184069
- Mullet K., and D. Sano "Designing Visual Interfaces: Communication Oriented Techniques", Upper Saddle River, NJ: Prentice Hall, 1994. ISBN: 0133033899

Syllabus for Unit Test

Unit Test 1	Units I & II
Unit Test 2	Units III & IV
Unit Test 3	Units V & VI



K30602 ELECTIVE II: REMOTE SENSING AND GIS

TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 70 Marks

Duration : 03 Hours

Unit Test : 30 Marks

Termwork : 25 Marks

Oral : 25 Marks

Unit-I

(08 Hours)

Principles of Geographical Information Systems:

Theory of GIS supported by extensive practical exercises, Geographic information and spatial data types, Hardware and software; GIS; Steps of spatial data handling, Database management systems, Spatial referencing, Data quality, measures of location errors on maps, Satellite-based positioning, Spatial data input, data preparation, Point data transformation, Analytical GIS capabilities; retrieval and classification; overlay functions Neighborhood operations; network analysis; error propagation, Data visualization.

Unit-II

(08 Hours)

Cartography:

Cartography, Introduction to Cartography, Classification of maps, Types of data, Visual variables, Generalization, Symbolization, Map design, Map Layout, Diagrams Map Projection, Topographic mapping, and Production of large-scale maps and photo.

GIS Analysis, Planning & Implementation:

Network analysis, Digital terrain modeling & analysis, Grid cell GIS modeling & analysis, GIS plan, Components of GIS plan, Phases: Planning, Analysis, Implementation, Successful Implementation of GIS, Management support, Leadership & vision, Data conversion & maintenance, Hardware & software, User training, Data communication, Software customization, User support, Funding.

Unit-III

(08 Hours)

Maintenance & Management of GIS Database:

Centralized GIS database, Distributed GIS database, Master & transaction

GIS databases, Data maintenance issues, Financial & legal aspects of GIS: GIS costs, Ongoing costs, Savings, Additional benefits, GIS model for financial justification, Laws for access, pricing, privacy, liability, copyright, practice etc. Pitfalls of GIS: Failures, Outstanding benefits, Experimentation, Undefined goals, Lack of long term planning & management support, Computerizing existing problems, User involvement, Lack of user training and R & D support, Budget overrun/underestimation etc.

Unit-IV

(08 Hours)

Advanced GIS:

Geo-information system and analysis, Raster data base design, GIS Vector based data structure/design, Data based creation for urban area analysis, Urban information system for resources and integrated developing planning, Urban modeling, GIS application case studies, Grid cell Data Processing, Principle of grid cell data processing, Rasterizing point, line and polygons, Selection of grid cell size and effect on data quality.

Unit-V

(08 Hours)

Remote Sensing:

Fundamentals of RS, Electromagnetic energy and remote sensing, Sensors, platforms and RS data acquisition systems, Multi spectral, hyper spectral and thermal sensors Radiometric aspects of remote sensing data, Geometric aspects of remote sensing data, Image enhancement and visualization, Image interpretation and classification, Microwave thermal remote sensing, Radar & Laser altimetry.

Remote Sensing Application in Agriculture and Soils, Forestry, Geosciences, Geology and water resources, Land use application, Environmental analysis and managements, Marine Science, Human Settlement analysis.

Unit-VI

(08 Hours)

Case Study:

Land records, Utility management, oil and gas, global change.

Text Books/References

- G.B. Korte, "The GIS Handbook"
- Chang, Kang, Tsung, "Programming ArcObjects with VBA CRC Press", 2004, Boca Raton Florida

Syllabus for Unit Test

Unit Test 1	Units I & II
Unit Test 2	Units III & IV
Unit Test 3	Units V & VI





K30602 ELECTIVE II: SIMULATION AND MODELING

TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 70 Marks

Duration : 03 Hours

Unit Test : 30 Marks

Termwork : 25 Marks

Oral : 25 Marks

Unit-I (08 Hours)

Introduction:

Objectives of Modelling, System Theory: State Variables, Theory of Models : Analytic, Simulation, Measurement, Analytical Modelling.

Unit-II (08 Hours)

Mathematical Background:

Probability Theory, Random Variables; Poisson Process. Markov Chains, Queuing Theory, Little's Law, M/M/1, M/M/1/k, M/M/C Queuing Models, M/G/1 (Impact Variation in Service Times).

Unit-III (08 Hours)

Petrinets:

Stochastic Petrinets (SPN), GSPN.

Unit-IV (08 Hours)

Simulation Modelling:

Continuous & discrete Event, Simulation, Monte Carlo Simulation, Pseudo Random Number Generation, Nonuniform Random Variable Generation.

Unit-V (08 Hours)

Simulation Language Features :

Simpack, GPSS, GASPIV, CSIM.

Unit-VI (08 Hours)

Estimation of Simulation:

Output/Output Matrix Confidence Intervals, Regenerative Simulation,

Method of Batch Means Case Studies, Analytic vs. Simulation Models
Application to Operating Systems, Data Bases, Networks, Architecture,
G/G/I, G/G/C Correlated Queues, Queuing Networks, Mean Value
Analysis, GTPN, ESPN.

Text Books/References

- M. K. Molloy, "Fundamentals of Performance Modelling", McMillan
- R. Nelson, "Probability, Stochastic Process & Queuing Theory", Springer-Verilog
- Taha, "Operations Research", McGraw Hill

Syllabus for Unit Test

Unit Test 1	Units I & II
Unit Test 2	Units III & IV
Unit Test 3	Units V & VI



RULES REGARDING ATKT, CONTINUOUS ASSESSMENT AND AWARD OF CLASS

A. T. K. T.

- A candidate who is granted term for M.Tech Semester-I will be allowed to keep term for his/her M.Tech. Semester-II examination even if he/she appears and fails or does not appear at M.Tech. Semester-I examination.
- A candidate who is granted term for M.Tech Semester-III will be allowed to keep term for his/her M.Tech. Semester-IV examination even if he/she appears and fails or does not appear at M.Tech. Semester-III examination.
- A student shall be allowed to keep term for M.Tech Semester-III even if he/she has a backlog of all Heads of passing in theory examination held at M.Tech Semester I & II taken together.
- A student has to secure 40% marks in theory and 50% marks in TW & oral as a condition of pass class. The overall percentage of marks of all semesters taken together should be more than 50% to declare the student to be passed.

CONTINUOUS ASSESSMENT

- The term work assessment will be based on the practical/assignment as described in the syllabus.
- Final assessment of termwork shall be done by pair of internal and external examiners jointly during the oral/practical examination schedule declared by the university. The teacher conducting practicals/assignments during the term shall maintain a record of continuous assessment. Every practical/term work/assignment shall be assessed continuously on the scale of 20 marks and weightage of 20 marks shall be distributed as follows:

Sr. No.	Activity	Marks
1	Timely Submission	04
2	Presentation	06
3	Understanding	10

This record of continuous assessment shall be made available to the examiners during Term work and oral examination. Examiner shall use this record for overall assessment of the performance of the student.

- Assessment of the seminar work and dissertation work shall be done continuously.

- Record of this assessment shall be made available during examination. The student should submit the dissertation stage-I report along with the dissertation stage-II report at the time of final submission.

CLASS

- The class should be awarded to the student on the basis of aggregate marks obtained together in both the semesters of the respective year by him/her. The award of class shall be as follows.

A	Aggregate 66% or more marks	First Class with Distinction
B	Aggregate 60% or more marks but less than 66%	First Class
C	Aggregate 55% or more marks but less than 60%	Higher Second Class
D	Aggregate 50% or more marks but less than 55%	Second Class
E	Aggregate 40% or more marks but less than 50%	Pass Class

