



**NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR**  
**DEPARTMENT OF INFORMATION TECHNOLOGY**

**SEMESTER: VIII**

S.No.	Board of Studies	Sub.Code	Subject Name	Periods/week			Examination Scheme					Total Marks	Credits L+(T+P)/2
				L	T	P	TA	FE	SE	T.C.A.	ESE		
1	Information Technology	IT 801	Data Mining & Ware Housing	3	1	-	20	15	15	50	70	120	4
2	Information Technology	IT 802	Cryptography	4	1	-	20	15	15	50	70	120	5
3	Information Technology	IT 80X	Elective V	3	1	-	20	15	15	50	70	120	4
4	Information Technology	IT 80Y	Elective VI	3	1	-	20	15	15	50	70	120	4
5	Information Technology	IT 891	. Net Laboratory	-	-	3	30	-	-	30	20	50	2
6	Information Technology	IT 892	Unix / Linux Shell Scripting	-	-	3	30	-	-	30	20	50	2
7	Information Technology	IT 893	Major Project	-	-	16	100	-	-	100	100	200	8
8	Information Technology		Discipline	-	-	-	50	-	-	50	-	50	1
			Total	13	4	22	290	60	60	410	420	830	30

Elective V & VI		
Sr.No.	Sub.Code	Subject Name
1	IT 803	Advanced Computer Networks
2	IT 804	Mobile Adhoc Networks
3	IT 805	Distributed Multimedia
4	IT 806	Real Time System
5	IT 807	Cyber Crime & Laws
6	IT 808	Genetic Algorithm
7	IT 809	Enterprise Resource Planning
8	IT 810	Quantum Computing

*Note : For attendance of a student in every theory and practical class, the teachers are supposed to keep records. Itimately in the following format which will be included in the semester mark-sheets.*

**T.C.A. = Total of Continuous Assessment.**

Format for attendance				
Attendance				Category
> 85			----->	High "H"
> 70 & < 85			----->	Medium "M"
> 60 & < 70			----->	Low "L"
< 60			----->	Poor "P"

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**SEMESTER – VIII**

**“Data Mining and Ware Housing”**

Theory Periods: 30  
Credits: 4

Tutorials: “10”  
Code: IT 801

**UNIT- I Overview and Concepts:**

Need for data warehousing, Basic elements of data warehousing, Data Warehouses and Data Marts, Trends in data warehousing. Planning And Requirements: Project planning and management, Collecting the requirements. Architecture And Infrastructure: Architectural components, Infrastructure and metadata.

**UNIT- II Data Design and Data Representation:**

Principles of dimensional modeling, Star Schema, Star Schema Keys, Dimensional modeling advanced topics: Snowflake Schema, Aggregate Fact Tables, Data extraction, transformation and loading, data quality ,data quality tools.

**UNIT- III Information Access and Delivery:**

Matching information to classes of users, Information Delivery Tools, OLAP in data warehouse :OLAP Models, Features and Functions, Data warehousing and the web. Implementation And Maintenance: Physical design process ,Indexing the data warehouse, data warehouse deployment, Security, backup and recovery, growth and maintenance.

**UNIT- IV Data Mining- Introduction:**

Basics of data mining, Data Mining Primitives, Languages, and System Architectures: Data mining primitives, Query language, Designing GUI based on a data mining query language ,Knowledge Discovery in Databases(KDD): KDD Process, Architectures of data mining systems. Data Mining Applications.

**UNIT -V Data Mining Techniques and Web Mining:**

Data Mining Algorithm: Association rules ,Classification and Prediction ,Association Rules-Market Basket Analysis, Tree Based Algorithms, Classification- CART, Naïve Bayes Techniques, Neural Based Techniques, Content Mining, Web Structure Mining, Web Usage mining .Introduction to Spatial mining, Data generalization and summarization-based characterization.

**Name of Text Books:**

1. Prabhu,Data ware housing- concepts, Techniques, Products and Applications, Prentice hall of India
2. Soman K P, “Insight into Data Mining: Theory & Practice” , Prentice hall of India.

3. M.H. Dunham, "Data Mining Introductory and Advanced Topics", Pearson Education.

***Name of Reference Books:***

1. Paulraj Ponniah, "Data Warehousing Fundamentals", John Wiley.
2. Gupta, "Introduction To Data mining with Case Studies", PHI.
3. Ralph Kimball, "The Data Warehouse Lifecycle toolkit", John Wiley.

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**SEMESTER – VIII**

**“Cryptography”**

Theory Periods: 40  
Credits: 5

Tutorials: “10”  
Code: IT 802

**UNIT I**

Introduction to Security attacks, services And mechanisms, Introduction to cryptology, Classical Encryption techniques , Cipher Principles, Data Encryption Standard , Block Cipher Design Principles and Modes of Operation - Evaluation criteria for AES, AES Cipher, Triple DES, Placement of Encryption Function, Traffic Confidentiality.

**UNIT II**

Key Management, Diffie-Hellman key Exchange, Elliptic Curve Architecture and Cryptography, Introduction to Number Theory, Confidentiality using Symmetric Encryption, Public Key Cryptography and RSA.

**UNIT III**

Authentication requirements , Authentication functions, Message Authentication Codes, Hash Functions , Security of Hash Functions and MACs, MD5 message Digest algorithm, Secure Hash Algorithm, Authentication Protocols, Digital Signature Standard.

**UNIT IV**

Authentication Applications: Kerberos , X.509 Authentication Service , Electronic Mail Security – PGP – S/MIME

**UNIT V**

**Web security:** security socket layer & transport layer security, secure electronic transaction (SET)

**System security:** intruders, viruses and related threads, firewall design principles.

***Name of Text Books:***

1. William Stallings, “Cryptography And Network Security – Principles and Practices”, Prentice Hall of India, Third Edition 2003.
2. Behrouz Forouzan, “Cryptography and Network Security” Tata McGraw-Hill ,1e (special Indian Edition), 2007.

***Name of Reference Books***

1. Atul Kahate, “Cryptography and Network Security”, Tata McGraw-Hill, 2003.
2. Bruce Schneier, “Applied Cryptography”, John Wiley & Sons Inc, 2001.
3. Charles B. Pfleeger, Shari Lawrence Pfleeger, “Security in Computing”, Third Edition, Pearson Education, 2003.
4. Menezes, A.J.; Van Oorschot, P.C.; Vanstone, S.A. Handbook of applied cryptography. CRC Press, 1997.

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**“Advanced Computer Networks”**

Theory Periods: 30  
Credits: 4

Tutorials: “10”  
Code: IT 803

**UNIT I**

Internet design philosophy, Layering and the end-to-end design principle, Adaptive link layer mechanisms for error-prone channels, Consistent overhead byte stuffing

**UNIT II**

Internet Service Providers (ISPs) and peering, BGP, instability and convergence issues, IGP convergence, traffic engineering, Fair queuing, packet scheduling

**UNIT III**

TCP congestion avoidance, TCP variants, Integrated services (IntServ) and Differentiated services (DiffServ), RSVP: Resource reSerVation Protocol

**UNIT IV**

Queuing Theory, Traffic Engineering, Multi-Protocol Label Switching (MPLS), IP Next generation, IPv6, IP Next Layer (IPNL).

**UNIT V**

Overlay networks, P2P networks, Web server systems, Web caching, Internet traffic modeling, Internet measurements, simulation issues, Network coding techniques, Network address translation issues, IPv6

**Text Books:**

1. Huitema, C., Routing in the Internet, 2nd ed., Prentice-Hall, 2000. Keshav, S., An Engineering Approach to Computer Networking, Addison-Wesley, 1997.
2. Kurose and Ross, “Computer Networking: A Top-Down Approach,” Addison-Wesley, 2000.
3. Peterson and Davie, “Computer Networks: A Systems Approach,” 2nd ed., Morgan Kaufmann, 2000.
4. A collection of manuscripts and research papers will be also made available to students.

**Reference:**

- 1 Stevens, “UNIX Network Programming, vol. 1: Networking APIs: Sockets and XTI,” 2nd ed., Prentice-Hall, 1997.
- 2 Tanenbaum, A., Computer Networks, 3rd ed., Prentice-Hall, 1996. Wright and Stevens, TCP/IP Illustrated v.2, Addison-Wesley.

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**“Mobile Adhoc Networks”**

Theory Periods: 30  
Credits: 4

Tutorials: “10”  
Code: IT 804

**Unit - I**

Introductory concepts. Different models of operation. Various applications of MANET, Destination-Sequenced Distance Vector protocol - overview, route advertisement, extending base station coverage. Properties of DSDV protocol.

**Unit - II**

Dynamic Source Routing protocol - overview and properties, DSR route discovery, route maintenance. Support for heterogeneous networks and mobile IP. Multicast routing with DSR.

**Unit - III**

Ad Hoc On-Demand Distance-Vector protocol - properties, unicast route Establishment, multicast route establishment. Broadcast. Optimizations and Enhancements.

**Unit - IV**

Link Reversal Routing - Gafni-Bertsekas algorithm, lightweight mobile routing algorithm. Temporally ordered routing algorithm.

**Unit - V**

Preserving battery life of mobile nodes - Associativity based routing, effects of beaconing on battery life. Recent trends in MANET.

***Name of Text Books:***

1. Charles E. Perkins, “Ad Hoc Networking” Addison-Wesley Professional.
2. Prasant Mohapatra , Srikanth Krishnamurthy, “AD HOC NETWORKS: Technologies and Protocols” Springer.

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**SEMESTER – VIII**

**“Distributed Multimedia”**

Theory Periods: 30  
Credits: 4

Tutorials: “10”  
Code: IT 805

**UNIT I**

**Multimedia Data Modeling:** Modeling Time-Based Media , Document Model Issues for Hypermedia, Introduction to Multimedia Software Engineering, Towards a Theory of Active Index,

**Multimedia Information Retrieval:** Introduction, Sigma Query Language, Content-Based Indexing and Retrieval, Video and Image Content Representation, Video Segmentation for Video Data Management.

**UNIT II**

**Multimedia Interface:** Visual Interfaces to Multimedia Databases (Presentation methodologies and tools, Teleconferencing tools) ,Multimedia Interfaces - Multimedia Content Indication , Extensible Markup Language XML, X-SMILES and SMIL.

**UNIT III**

**Memory and Database Management:** Introduction: Dependency relations for Multimedia Databases, Memory and Database Management: Codecs, Design of Large-Scale Multimedia-on-Demand Storage Servers and Storage Hierarchies.

**UNIT IV**

**Multimedia Communications:** Introduction, Introduction to MPEG Multimedia Communications-Synchronization , Adlet: Active Document for Adaptive Information Integration, Transformation and Exchange of Multimedia Objects in Distributed Multimedia Systems.

**UNIT V**

**Prototype Systems:** ImageDatabasePrototypes,VideoDatabaseSystems-RecentTrendsThird-Generation Distributed Hypermedia Systems.

**Text Book :**

1. The Handbook of Multimedia Information Management, edited by W. Grosky, R. Jain and R. Mehrotra, Prentice-Hall PTR, 1997, ISBN 0-13-207325-0.

**Reference Book:**

1. S. K. Chang and E. Jungert, Symbolic Projection for Image Information Retrieval and Visual Reasoning, Academic Press, 1996 (ISBN 0-12-168030-4).



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**SEMESTER – VIII**

**“Real Time System”**

Theory Periods: 30  
Credits: 4

Tutorials: “10”  
Code: IT 806

**UNIT I**

**Introduction:** Concept of Real Time System, Issues in real time computing, Performance measures of Real Time System, Issues in Real Time Computing, Performance measures of Real time Systems, Real Time Application.

**Task Assignment and Scheduling:** Different task model, Scheduling hierarchy, offline vs Online Scheduling, Clock Drives.

**UNIT II**

**Model of Real Time System:** Processor, resources, temporal parameter, Periodic Task Model, Sporadic Task Model, Precedence Constraints and Data Dependencies, Scheduling hierarchy.

**Scheduling of Periodic Task:** Assumptions, fixed versus dynamic priority algorithms, schedulability test for fixed priority task with arbitrary deadlines.

**UNIT III**

**Scheduling of Aperiodic and Sporadic Tasks:** Assumptions and approaches, deferrable, sporadic servers, slack stealing in deadline driven and fixed priority systems. Two level schemes for integrated scheduling, Scheduling for applications having flexible constrains.

**Resources and Resource Access Control:** Assumptions on resources and their usage, resource contention, resource access control (Priority Ceiling Protocol, Priority Inheritance protocol, Slack Based Priority Ceiling Protocol, Preemption Ceiling Protocol).

**UNIT IV**

**Multi Processor Scheduling:** Model of multi processor and distributed systems, Scheduling algorithms for end to end periodic tasks in homogeneous/heterogeneous systems, Predictability and validation of dynamic multiprocessor system.

**UNIT V**

**Real time Communication:** Model of real time Communication, Priority base service For switched network, Weighted Round Robin Service, Medium access Control Protocol, Real Time Protocol.

**Books and References:**

1. Jane .W. S. Liu “Real Time Systems” Pearson Education.
2. Krishna .C.M “Real Time Systems” Mc-Graw Hill Publication.

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**SEMESTER – VIII**  
**“Cyber Crime and Laws”**

Theory Periods: 30  
Credits: 4

Tutorials: “10”  
Code: IT 807

**UNIT I: INTRODUCTION TO CYBERSPACE AND CYBERCRIMES**

**Cyber Space:** Understanding Cyber Space, Defining Cyber Laws Jurisdiction in Cyber Space: Concept of Jurisdiction, Internet Jurisdiction, Indian Context of Jurisdiction .**Understanding Cyber Crimes:** Defining Crime, Crime in context of Internet – Actus Reus/ Mens Rea, Types of crime in Internet, Computing damage in Internet crime. **Cyber Crimes:** Fraud, Hacking, Mischief, Trespass, Defamation, Stalking, Spam. Web hosting and web Development agreement, Legal and Technological Significance of domain name.

**UNIT II: IT ACT 2000**

Overview of IT Act 2000, Amendments and Limitations of IT Act, Digital Signatures, **Cryptographic Algorithm:** Public Cryptography, Private Cryptography; **Electronic Governance:** Legal Recognition of Electronic Records, Legal Recognition of Digital Signature; Certifying Authorities, Network Service Providers Liability, Cyber Regulations Appellate Tribunal, Penalties and Adjudication; Alternative Dispute Resolution , Online Dispute Resolution (ODR).

**UNIT III: TRADEMARKS AND PATENTS**

**Legal Issues in Internet and Software Copyright:** Jurisdiction Issues and Copyright, Infringement, Remedies of Infringement, Multimedia and Copyright issues, Software Piracy, **Patents:** Understanding Patents, International context of Patents ,Indian Position on Computer related Patents.

**Trademarks:** Understanding Trademarks, Trademark Law in India, Infringement and Passing Off, Trademarks in Internet, Domain name registration, Domain Name Disputes & WIPO.

**UNIT IV: CYBER LAW AND RELATED LEGISLATION**

IT Act and Civil Procedure Code, IT Act and Criminal Procedural Code, **Relevant Sections :** Relevant Sections of Indian Evidence Act, Relevant Sections of Bankers Book Evidence Act, Relevant Sections of Indian Penal Code, Relevant Sections of Reserve Bank of India Act; Law Relating To Employees And Internet, Hierarchy of courts.

**UNIT V: E-COMMERCE AND LEGAL ISSUES**

Electronic Money, Regulating e-transactions, Role of RBI and Legal issues, Transnational Transactions of E-Cash, Credit Card and Internet, Laws relating to Internet credit cards, Secure Electronic Transactions, Electronic Data Base and its Protection.

**Text Books:**

1. Cyber law simplified : Vivek Sood , Tata McGraw Hill Education Pvt Ltd , 2001, fifth reprint 2009.
2. Cyber Laws: Intellectual property & E Commerce, Security- Kumar K, dominant Publisher.

3. Information Security policy & implementation Issues, NIIT, PHI.

**Reference:**

1. Cyber CRIME notorious Aspects of the Humans & net Criminals activity in Cyber World  
Barna Y Dayal D P Dominant Publisher.
2. Cyber Crime Impact in the new millennium, Marine R.C. Auther press.
3. Spam Attack, Cyber Stalking & abuse, Barna Y, Dayaal D P Dominant publisher.
4. Frauds & Financial crisis in Cyber space, Barna Y, Dayal D P , Dominant publisher.
5. Information Security , NIIT: PHI.

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**“Genetic Algorithm”**

Theory Periods: 30  
Credits: 4

Tutorials: “10”  
Code: IT 808

**Unit I**

Introduction and Overview, Pervasiveness of the Problem of Program Induction, Introduction to Genetic Algorithms, The Representation Problem for Genetic Algorithms, Overview of Genetic Programming, Detailed Description of Genetic Programming, Introductory Examples of Genetic Programming.

**Unit II**

Computer implementation, Data structure, Reproduction, Crossover, Mutation, Mapping objective function to fitness form, fitness scaling, coding, Discretization, constraints

**Unit III**

Amount of Processing Required to Solve a Problem, Non randomness of Genetic Programming, Symbolic Regression Q Error-Driven Evolution, Control Q Cost-Driven Evolution, Evolution of Emergent Behavior, Evolution of Subsumption, Entropy-Driven Evolution, Evolution of Strategy, Co-Evolution

**Unit IV**

Risc of genetic algorithm, Genetic algorithm application of historical interest, Function optimization, improvement in basic techniques, current application of genetic algorithms.

**Unit V**

Parallelization of Genetic Programming, Ruggedness of Genetic Programming, Extraneous Variables and Functions, Operational Issues, Review of Genetic Programming Comparison with Other Paradigms

**Text Books:**

1. “Genetic algorithm in search optimization and machine learning”, David E Goldberg

**Reference Book:**

1. 2. "An Introduction to genetic Algorithms ", Melanie Mitchell MIT Press

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**SEMESTER – VIII**

**“Enterprise Resource Planning”**

Theory Periods: 30  
Credits: 4

Tutorials: “10”  
Code: IT 809

**UNIT I: INTRODUCTION TO ERP**

Overview – Benefits of ERP – ERP and Related Technologies – Business Process Reengineering – Data Warehousing – Data Mining – On-line Analytical Processing – Supply Chain Management.

**UNIT II: ERP IMPLEMENTATION**

Implementation Life Cycle – Implementation Methodology – Hidden Costs – Organizing Implementation – Vendors, Consultants and Users – Contracts – Project Management and Monitoring.

**UNIT III: BUSINESS MODULES**

Business Modules in an ERP Package – Finance – Manufacturing – Human Resource – Plant Maintenance – Materials Management – Quality Management – Sales and Distribution.

**UNIT IV: ERP MARKET**

ERP Market Place – SAP AG – PeopleSoft – Baan Company – JD Edwards World Solutions Company – Oracle Corporation – QAD – System Software Associates.

**UNIT V: ERP – PRESENT AND FUTURE**

Turbo Charge the ERP System – EIA – ERP and E-Commerce – ERP and Internet – Future Directions in ERP.

***Name of Text Books:***

1. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, 1999.
2. Joseph A. Brady, Ellen F. Monk, Bret J. Wangner, “Concepts in Enterprise Resource Planning”, Thomson Learning, 2001.

***Name of Reference Books:***

1. Vinod Kumar Garg and N.K .Venkata Krishnan, “Enterprise Resource Planning – concepts and Planning”, Prentice Hall, 1998.
2. Jose Antonio Fernandez, “ The SAP R /3 Hand book”, Tata McGraw Hill, 1998.
3. Fu, “SAP BW: A Step by Step Guide”, First Edition, Pearson Education, 2003.

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**“Quantum Computing”**

Theory Periods: 30  
Credits: 4

Tutorials: “10”  
Code: IT 810

**UNIT I**

Review of Linear Algebra. The postulates of quantum mechanics. Review of Theory of Finite Dimensional Hilbert Spaces and Tensor Products.

**UNIT II**

Models of computation – Turing machines. Quantifying resources. Computational complexity and the various complexity classes. Models for Quantum Computation. Qubits. Single and multiple qubit gates. Quantum circuits. Bell states. Single qubit operations. Controlled operations and measurement. Universal quantum gates.

**UNIT III**

Quantum Algorithms – Quantum search algorithm - geometric visualization and performance. Quantum search as a quantum simulation. Speeding up the solution of NP Complete problems. Quantum search as an unstructured database. Grover’s and Shor’s Algorithms.

**UNIT IV**

Introduction to Quantum Coding Theory. Quantum error correction. The Shor code. Discretization of errors, Independent error models, Degenerate Codes.

**UNIT V**

The quantum Hamming bound. Constructing quantum codes – Classical linear codes, Shannon entropy and Von Neuman Entropy.

***Name of Text Books:***

1. Nielsen M.A. and I.L. Chuang, Quantum Computation and Quantum Information, Cambridge University Press, 2002.

***Name of Reference Books:***

1. Gruska, J. Quantum Computing, McGraw Hill, 1999.
2. Halmos, P. R. Finite Dimensional Vector Spaces, Van Nostrand, 1958.

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**SEMESTER – VIII**

<b>Semester: VIII</b>	<b>Code: IT 891</b>
<b>Subject: .Net Laboratory</b>	
<b>Credits: 2</b>	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

<b>Semester: VIII</b>	<b>Code: IT 892</b>
<b>Subject: Unix / Linux Shell Scripting</b>	
<b>Credits: 2</b>	

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

<b>Semester: VIII</b>	<b>Code: IT 893</b>
<b>Subject: Major Project</b>	
<b>Credits: 8</b>	

<b>Semester: VIII</b>	
<b>Subject: Discipline</b>	
<b>Credits: 1</b>	