Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal
Course of Study and Scheme of Examination
B.E. Information Technology
SEMESTER – VII

Revised Syllabus and Scheme of Examination Effective from July 2010-11

S. No.	Course Category	Course Code (New)	Name of Course	Hours Per week			CREDITS	Distribution of Marks					
								Theory Exam	Practical Block	Internal Assessment			Total
										MST	TW	Total	
				L	T	P	C	I	II			III	I+II+III
1	DC-19	IT 701	Object Oriented Analysis and Design	3	1	2	6	100	50	20	30	50	200
2	DC-20	IT 702	Wireless and Mobile Computing	3	1	0	4	100	--	20	--	20	120
3	DC-21	IT 703	Distributed systems	3	1	2	6	100	50	20	30	50	200
4	DCO(E)-I	Refer table below	Elective I	3	1	0	4	100	--	20	--	20	120
5	DCO(E)-II	Refer table below	Elective-II	3	1	0	4	100	--	20	--	20	120
6	DC-22	IT 704	Major Project-I	0	0	4	4	--	50	--	50	50	100
7	DC-23	IT 705	Industrial Training (Six Weeks)*	0	0	0	4	--	50	--	30	30	80
8	NECC-9	IT 706	Self Study	0	0	1	1	--	--	--	30	30	30
9	NECC-10	IT 707	Seminar/Group Discussion etc.	0	0	1	1	--	--	--	30	30	30
Total				**15**	**5**	**10**	**34**	**500**	**200**	**100**	**200**	**300**	**1000**

* Student will undertake industrial training in the summer break, after VI semester in assessed in VII semester,
MST-Mid Semester Test, **TW**- Term Work.

ELLECTIVE-I							
IT 710	Advanced concepts in database system	IT 711	Simulation and Modeling	IT 712	Human Computer Interaction	IT 713	Automata and Compiler Design
ELLECTIVE-II							
IT 720	Embedded System	IT 721	E-Commerce and Governance	IT 722	High performance computing	IT 723	Bio-Informatics

Note :- 1. Minimum strength of **Ten Students** is required to offer an Elective in the College in a particular Academic Session.
2. Choice of Elective Course ones made for an examination cannot be changed for future examinations.

Course Contents

Category of Course	Course Title	Course Code	Credits-6C			Theory Paper (ES)
			L	T	P	
Departmental Core DC-19	Object Oriented Analysis and Design	IT 701	3	1	2	Max. Marks-100 Min. Marks-35 Duration-3 Hrs.

Branch : Information Technology, VII Semester

Course: Object Oriented Analysis and Design

Unit I: Overview of Object Oriented concepts: Objects and classes, abstraction, generalization and inheritance, encapsulation, multiple inheritance, aggregation abstraction classes, polymorphism, link and association, Need for object oriented approach

Unit II: System design life cycle, object oriented S/W development process model, Object Oriented Analysis, Object Modeling Technique (OMT): object model, function model, relationship among models, object diagrams, state diagrams, data flow diagrams, analysis.

Unit III: Object oriented Design: Overview of object design, Combination the models, Designing algorithms, design optimization, Implementation of control, Adjustment, Design of association, object representation, physical packaging, documenting design decision, comparison of use-case driven approach.

Unit IV: Translation Object Oriented design into implementation, Programming style, Documentation, characterization of object oriented languages, Comparison of object oriented language like C++, JAVA, object programming.

Unit V: Unified Modeling Language (UML): Class diagram sequence diagram Use case diagram, Collaboration, diagram, state, chart diagram, Activity diagram, component diagram, deployment diagram, Object oriented Database: Relational Vs .object oriented database, the architecture of object oriented database, query language for Object Oriented database.

References:-

- Satzinger, Jackson and Burd, “Object oriented Analysis and design with the Unified Process”, CENGAGE Learning.
- Michael Blaha and J. Rumbugh, “Object oriented Modeling and design with UML”, Pearson Education
- O’Docherty, “Object Oriented Analysis and Design Understanding, System Development with UML2.0”, Wiley India.

List of Experiment:-

- Draw Object, state, Data flow Diagram of ATM.
- Draw Object, state, Data flow Diagram of Telephone Call.
- Draw Object, state, Data flow Diagram of Library Information System.
- Draw Object, state, Data flow Diagram of Airline reservation System.
- Draw Object, state, Data flow Diagram of Calculator.
- Draw Object, state, Data flow Diagram of College Management system.
- Draw Object, state, Data flow Diagram of Payroll System.
- Draw Object, state, Data flow Diagram of Railway Reservation system.
- Draw Object, state, Data flow Diagram of Online Sales.
- Draw Object, state, Data flow Diagram of Examination result display System of a University.

Course Contents

Category of Course	Course Title	Course Code	Credits-4C			Theory Paper (ES)
			L	T	P	
Departmental Core DC-20	Wireless & Mobile Computing	IT 702	3	1	0	Max. Marks-100 Min. Marks-35 Duration-3 Hrs.

Branch : Information Technology, VII Semester
Course: Wireless & Mobile Computing

Unit I: Antenna , variation pattern, antenna types, antenna gain, propagation modes, types of fading. Model for wireless digital communication, multiple access technique-SDMA, TDMA, FDMA, CDMA, DAMA, PRMA, MAC/CA, Cellular network organization, operations of cellular system, mobile radio propogation effects, , handoff, power control, sectorization, traffic engineering, Infinite sources, lost calls cleared, grade of service, poison arrival process

Unit II: GSM- Services, system architecture, radio interface, logical channels, protocols, localization and calling, handover, security, HSCSD, GPRS-architecture, Interfaces, Channels, mobility management DECT, TETRA, UMTS.

Unit III: IEEE 802.11: LAN-architecture, 802.11 a, b and g, protocol architecture, physical layer, MAC layer , MAC management, HIPERLAN-protocol architecture, physical layer, access control sub layer, MAC sub layer. Bluetooth-user scenarios- physical layer, MAC layer.

Unit IV: Mobile IP, DHCP, Ad hoc networks: Characteristics, performance issue, routing in mobile host. Wireless sensor network, Mobile transport layer: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, transaction oriented TCP. Introduction to WAP.

Unit V: Intruders, Intrusion detection, password management, viruses and related threads, worms, trojan horse defense, difference biometrics and authentication system, firewall design principle.

References:-

- J. Schiller, “Mobile Communication”, Addision , Wiley
- William Stalling, “Wireless Communication and Network”, Pearson Education
- Upen Dalal,” Wireless Communication”, Oxford Higher Education
- Dr. Kamilo Feher, “Wireless Digital communication”, PHI
- William C.Y Lee, “Mobile Communication Design Fundamental” , John Wiley.

Course Contents

Category of Course	Course Title	Course Code	Credits-6C			Theory Paper (ES)
			L	T	P	
Departmental Core DC-21	Distributed System	IT 703	3	1	2	Max. Marks-100 Min. Marks-35 Duration-3 Hrs.

Branch : Information Technology, VII Semester
Course: Distributed System

Unit I: Characterization of Distributed Systems: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges. System Models: Architectural models, Fundamental Models Theoretical Foundation for Distributed System : Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks. Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms.

Unit II: Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms. Agreement Protocols: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem.

Unit III: Distributed Objects and Remote Invocation: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study. Security: Overview of security techniques, Distributed File Systems: File service architecture, Sun Network File System, The Andrew File System.

Unit IV: Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault-tolerant services, Transactions with replicated data.

Unit V: Distributed Algorithms: Destination based routing, APP (assignment problem in parallel), Deadlock free Packet switching, Introduction to Wave & traversal algorithms, Election algorithm. CORBA Case Study: CORBA, CORBA services.

References:-

- P K Sinha, "Distributed operating systems; Concepts and design", PHI Learning.
- Sunita Mahajan & Shah, Distributed Computing, Oxford Press
- Tanenbaum and steen, "Distributed systems: Principles and paradigms", 2nd edition, PHI Learning.
- Singhal & Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill
- Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design", Pearson Ed.
- Gerald Tel, "Distributed Algorithms", Cambridge University Press

List of Experiment:-

- Case Study – CORBA.
- Implementation of Deadlock through Simulation.
- Implementation of Election Algorithm.
- S/W Simulation for Clock Synchronization in Distributed System using Lamport's Algorithm.
- Implementation of Banker's Algorithm for avoiding Deadlock
- Case Study on.
    a) Inventory Management
    b) Supply Chain Management
    c) Reservation System
    d) University Counseling
    e) Online Chain Management.

Course Contents

Category of Course	Course Title	Course Code	Credits-4C			Theory Paper (ES)
			L	T	P	
DCO(E)-I	Advanced Concept In Database Systems	IT 710	3	1	0	Max. Marks-100 Min. Marks-35 Duration-3 Hrs.

Branch : Information Technology, VII Semester

Course: Advanced Concept In Database Systems

Unit I: An overview of database, 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.

Unit II: Query Processing, Optimization & Database Tuning: Algorithms For Executing Query Operations. Heuristics For Query Optimizations, Estimations of Query Processing Cost, Join Strategies for Parallel Processors, Database Workloads, Tuning Decisions, DBMS Benchmarks, Clustering & Indexing, Multiple Attribute Search Keys, Query Evaluation Plans, Pipelined Evaluations, System Catalogue in RDBMS.

Unit III: Distributed Database System: Structure of Distributed Database, Data Fragmentation, Data Model, Query Processing, Semi Join, Parallel & Pipeline Join, Distributed Query Processing In R * System, Concurrency Control In Distributed Database System, Recovery In Distributed Database System, Distributed Deadlock Detection and Resolution, Commit Protocols.

Unit IV: Enhanced Data Model For Advanced Applications: Database Operating System, Introduction to Temporal Database Concepts, Spatial And Multimedia Databases, Data Mining, Active Database System, Deductive Databases, Database Machines, Web Databases, Advanced Transaction Models, Issues in Real Time Database Design.

Unit V: Accessing databases from Web, JavaScript, JDBC, Java Servlets , database technology to Web related areas such as semi-structured databases and data integration, XML, XQuery, XPath, XML Schemas, distributed database design, distributed database transactions, and distributed query processing

References:-

- Majumdar & Bhattacharya, “Database Management System”, TMH.
- Elmasri, Navathe, “Fundamentals of Database Systems”, Addison Wesley.
- Korth, Silbertz, Sudarshan, “ Database Concepts”, McGraw Hill.
- David M. Croenke and David J. Auer “Database Processing” Eleventh Edition, PHI
- Ramakrishnan, Gehrke, “Database Management System”, McGraw Hill.
- Peter Rob and Coronel, “Database Systems, Design, Implementation and Management”, Cengage Learning
- Data C J,” An Introduction To Database System”, Addison Wesley.
- Bernstein, Hadzilacous, Goodman, “Concurrency Control & Recovery”, Addison Wesley.

Course Contents

Category of Course	Course Title	Course Code	Credits-4C			Theory Paper (ES)
			L	T	P	
DCO(E)-I	Simulation and Modeling	IT 711	3	1	0	Max. Marks-100 Min. Marks-35 Duration-3 Hrs.

Branch : Information Technology, VII Semester
Course: Simulation and Modeling

Unit I: PHYSICAL MODELING: Concept of system and environment, continuous and discrete system, linear and nonlinear system, stochastic activities, static and dynamic models, principles used in modeling, Basic simulation modeling, Role of simulation in model evaluation and studies, Advantages and Disadvantages of simulation. Modeling of systems, Iconic, analog and Mathematical Modeling.

Unit II: COMPUTER BASED SYSTM SIMULATION: Technique of simulation, Monte Carlo method, experimental nature of simulation, numerical computation techniques, calumnious system models, analog and hybrid simulation, feedback systems, Buildings simulation models- Financial Model for an office Building, Sensitivity analysis for office building Model.

Unit III: SYSTEM DYNAMICS MODELING: Identification of problem situation, Exponential Growth Model and Decay Model, Logistic Curve, System Dynamic Diagrams, Simulation of System Dynamics-Waiting Times in Single Server Queuing System.

Unit IV: PROBABILITY CONCEPTS IN SIMULATION: Stochastic variables, discrete and continuous probability functions, Distributed Random numbers, generation of random numbers-Uniform and Non Uniform Random numbers, variance reduction techniques-Introduction, Common Random numbers-Rationale, Applicability and Synchronization.

Unit V: SIMULATION SOFTWARE: Introduction, Comparison of Simulation Package with Programming Languages, Classification of Simulation Software, Desirable Software features, General Purpose Simulation Package-ARENA, EXTEND, Study of SIMULA, DYNAMO,

References:-

- Gorden G., “System simulation”, Printice Hall.
- Averill M Law “ Simulation Modeling and Analysis”, TMH
- Seila,Ceric and Tadikamalla “ Applied Simulation Modeling”, Cengage Learning.
- Severance” System Modelling & Simulation : An Introduction”,John Wiley
- Payer T., “Introduction to system simulation”, McGraw Hill.
- Allan Carrie, "Simulation and Modeling", McGraw Hill.

Course Contents

Category of Course	Course Title	Course Code	Credits-4C			Theory Paper (ES)
Departmental Elective DCO(E)-I	Human-Computer Interaction	IT 712	L	T	P	Max. Marks-100 Min. Marks-35 Duration-3 Hrs.
			3	1	0	

Branch : Information Technology, VII Semester

Course: Human-Computer Interaction

Unit I: Introduction, Human Computer Interaction (HCI) concepts and definitions, Nature of interaction-human and Machine, interaction design, understanding and conceptualizing interaction, understanding users, interfaces and interactions, data gathering.

Unit II: Introduction to User Centered System Design (UCSD), Natural computing, user centered system design, core concepts, interactive design and its strength and weakness, types of user model, user model and evaluation, Heuristic evaluation.

Unit III: Psychological user models. Black box models of human performance, including perception, motor control, memory and problem-solving. Quantitative analysis of performance. Human processor, keystroke level model, and GOMS descriptions of user performance.

Unit IV: Modeling of system understanding. Mental models and metaphor, use of design prototypes, controlled experiments. Cognitive walkthrough. Evaluation from the perspective of a novice learning to use the system.

Unit V: Task analysis and design. Contextual and qualitative studies, use-case driven design. Research techniques. Cognitive dimensions of notations, CSCW, ubiquitous computing, new interaction techniques, programmability.

References:-

- Alan Dix, Janet E. Finlay, “Human-Computer interaction”, Pearson Education.
- Olsen, “Human-Computer Interaction”, Cengage Learning.
- Preece, J. Sharp, H. & Rogers, “Interaction design: beyond human-computer interaction”, Y. Wiley.
- Smith Atakan Serengal, “Human-Computer Interaction”, Cengage Learning.

Course Contents

Category of Course	Course Title	Course Code	Credits-4C			Theory Paper (ES)
			L	T	P	
DCO(E)-I	Automata and Compiler Design	IT 713	3	1	0	Max. Marks-100 Min. Marks-35 Duration-3 Hrs.

Branch : Information Technology, VII Semester
Course: Automata and Compiler Design

Unit I: Introduction: Alphabets, Strings and Languages; Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA, Nondeterministic finite Automata (NFA), Equivalence of NFA and DFA, Minimization of Finite Automata, Regular Expressions, Arden's theorem.

Unit II: Compiler Structure: Compilers and Translators, Various Phases of Compiler, Pass Structure of Compiler, Bootstrapping of Compiler. Lexical Analysis: The role of Lexical Analyzer, A simple approach to the design of Lexical Analyzer, Implementation of Lexical Analyzer. The Syntactic Specification of Programming Languages: CFG, Derivation and Parse tree, Ambiguity, Capabilities of CFG. Basic Parsing Techniques: Top-Down parsers with backtracking, Recursive Descent Parsers, Predictive Parsers,

Unit III: Bottom–up Parsers, Shift-Reduce Parsing, Operator Precedence Parsers, LR parsers (SLR, Canonical LR, LALR) Syntax Analyzer Generator: YACC, Intermediate Code Generation: Different Intermediate forms: three address code, Quadruples & Triples. Syntax Directed translation mechanism and attributed definition. Translation of Declaration, Assignment, Control flow, Boolean expression, Array References in arithmetic expressions, procedure calls, case statements, postfix translation.

Unit IV: Run Time Memory Management: Static and Dynamic storage allocation, stack based memory allocation schemes, Symbol Table management Error Detection and Recovery: Lexical phase errors, Syntactic phase errors, Semantic errors.

Unit V: Code Optimization and Code Generation: Local optimization, Loop optimization, Peephole optimization, Basic blocks and flow graphs, DAG, Data flow analyzer, Machine Model, Order of evaluation, Register allocation and code selection

References:-

- Louden, "Compiler construction", Cengage learning .
- Alfred V Aho, Jeffrey D. Ullman, "Principles of Compiler Design", Narosa.
- A.V. Aho, R. Sethi and J.D Ullman, "Compiler: principle, Techniques and Tools", AW.
- Michal Sipser, "Theory of Computation", Cengage learning.
- H.C. Holub, "Compiler Design in C", Prentice Hall Inc.
- Hopcroft, Ullman, "Introduction to Automata Theory, Languages and Computation", Pearson Education.

- K.L.P. Mishra and N.Chandrasekaran, “Theory of Computer Science : Automata, Languages and Computation”,PHI.

Course Contents

Category of Course	Course Title	Course Code	Credits-4C			Theory Paper (ES)
			L	T	P	Max. Marks-100
DCO(E)-II	Embedded System	IT 720	3	1	0	Min. Marks-35 Duration-3 Hrs.

Branch : Information Technology, VII Semester
Course: Embedded System

Unit I: Introduction to Embedded System, Categories, Requirements, Applications, Challenges and Issues. Core of Embedded system, Memory, Sensors and Actuators, communication interface, Embedded firmware, system components.

Unit II: Fundamental issues of hardware software co-design, computational models in embedded design- data flow graph, control flow graph, state machine model, sequential programmed model, concurrent model, unified modeling language.

Unit III: Architecture of 8085 microcontroller, memory organization, registers, interrupts, addressing modes, instruction sets.

Unit IV: Embedded firmware design approaches- OS based, Super loop based. Embedded firmware development languages- Assembly language based, high level language based, mixed. Programming in embedded C.

Unit V: Types of Operating system, Task, process and threads, Multi processing and multi task, Task scheduling, Task communication, Task synchronization.

References:-

- Shibu K V, "Introduction to Embedded System", TMH.
- David E Simon, "An Embedded Software Primer", Pearson education Asia, 2001.
- Steven F. Barett, Daniel J. Pack, "Embedded Systems" Pearson education, First Impression 2008.
- Vahid Frank, Tony Givargis, "Embedded System Design", John Wiley and Sons, Inc.
- Dream Tech Software Team, "Programming for Embedded Systems" Wiley Publishing house Inc.
- Sriram V Iyer, Pankaj Gupta, "Embedded Realtime Systems Programming", TMH.
- Raj Kamal, "Embedded Systems", TMH.

Course Contents

Category of Course	Course Title	Course Code	Credits-4C			Theory Paper (ES)
			L	T	P	
DCO(E)-II	E-Commerce and Governance	IT 721	3	1	0	Max. Marks-100 Min. Marks-35 Duration-3 Hrs.

Branch : Information Technology, VII Semester
Course: E-Commerce and Governance

Unit I: Introduction to e-commerce: History of e-commerce, e-business models B2B, B2C, C2C, C2B, legal; environment of e-commerce, ethical issues, electronic data interchange, value chain and supply chain, advantages and disadvantages of e-commerce.

Unit II: Electronic Payment Systems: Credit cards, debit cards, smart cards, e-credit accounts, e-money, Marketing on the web, marketing strategies, advertising on the web, customer service and support, introduction to m-commerce, case study: e-commerce in passenger air transport.

Unit III: E-Government, theoretical background of e-governance, issues in e-governance applications, evolution of e-governance, its scope and content, benefits and reasons for the introduction of e-governance, e-governance models- broadcasting, critical flow, comparative analysis, mobilization and lobbying, interactive services / G2C2G.

Unit IV: E-readiness, e-government readiness, E- Framework, step & issues, application of data warehousing and data mining in e-government, Case studies: NICNET-role of nation wide networking in e-governance, e-seva.

Unit V: E-Government systems security: Challenges and approach to e-government security, security concern in e-commerce, security for server computers, communication channel security, security for client computers.

References:-

- Gary P. Schneider, “E-commerce”, Cengage Learning India.
- C.S.R. Prabhu, “E-governence: concept and case study”, PHI Learning Private Limited.
- V. Rajaraman, “Essentials of E-Commerce Technology”, PHI Learning Private Limited.
- David Whiteley, “E-commerce study , technology and applications”, TMH.
- J. Satyanarayan, “E-government: The science of the possible”, PHI Learning Private Limited.
- P.T. Joseph, “E-Commerce An Indian Perspective”, PHI Learning Private Limited.
- Hanson and Kalyanam, “E-Commerce and Web Marketing”, Cengage Learning India.

Course Contents

Category of Course	Course Title	Course Code	Credits-4C			Theory Paper (ES)
			L	T	P	Max. Marks-100
DCO(E)-II	High Performance Computing	IT 722	3	1	0	Min. Marks-35 Duration-3 Hrs.

Branch : Information Technology, VII Semester
Course: High Performance Computing

Unit I: Introduction to high performance computing: Aim, Architectures, Cluster, Grid, Meta-computing, Middleware, Examples of representative applications.
Programming models: Parallel programming paradigms, task partitioning and mapping, shared memory, message passing, peer-to-peer, broker-based. Introduction to PVM and MPI.

Unit II: Architecture of cluster-based systems, Issues in cluster design: performance, single-system-image, fault tolerance, manageability, programmability, load balancing, security, storage.
High performance sequential computing: Effects of the memory hierarchy, Out-of-order execution, superscalar processors, Vector processing.

Unit III: Shared-memory processing: Architectures (extensions of the memory hierarchy), Programming paradigms, OpenMP.
Distributed-memory processing: Architectural issues (networks and interconnects), Programming paradigms, MPI (+MPI2).

Unit IV: Grids: Computational grids, Data grids ,Architecture of Grid systems, Grid security infrastructure. Examples of Grids: Globus.
The productivity crisis & future directions: Development overheads, Petaflops programming, New parallel languages: UPC, Titanium, Co-Array FORTRAN.

Unit V: Performance Issues and Techniques: Cost and Frequency Models for I/O, paging, and caching. Notion of Cacheing; temporal and spatial locality models for instruction and data accesses; Intra-process parallelism and pipelining.
Typical Compiler Optimizations of Programs; Improving Performance: Identifying program bottlenecks - profiling, tracing; simple high-level-language optimizations - locality enhancement, memory disambiguation, moving loop-invariants.

References:-

- Charles Severance, Kevin Dowd, O'reilly, "High Performance Computing", Second Edition July 1998
- David j. Kuck, "High Performance Computing", Oxford Univ Pr, 1996
- Gary W. Sabot, "High Performance Computing ", Addison-Wesley, 1995
- Dowd K, "High Performance Computing", O' Reilly Series, 1993.
- R.E. Bryant and D. O'Hallaron, "Computer Systems:A Programer's Perspective", Pearson Education, 2003.

Course Contents

Category of Course	Course Title	Course Code	Credits-4C			Theory Paper (ES)
			L	T	P	Max. Marks-100
DCO(E)-II	Bioinformatics	IT 723	3	1	0	Min. Marks-35 Duration-3 Hrs.

Branch : Information Technology, VII Semester
Course: Bioinformatics

Unit I: Introduction to bioinformatics: Definition and History of Bioinformatics, Application and research of bioinformatics, finding Bioinformatics data online Bioinformatics, private and future data sources, Meta data Summary and reference systems.

Unit II: Bioinformatics Database: Characteristics and categories of Bioinformatics database, Navigating databases, Information retrieval Systems, Sequence database Nucleotide(primary and Secondary), Protein sequence, Structure Databases: File Formats, Protein Structure, PDB, MMDB, CATH, Other Database Enzyme, MEROPS, BRENDA, Pathway databases

Unit III: Bioinformatics Tools: Need for tools, Industry Trends, Data Mining Tools, Data Submission tools: Nucleotide Sequence, protein Submission tools, Data Analysis tools: Nucleotide Sequence, protein Sequence, Prediction Tools: Phylogenetic trees, Gene prediction, Protein Structure and Function prediction, Modeling Tools: 2D and 3D Protein Modeling.

Unit IV: Bioinformatics Algorithms: Classification of Algorithms, Biological Algorithm, Sequence Comparison Algorithm, Substitution Matrices Algorithms, Sequence Alignment Algorithm ,Gene Prediction Algorithm.

Unit V: Bioinformatics Software: Local Alignment Search Tool (BLAST),Purpose of BLAST,BLAST Analysis, Purpose of BLAST II, Scoring Metrics, PAM, BLOSUM, Working of BLAST. Introduction of HMMER, Practical example of HMMER.

References:-

- Orpita Bosu and Simminder Kaur Thukral, "Bioinformatics Databases,Tools and Algorithms", Oxford University Press 2007.
- Harshawardhan P.bal, "Bioinformatics Principle and Applications", TMH.
- Lesk, A.M.2002, "Introduction to Bioinformatics", Oxford University Press.
- Rastogi, S.C. ,Mendiratta N, "Bioinformatics Concepts,Skill & Applications", CBS Publishers.
- Claverie, J.M and Notredame C, "Bioinformatics for Dummies", Wiley Editior.