

**ANNA UNIVERSITY CHENNAI : : CHENNAI – 600 025**  
**AFFILIATED INSTITUTIONS**  
**B.E. (8 SEMESTER) COMPUTER SCIENCE AND ENGINEERING**  
**CURRICULUM – R 2008**  
**(Common to all branches of B.E. / B.Tech Programmes)**

**SEMESTER VI**

(Applicable to the students admitted from the Academic year 2008–2009 onwards)

CODE NO.	COURSE TITLE	L	T	P	C
<b>THEORY</b>					
CS2351	<a href="#">Artificial Intelligence</a>	3	0	0	3
CS2352	<a href="#">Principles of Compiler Design</a>	3	0	2	4
CS2353	<a href="#">Object Oriented Analysis and Design</a>	3	0	0	3
CS2354	<a href="#">Advanced Computer Architecture</a>	3	0	0	3
	Elective – I	3	0	0	3
	Elective – II	3	0	0	3
<b>PRACTICAL</b>					
CS2357	<a href="#">Object Oriented Analysis and Design Lab</a>	0	0	3	2
GE2321	<a href="#">Communication Skills Lab</a>	0	0	3	2
CS2358	<a href="#">Internet Programming Lab</a>	1	0	3	2
<b>TOTAL</b>		<b>19</b>	<b>0</b>	<b>11</b>	<b>25</b>

**SEMESTER VII**

(Applicable to the students admitted from the Academic year 2008–2009 onwards)

CODE NO.	COURSE TITLE	L	T	P	C
<b>THEORY</b>					
MG2452	<a href="#">Engineering Economics &amp; Financial Accounting</a>	3	0	0	3
CS2401	<a href="#">Computer Graphics</a>	3	0	0	3
CS2402	<a href="#">Mobile and Pervasive Computing</a>	3	0	0	3
CS2403	<a href="#">Digital Signal Processing</a>	3	0	0	3
	Elective III	3	0	0	3
	Elective IV	3	0	0	3
<b>PRACTICAL</b>					
CS2405	<a href="#">Computer Graphics Lab</a>	0	0	3	2
CS2406	<a href="#">Open Source Lab</a>	0	0	3	2
<b>TOTAL</b>		<b>18</b>	<b>0</b>	<b>6</b>	<b>22</b>

## SEMESTER VIII

(Applicable to the students admitted from the Academic year 2008–2009 onwards)

CODE NO.	COURSE TITLE	L	T	P	C
<b>THEORY</b>					
	Elective V	3	0	0	3
	Elective VI	3	0	0	3
<b>PRACTICAL</b>					
CS2451	Project Work	0	0	12	6
<b>TOTAL</b>		<b>6</b>	<b>0</b>	<b>12</b>	<b>12</b>

### LIST OF ELECTIVES SEMESTER VI – Elective I

CODE NO.	COURSE TITLE	L	T	P	C
CS2021	<a href="#">Multicore Programming</a>	3	0	0	3
CS2022	<a href="#">Visual Programming</a>	3	0	0	3
CS2023	<a href="#">Advanced JAVA Programming</a>	3	0	0	3
CS2024	<a href="#">Parallel Programming</a>	3	0	0	3
IT2353	<a href="#">Web Technology</a>	3	0	0	3

### SEMESTER VI – Elective II

CODE NO.	COURSE TITLE	L	T	P	C
CS2028	<a href="#">UNIX Internals</a>	3	0	0	3
MA2264	<a href="#">Numerical Methods</a>	3	1	0	4
IT2354	<a href="#">Embedded Systems</a>	3	0	0	3
CS2029	<a href="#">Advanced Database Technology</a>	3	0	0	3
IT2043	<a href="#">Knowledge Management</a>	3	0	0	3
CS2030	<a href="#">High Performance Microprocessors</a>	3	0	0	3

### SEMESTER VII – Elective III

CODE NO.	COURSE TITLE	L	T	P	C
MG2453	<a href="#">Resource Management Techniques</a>	3	0	0	3
CS2032	<a href="#">Data Warehousing and Data Mining</a>	3	0	0	3
CS2033	<a href="#">Real Time Systems</a>	3	0	0	3
CS2034	<a href="#">TCP/IP Design and Implementation</a>	3	0	0	3
CS2035	<a href="#">Natural Language Processing</a>	3	0	0	3
IT2024	<a href="#">User Interface Design</a>	3	0	0	3
IT2401	<a href="#">Service Oriented Architecture</a>	3	0	0	3

### SEMESTER VII – Elective IV

CODE NO.	COURSE TITLE	L	T	P	C
CS2040	<a href="#">Advanced Operating Systems</a>	3	0	0	3
CS2041	<a href="#">C# and .NET Framework</a>	3	0	0	3
IT2352	<a href="#">Cryptography and Network Security</a>	3	0	0	3
IT2061	<a href="#">Systems Modeling &amp; Simulation</a>	3	0	0	3
GE2022	<a href="#">Total Quality Management</a>	3	0	0	3
IT2351	<a href="#">Network Programming and Management</a>	3	0	0	3
IT2032	<a href="#">Software Testing</a>	3	0	0	3
CS2045	<a href="#">Wireless Networks</a>	3	0	0	3

### SEMESTER VIII – Elective V

CODE NO.	COURSE TITLE	L	T	P	C
GE2071	<a href="#">Intellectual Property Rights</a>	3	0	0	3
CS2051	<a href="#">Graph Theory</a>	3	0	0	3
IT2042	<a href="#">Information Security</a>	3	0	0	3
CS2053	<a href="#">Soft Computing</a>	3	0	0	3
IT2023	<a href="#">Digital Image Processing</a>	3	0	0	3
CS2055	<a href="#">Software Quality Assurance</a>	3	0	0	3
CS2056	<a href="#">Distributed Systems</a>	3	0	0	3
CS2057	<a href="#">Knowledge Based Decision Support Systems</a>	3	0	0	3
GE2021	<a href="#">Professional Ethics in Engineering</a>	3	0	0	3
GE 2023	<a href="#">Fundamentals Of Nanoscience</a>	3	0	0	3

### SEMESTER VIII – Elective VI

CODE NO.	COURSE TITLE	L	T	P	C
GE2072	<a href="#">Indian Constitution and Society</a>	3	0	0	3
CS2060	<a href="#">High Speed Networks</a>	3	0	0	3
CS2061	<a href="#">Robotics</a>	3	0	0	3
IT2403	<a href="#">Software Project Management</a>	3	0	0	3
CS2062	<a href="#">Quantum Computing</a>	3	0	0	3
CS2063	<a href="#">Grid Computing</a>	3	0	0	3
CS2064	<a href="#">Agent Based Intelligent Systems</a>	3	0	0	3
IT2033	<a href="#">Bio Informatics</a>	3	0	0	3
IT2064	<a href="#">Speech Signal Processing</a>	3	0	0	3

**AIM:**

To learn the basics of designing intelligent agents that can solve general purpose problems, represent and process knowledge, plan and act, reason under uncertainty and can learn from experiences

**UNIT I      PROBLEM SOLVING      9**

Introduction – Agents – Problem formulation – uninformed search strategies – heuristics – informed search strategies – constraint satisfaction

**UNIT II      LOGICAL REASONING      9**

Logical agents – propositional logic – inferences – first-order logic – inferences in first-order logic – forward chaining – backward chaining – unification – resolution

**UNIT III      PLANNING      9**

Planning with state-space search – partial-order planning – planning graphs – planning and acting in the real world

**UNIT IV      UNCERTAIN KNOWLEDGE AND REASONING      9**

Uncertainty – review of probability - probabilistic Reasoning – Bayesian networks – inferences in Bayesian networks – Temporal models – Hidden Markov models

**UNIT V      LEARNING      9**

Learning from observation - Inductive learning – Decision trees – Explanation based learning – Statistical Learning methods - Reinforcement Learning

**TOTAL: 45PERIODS****TEXT BOOK:**

1. S. Russel and P. Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education, 2003.

**REFERENCES:**

1. David Poole, Alan Mackworth, Randy Goebel, "Computational Intelligence : a logical approach", Oxford University Press, 2004.
2. G. Luger, "Artificial Intelligence: Structures and Strategies for complex problem solving", Fourth Edition, Pearson Education, 2002.
3. J. Nilsson, "Artificial Intelligence: A new Synthesis", Elsevier Publishers, 1998.

**UNIT I      LEXICAL ANALYSIS      9**

Introduction to Compiling- Compilers-Analysis of the source program-The phases-Cousins-The grouping of phases-Compiler construction tools. The role of the lexical analyzer- Input buffering-Specification of tokens-Recognition of tokens-A language for specifying lexical analyzer.

**UNIT II SYNTAX ANALYSIS and RUN-TIME ENVIRONMENTS 9**

Syntax Analysis- The role of the parser-Context-free grammars-Writing a grammar-Top-down parsing-Bottom-up Parsing-LR parsers-Constructing an SLR(1) parsing table. Type Checking- Type Systems-Specification of a simple type checker. Run-Time Environments-Source language issues-Storage organization-Storage-allocation strategies.

**UNIT III INTERMEDIATE CODE GENERATION 9**

Intermediate languages-Declarations-Assignment statements - Boolean expressions-Case statements- Backpatching-Procedure calls

**UNIT IV CODE GENERATION 9**

Issues in the design of a code generator- The target machine-Run-time storage management-Basic blocks and flow graphs- Next-use information-A simple code generator-Register allocation and assignment-The dag representation of basic blocks - Generating code from dags.

**UNIT V CODE OPTIMIZATION 9**

Introduction-The principle sources of optimization-Peephole optimization- Optimization of basic blocks-Loops in flow graphs- Introduction to global data-flow analysis-Code improving transformations.

**TOTAL: 75 PERIODS**

**TEXT BOOK:**

1. Alfred V. Aho, Ravi Sethi Jeffrey D. Ullman, "Compilers- Principles, Techniques, and Tools", Pearson Education Asia, 2007.

**REFERENCES:**

1. David Galles, "Modern Compiler Design", Pearson Education Asia, 2007
2. Steven S. Muchnick, "Advanced Compiler Design & Implementation",Morgan Kaufmann Pulishers, 2000.
3. C. N. Fisher and R. J. LeBlanc "Crafting a Compiler with C", Pearson Education, 2000.

**CS2353 OBJECT ORIENTED ANALYSIS AND DESIGN L T P C  
3 0 0 3**

**OBJECTIVES:**

1. To learn basic OO analysis and design skills through an elaborate case study
2. To use the UML design diagrams
3. To apply the appropriate design patterns

<b>UNIT I</b>	<b>9</b>
Introduction to OOAD – What is OOAD? – What is UML? What are the United process(UP) phases - Case study – the NextGen POS system, Inception -Use case Modeling - Relating Use cases – include, extend and generalization.	
<b>UNIT II</b>	<b>9</b>
Elaboration - Domain Models - Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class hierarchies- Aggregation and Composition- UML activity diagrams and modeling	
<b>UNIT III</b>	<b>9</b>
System sequence diagrams - Relationship between sequence diagrams and use cases Logical architecture and UML package diagram – Logical architecture refinement - UML class diagrams - UML interaction diagrams	
<b>UNIT IV</b>	<b>9</b>
GRASP: Designing objects with responsibilities – Creator – Information expert – Low Coupling –Controller – High Cohesion – Designing for visibility - Applying GoF design patterns – adapter, singleton, factory and observer patterns.	
<b>UNIT V</b>	<b>9</b>
UML state diagrams and modeling - Operation contracts- Mapping design to code -UML deployment and component diagrams	

**TOTAL: 45 PERIODS**

**TEXT BOOK :**

- 1.Craig Larman,"Applying UML and Patterns: An Introduction to object-oriented Analysis and Design and iterative development", Third Edition, Pearson Education, 2005

**REFERENCES:**

1. Mike O’Docherty, “Object-Oriented Analysis & Design: Understanding System Development with UML 2.0”, John Wiley & Sons, 2005.
2. James W- Cooper, Addison-Wesley, “Java Design Patterns – A Tutorial”, 2000.
3. Micheal Blaha, James Rambaugh, “Object-Oriented Modeling and Design with UML”, Second Edition, Prentice Hall of India Private Limited, 2007
4. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, “Design patterns: Elements of Reusable object-oriented software”, Addison-Wesley, 1995.

<b>CS2354</b>	<b>ADVANCED COMPUTER ARCHITECTURE</b>	<b>L T P C</b> <b>3 0 0 3</b>
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<b>UNIT I</b>	<b>INSTRUCTION LEVEL PARALLELISM</b>	<b>9</b>
ILP – Concepts and challenges – Hardware and software approaches – Dynamic scheduling – Speculation - Compiler techniques for exposing ILP – Branch prediction.		

**UNIT II MULTIPLE ISSUE PROCESSORS 9**  
VLIW & EPIC – Advanced compiler support – Hardware support for exposing parallelism – Hardware versus software speculation mechanisms – IA 64 and Itanium processors – Limits on ILP.

**UNIT III MULTIPROCESSORS AND THREAD LEVEL PARALLELISM 9**  
Symmetric and distributed shared memory architectures – Performance issues – Synchronization – Models of memory consistency – Introduction to Multithreading.

**UNIT IV MEMORY AND I/O 9**  
Cache performance – Reducing cache miss penalty and miss rate – Reducing hit time – Main memory and performance – Memory technology. Types of storage devices – Buses – RAID – Reliability, availability and dependability – I/O performance measures – Designing an I/O system.

**UNIT V MULTI-CORE ARCHITECTURES 9**  
Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture - heterogenous multi-core processors – case study: IBM Cell Processor.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. John L. Hennessey and David A. Patterson, “ Computer architecture – A quantitative approach”, Morgan Kaufmann / Elsevier Publishers, 4<sup>th</sup>. edition, 2007.

**REFERENCES:**

1. David E. Culler, Jaswinder Pal Singh, “Parallel computing architecture: A hardware/software approach” , Morgan Kaufmann /Elsevier Publishers, 1999.
2. Kai Hwang and Zhi.Wei Xu, “Scalable Parallel Computing”, Tata McGraw Hill, New Delhi, 2003.

**CS2357**

**OOAD LAB**

**L T P C  
0 0 3 2**

**OBJECTIVE: To develop a mini-project following the 12 exercises listed below.**

1. To develop a problem statement.
2. Develop an IEEE standard SRS document. Also develop risk management and project plan (Gantt chart).
3. Identify Use Cases and develop the Use Case model.
4. Identify the business activities and develop an UML Activity diagram.
5. Identity the conceptual classes and develop a domain model with UML Class diagram.
6. Using the identified scenarios find the interaction between objects and represent them using UML Interaction diagrams.
7. Draw the State Chart diagram.
8. Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
9. Implement the Technical services layer.
10. Implement the Domain objects layer.
11. Implement the User Interface layer.
12. Draw Component and Deployment diagrams.

**Suggested domains for Mini-project.**

1. Passport automation system.
2. Book bank
3. Exam Registration
4. Stock maintenance system.
5. Online course reservation system
6. E-ticketing
7. Software personnel management system
8. Credit card processing
9. e-book management system
10. Recruitment system
11. Foreign trading system
12. Conference Management System
13. BPO Management System

**Suggested Software Tools**

ArgoUML, Eclipse IDE, Visual Paradigm, Visual case, and Rational Suite

**TOTAL: 45 PERIODS**

**Requirement for a batch of 30 students**

<b>S. No.</b>	<b>Description of Equipment</b>	<b>Quantity Required</b>
1.	<b>Software Tools</b> ArgoUML, Eclipse IDE, Visual Paradigm, Visual case and Rational Suite	30 user License
2.	PC's	30

**GE2321**

**COMMUNICATION SKILLS LABORATORY**

**L T P C**

**0 0 3 2**

**(Fifth / Sixth Semester)**

Globalisation has brought in numerous opportunities for the teeming millions, with more focus on the students' overall capability apart from academic competence. Many students, particularly those from non-English medium schools, find that they are not preferred due to their inadequacy of communication skills and soft skills, despite possessing sound knowledge in their subject area along with technical capability. Keeping in view their pre-employment needs and career requirements, this course on Communication Skills Laboratory will prepare students to adapt themselves with ease to the industry environment, thus rendering them as prospective assets to industries. The course will equip the students with the necessary communication skills that would go a long way in helping them in their profession.



**OBJECTIVES:**

- To equip students of engineering and technology with effective speaking and listening skills in English.
- To help them develop their soft skills and interpersonal skills, which will make the transition from college to workplace smoother and help them excel in their job.
- To enhance the performance of students at Placement Interviews, Group

<b>I. PC based session</b>	<b>(Weightage 40%)</b>	<b>24 periods</b>
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Discussions and other recruitment exercises.

**A. English Language Lab (18 Periods)**

**1. Listening Comprehension: (6)**

Listening and typing – Listening and sequencing of sentences – Filling in the blanks - Listening and answering questions.

**2. Reading Comprehension: (6)**

Filling in the blanks - Close exercises – Vocabulary building - Reading and answering questions.

**3. Speaking: (6)**

Phonetics: Intonation – Ear training - Correct Pronunciation – Sound recognition exercises – Common Errors in English.

Conversations: Face to Face Conversation – Telephone conversation – Role play activities (Students take on roles and engage in conversation)

**B. Discussion of audio-visual materials (6 periods)**

**(Samples are available to learn and practice)**

**1. Resume / Report Preparation / Letter Writing (1)**

Structuring the resume / report - Letter writing / Email Communication - Samples.

**2. Presentation skills: (1)**

Elements of effective presentation – Structure of presentation - Presentation tools – Voice Modulation – Audience analysis - Body language – Video samples

**3. Soft Skills: (2)**

Time management – Articulateness – Assertiveness – Psychometrics – Innovation and Creativity - Stress Management & Poise - Video Samples

**4. Group Discussion: (1)**

Why is GD part of selection process ? - Structure of GD – Moderator – led and other GDs - Strategies in GD – Team work - Body Language - Mock GD -Video samples

**5. Interview Skills: (1)**

Kinds of interviews – Required Key Skills – Corporate culture – Mock interviews- Video samples.

<b>II. Practice Session</b>	<b>(Weightage – 60%)</b>	<b>24 periods</b>
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1. **Resume / Report Preparation / Letter writing:** Students prepare their own resume and report. (2)
2. **Presentation Skills:** Students make presentations on given topics. (8)
3. **Group Discussion:** Students participate in group discussions. (6)
4. **Interview Skills:** Students participate in Mock Interviews (8)

**REFERENCES:**

1. Anderson, P.V, **Technical Communication**, Thomson Wadsworth, Sixth Edition, New Delhi, 2007.
2. Prakash, P, **Verbal and Non-Verbal Reasoning**, Macmillan India Ltd., Second Edition, New Delhi, 2004.
3. John Seely, **The Oxford Guide to Writing and Speaking**, Oxford University Press, New Delhi, 2004.
4. Evans, D, **Decision maker**, Cambridge University Press, 1997.
5. Thorpe, E, and Thorpe, S, **Objective English**, Pearson Education, Second Edition, New Delhi, 2007.
6. Turton, N.D and Heaton, J.B, **Dictionary of Common Errors**, Addison Wesley Longman Ltd., Indian reprint 1998.

**Lab Requirements:**

1. Teacher console and systems for students.
2. English Language Lab Software
3. Career Lab Software

**GE2321**

**COMMUNICATION SKILLS LABORATORY**  
**Guidelines for the course**

**L T P C**  
**0 0 3 2**

1. A batch of 60 / 120 students is divided into two groups – one group for the PC-based session and the other group for the Class room session.
2. The English Lab (2 Periods) will be handled by a faculty member of the **English Department**. The Career Lab (2 Periods) may be handled by any competent teacher, **not necessarily from English Department**
3. **Record Notebook:** At the end of each session of English Lab, review exercises are given for the students to answer and the computer evaluated sheets are to be compiled as record notebook. Similar exercises for the career lab are to be compiled in the record notebook.
4. **Internal Assessment:** The 15 marks (the other 5 marks for attendance) allotted for the internal assessment will be based on the record notebook compiled by the candidate. 10 marks may be allotted for English Lab component and 5 marks for the Career Lab component.
5. **End semester Examination:** The end-semester examination carries 40% weightage for English Lab and 60% weightage for Career Lab.

Each candidate will have separate sets of questions assigned by the teacher using the teacher-console enabling PC-based evaluation for the 40% of marks allotted.

The Career Lab component will be evaluated for a maximum of 60% by a local examiner & an external examiner drafted from other Institutions, similar to any other lab examination conducted by Anna University.

**TOTAL: 45 PERIODS**

**CS2358**

**INTERNET PROGRAMMING LAB**

**L T P C**

**1 0 3 2**

**LIST OF EXPERIMENTS**

1. Create a web page with the following using HTML
  - i) To embed an image map in a web page
  - ii) To fix the hot spots
  - iii) Show all the related information when the hot spots are clicked.
2. Create a web page with all types of Cascading style sheets.
3. Client Side Scripts for Validating Web Form Controls using DHTML
4. Write programs in Java to create applets incorporating the following features:
5. Create a color palette with matrix of buttons  
Set background and foreground of the control text area by selecting a color from color palette.  
In order to select Foreground or background use check box control as radio buttons  
To set background images
6. Write programs in Java using Servlets:  
To invoke servlets from HTML forms  
To invoke servlets from Applets
7. Write programs in Java to create three-tier applications using JSP and Databases
  - for conducting on-line examination.
  - for displaying student mark list. Assume that student information is available in a database which has been stored in a database server.
8. Programs using XML – Schema – XSLT/XSL
9. Programs using AJAX
10. Consider a case where we have two web Services- an airline service and a travel agent and the travel agent is searching for an airline. Implement this scenario using Web Services and Data base.

**TOTAL 15 + 45 = 60 PERIODS**

**TEXT BOOK:**

1. Robert W. Sebesta, "Programming the world wide web", Pearson Education, 2006.

**REFERENCES:**

1. Deitel, "Internet and world wide web, How to Program", PHI, 3<sup>rd</sup> Edition, 2005

**MG2452      ENGINEERING ECONOMICS AND FINANCIAL ACCOUNTING**

**L T P C  
3 0 0 3**

**UNIT I      INTRODUCTION      6**

Managerial Economics - Relationship with other disciplines - Firms: Types, objectives and goals - Managerial decisions - Decision analysis.

**UNIT II      DEMAND & SUPPLY ANALYSIS      10**

Demand - Types of demand - Determinants of demand - Demand function - Demand elasticity - Demand forecasting - Supply - Determinants of supply - Supply function - Supply elasticity.

**UNIT III      PRODUCTION AND COST ANALYSIS      10**

Production function - Returns to scale - Production optimization - Least cost input - Isoquants - Managerial uses of production function.

Cost Concepts - Cost function – Types of Cost - Determinants of cost - Short run and Long run cost curves - Cost Output Decision - Estimation of Cost.

**UNIT IV      PRICING      9**

Determinants of Price - Pricing under different objectives and different market structures - Price discrimination - Pricing methods in practice – role of Government in pricing control.

**UNIT V      FINANCIAL ACCOUNTING (ELEMENTARY TREATMENT)      10**

Balance sheet and related concepts - Profit & Loss Statement and related concepts - Financial Ratio Analysis - Cash flow analysis - Funds flow analysis - Comparative financial statements - Analysis & Interpretation of financial statements.

Investments - Risks and return evaluation of investment decision - Average rate of return - Payback Period - Net Present Value - Internal rate of return.

**TOTAL= 45 PERIODS**

**TEXT BOOKS:**

1. McGuigan, Moyer and Harris, 'Managerial Economics; Applications, Strategy and Tactics', Thomson South Western, 10th Edition, 2005.
2. Prasanna Chandra. 'Fundamentals of Financial Management', Tata Mcgraw Hill Publishing Ltd., 4<sup>th</sup> edition, 2005.

**REFERENCES:**

1. Samuelson. Paul A and Nordhaus W.D., 'Economics', Tata Mcgraw Hill Publishing Company Limited, New Delhi, 2004.
2. Paresh Shah, 'Basic Financial Accounting for Management', Oxford University Press, New Delhi, 2007.
3. Salvatore Dominick, 'Managerial Economics in a global economy'. Thomson South Western, 4th Edition, 2001.

**CS2401**

**COMPUTER GRAPHICS**

**L T P C**

**3 0 0 3**

**UNIT I 2D PRIMITIVES**

**9**

output primitives – Line, Circle and Ellipse drawing algorithms - Attributes of output primitives – Two dimensional Geometric transformation - Two dimensional viewing – Line, Polygon, Curve and Text clipping algorithms

**UNIT II 3D CONCEPTS**

**9**

Parallel and Perspective projections - Three dimensional object representation – Polygons, Curved lines, Splines, Quadric Surfaces,- Visualization of data sets - 3D transformations – Viewing -Visible surface identification.

**UNIT III GRAPHICS PROGRAMMING**

**9**

Color Models – RGB, YIQ, CMY, HSV – Animations – General Computer Animation, Raster, Keyframe - Graphics programming using OPENGL – Basic graphics primitives – Drawing three dimensional objects - Drawing three dimensional scenes

**UNIT IV RENDERING**

**9**

Introduction to Shading models – Flat and Smooth shading – Adding texture to faces – Adding shadows of objects – Building a camera in a program – Creating shaded objects – Rendering texture – Drawing Shadows.

**UNIT V FRACTALS**

**9**

Fractals and Self similarity – Peano curves – Creating image by iterated functions – Mandelbrot sets – Julia Sets – Random Fractals – Overview of Ray Tracing – Intersecting rays with other primitives – Adding Surface texture – Reflections and Transparency – Boolean operations on Objects

**TOTAL = 45 PERIODS**

**TEXT BOOKS:**

1. Donald Hearn, Pauline Baker, Computer Graphics – C Version, second edition, Pearson Education, 2004.
2. F.S. Hill, Computer Graphics using OPENGL, Second edition, Pearson Education, 2003.

**REFERENCES:**

1. James D. Foley, Andries Van Dam, Steven K. Feiner, John F. Hughes, Computer Graphics- Principles and practice, Second Edition in C, Pearson Education, 2007.

**CS2402**

**MOBILE AND PERVASIVE COMPUTING**

**L T P C**

**3 0 0 3**

**UNIT I MOBILE NETWORKS**

**9**

Cellular Wireless Networks – GSM – Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Mobility Management – Security – GPRS.

**UNIT II WIRELESS NETWORKS**

**9**

Wireless LANs and PANs – IEEE 802.11 Standard – Architecture – Services – Network – HiperLAN – Blue Tooth- Wi-Fi – WiMAX

**UNIT III ROUTING 9**  
Mobile IP – DHCP – AdHoc– Proactive and Reactive Routing Protocols – Multicast Routing.

**UNIT IV TRANSPORT AND APPLICATION LAYERS 9**  
Mobile TCP– WAP – Architecture – WWW Programming Model– WDP – WTLS – WTP – WSP – WAE – WTA Architecture – WML – WMLScripts.

**UNIT V PERVASIVE COMPUTING 9**  
Pervasive computing infrastructure-applications- Device Technology - Hardware, Human-machine Interfaces, Biometrics, and Operating systems– Device Connectivity – Protocols, Security, and Device Management- Pervasive Web Application architecture- Access from PCs and PDAs - Access via WAP

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Jochen Schiller, "Mobile Communications", PHI, Second Edition, 2003.
2. Jochen Burkhardt, Pervasive Computing: Technology and Architecture of Mobile Internet Applications, Addison-Wesley Professional; 3<sup>rd</sup> edition, 2007

**REFERENCES:**

1. Frank Adelstein, Sandeep KS Gupta, Golden Richard, Fundamentals of Mobile and Pervasive Computing, McGraw-Hill 2005
2. Debashis Saha, Networking Infrastructure for Pervasive Computing: Enabling Technologies, Kluwer Academic Publisher, Springer; First edition, 2002
3. Introduction to Wireless and Mobile Systems by Agrawal and Zeng, Brooks/ Cole (Thomson Learning), First edition, 2002
4. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, Principles of Mobile Computing, Springer, New York, 2003.

**CS2403 DIGITAL SIGNAL PROCESSING L T P C**  
**3 0 0 3**

**UNIT I SIGNALS AND SYSTEMS 9**  
Basic elements of DSP – concepts of frequency in Analog and Digital Signals – sampling theorem – Discrete – time signals, systems – Analysis of discrete time LTI systems – Z transform – Convolution (linear and circular) – Correlation.

**UNIT II FREQUENCY TRANSFORMATIONS 9**  
Introduction to DFT – Properties of DFT – Filtering methods based on DFT – FFT Algorithms Decimation – in – time Algorithms, Decimation – in – frequency Algorithms – Use of FFT in Linear Filtering – DCT.

**UNIT III IIR FILTER DESIGN 9**  
Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (HPF, BPF, BRF) filter design using frequency translation

**UNIT IV FIR FILTER DESIGN 9**  
Structures of FIR – Linear phase FIR filter – Filter design using windowing techniques, Frequency sampling techniques – Finite word length effects in digital Filters

**UNIT V APPLICATIONS****9**

Multirate signal processing – Speech compression – Adaptive filter – Musical sound processing – Image enhancement.

**TOTAL: 45 PERIODS****TEXT BOOKS:**

1. John G. Proakis & Dimitris G. Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", Fourth edition, Pearson education / Prentice Hall, 2007.
2. Emmanuel C. Ifeachor, & Barrie W. Jervis, "Digital Signal Processing", Second edition, Pearson Education / Prentice Hall, 2002.

**REFERENCES:**

1. Alan V. Oppenheim, Ronald W. Schaffer & John R. Buck, "Discrete Time Signal Processing", Pearson Education, 2<sup>nd</sup> edition, 2005.
2. Andreas Antoniou, "Digital Signal Processing", Tata McGraw Hill, 2001

**CS2405****COMPUTER GRAPHICS LABORATORY****L T P C  
0 0 3 2**

1. Implementation of Bresenham's Algorithm – Line, Circle, Ellipse.
2. Implementation of Line, Circle and ellipse Attributes
3. Two Dimensional transformations - Translation, Rotation, Scaling, Reflection, Shear.
4. Composite 2D Transformations
5. Cohen Sutherland 2D line clipping and Windowing
6. Sutherland – Hodgeman Polygon clipping Algorithm
7. Three dimensional transformations - Translation, Rotation, Scaling
8. Composite 3D transformations
9. Drawing three dimensional objects and Scenes
10. Generating Fractal images

**TOTAL: 45 PERIODS****LIST OF EQUIPMENTS:**

- 1) Turbo C
- 2) Visual C++ with OPENGL
- 3) Any 3D animation software like 3DSMAX, Maya, Blender

**CS2406****OPEN SOURCE LAB****L T P C  
0 0 3 2****OBJECTIVE:**

To expose students to FOSS environment and introduce them to use open source packages

1. **Kernel configuration, compilation and installation** : Download / access the latest kernel source code from kernel.org, compile the kernel and install it in the local system. Try to view the source code of the kernel
2. **Virtualisation environment** (e.g., xen, qemu or lguest) to test an applications, new kernels and isolate applications. It could also be used to expose students to other alternate OSs like \*BSD

3. **Compiling from source** : learn about the various build systems used like the auto\* family, cmake, ant etc. instead of just running the commands. This could involve the full process like fetching from a cvs and also include autoconf, automake etc.,
4. **Introduction to packet management system** : Given a set of RPM or DEB, how to build and maintain, serve packages over http or ftp. and also how do you configure client systems to access the package repository.
5. **Installing various software packages**  
 Either the package is yet to be installed or an older version is existing. The student can practice installing the latest version. Of course, this might need internet access.
  - Install samba and share files to windows
  - Install Common Unix Printing System(CUPS)
6. **Write userspace drivers using fuse** -- easier to debug and less dangerous to the system (Writing full-fledged drivers is difficult at student level)
7. **GUI programming : a sample programme** – using Gambas since the students have VB knowledge. However, one should try using GTK or QT
8. **Version Control System setup and usage** using RCS, CVS, SVN
9. **Text processing with Perl:** simple programs, connecting with database e.g., MYSQL
10. **Running PHP** : simple applications like login forms after setting up a LAMP stack
11. **Running Python** : some simple exercise – e.g. Connecting with MySql database
12. **Set up the complete network interface** usinf ifconfig command liek setting gateway, DNS, IP tables, etc.,

**Resources :**

An environment like **FOSS Lab Server** (developed by NRCFOSS containing the various packages)

OR

Equivalent system with Linux distro supplemented with relevant packages

**Note:**

Once the list of experiments are finalised, NRCFOSS can generate full lab manuals complete with exercises, necessary downloads, etc. These could be made available on NRCFOSS web portal.

**TOTAL: 45 PERIODS**

**LIST OF EQUIPMENTS:**

**Hardware:**

**Minimum Requirements:**

- 700 Mhz X86 Processor
- 384 MB of system memory (RAM)
- 40 GB of disk space
- Graphics card capable of 1024\*768 resolution
- Sound Card
- Network or Internet Connection

**Software:**

Latest distribution of Linux



**CS2028**

**UNIX INTERNALS**

**L T P C**

**3 0 0 3**

**UNIT I**

**9**

General Review of the System-History-System structure-User Perspective-Operating System Services- Assumptions About Hardware. Introduction to the Kernel-Architecture System Concepts-Data Structures- System Administration.

**UNIT II**

**9**

The Buffer Cache-Headers-Buffer Pool-Buffer Retrieval-Reading and Writing Disk Blocks-Advantages and Disadvantages. Internal Representation of Files-Inodes-Structure-Directories-Path Name to Inode- Super Block-Inode Assignment-Allocation of Disk Blocks -Other File Types.

**UNIT III**

**9**

System Calls for the File System-Open-Read-Write-Lseek-Close-Create-Special files Creation-Change Directory and Change Root-Change Owner and Change Mode- Stat-Fstat-Pipes-Dup-Mount-Unmount-Link-Unlink-File System Abstraction-Maintenance.

**UNIT IV**

**9**

The System Representation of Processes-States-Transitions-System Memory-Context of a Process-Saving the Context-Manipulation of a Process Address Space-Sleep Process Control-signals-Process Termination-Awaiting-Invoking other Programs-The Shell-System Boot and the INIT Process.

**UNIT V**

**9**

Memory Management Policies-Swapping-Demand Paging-a Hybrid System-I/OSubsystem-Driver Interfaces-Disk Drivers-Terminal Drivers.

**TOTAL: 45 PERIODS**

**TEXTBOOK:**

1. Maurice J. Bach, "The Design of the Unix Operating System", Pearson Education, 2002.

**REFERENCES:**

1. Uresh Vahalia, "UNIX Internals: The New Frontiers", Prentice Hall, 2000.
2. John Lion, "Lion's Commentary on UNIX", 6th edition, Peer-to-Peer Communications, 2004.
3. Daniel P. Bovet & Marco Cesati, "Understanding the Linux Kernel", O'REILLY, Shroff Publishers & Distributors Pvt. Ltd, 2000.
4. M. Beck et al, "Linux Kernel Programming", Pearson Education Asia, 2002

**MA2264**

**NUMERICAL METHODS**

**L T P C**

**3 1 0 4**

**UNIT I**

**SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS**

**9**

Solution of equation –Fixed point iteration:  $x=g(x)$  method - Newton's method – Solution of linear system by Gaussian elimination and Gauss-Jordon method– Iterative method - Gauss-Seidel method - Inverse of a matrix by Gauss Jordon method – Eigen value of a matrix by power method and by Jacobi method for symmetric matrix.

**UNIT II INTERPOLATION AND APPROXIMATION 9**  
Lagrangian Polynomials – Divided differences – Interpolating with a cubic spline – Newton’s forward and backward difference formulas.

**UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION 9**  
Differentiation using interpolation formulae – Numerical integration by trapezoidal and Simpson’s 1/3 and 3/8 rules – Romberg’s method – Two and Three point Gaussian quadrature formulae – Double integrals using trapezoidal and Simpsons’s rules.

**UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9**  
Single step methods: Taylor series method – Euler method for first order equation – Fourth order Runge – Kutta method for solving first and second order equations – Multistep methods: Milne’s and Adam’s predictor and corrector methods.

**UNIT V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS 9**  
Finite difference solution of second order ordinary differential equation – Finite difference solution of one dimensional heat equation by explicit and implicit methods – One dimensional wave equation and two dimensional Laplace and Poisson equations.

**L : 45 , T : 15 , TOTAL = 60 PERIODS**

**TEXT BOOKS:**

1. Veerarajan, T and Ramachandran, T. ‘Numerical methods with programming in ‘C’ Second Edition, Tata McGraw-Hill Publishing.Co.Ltd. (2007).
2. Sankara Rao K, ‘Numerical Methods for Scientists and Engineers’ – 3<sup>rd</sup> edition Printice Hall of India Private Ltd, New Delhi, (2007).

**REFERENCES:**

1. Chapra, S. C and Canale, R. P. “Numerical Methods for Engineers”, 5<sup>th</sup> Edition, Tata McGraw-Hill, New Delhi, 2007.
2. Gerald, C. F. and Wheatley, P.O., “Applied Numerical Analysis”, 6<sup>th</sup> Edition, Pearson Education Asia, New Delhi, 2006.
3. Grewal, B.S. and Grewal, J.S., “ Numerical methods in Engineering and Science”, 6<sup>th</sup> Edition, Khanna Publishers, New Delhi, 2004

**CS2021 MULTICORE PROGRAMMING L T P C  
3 0 0 3**

**UNIT I INTRODUCTION TO MULTIPROCESSORS AND SCALABILITY ISSUES 9**  
Scalable design principles – Principles of processor design – Instruction Level Parallelism, Thread level parallelism. Parallel computer models -- Symmetric and distributed shared memory architectures – Performance Issues – Multi-core Architectures - Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture.

**UNIT II PARALLEL PROGRAMMING 9**  
Fundamental concepts – Designing for threads – scheduling - Threading and parallel programming constructs – Synchronization – Critical sections – Deadlock. Threading APIs.

**UNIT III OPENMP PROGRAMMING 9**  
 OpenMP – Threading a loop – Thread overheads – Performance issues – Library functions. Solutions to parallel programming problems – Data races, deadlocks and livelocks – Non-blocking algorithms – Memory and cache related issues.

**UNIT IV MPI PROGRAMMING 9**  
 MPI Model – collective communication – data decomposition – communicators and topologies – point-to-point communication – MPI Library.

**UNIT V MULTITHREADED APPLICATION DEVELOPMENT 9**  
 Algorithms, program development and performance tuning.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Shameem Akhter and Jason Roberts, “Multi-core Programming”, Intel Press, 2006.
2. Michael J Quinn, Parallel programming in C with MPI and OpenMP, Tata Mc graw Hill, 2003.

**REFERENCES:**

1. John L. Hennessey and David A. Patterson, “ Computer architecture – A quantitative approach”, Morgan Kaufmann/Elsevier Publishers, 4<sup>th</sup>. edition, 2007.
2. David E. Culler, Jaswinder Pal Singh, “Parallel computing architecture : A hardware/ software approach” , Morgan Kaufmann/Elsevier Publishers, 1999.

**CS2022 VISUAL PROGRAMMING L T P C**  
**3 0 0 3**

**UNIT I 9**  
 Windows Programming Fundamentals – MFC – Windows – Graphics – Menus – Mouse and keyboard – Bitmaps – Palettes – Device-Independent Bitmaps

**UNIT II 9**  
 Controls – Modal and Modeless Dialog – Property – Data I/O – Sound – Timer

**UNIT III 9**  
 Memory management – SDI – MDI – MFC for Advanced windows user Interface – status bar and Toolbars – Tree view – List view – Threads

**UNIT IV 9**  
 ODBC – MFC Database classes – DAO - DLLs – Working with Images

**UNIT V 9**  
 COM Fundamentals – ActiveX control – ATL – Internet Programming

**TEXT BOOK:**

1. Richard C.Leinecker and Tom Archer, “Visual C++ 6 Programming Bible”, Wiley DreamTech Press, 2006.

**REFERENCES:**

1. Lars Klander, “Core Visual C++ 6”, Pearson Education, 2000
2. Deital, DEital, Liperi and Yaeger “Visual V++ .NET How to Program” , Pearson Education, 2004.

<b>IT2354</b>	<b>EMBEDDED SYSTEMS</b>	<b>L T P C</b> <b>3 0 0 3</b>
<b>UNIT I</b>	<b>EMBEDDED COMPUTING</b>	<b>9</b>
Challenges of Embedded Systems – Embedded system design process. Embedded processors – 8051 Microcontroller, ARM processor – Architecture, Instruction sets and programming.		
<b>UNIT II</b>	<b>MEMORY AND INPUT / OUTPUT MANAGEMENT</b>	<b>9</b>
Programming Input and Output – Memory system mechanisms – Memory and I/O devices and interfacing – Interrupts handling.		
<b>UNIT III</b>	<b>PROCESSES AND OPERATING SYSTEMS</b>	<b>9</b>
Multiple tasks and processes – Context switching – Scheduling policies – Interprocess communication mechanisms – Performance issues.		
<b>UNIT IV</b>	<b>EMBEDDED SOFTWARE</b>	<b>9</b>
Programming embedded systems in assembly and C – Meeting real time constraints – Multi-state systems and function sequences. Embedded software development tools – Emulators and debuggers.		
<b>UNIT V</b>	<b>EMBEDDED SYSTEM DEVELOPMENT</b>	<b>9</b>
Design issues and techniques – Case studies – Complete design of example embedded systems.		
		<b>TOTAL = 45 PERIODS</b>

**TEXT BOOKS:**

1. Wayne Wolf, "Computers as Components: Principles of Embedded Computer System Design", Elsevier, 2006.
2. Michael J. Pont, "Embedded C", Pearson Education , 2007.

**REFERENCES:**

1. Steve Heath, "Embedded System Design", Elsevier, 2005.
2. Muhammed Ali Mazidi, Janice Gillispie Mazidi and Rolin D. McKinlay, "The 8051 Microcontroller and Embedded Systems", Pearson Education, Second edition, 2007.

<b>CS2029</b>	<b>ADVANCED DATABASE TECHNOLOGY</b>	<b>L T P C</b> <b>3 0 0 3</b>
<b>UNIT I</b>	<b>RELATIONAL MODEL ISSUES</b>	<b>9</b>
ER Model - Normalization – Query Processing – Query Optimization - Transaction Processing - Concurrency Control – Recovery - Database Tuning.		
<b>UNIT II</b>	<b>DISTRIBUTED DATABASES</b>	<b>9</b>
Parallel Databases – Inter and Intra Query Parallelism – Distributed Database Features – Distributed Database Architecture – Fragmentation – Distributed Query Processing – Distributed Transactions Processing – Concurrency Control – Recovery – Commit Protocols.		
<b>UNIT III</b>	<b>OBJECT ORIENTED DATABASES</b>	<b>9</b>
Introduction to Object Oriented Data Bases - Approaches - Modeling and Design - Persistence – Query Languages - Transaction - Concurrency – Multi Version Locks – Recovery – POSTGRES – JASMINE –GEMSTONE - ODMG Model.		

**UNIT IV EMERGING SYSTEMS 9**  
Enhanced Data Models - Client/Server Model - Data Warehousing and Data Mining - Web Databases – Mobile Databases- XML and Web Databases.

**UNIT V CURRENT ISSUES 9**  
Rules - Knowledge Bases - Active and Deductive Databases - Multimedia Databases– Multimedia Data Structures – Multimedia Query languages - Spatial Databases.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Thomas Connolly and Carolyn Begg, “Database Systems, A Practical Approach to Design, Implementation and Management”, Third Edition, Pearson Education 2003.

**REFERENCES:**

1. R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education, 2006.
2. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Fifth Edition, Tata McGraw Hill, 2006.
3. C.J.Date, A.Kannan, S.Swamynathan, “An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.

**IT2043 KNOWLEDGE MANAGEMENT L T P C  
3 0 0 3**

**UNIT I KNOWLEDGE MANAGEMENT 9**  
KM Myths – KM Life Cycle – Understanding Knowledge – Knowledge, intelligence – Experience – Common Sense – Cognition and KM – Types of Knowledge – Expert Knowledge – Human Thinking and Learning.

**UNIT II KNOWLEDGE MANAGEMENT SYSTEM LIFE CYCLE 9**  
Challenges in Building KM Systems – Conventional Vrs KM System Life Cycle (KMSLS) – Knowledge Creation and Knowledge Architecture – Nonaka’s Model of Knowledge Creation and Transformation. Knowledge Architecture.

**UNIT III CAPTURING KNOWLEDGE 9**  
Evaluating the Expert – Developing a Relationship with Experts – Fuzzy Reasoning and the Quality of Knowledge – Knowledge Capturing Techniques, Brain Storming – Protocol Analysis – Consensus Decision Making – Repertory Grid- Concept Mapping – Blackboarding.

**UNIT IV KNOWLEDGE CODIFICATION 9**  
Modes of Knowledge Conversion – Codification Tools and Procedures – Knowledge Developer’s Skill Sets – System Testing and Deployment – Knowledge Testing – Approaches to Logical Testing, User Acceptance Testing – KM System Deployment Issues – User Training – Post implementation.

**UNIT V KNOWLEDGE TRANSFER AND SHARING 9**  
Transfer Methods – Role of the Internet – Knowledge Transfer in e-world – KM System Tools – Neural Network – Association Rules – Classification Trees – Data Mining and Business Intelligence – Decision Making Architecture – Data Management – Knowledge Management Protocols – Managing Knowledge Workers.

**TOTAL: 45 PERIODS**

**TEXT BOOK:**

1. Elias.M. Award & Hassan M. Ghaziri – “Knowledge Management” Pearson Education 2003.

**REFERENCES:**

1. Guus Schreiber, Hans Akkermans, Anjo Anjewierden, Robert de Hoog, Nigel Shadbolt, Walter Van de Velde and Bob Wielinga, “Knowledge Engineering and Management”, Universities Press, 2001.
2. C.W. Holsapple, “Handbooks on Knowledge Management”, International Handbooks on Information Systems, Vol 1 and 2, 2003

**CS2030 HIGH PERFORMANCE MICROPROCESSORS L T P C  
3 0 0 3**

**UNIT I CISC PRINCIPLES 9**

Classic CISC microprocessors, Intel x86 Family: Architecture - register set - Data formats - Addressing modes - Instruction set - Assembler directives – Interrupts - Segmentation, Paging, Real and Virtual mode execution – Protection mechanism, Task management 80186, 286, 386 and 486 architectures.

**UNIT II PENTIUM PROCESSORS 10**

Introduction to Pentium microprocessor – Special Pentium Registers – Pentium Memory Management – New Pentium instructions – Introduction to Pentium Pro and its special features – Architecture of Pentium-II, Pentium-III and Pentium4 microprocessors.

**UNIT III RISC PRINCIPLES 10**

RISC Vs CISC – RISC properties and evaluation – On chip register File Vs Cache evaluation – Study of a typical RISC processor – The PowerPC – Architecture & special features – Power PC 601 – IBM RS/6000, Sun SPARC Family – Architecture – Super SPARC.

**UNIT IV RISC PROCESSOR 8**

MIPS Rx000 family – Architecture – Special features – MIPS R4000 and R4400 – Motorola 88000 Family – Architecture – MC 88110 – MC 88100 and MC 88200.

**UNIT V SPECIAL PURPOSE PROCESSORS 8**

EPIC Architecture – ASIPs – Network Processors – DSPs – Graphics / Image Processors.

**TOTAL: 45 PERIODS**

**TEXT BOOK:**

1. Daniel Tabak, “Advanced Microprocessors”, Tata McGraw-Hill, 1995, 2<sup>nd</sup> Edition.

**REFERENCES:**

1. [www.intel.com/products/server/processors/server/itanium2](http://www.intel.com/products/server/processors/server/itanium2) (Unit V:EPIC)
2. [www.hpl.hp.com/techreports/1999/HPL-1999-111.html](http://www.hpl.hp.com/techreports/1999/HPL-1999-111.html) (Unit V: Network Processor)
3. [www.intel.com/design/network/products/npfamily](http://www.intel.com/design/network/products/npfamily) (Unit V: Network Processor)
4. [www.national.com/appinfo/imaging/processors.html](http://www.national.com/appinfo/imaging/processors.html)(Unit V: Image Processor)
5. Barry B.Brey, “The Intel Microprocessors, 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, PentiumPro Processor, PentiumII, PentiumIII, PentiumIV, Architecture, Programming & Interfacing”, 6<sup>th</sup> Edition, Pearson Education/PHI, 2002.

**CS2023**

**ADVANCED JAVA PROGRAMMING**

**L T P C**  
**3 0 0 3**

**UNIT I JAVA FUNDAMENTALS 9**

Java I/O streaming – filter and pipe streams – Byte Code interpretation - Threading – Swing.

**UNIT II NETWORK PROGRAMMING IN JAVA 9**

Sockets – secure sockets – custom sockets – UDP datagrams – multicast sockets – URL classes – Reading Data from the server – writing data – configuring the connection – Reading the header – telnet application – Java Messaging services

**UNIT III APPLICATIONS IN DISTRIBUTED ENVIRONMENT 9**

Remote method Invocation – activation models – RMI custom sockets – Object Serialization – RMI – IIOP implementation – CORBA – IDL technology – Naming Services – CORBA programming Models - JAR file creation

**UNIT IV MULTI-TIER APPLICATION DEVELOPMENT 9**

Server side programming – servlets – Java Server Pages - Applet to Applet communication – applet to Servlet communication - JDBC – Applications on databases – Multimedia streaming applications – Java Media Framework.

**UNIT V ENTERPRISE APPLICATIONS 9**

Server Side Component Architecture – Introduction to J2EE – Session Beans – Entity Beans – Persistent Entity Beans .

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Elliotte Rusty Harold, “ Java Network Programming”, O’Reilly publishers, 2000 (UNIT II)
2. Ed Roman, “Mastering Enterprise Java Beans”, John Wiley & Sons Inc., 1999. (UNIT III and UNIT V)
3. Hortsman & Cornell, “CORE JAVA 2 ADVANCED FEATURES, VOL II”, Pearson Education, 2002. (UNIT I and UNIT IV)

**REFERENCES:**

1. Web reference: <http://java.sun.com>.
2. Patrick Naughton, “COMPLETE REFERENCE: JAVA2”, Tata McGraw-Hill, 2003.

**CS2024**

**PARALLEL PROGRAMMING**

**L T P C**  
**3 0 0 3**

**UNIT I PARALLEL PROGRAMMING 9**

Introduction to parallel programming – data parallelism – functional parallelism – pipelining – Flynn's taxonomy – parallel algorithm design – task/channel model – Foster's design methodology – case studies: boundary value problem – finding the maximum – n-body problem – Speedup and efficiency – Amdahl's law – Gustafson-Barsis's Law – Karp-Flatt Metric – Isoefficiency metric

**UNIT II MESSAGE-PASSING PROGRAMMING 9**

The message-passing model – the message-passing interface – MPI standard – basic concepts of MPI: MPI\_Init, MPI\_Comm\_size, MPI\_Comm\_rank, MPI\_Send, MPI\_Recv,

MPI\_Finalize – timing the MPI programs: MPI\_Wtime, MPI\_Wtick – collective communication: MPI\_Reduce, MPI\_Barrier, MPI\_Bcast, MPI\_Gather, MPI\_Scatter – case studies: the sieve of Eratosthenes, Floyd's algorithm, Matrix-vector multiplication

**UNIT III SHARED-MEMORY PROGRAMMING 9**

Shared-memory model – OpenMP standard – parallel *for* loops – *parallel for* pragma – private variables – critical sections – reductions – parallel loop optimizations – general data parallelism – functional parallelism – case studies: the sieve of Eratosthenes, Floyd's algorithm, matrix-vector multiplication – distributed shared-memory programming – DSM primitives

**UNIT IV PARALLEL ALGORITHMS – I 9**

Monte Carlo methods – parallel random number generators – random number distributions – case studies – Matrix multiplication – rowwise block-stripped algorithm – Cannon's algorithm – solving linear systems – back substitution – Gaussian elimination – iterative methods – conjugate gradient method

**UNIT V PARALLEL ALGORITHMS – II 9**

Sorting algorithms – quicksort – parallel quicksort – hyperquicksort – sorting by regular sampling – Fast fourier transform – combinatorial search – divide and conquer – parallel backtrack search – parallel branch and bound – parallel alpha-beta search

**TOTAL: 45 PERIODS**

**TEXT BOOK:**

1. Michael J. Quinn, "Parallel Programming in C with MPI and OpenMP", Tata McGraw-Hill Publishing Company Ltd., 2003.

**REFERENCES:**

1. B. Wilkinson and M. Allen, "Parallel Programming – Techniques and applications using networked workstations and parallel computers", Second Edition, Pearson Education, 2005.
2. M. J. Quinn, "Parallel Computing – Theory and Practice", Second Edition, Tata McGraw-Hill Publishing Company Ltd., 2002.

**IT2353**

**WEB TECHNOLOGY**

**L T P C**

**3 0 0 3**

**UNIT I 9**

Web Essentials: Clients, Servers, and Communication. The Internet-Basic Internet Protocols -The World Wide Web-HTTP request message-response message-Web Clients Web Servers-Case Study. Markup Languages: XHTML. An Introduction to HTML History-Versions-Basic XHTML Syntax and Semantics-Some Fundamental HTML Elements-Relative URLs-Lists-tables-Frames-Forms-XML Creating HTML Documents Case Study.

**UNIT II 9**

Style Sheets: CSS-Introduction to Cascading Style Sheets-Features-Core Syntax-Style Sheets and HTML Style Rle Cascading and Inheritance-Text Properties-Box Model Normal Flow Box Layout-Beyond the Normal Flow-Other Properties-Case Study. Client-Side Programming: The JavaScript Language-History and Versions Introduction



JavaScript in Perspective-Syntax-Variables and Data Types-Statements-Operators-Literals-Functions-Objects-Arrays-Built-in Objects-JavaScript Debuggers.

### **UNIT III**

**9**

Host Objects : Browsers and the DOM-Introduction to the Document Object Model DOM History and Levels-Intrinsic Event Handling-Modifying Element Style-The Document Tree-DOM Event Handling-Accommodating Noncompliant Browsers Properties of window-Case Study. Server-Side Programming: Java Servlets- Architecture -Overview-A Servlet-Generating Dynamic Content-Life Cycle- Parameter Data-Sessions-Cookies-URL Rewriting-Other Capabilities-Data Storage Servlets and Concurrency-Case Study-Related Technologies.

### **UNIT IV**

**9**

Representing Web Data: XML-Documents and Vocabularies-Versions and Declaration-Namespaces JavaScript and XML: Ajax-DOM based XML processing Event-oriented Parsing: SAX-Transforming XML Documents-Selecting XML Data:XPath-Template-based Transformations: XSLT-Displaying XML Documents in Browsers-Case Study-Related Technologies. Separating Programming and Presentation: JSP Technology Introduction-JSP and Servlets-Running JSP Applications Basic JSP-JavaBeans Classes and JSP-Tag Libraries and Files-Support for the Model-View-Controller Paradigm-Case Study-Related Technologies.

### **UNIT V**

**9**

Web Services: JAX-RPC-Concepts-Writing a Java Web Service-Writing a Java Web Service Client-Describing Web Services: WSDL- Representing Data Types: XML Schema-Communicating Object Data: SOAP Related Technologies-Software Installation-Storing Java Objects as Files-Databases and Java Servlets.

**TOTAL: 45 PERIODS**

### **TEXT BOOK:**

1. Jeffrey C. Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education, 2006.

### **REFERENCES:**

1. Robert. W. Sebesta, "Programming the World Wide Web", Fourth Edition, Pearson Education, 2007 .
2. Deitel, Deitel, Goldberg, "Internet & World Wide Web How To Program", Third Edition, Pearson Education, 2006.
3. Marty Hall and Larry Brown,"Core Web Programming" Second Edition, Volume I and II, Pearson Education, 2001.
4. Bates, "Developing Web Applications", Wiley, 2006.

**MG2453**

**RESOURCE MANAGEMENT TECHNIQUES**

**L T P C**  
**3 0 0 3**

**UNIT I LINEAR PROGRAMMING: 9**

Principal components of decision problem – Modeling phases – LP Formulation and graphic solution – Resource allocation problems – Simplex method – Sensitivity analysis.

**UNIT II DUALITY AND NETWORKS: 9**

Definition of dual problem – Primal – Dual relation ships – Dual simplex methods – Post optimality analysis – Transportation and assignment model shortest route problem.

**UNIT III INTEGER PROGRAMMING: 9**

Cutting plan algorithm – Branch and bound methods, Multistage (Dynamic) programming.

**UNIT IV CLASSICAL OPTIMISATION THEORY: 9**

Unconstrained external problems, Newton – Ralphson method – Equality constraints – Jacobean methods – Lagrangian method – Kuhn – Tucker conditions – Simple problems.

**UNIT V OBJECT SCHEDULING: 9**

Network diagram representation – Critical path method – Time charts and resource leveling – PERT.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. H.A.Taha, 'Operation Research', Prentice Hall of India, 2002.
2. Paneer Selvam, 'Operations Research', Prentice Hall of India.

**REFERENCES:**

1. Anderson 'Quantitative Methods for Business', 8th Edition, Thomson Learning, 2002.
2. Winston 'Operation Research', Thomson Learning, 2003.
3. Vohra, 'Quantitative Techniques in Management', Tata McGraw Hill, 2002.
4. Anand Sarma, 'Operation Research', Himalaya Publishing House, 2003.

**CS2032**

**DATA WAREHOUSING AND DATA MINING**

**L T P C**  
**3 0 0 3**

**UNIT I DATA WAREHOUSING 10**

Data warehousing Components –Building a Data warehouse -- Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata.

**UNIT II BUSINESS ANALYSIS 8**

Reporting and Query tools and Applications – Tool Categories – The Need for Applications – Cognos Impromptu – Online Analytical Processing (OLAP) – Need – Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multirelational OLAP – Categories of Tools – OLAP Tools and the Internet.

**UNIT III DATA MINING 8**

Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues –Data Preprocessing.

**UNIT IV ASSOCIATION RULE MINING AND CLASSIFICATION 11**

Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining Various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Backpropagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods - Prediction

**UNIT V CLUSTERING AND APPLICATIONS AND TRENDS IN DATA MINING 8**

Cluster Analysis - Types of Data – Categorization of Major Clustering Methods - K-means – Partitioning Methods – Hierarchical Methods - Density-Based Methods –Grid Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data - Constraint – Based Cluster Analysis – Outlier Analysis – Data Mining Applications.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Alex Berson and Stephen J. Smith, “ Data Warehousing, Data Mining & OLAP”, Tata McGraw – Hill Edition, Tenth Reprint 2007.
2. Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques”, Second Edition, Elsevier, 2007.

**REFERENCES:**

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, “ Introduction To Data Mining”, Person Education, 2007.
2. K.P. Soman, Shyam Diwakar and V. Ajay “, Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, “ Introduction to Data Mining with Case Studies”, Easter Economy Edition, Prentice Hall of India, 2006.
4. Daniel T.Larose, “Data Mining Methods and Models”, Wile-Interscience, 2006.

**CS2033 REAL TIME SYSTEMS L T P C  
3 0 0 3**

**UNIT I INTRODUCTION 9**

Introduction - Issues in Real Time Computing, Structure of a Real Time System. Task Classes, Performance Measures for Real Time Systems, Estimating Program Run times. Task Assignment and Scheduling - Classical Uniprocessor scheduling algorithms, UniProcessor scheduling of IRIS Tasks, Task Assignment, Mode Changes, and Fault Tolerant Scheduling.

**UNIT II PROGRAMMING LANGUAGES AND TOOLS 9**

Programming Language and Tools – Desired Language characteristics, Data Typing, Control structures, Facilitating Hierarchical Decomposition, Packages, Run-time (Exception) Error handling, Overloading and Generics, Multitasking, Low Level programming, Task scheduling, Timing Specifications, Programming Environments, Run-time Support.

<b>UNIT III</b>	<b>REAL TIME DATABASES</b>	<b>9</b>
Real time Databases - Basic Definition, Real time Vs General Purpose Databases, Main Memory Databases, Transaction priorities, Transaction Aborts, Concurrency Control Issues, Disk Scheduling Algorithms, Two-phase Approach to improve Predictability, Maintaining Serialization Consistency, Databases for Hard Real Time systems.		
<b>UNIT IV</b>	<b>COMMUNICATION</b>	<b>9</b>
Real-Time Communication - Communications Media, Network Topologies Protocols, Fault Tolerant Routing. Fault Tolerance Techniques - Fault Types, Fault Detection. Fault Error containment Redundancy, Data Diversity, Reversal Checks, Integrated Failure handling.		
<b>UNIT V</b>	<b>EVALUATION TECHNIQUES</b>	<b>9</b>
Reliability Evaluation Techniques - Obtaining Parameter Values, Reliability Models for Hardware Redundancy, Software Error models. Clock Synchronization - Clock, A Nonfault-Tolerant Synchronization Algorithm, Impact of Faults, Fault Tolerant Synchronization in Hardware, Fault Tolerant Synchronization in Software		
<b>TOTAL= 45 PERIODS</b>		

**TEXT BOOKS:**

1. C.M. Krishna, Kang G. Shin, "Real-Time Systems", McGraw-Hill International Editions, 1997.

**REFERENCES:**

1. Stuart Bennett, "Real Time Computer Control-An Introduction", Second edition Perntice Hall PTR, 1994.
2. Peter D. Lawrence, "Real time Micro Computer System Design – An Introduction", McGraw Hill, 1988.
3. S.T. Allworth and R.N. Zobel, "Introduction to real time software design", Macmillan, II Edition, 1987.
4. R.J.A Buhur, D.L. Bailey, " An Introduction to Real-Time Systems", Prentice-Hall International, 1999.
5. Philip.A.Laplante "Real Time System Design and Analysis" PHI , III Edition, April 2004.

<b>CS2034</b>	<b>TCP/IP DESIGN AND IMPLEMENTATION</b>	<b>L T P C</b>
		<b>3 0 0 3</b>

<b>UNIT I</b>	<b>INTRODUCTION</b>	<b>9</b>
Internetworking concepts and architecture model – classful Internet address – CIDR – Subnetting and Supernetting – AARP – RARP- IP- IP Routing – ICMP – IPV6.		
<b>UNIT II</b>	<b>TCP</b>	<b>9</b>
Services – header – connection establishment and termination – interactive data flow – bulk data flow – timeout and retransmission – persist timer – keep alive timer – futures and performance.		
<b>UNIT III</b>	<b>IP IMPLEMENTATION</b>	<b>9</b>
IP global software organization – routing table – routing algorithms – fragmentation and reassembly – error processing (ICMP) – Multicast Processing (IGMP).		

**UNIT IV TCP IMPLEMENTATION I 9**  
Data structure and input processing – transmission control blocks – segment format – comparison – finite state machine implementation – Output processing – mutual exclusion – computing the TCP Data length.

**UNIT V TCP IMPLEMENTATION II 9**  
Timers – events and messages – timer process – deleting and inserting timer event – flow control and adaptive retransmission – congestion avoidance and control – urgent data processing and push function.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Douglas E Comer, "Internetworking with TCP/IP Principles, Protocols and Architecture", Vol 1 and 2, Vth Edition
2. W. Richard Stevens "TCP/IP Illustrated" Vol 1. 2003.

**REFERENCES:**

1. Forouzan, "TCP/IP Protocol Suite" Second Edition, Tate MC Graw Hill, 2003.
2. W. Richard Stevens "TCP/IP Illustrated" Volume 2, Pearson Education 2003

**CS2041 C# AND .NET FRAMEWORK LT P C  
3 0 0 3**

**UNIT I 9**  
Review of OOP Concepts - Overview of .NET Framework - Basic Elements of C# - Program Structure and simple Input and Output Operations – Operators and Expressions – Statements – Arrays and Structures.

**UNIT II 9**  
Inheritance - Namespace – Polymorphism – Interface and Overloading – Multiple Inheritance – Property – Indexes – Delegates – Publish/Subscribe Design Patterns- Operator Overloading-Method Overloading

**UNIT III 9**  
C# Concepts for creating Data Structures - File Operation – File Management systems – Stream Oriented Operations- Multitasking – Multithreading – Thread Operation – Synchronization.

**UNIT IV 9**  
Working with XML – Techniques for Reading and Writing XML Data - Using XPath and Search XML - ADO.NET Architecture – ADO.NET Connected and Disconnected Models – XML and ADO.NET – Simple and Complex Data Binding– Data Grid View Class.

**UNIT V 9**  
Application Domains – Remoting – Leasing and Sponsorship - .NET Coding Design Guidelines – Assemblies – Security – Application Development – Web Services - Building an XML Web Service - Web Service Client – WSDL and SOAP – Web Service with Complex Data Types – Web Service Performance.

**TOTAL : 45 PERIODS**

**TEXT BOOKS:**

1. S. Thamarai Selvi and R. Murugesan “A Textbook on C# “, Pearson Education,2003.
2. Stephen C. Perry “ Core C# and .NET”, Pearson Education,2006.

**REFERENCES:**

1. Jesse Liberty, “Programming C#”, Second Edition, O’Reilly Press, 2002.
2. Robinson et al, “Professional C#”, Fifth Edition, Wrox Press, 2002.
3. Herbert Schildt, “The Complete Reference: C#”, Tata McGraw Hill, 2004.
4. Andrew Troelsen, “C# and the .NET Platform”, A! Press, 2003.
5. Thuan Thai and Hoang Q. Lam, “. NET Framework Essentials”, Second Edition, O’Reilly, 2002.

**IT2352****CRYPTOGRAPHY AND NETWORK SECURITY****L T P C  
3 0 0 3****UNIT I****9**

Security trends – Attacks and services – Classical crypto systems – Different types of ciphers – LFSR sequences – Basic Number theory – Congruences – Chinese Remainder theorem – Modular exponentiation – Fermat and Euler’s theorem – Legendre and Jacobi symbols – Finite fields – continued fractions.

**UNIT II****9**

Simple DES – Differential cryptanalysis – DES – Modes of operation – Triple DES – AES – RC4 – RSA – Attacks – Primality test – factoring.

**UNIT III****9**

Discrete Logarithms – Computing discrete logs – Diffie-Hellman key exchange – ElGamal Public key cryptosystems – Hash functions – Secure Hash – Birthday attacks – MD5 – Digital signatures – RSA – ElGamal – DSA.

**UNIT IV****9**

Authentication applications – Kerberos, X.509, PKI – Electronic Mail security – PGP, S/MIME – IP security – Web Security – SSL, TLS, SET.

**UNIT V****9**

System security – Intruders – Malicious software – viruses – Firewalls – Security Standards.

**TOTAL = 60 PERIODS****TEXT BOOKS:**

1. Wade Trappe, Lawrence C Washington, “ Introduction to Cryptography with coding theory”, 2<sup>nd</sup> ed, Pearson, 2007.
2. William Stallings, “Cryptography and Network security Principles and Practices”, Pearson/PHI, 4<sup>th</sup> ed, 2006.

**REFERENCES:**

1. W. Mao, “Modern Cryptography – Theory and Practice”, Pearson Education, Second Edition, 2007.
2. Charles P. Pfleeger, Shari Lawrence Pfleeger – Security in computing Third Edition – Prentice Hall of India, 2006.

**CS2035****NATURAL LANGUAGE PROCESSING****L T P C**

<b>UNIT I</b>	<b>9</b>
Introduction – Models -and Algorithms - The Turing Test -Regular Expressions Basic Regular Expression Patterns -Finite State Automata -Regular Languages and FSAs – Morphology -Inflectional Morphology - Derivational Morphology -Finite-State Morphological Parsing - Combining an FST Lexicon and Rules -Porter Stemmer	
<b>UNIT II</b>	<b>9</b>
N-grams Models of Syntax - Counting Words - Unsmoothed N-grams – Smoothing-Backoff - Deleted Interpolation – Entropy - English Word Classes - Tagsets for English - Part of Speech Tagging -Rule-Based Part of Speech Tagging - Stochastic Part of Speech Tagging - Transformation-Based Tagging -	
<b>UNIT III</b>	<b>9</b>
Context Free Grammars for English Syntax- Context-Free Rules and Trees - Sentence-Level Constructions –Agreement – Sub Categorization – Parsing – Top-down – Earley Parsing -Feature Structures - Probabilistic Context-Free Grammars	
<b>UNIT IV</b>	<b>9</b>
Representing Meaning - Meaning Structure of Language - First Order Predicate Calculus - Representing Linguistically Relevant Concepts -Syntax-Driven Semantic Analysis - Semantic Attachments - Syntax-Driven Analyzer - Robust Analysis - Lexemes and Their Senses - Internal Structure - Word Sense Disambiguation -Information Retrieval	
<b>UNIT V</b>	<b>9</b>
Discourse -Reference Resolution - Text Coherence -Discourse Structure - Dialog and Conversational Agents - Dialog Acts – Interpretation – Coherence -Conversational Agents - Language Generation – Architecture -Surface Realizations - Discourse Planning – Machine Translation -Transfer Metaphor – Interlingua – Statistical Approaches	

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. D. Jurafsky and J. Martin “Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition”,
2. C. Manning and H. Schutze, “Foundations of Statistical Natural Language Processing”,

**REFERENCE:**

1. James Allen. “Natural Language Understanding”, Addison Wesley, 1994.

**IT2061**

**SYSTEMS MODELING AND SIMULATION**

**L T P C**  
**3 0 0 3**

<b>UNIT I</b>	<b>INTRODUCTION TO SIMULATION</b>	<b>9</b>
Introduction – Simulation Terminologies- Application areas – Model Classification – Types of Simulation- Steps in a Simulation study- Concepts in Discrete Event Simulation - Simulation Examples		

**UNIT II MATHEMATICAL MODELS 9**

Statistical Models - Concepts – Discrete Distribution- Continuous Distribution – Poisson Process- Empirical Distributions- Queueing Models – Characteristics- Notation – Queueing Systems – Markovian Models- Properties of random numbers- Generation of Pseudo Random numbers- Techniques for generating random numbers-Testing random number generators- Generating Random-Variates- Inverse Transform technique – Acceptance- Rejection technique – Composition & Convolution Method.

**UNIT III ANALYSIS OF SIMULATION DATA 9**

Input Modeling - Data collection - Assessing sample independence - Hypothesizing distribution family with data - Parameter Estimation - Goodness-of-fit tests - Selecting input models in absence of data- Output analysis for a Single system – Terminating Simulations – Steady state simulations.

**UNIT IV VERIFICATION AND VALIDATION 9**

Model Building – Verification of Simulation Models – Calibration and Validation of Models – Validation of Model Assumptions – Validating Input – Output Transformations.

**UNIT V SIMULATION OF COMPUTER SYSTEMS AND CASE STUDIES 9**

Simulation Tools – Model Input – High level computer system simulation – CPU – Memory Simulation – Comparison of systems via simulation – Simulation Programming techniques - Development of Simulation models.

**TEXT BOOKS:**

1. Jerry Banks and John Carson, “ Discrete Event System Simulation”, Fourth Edition, PHI, 2005.
2. Geoffrey Gordon, “System Simulation”, Second Edition, PHI, 2006 (Unit – V).

**REFERENCES:**

1. Frank L. Severance, “ System Modeling and Simulation”, Wiley, 2001.
2. Averill M. Law and W.David Kelton, “ Simulation Modeling and Analysis, Third Edition, McGraw Hill, 2006.
3. Jerry Banks, “Handbook of Simulation: Principles, Methodology, Advances, Applications and Practice”, Wiley, 1998.

**IT2024 USER INTERFACE DESIGN L T P C  
3 0 0 3**

**UNIT I INTRODUCTION 8**

Human–Computer Interface – Characteristics Of Graphics Interface –Direct Manipulation Graphical System – Web User Interface –Popularity –Characteristic & Principles.

**UNIT II HUMAN COMPUTER INTERACTION 10**

User Interface Design Process – Obstacles –Usability –Human Characteristics In Design – Human Interaction Speed –Business Functions –Requirement Analysis – Direct – Indirect Methods – Basic Business Functions – Design Standards – System Timings – Human Consideration In Screen Design – Structures Of Menus – Functions Of Menus–



Contents Of Menu– Formatting – Phrasing The Menu – Selecting Menu Choice– Navigating Menus– Graphical Menus.

**UNIT III WINDOWS 9**  
Characteristics– Components– Presentation Styles– Types– Managements– Organizations– Operations– Web Systems– Device– Based Controls Characteristics– Screen – Based Controls – Operate Control – Text Boxes– Selection Control– Combination Control– Custom Control– Presentation Control.

**UNIT IV MULTIMEDIA 9**  
Text For Web Pages – Effective Feedback– Guidance & Assistance– Internationalization– Accesssibility– Icons– Image– Multimedia – Coloring.

**UNIT V WINDOWS LAYOUT– TEST 9**  
Prototypes – Kinds Of Tests – Retest – Information Search – Visualization – Hypermedia – WWW– Software Tools.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Wilbent. O. Galitz ,“The Essential Guide To User Interface Design”, John Wiley& Sons, 2001.
2. Ben Sheiderman, “Design The User Interface”, Pearson Education, 1998.

**REFERENCES:**

1. Alan Cooper, “The Essential Of User Interface Design”, Wiley – Dream Tech Ltd., 2002.

**GE2022 TOTAL QUALITY MANAGEMENT L T P C  
3 0 0 3**

**UNIT I INTRODUCTION 9**  
Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of manufacturing and service quality - Basic concepts of TQM - Definition of TQM – TQM Framework - Contributions of Deming, Juran and Crosby – Barriers to TQM.

**UNIT II TQM PRINCIPLES 9**  
Leadership – Strategic quality planning, Quality statements - Customer focus – Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal - Continuous process improvement – PDSA cycle, 5s, Kaizen - Supplier partnership – Partnering, Supplier selection, Supplier Rating.

**UNIT III TQM TOOLS & TECHNIQUES I 9**  
The seven traditional tools of quality – New management tools – Six-sigma: Concepts, methodology, applications to manufacturing, service sector including IT – Bench marking – Reason to bench mark, Bench marking process – FMEA – Stages, Types.

**UNIT IV TQM TOOLS & TECHNIQUES II 9**  
Quality circles – Quality Function Deployment (QFD) – Taguchi quality loss function – TPM – Concepts, improvement needs – Cost of Quality – Performance measures.

**UNIT V          QUALITY SYSTEMS****9**

Need for ISO 9000- ISO 9000-2000 Quality System – Elements, Documentation, Quality auditing- QS 9000 – ISO 14000 – Concepts, Requirements and Benefits – Case studies of TQM implementation in manufacturing and service sectors including IT.

**TOTAL: 45 PERIODS****TEXT BOOK:**

1. Dale H.Besterfield, et al., “Total Quality Management”, Pearson Education Asia, 3<sup>rd</sup> Edition, Indian Reprint (2006).

**REFERENCES:**

1. James R. Evans and William M. Lindsay, “The Management and Control of Quality”, 6<sup>th</sup> Edition, South-Western (Thomson Learning), 2005.
2. Oakland, J.S., “TQM – Text with Cases”, Butterworth – Heinemann Ltd., Oxford, 3<sup>rd</sup> Edition, 2003.
3. Suganthi,L and Anand Samuel, “Total Quality Management”, Prentice Hall (India) Pvt. Ltd.,2006.
4. Janakiraman, B and Gopal, R.K, “Total Quality Management – Text and Cases”, Prentice Hall (India) Pvt. Ltd., 2006.

**IT2351          NETWORK PROGRAMMING AND MANAGEMENT****L T P C****3 0 0 3****UNIT I          ELEMENTARY TCP SOCKETS****9**

Introduction to Socket Programming – Overview of TCP/IP Protocols –Introduction to Sockets – Socket address Structures – Byte ordering functions – address conversion functions – Elementary TCP Sockets – socket, connect, bind, listen, accept, read, write, close functions – Iterative Server – Concurrent Server.

**UNIT II          APPLICATION DEVELOPMENT****9**

TCP Echo Server – TCP Echo Client – Posix Signal handling – Server with multiple clients – boundary conditions: Server process Crashes, Server host Crashes, Server Crashes and reboots, Server Shutdown – I/O multiplexing – I/O Models – select function – shutdown function – TCP echo Server (with multiplexing) – poll function – TCP echo Client (with Multiplexing).

**UNIT III          SOCKET OPTIONS, ELEMENTARY UDP SOCKETS****9**

Socket options – getsockopt and setsockopt functions – generic socket options – IP socket options – ICMP socket options – TCP socket options – Elementary UDP sockets – UDP echo Server – UDP echo Client – Multiplexing TCP and UDP sockets – Domain name system – gethostbyname function – Ipv6 support in DNS – gethostbyadr function – getservbyname and getservbyport functions.

**UNIT IV          ADVANCED SOCKETS****9**

Ipv4 and Ipv6 interoperability – threaded servers – thread creation and termination – TCP echo server using threads – Mutexes – condition variables – raw sockets – raw socket creation – raw socket output – raw socket input – ping program – trace route program.

**UNIT V SIMPLE NETWORK MANAGEMENT 9**

SNMP network management concepts – SNMP management information – standard MIB's – SNMPv1 protocol and Practical issues – introduction to RMON, SNMPv2 and SNMPv3.

**TOTAL : 45 PERIODS**

**TEXT BOOKS:**

1. W. Richard Stevens, "Unix Network Programming Vol-I", Second Edition, Pearson Education, 1998.
2. Mani Subramaniam, "Network Management: Principles and Practice", Addison Wesley, First Edition, 2001.

**REFERENCES:**

1. D.E. Comer, "Internetworking with TCP/IP Vol- III", (BSD Sockets Version), Second Edition, Pearson Education, 2003.
2. William Stallings, "SNMP, SNMPv2, SNMPv3 and RMON 1 and 2", Third Edition, Addison Wesley, 1999.

**IT2032 SOFTWARE TESTING L T P C  
3 0 0 3**

**UNIT I INTRODUCTION 9**

Testing as an Engineering Activity – Role of Process in Software Quality – Testing as a Process – Basic Definitions – Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support for Developing a Defect Repository.

**UNIT II TEST CASE DESIGN 9**

Introduction to Testing Design Strategies – The Smarter Tester – Test Case Design Strategies – Using Black Box Approach to Test Case Design Random Testing – Requirements based testing – positive and negative testing — Boundary Value Analysis – decision tables - Equivalence Class Partitioning state-based testing– cause-effect graphing – error guessing - compatibility testing – user documentation testing – domain testing Using White-Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing - Coverage and Control Flow Graphs – Covering Code Logic – Paths – Their Role in White-box Based Test Design – code complexity testing – Evaluating Test Adequacy Criteria.

**UNIT III LEVELS OF TESTING 9**

The Need for Levels of Testing – Unit Test – Unit Test Planning –Designing the Unit Tests. The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – scenario testing – defect bash elimination -System Testing – types of system testing - Acceptance testing – performance testing - Regression Testing – internationalization testing – ad-hoc testing - Alpha – Beta Tests – testing OO systems – usability and accessibility testing

**UNIT IV TEST MANAGEMENT 9**

People and organizational issues in testing – organization structures for testing teams – testing services - Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process - Reporting Test Results – The

role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group.

**UNIT V CONTROLLING AND MONITORING 9**

Software test automation – skills needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation - Test metrics and measurements –project, progress and productivity metrics – Status Meetings – Reports and Control Issues – Criteria for Test Completion – SCM – Types of reviews – Developing a review program – Components of Review Plans– Reporting Review Results. – evaluating software quality – defect prevention – testing maturity model

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Srinivasan Desikan and Gopaldaswamy Ramesh, “ Software Testing – Principles and Practices”, Pearson education, 2006.
2. Aditya P.Mathur, “Foundations of Software Testing”, Pearson Education,2008.

**REFERENCES:**

1. Boris Beizer, “Software Testing Techniques”, Second Edition,Dreamtech, 2003
2. Elfriede Dustin, “Effective Software Testing”, First Edition, Pearson Education, 2003.
3. Renu Rajani, Pradeep Oak, “Software Testing – Effective Methods, Tools and Techniques”, Tata McGraw Hill, 2004.

**IT2401 SERVICE ORIENTED ARCHITECTURE L T P C  
3 0 0 3**

**UNIT I 9**

Roots of SOA – Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA- How components in an SOA interrelate - Principles of service orientation

**UNIT II 9**

Web services – Service descriptions – Messaging with SOAP –Message exchange Patterns – Coordination –Atomic Transactions – Business activities – Orchestration – Choreography - Service layer abstraction – Application Service Layer – Business Service Layer – Orchestration Service Layer

**UNIT III 9**

Service oriented analysis – Business-centric SOA – Deriving business services- service modeling - Service Oriented Design – WSDL basics – SOAP basics – SOA composition guidelines – Entity-centric business service design – Application service design – Task-centric business service design

**UNIT IV 9**

SOA platform basics – SOA support in J2EE – Java API for XML-based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC)- Web Services Interoperability Technologies (WSIT) - SOA support in .NET – Common Language Runtime - ASP.NET web forms – ASP.NET web services – Web Services Enhancements (WSE)

**UNIT V****9**

WS-BPEL basics – WS-Coordination overview - WS-Choreography, WS-Policy, WS-Security

**TOTAL: 45 PERIODS****TEXT BOOK:**

1. Thomas Erl, "[Service-Oriented Architecture: Concepts, Technology, and Design](#)", Pearson Education, 2005.

**REFERENCES:**

1. Thomas Erl, "[SOA Principles of Service Design](#) "(The Prentice Hall Service-Oriented Computing Series from Thomas Erl), 2005.
2. Newcomer, Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.
3. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services, An Architect's Guide", Pearson Education, 2005.
4. Dan Woods and Thomas Mattern, "Enterprise SOA Designing IT for Business Innovation" O'REILLY, First Edition, 2006.

**CS2040****ADVANCED OPERATING SYSTEMS**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**UNIT I****9**

Architectures of Distributed Systems - System Architecture types - issues in distributed operating systems - communication networks – communication primitives. Theoretical Foundations - inherent limitations of a distributed system – lamp ports logical clocks – vector clocks – casual ordering of messages – global state – cuts of a distributed computation – termination detection. Distributed Mutual Exclusion – introduction – the classification of mutual exclusion and associated algorithms – a comparative performance analysis.

**UNIT II****9**

Distributed Deadlock Detection -Introduction - deadlock handling strategies in distributed systems – issues in deadlock detection and resolution – control organizations for distributed deadlock detection – centralized and distributed deadlock detection algorithms –hierarchical deadlock detection algorithms. Agreement protocols – introduction-the system model, a classification of agreement problems, solutions to the Byzantine agreement problem, applications of agreement algorithms. Distributed resource management: introduction-architecture – mechanism for building distributed file systems – design issues – log structured file systems.

**UNIT III****9**

Distributed shared memory-Architecture– algorithms for implementing DSM – memory coherence and protocols – design issues. Distributed Scheduling – introduction – issues in load distributing – components of a load distributing algorithm – stability – load distributing algorithm – performance comparison – selecting a suitable load sharing algorithm – requirements for load distributing -task migration and associated issues. Failure Recovery and Fault tolerance: introduction– basic concepts – classification of failures – backward and forward error recovery, backward error recovery- recovery in concurrent systems – consistent set of check points – synchronous and asynchronous check pointing and recovery – check pointing for distributed database systems- recovery in replicated distributed databases.

**UNIT IV** **9**  
 Protection and security -preliminaries, the access matrix model and its implementations.- safety in matrix model- advanced models of protection. Data security – cryptography: Model of cryptography, conventional cryptography- modern cryptography, private key cryptography, data encryption standard- public key cryptography – multiple encryption – authentication in distributed systems.

**UNIT V** **9**  
 Multiprocessor operating systems - basic multiprocessor system architectures – inter connection networks for multiprocessor systems – caching – hypercube architecture. Multiprocessor Operating System - structures of multiprocessor operating system, operating system design issues- threads- process synchronization and scheduling.

Database Operating systems :Introduction- requirements of a database operating system Concurrency control : theoretical aspects – introduction, database systems – a concurrency control model of database systems- the problem of concurrency control – serializability theory- distributed database systems, concurrency control algorithms – introduction, basic synchronization primitives, lock based algorithms-timestamp based algorithms, optimistic algorithms – concurrency control algorithms, data replication.

**TOTAL: 45 PERIODS**

**TEXT BOOK:**

1. Mukesh Singhal, Niranjana G.Shivaratri, "Advanced concepts in operating systems: Distributed, Database and multiprocessor operating systems", TMH, 2001

**REFERENCES:**

1. Andrew S.Tanenbaum, "Modern operating system", PHI, 2003
2. Pradeep K.Sinha, "Distributed operating system-Concepts and design", PHI, 2003.
3. Andrew S.Tanenbaum, "Distributed operating system", Pearson education, 2003

**CS2045** **WIRELESS NETWORKS** **L T P C**  
**3 0 0 3**

**UNIT I** **WIRELESS COMMUNICATION** **7**  
 Cellular systems- Frequency Management and Channel Assignment- types of handoff and their characteristics, dropped call rates & their evaluation - MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks

**UNIT II** **WIRELESS LAN** **9**  
 IEEE 802.11 Standards – Architecture – Services – Mobile Ad hoc Networks- WiFi and WiMAX - Wireless Local Loop

**UNIT III** **MOBILE COMMUNICATION SYSTEMS** **11**  
 GSM-architecture-Location tracking and call setup- Mobility management- Handover-Security-GSM SMS –International roaming for GSM- call recording functions-subscriber and service data mgt –Mobile Number portability -VoIP service for Mobile Networks – GPRS –Architecture-GPRS procedures-attach and detach procedures-PDP context procedure-combined RA/LA update procedures-Billing

**UNIT IV MOBILE NETWORK AND TRANSPORT LAYERS 9**  
 Mobile IP – Dynamic Host Configuration Protocol-Mobile Ad Hoc Routing Protocols– Multicast routing-TCP over Wireless Networks – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit / Fast Recovery – Transmission/Timeout Freezing-Selective Retransmission – Transaction Oriented TCP- TCP over 2.5 / 3G wireless Networks

**UNIT V APPLICATION LAYER 9**  
 WAP Model- Mobile Location based services -WAP Gateway –WAP protocols – WAP user agent profile- caching model-wireless bearers for WAP - WML – WMLScripts - WTA - iMode- SyncML

**TOTAL : 45 PERIODS**

**TEXT BOOKS:**

1. Jochen Schiller, “Mobile Communications”, Second Edition, Pearson Education, 2003.
2. William Stallings, “Wireless Communications and Networks”, Pearson Education, 2002.

**REFERENCES:**

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, “Principles of Wireless Networks”, First Edition, Pearson Education, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, 2003.
3. C.K.Toh, “AdHoc Mobile Wireless Networks”, First Edition, Pearson Education, 2002.

**GE2071 INTELLECTUAL PROPERTY RIGHTS (IPR) L T P C  
 3 0 0 3**

**UNIT I 9**  
 Introduction – Invention and Creativity – Intellectual Property (IP) – Importance – Protection of IPR – Basic types of property (i). Movable Property - Immovable Property and - Intellectual Property.

**UNIT II 9**  
 IP – Patents – Copyrights and related rights – Trade Marks and rights arising from Trademark registration – Definitions – Industrial Designs and Integrated circuits – Protection of Geographical Indications at national and International levels – Application Procedures..

**UNIT III 9**  
 International convention relating to Intellectual Property – Establishment of WIPO – Mission and Activities – History – General Agreement on Trade and Tariff (GATT) – TRIPS Agreement.

**UNIT IV 9**  
 Indian Position Vs WTO and Strategies – Indian IPR legislations – commitments to WTO-Patent Ordinance and the Bill – Draft of a national Intellectual Property Policy – Present against unfair competition.

**UNIT V** **9**  
 Case Studies on – Patents (Basumati rice, turmeric, Neem, etc.) – Copyright and related rights – Trade Marks – Industrial design and Integrated circuits – Geographic indications – Protection against unfair competition.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Subbaram N.R. "Handbook of Indian Patent Law and Practice ", S. Viswanathan Printers and Publishers Pvt. Ltd., 1998.

**REFERENCES:**

1. Eli Whitney, United States Patent Number: 72X, Cotton Gin, March 14, 1794.
2. Intellectual Property Today: Volume 8, No. 5, May 2001, [www.iptoday.com].
3. Using the Internet for non-patent prior art searches, Derwent IP Matters, July 2000. [www.ipmatters.net/features/000707\\_gibbs.html](http://www.ipmatters.net/features/000707_gibbs.html).

**CS2051** **GRAPH THEORY** **L T P C**  
**3 0 0 3**

**UNIT I INTRODUCTION** **9**  
 Graphs – Introduction – Isomorphism – Sub graphs – Walks, Paths, Circuits – Connectedness – Components – Euler Graphs – Hamiltonian Paths and Circuits – Trees – Properties of trees – Distance and Centers in Tree – Rooted and Binary Trees.

**UNIT II TREES, CONNECTIVITY, PLANARITY** **9**  
 Spanning trees – Fundamental Circuits – Spanning Trees in a Weighted Graph – Cut Sets – Properties of Cut Set – All Cut Sets – Fundamental Circuits and Cut Sets – Connectivity and Separability – Network flows – 1-Isomorphism – 2-Isomorphism – Combinational and Geometric Graphs – Planer Graphs – Different Representation of a Planer Graph.

**UNIT III MATRICES, COLOURING AND DIRECTED GRAPH** **9**  
 Incidence matrix – Submatrices – Circuit Matrix – Path Matrix – Adjacency Matrix – Chromatic Number – Chromatic partitioning – Chromatic polynomial – Matching – Covering – Four Color Problem – Directed Graphs – Types of Directed Graphs – Digraphs and Binary Relations – Directed Paths and Connectedness – Euler Graphs – Adjacency Matrix of a Digraph.

**UNIT IV ALGORITHMS** **9**  
 Algorithms: Connectedness and Components – Spanning tree – Finding all Spanning Trees of a Graph – Set of Fundamental Circuits – Cut Vertices and Separability – Directed Circuits.

**UNIT V ALGORITHMS** **9**  
 Algorithms: Shortest Path Algorithm – DFS – Planarity Testing – Isomorphism.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Narsingh Deo, "Graph Theory: With Application to Engineering and Computer Science", Prentice Hall of India, 2003.

**REFERENCES:**

1. R.J. Wilson, "Introduction to Graph Theory", Fourth Edition, Pearson Education, 2003.



**IT2042** **INFORMATION SECURITY** **L T P C**

**3 0 0 3**

**UNIT I INTRODUCTION** **9**

History, What is Information Security?, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access, The SDLC, The Security SDLC

**UNIT II SECURITY INVESTIGATION** **9**

Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues

**UNIT III SECURITY ANALYSIS** **9**

Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk

**UNIT IV LOGICAL DESIGN** **9**

Blueprint for Security, Information Security Policy, Standards and Practices, ISO 17799/BS 7799, NIST Models, VISA International Security Model, Design of Security Architecture, Planning for Continuity

**UNIT V PHYSICAL DESIGN** **9**

Security Technology, IDS, Scanning and Analysis Tools, Cryptography, Access Control Devices, Physical Security, Security and Personnel

**TOTAL: 45 PERIODS**

**TEXT BOOK:**

1. Michael E Whitman and Herbert J Mattord, "Principles of Information Security", Vikas Publishing House, New Delhi, 2003

**REFERENCES:**

1. Micki Krause, Harold F. Tipton, "Handbook of Information Security Management", Vol 1-3 CRC Press LLC, 2004.
2. Stuart Mc Clure, Joel Scrambray, George Kurtz, "Hacking Exposed", Tata McGraw-Hill, 2003
3. Matt Bishop, "Computer Security Art and Science", Pearson/PHI, 2002.

**CS2060** **HIGH SPEED NETWORKS** **L T P C**

**3 0 0 3**

**UNIT I HIGH SPEED NETWORKS** **9**

Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection – ATM Cell – ATM Service Categories – AAL. High Speed LAN's: Fast Ethernet – Gigabit Ethernet– Fibre Channel – Wireless LAN's, WiFi and WiMax Networks applications, requirements – Architecture of 802.11.

**UNIT II CONGESTION AND TRAFFIC MANAGEMENT** **8**

Queuing Analysis – Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

**UNIT III TCP AND ATM CONGESTION CONTROL 12**

TCP Flow control – TCP Congestion Control – Retransmission – Timer Management – Exponential RTO backoff – KARN’s Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats – ABR Capacity allocations – GFR traffic management.

**UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES 8**

Integrated Services Architecture – Approach, Components, Services- Queuing Discipline – FQ – PS – BRFQ – GPS – WFQ – Random Early Detection – Differentiated Services.

**UNIT V PROTOCOLS FOR QOS SUPPORT 8**

RSVP – Goals & Characteristics, Data Flow, RSVP operations – Protocol Mechanisms – Multiprotocol Label Switching – Operations, Label Stacking – Protocol details – RTP – Protocol Architecture – Data Transfer Protocol– RTCP.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. William Stallings, “High speed networks and internet”, Second Edition, Pearson Education, 2002.

**REFERENCES:**

1. Warland, Pravin Varaiya, “High performance communication networks”, Second Edition , Jean Harcourt Asia Pvt. Ltd., , 2001.
2. Irvan Pepelnjk, Jim Guichard, Jeff Aparcar, “MPLS and VPN architecture”, Cisco Press, Volume 1 and 2, 2003.
3. Abhijit S. Pandya, Ercan Sea, “ATM Technology for Broad Band Telecommunication Networks”, CRC Press, New York, 2004.

**CS2061**

**ROBOTICS**

**L T P C  
3 0 0 3**

**UNIT I SCOPE OF ROBOTS AND INTELLIGENCE 9**

The scope of industrial Robots - Definition of an industrial robot - Need for industrial robots - applications. Robot Intelligence – State Space Search – Problem Reduction – Use of Predicate – logic – means Ends Analysis – Problem Solving – Robot Learning – Robot Task Planning – Basic Problems in Task Planning.

**UNIT II ROBOT COMPONENTS 9**

Fundamentals opf Robot Technology - Automation and Robotics - Robot anatomy - Work volume - Precsion of movement - End effectors - Sensors.

**UNIT III ROBOT PROGRAMMING 9**

Robot Programming - Methods - interlocks textual languages. Characteristics of Robot level languages, characteristic of task level languages.

**UNIT IV ROBOT WORK CELL 9**

Robot Cell Design and Control - Remote Cemter compliance - Safety in Robotics.

**UNIT V FUTURE TRENDS 9**

Advanced robotics, Advanced robotics in Space - Specific features of space robotics systems - long-term technical developments, Advanced robotics in under - water operations. Robotics Technology of the Future - Future Applications.

**TOTAL: 45 PERIODS**

**TEXTBOOK:**

1. Barry Leatham - Jones, "Elements of industrial Robotics" PITMAN Publishing, 1987.

**REFERENCES:**

1. Mikell P.Groover, Mitchell Weiss, Roger N.Nagel Nicholas G.Odrey, "Industrial Robotics Technology, Programming and Applications ", McGraw Hill Book Company 1986.
2. Fu K.S. Gonzaleaz R.C. and Lee C.S.G., "Robotics Control Sensing, Visioon and Intelligence (chapter 10) " McGraw Hill International Editions, 1987.
3. Bernard Hodges and Paul Hallam, " Industrial Robotics", British Library Cataloging in Publication 1990.
4. Deb, S.R. Robotics Technology and flexible automation, Tata Mc GrawHill, 1994.

**CS2053****SOFT COMPUTING****L T P C  
3 0 0 3****UNIT I FUZZY SET THEORY 10**

Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set-theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If-Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

**UNIT II OPTIMIZATION 8**

Derivative-based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton’s Method – Step Size Determination – Derivative-free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

**UNIT III ARTIFICIAL INTELLIGENCE 10**

Introduction, Knowledge Representation – Reasoning, Issues and Acquisition: Propositional and Predicate Calculus Rule Based knowledge Representation Symbolic Reasoning Under Uncertainty Basic knowledge Representation Issues Knowledge acquisition – Heuristic Search: Techniques for Heuristic search Heuristic Classification - State Space Search: Strategies Implementation of Graph Search Search based on Recursion Patent-directed Search Production System and Learning.

**UNIT IV NEURO FUZZY MODELING 9**

Adaptive Neuro-Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

**UNIT V APPLICATIONS OF COMPUTATIONAL INTELLIGENCE 8**

Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. J.S.R.Jang, C.T.Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing", PHI, 2004, Pearson Education 2004.
2. N.P.Padhy, "Artificial Intelligence and Intelligent Systems", Oxford University Press, 2006.

**REFERENCES:**

1. Elaine Rich & Kevin Knight, Artificial Intelligence, Second Edition, Tata Mcgraw Hill Publishing Comp., 2006, New Delhi.
2. Timothy J.Ross, "Fuzzy Logic with Engineering Applications", McGraw-Hill, 1997.
3. Davis E.Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley, N.Y., 1989.
4. S. Rajasekaran and G.A.V.Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2003.
5. R.Eberhart, P.Simpson and R.Dobbins, "Computational Intelligence - PC Tools", AP Professional, Boston, 1996.
6. Amit Konar, "Artificial Intelligence and Soft Computing Behaviour and Cognitive model of the human brain", CRC Press, 2008.

**IT2023****DIGITAL IMAGE PROCESSING****L T P C  
3 0 0 3****UNIT I            FUNDAMENTALS OF IMAGE PROCESSING            9**

Introduction – Steps in Image Processing Systems – Image Acquisition – Sampling and Quantization – Pixel Relationships – Colour Fundamentals and Models, File Formats, Image operations – Arithmetic, Geometric and Morphological.

**UNIT II            IMAGE ENHANCEMENT            9**

Spatial Domain Gray level Transformations Histogram Processing Spatial Filtering – Smoothing and Sharpening. Frequency Domain : Filtering in Frequency Domain – DFT, FFT, DCT – Smoothing and Sharpening filters – Homomorphic Filtering.

**UNIT III            IMAGE SEGMENTATION AND FEATURE ANALYSIS            9**

Detection of Discontinuities – Edge Operators – Edge Linking and Boundary Detection – Thresholding – Region Based Segmentation – Morphological WaterSheds – Motion Segmentation, Feature Analysis and Extraction.

**UNIT IV            MULTI RESOLUTION ANALYSIS AND COMPRESSIONS            9**

Multi Resolution Analysis : Image Pyramids – Multi resolution expansion – Wavelet Transforms.  
Image Compression : Fundamentals – Models – Elements of Information Theory – Error Free Compression – Lossy Compression – Compression Standards.

**UNIT V            APPLICATIONS OF IMAGE PROCESSING            9**

Image Classification – Image Recognition – Image Understanding – Video Motion Analysis – Image Fusion – Steganography – Digital Compositing – Mosaics – Colour Image Processing..

**TOTAL : 45 PERIODS**

**TEXT BOOKS:**

1. Rafael C.Gonzalez and Richard E.Woods, “Digital Image Processing” Second Edition, Pearson Education, 2003.

**REFERENCES:**

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, “Image Processing, Analysis and Machine Vision”, Second Edition, Thomson Learning, 2001
2. Anil K.Jain, “Fundamentals of Digital Image Processing”, PHI, 2006.
3. Sanjit K. Mitra, & Giovanni L. Sicuranza, “Non Linear Image Processing”, Elsevier, 2007.
4. Richard O. Duda, Peter E. HOF, David G. Stork, “Pattern Classification” Wiley Student Edition, 2006.

<b>CS2055</b>	<b>SOFTWARE QUALITY ASSURANCE</b>	<b>L T P C</b>
		<b>3 0 0 3</b>

<b>UNIT I</b>	<b>FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE</b>	<b>9</b>
The Role of SQA – SQA Plan – SQA considerations – SQA people – Quality Management – Software Configuration Management		

<b>UNIT II</b>	<b>MANAGING SOFTWARE QUALITY</b>	<b>9</b>
Managing Software Organizations – Managing Software Quality – Defect Prevention – Software Quality Assurance Management		

<b>UNIT III</b>	<b>SOFTWARE QUALITY ASSURANCE METRICS</b>	<b>9</b>
Software Quality – Total Quality Management (TQM) – Quality Metrics – Software Quality Metrics Analysis		

<b>UNIT IV</b>	<b>SOFTWARE QUALITY PROGRAM</b>	<b>9</b>
Software Quality Program Concepts – Establishment of a Software Quality Program – Software Quality Assurance Planning – An Overview – Purpose & Scope.		

<b>UNIT V</b>	<b>SOFTWARE QUALITY ASSURANCE STANDARDIZATION</b>	<b>9</b>
Software Standards–ISO 9000 Quality System Standards - Capability Maturity Model and the Role of SQA in Software Development Maturity – SEI CMM Level 5 – Comparison of ISO 9000 Model with SEI’s CMM		

**TOTAL : 45 PERIODS**

**TEXT BOOKS:**

1. Mordechai Ben-Menachem / Garry S Marliss, “Software Quality”, Vikas Publishing House, Pvt, Ltd., New Delhi.(UNIT III to V)
2. Watts S Humphrey, “ Managing the Software Process”, Pearson Education Inc.(UNIT I and II)

**REFERENCES:**

1. Gordon G Schulmeyer, “Handbook of Software Quality Assurance”, Third Edition, Artech House Publishers 2007
2. Nina S Godbole, “Software Quality Assurance: Principles and Practice”, Alpha Science International, Ltd, 2004

**IT2403 SOFTWARE PROJECT MANAGEMENT L T P C**  
**3 0 0 3**

**UNIT I INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT 9**

Project Definition – Contract Management – Activities Covered By Software Project Management – Overview Of Project Planning – Stepwise Project Planning.

**UNIT II PROJECT EVALUATION 9**

Strategic Assessment – Technical Assessment – Cost Benefit Analysis –Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

**UNIT III ACTIVITY PLANNING 9**

Objectives – Project Schedule – Sequencing and Scheduling Activities –Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control.

**UNIT IV MONITORING AND CONTROL 9**

Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.

**UNIT V MANAGING PEOPLE AND ORGANIZING TEAMS 9**

Introduction – Understanding Behavior – Organizational Behaviour:A Background – Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation – The Oldman – Hackman Job Characteristics Model – Working In Groups – Becoming A Team –Decision Making – Leadership – Organizational Structures – Stress –Health And Safety – Case Studies.

**TOTAL: 45 PERIODS**

**TEXT BOOK:**

1. Bob Hughes, Mikecoterrell, "Software Project Management", Third Edition, Tata McGraw Hill, 2004.

**REFERENCES:**

1. Ramesh, Gopaldaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
2. Royce, "Software Project Management", Pearson Education, 1999.
3. Jalote, "Software Project Manangement in Practive", Pearson Education, 2002.

**CS2056 DISTRIBUTED SYSTEMS L T P C**  
**3 0 0 3**

**UNIT I 9**

Characterization of Distributed Systems-Introduction-Examples-Resource Sharing and the Web-Challenges.

System Models-Architectural-Fundamental.

Interprocess Communication-Introduction-API for Internet protocols-External data representation and marshalling--Client-server communication-Group communication-Case study: Interprocess Communication in UNIX.

**UNIT II** **9**  
 Distributed Objects and Remote Invocation-Introduction-Communication between distributed objects-Remote procedure calls-Events and notifications-Case study: Java RMI.

Operating System Support-Introduction-OS layer-Protection-Processes and threads-Communication and invocation OS architecture.

**UNIT III** **9**  
 Distributed File Systems-Introduction-File service architecture-Case Study:Sun Network File System-Enhancements and further developments.

Name Services-Introduction-Name Services and the Domain Name System-Directory Services-Case Study: Global Name Service.

**UNIT IV** **9**  
 Time and Global States-Introduction-Clocks, events and process states-Synchronizing physical clocks-Logical time and logical clocks-Global states-Distributed debugging.

Coordination and Agreement-Introduction-Distributed mutual exclusion-Elections-Multicast communication-Consensus and related problems.

**UNIT V** **9**  
 Distributed Shared Memory-Introduction-Design and implementation issues-Sequential consistency and Ivy case study Release consistency and Munin case study-Other consistency models.

CORBA Case Study- Introduction-CORBA RMI-CORBA services.

**TOTAL: 45 PERIODS**

**TEXT BOOK:**

1. George Coulouris, Jean Dollimore, Tim Kindberg, , "Distributed Systems: Concepts and Design", 4th Edition, Pearson Education, 2005.

**REFERENCES:**

1. A. S. Tanenbaum and M. V. Steen, "Distributed Systems: Principles and Paradigms", Second Edition, Prentice Hall, 2006.
2. M.L.Liu, "Distributed Computing Principles and Applications", Pearson Addison Wesley, 2004.
3. Mukesh Singhal, "Advanced Concepts In Operating Systems", McGrawHill Series in Computer Science, 1994.
4. Nancy A. Lynch, "Distributed Algorithms", The Morgan Kaufmann Series in Data Management System, Morgan Kaufmann Publishers, 2000.

**CS2062**

**QUANTUM COMPUTING**

**L T P C**  
**3 0 0 3**

**UNIT I FOUNDATION** **9**  
 Overview of traditional computing – Church-Turing thesis – circuit model of computation – reversible computation – quantum physics – quantum physics and computation – Dirac notation and Hilbert Spaces – dual vectors – operators – the spectral theorem – functions of operators – tensor products – Schmidt decomposition theorem

**UNIT II QUBITS AND QUANTUM MODEL OF COMPUTATION** **9**  
 State of a quantum system – time evolution of a closed system – composite systems – measurement – mixed states and general quantum operations – quantum circuit model –

quantum gates – universal sets of quantum gates – unitary transformations – quantum circuits

**UNIT III QUANTUM ALGORITHMS – I 9**

Superdense coding – quantum teleportation – applications of teleportation – probabilistic versus quantum algorithms – phase kick-back – the Deutsch algorithm – the Deutsch-Jozsa algorithm – Simon's algorithm – Quantum phase estimation and quantum Fourier Transform – eigenvalue estimation

**UNIT IV QUANTUM ALGORITHMS – II 9**

Order-finding problem – eigenvalue estimation approach to order finding – Shor's algorithm for order finding – finding discrete logarithms – hidden subgroups – Grover's quantum search algorithm – amplitude amplification – quantum amplitude estimation – quantum counting – searching without knowing the success probability

**UNIT V QUANTUM COMPUTATIONAL COMPLEXITY AND ERROR CORRECTION 9**

Computational complexity – black-box model – lower bounds for searching – general black-box lower bounds – polynomial method – block sensitivity – adversary methods – classical error correction – classical three-bit code – fault tolerance – quantum error correction – three- and nine-qubit quantum codes – fault-tolerant quantum computation

**TOTAL: 45 PERIODS**

**TEXT BOOK:**

1. P. Kaye, R. Laflamme, and M. Mosca, "An introduction to Quantum Computing", Oxford University Press, 1999.

**REFERENCES:**

1. V. Sahni, "Quantum Computing", Tata McGraw-Hill Publishing Company, 2007.

**CS2057 KNOWLEDGE BASED DECISION SUPPORT SYSTEM L T P C  
3 0 0 3**

**UNIT I 9**

Decision Making and computerized support: Management support systems. Decision making systems modeling- support.

**UNIT II 9**

Decision Making Systems – Modeling and Analysis – Business Intelligence – Data Warehousing, Data Acquisition - Data Mining. Business Analysis – Visualization - Decision Support System Development.

**UNIT III 9**

Collaboration, Communicate Enterprise Decision Support System & Knowledge management – Collaboration Com Technologies Enterprise information system – knowledge management.

**UNIT IV 9**



Intelligent Support Systems – AI & Expert Systems – Knowledge based Systems – Knowledge Acquisition , Representation & Reasoning, Advanced intelligence system – Intelligence System over internet.

**UNIT V** **9**  
 Implementing MSS in the E-Business ERA – Electronic Commerce – integration, Impacts and the future management support systems.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Decision Support Systems & Intelligent Systems – Seventh edition Efraim Turban & Jay E. Aronson Ting-Peng Liang - Pearson/prentice Hall
2. Decision support Systems – Second Edition – George M Marakas - Pearson/prentice Hall.

**REFERENCES:**

1. Decision Support Systems – V.S. Janakiraman & K. Sarukesi
2. Decision Support systems and Data warehouse Systems by Efrem G Mallach- Mc Graw Hill

<b>CS 2063</b>	<b>GRID COMPUTING</b>	<b>L T P C</b>
		<b>3 0 0 3</b>

**UNIT I CONCEPTS AND ARCHITECTURE** **9**  
 Introduction-Parallel and Distributed Computing-Cluster Computing-Grid Computing- Anatomy and Physiology of Grid-Review of Web Services-OGSA-WSRF.

**UNIT II GRID MONITORING** **9**  
 Grid Monitoring Architecture (GMA) - An Overview of Grid Monitoring Systems- GridICE – JAMM -MDS-Network Weather Service-R-GMA-Other Monitoring Systems- Ganglia and GridMon

**UNIT III GRID SECURITY AND RESOURCE MANAGEMENT** **9**  
 Grid Security-A Brief Security Primer-PKI-X509 Certificates-Grid Security-Grid Scheduling and Resource Management-Scheduling Paradigms- Working principles of Scheduling -A Review of Condor, SGE, PBS and LSF-Grid Scheduling with QoS.

**UNIT IV DATA MANAGEMENT AND GRID PORTALS** **9**  
 Data Management-Categories and Origins of Structured Data-Data Management Challenges-Architectural Approaches-Collective Data Management Services-Federation Services-Grid Portals-First-Generation Grid Portals-Second-Generation Grid Portals.

**UNIT V GRID MIDDLEWARE** **9**  
 List of globally available Middlewares - Case Studies-Recent version of Globus Toolkit and gLite - Architecture, Components and Features.

**TOTAL: 45 PERIODS**

**TEXT BOOK:**

1. Maozhen Li, Mark Baker, The Grid Core Technologies, John Wiley & Sons ,2005.

**REFERENCES:**

1. Ian Foster & Carl Kesselman, The Grid 2 – Blueprint for a New Computing Infrastructure , Morgan Kaufman – 2004
2. Joshy Joseph & Craig Fellenstein, “Grid Computing”, Pearson Education 2004.
3. Fran Berman,Geoffrey Fox, Anthony J.G.Hey, “Grid Computing: Making the Global Infrastructure a reality”, John Wiley and sons, 2003.

<b>CS2064</b>	<b>AGENT BASED INTELLIGENT SYSTEMS</b>	<b>L T P C</b>
		<b>3 0 0 3</b>
<b>UNIT I</b>	<b>INTRODUCTION</b>	<b>9</b>
Definitions - Foundations - History - Intelligent Agents-Problem Solving-Searching - Heuristics -Constraint Satisfaction Problems - Game playing.		
<b>UNIT II</b>	<b>KNOWLEDGE REPRESENTATION AND REASONING</b>	<b>9</b>
Logical Agents-First order logic-First Order Inference-Unification-Chaining- Resolution Strategies-Knowledge Representation-Objects-Actions-Events		
<b>UNIT III</b>	<b>PLANNING AGENTS</b>	<b>9</b>
Planning Problem-State Space Search-Partial Order Planning-Graphs-Nondeterministic Domains-Conditional Planning-Continuous Planning-MultiAgent Planning.		
<b>UNIT IV</b>	<b>AGENTS AND UNCERTAINTY</b>	<b>9</b>
Acting under uncertainty – Probability Notation-Bayes Rule and use - Bayesian Networks-Other Approaches-Time and Uncertainty-Temporal Models- Utility Theory - Decision Network – Complex Decisions.		
<b>UNIT V</b>	<b>HIGHER LEVEL AGENTS</b>	<b>9</b>
Knowledge in Learning-Relevance Information-Statistical Learning Methods-Reinforcement Learning-Communication-Formal Grammar-Augmented Grammars-Future of AI.		
		<b>TOTAL: 45 PERIODS</b>

**TEXT BOOK:**

1. Stuart Russell and Peter Norvig, “Artificial Intelligence - A Modern Approach”,2<sup>nd</sup> Edition, Prentice Hall, 2002

**REFERENCES:**

1. Michael Wooldridge, “An Introduction to Multi Agent System”, John Wiley, 2002.
2. Patrick Henry Winston, Artificial Intelligence, 3<sup>rd</sup> Edition, AW, 1999.
3. Nils.J.Nilsson, Principles of Artificial Intelligence, Narosa Publishing House, 1992

**GE2021 PROFESSIONAL ETHICS IN ENGINEERING**

		<b>L T P C</b>
		<b>3 0 0 3</b>
<b>UNIT I</b>	<b>ENGINEERING ETHICS</b>	<b>9</b>
Senses of ‘Engineering Ethics’ – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg’s theory – Gilligan’s theory – Consensus and Controversy – Professions and Professionalism – Professional Ideals and Virtues – Uses of Ethical Theories.		

**UNIT II ENGINEERING AS SOCIAL EXPERIMENTATION 9**  
Engineering as Experimentation – Engineers as responsible Experimenters – Research Ethics - Codes of Ethics – Industrial Standards - A Balanced Outlook on Law – The Challenger Case Study

**UNIT III ENGINEER’S RESPONSIBILITY FOR SAFETY 9**  
Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis – Reducing Risk – The Government Regulator’s Approach to Risk - Chernobyl Case Studies and Bhopal

**UNIT IV RESPONSIBILITIES AND RIGHTS 9**  
Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) - Discrimination

**UNIT V GLOBAL ISSUES 9**  
Multinational Corporations – Business Ethics - Environmental Ethics – Computer Ethics - Role in Technological Development – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Honesty – Moral Leadership – Sample Code of Conduct

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Mike Martin and Roland Schinzinger, “Ethics in Engineering”, McGraw Hill, New York, 2005.
2. Charles E Harris, Michael S Pritchard and Michael J Rabins, “Engineering Ethics – Concepts and Cases”, Thompson Learning, 2000.

**REFERENCES:**

1. Charles D Fleddermann, “Engineering Ethics”, Prentice Hall, New Mexico, 1999.
2. John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, 2003
3. Edmund G Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers”, Oxford University Press, 2001.
4. Prof. (Col) P S Bajaj and Dr. Raj Agrawal, “Business Ethics – An Indian Perspective”, Biztantra, New Delhi, 2004.
5. David Ermann and Michele S Shauf, “Computers, Ethics and Society”, Oxford University Press, (2003)

**GE 2023**

**FUNDAMENTALS OF NANOSCIENCE**

**L T P C  
3 0 0 3**

**UNIT I INTRODUCTION 9**  
Nanoscale Science and Technology- Implications for Physics, Chemistry, Biology and Engineering-Classifications of nanostructured materials- nano particles- quantum dots, nanowires-ultra-thinfilms-multilayered materials. Length Scales involved and effect on properties: Mechanical, Electronic, Optical, Magnetic and Thermal properties. Introduction to properties and motivation for study (qualitative only).

**UNIT II PREPARATION METHODS 10**

Bottom-up Synthesis-Top-down Approach: Precipitation, Mechanical Milling, Colloidal routes, Self-assembly, Vapour phase deposition, MOCVD, Sputtering, Evaporation, Molecular Beam Epitaxy, Atomic Layer Epitaxy, MOMBE.

**UNIT III PATTERNING AND LITHOGRAPHY FOR NANOSCALE DEVICES 7**

Introduction to optical/UV electron beam and X-ray Lithography systems and processes, Wet etching, dry (Plasma /reactive ion) etching, Etch resists-dip pen lithography

**UNIT IV PREPARATION ENVIRONMENTS 9**

Clean rooms: specifications and design, air and water purity, requirements for particular processes, Vibration free environments: Services and facilities required. Working practices, sample cleaning, Chemical purification, chemical and biological contamination, Safety issues, flammable and toxic hazards, biohazards.

**UNIT V CHARECTERISATION TECHNIQUES 10**

X-ray diffraction technique, Scanning Electron Microscopy - environmental techniques, Transmission Electron Microscopy including high-resolution imaging, Surface Analysis techniques- AFM, SPM, STM, SNOM, ESCA, SIMS-Nanoindentation

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. A.S. Edelstein and R.C. Cammearata, eds., Nanomaterials: Synthesis, Properties and Applications, (Institute of Physics Publishing, Bristol and Philadelphia, 1996)
2. N John Dinardo, Nanoscale charecterisation of surfaces & Interfaces, Second edition, Weinheim Cambridge, Wiley-VCH, 2000

**REFERENCES:**

1. G Timp (Editor), Nanotechnology, AIP press/Springer, 1999
2. Akhlesh Lakhtakia (Editor) The Hand Book of Nano Technology, "Nanometer Structure", Theory, Modeling and Simulations. Prentice-Hall of India (P) Ltd, New Delhi, 2007.

**GE2072 INDIAN CONSTITUTION AND SOCIETY L T P C  
3 0 0 3**

**UNIT I 9**

Historical Background – Constituent Assembly of India – Philosophical foundations of the Indian Constitution – Preamble – Fundamental Rights – Directive Principles of State Policy – Fundamental Duties – Citizenship – Constitutional Remedies for citizens.

**UNIT II 9**

Union Government – Structures of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review.

**UNIT III 9**

State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts.

**UNIT IV** **9**  
Indian Federal System – Center – State Relations – President’s Rule – Constitutional Amendments – Constitutional Functionaries - Assessment of working of the Parliamentary System in India.

**UNIT V** **9**  
Society : Nature, Meaning and definition; Indian Social Structure; Caste, Religion, Language in India; Constitutional Remedies for citizens – Political Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Durga Das Basu, “ Introduction to the Constitution of India “, Prentice Hall of India, New Delhi.
2. R.C.Agarwal, (1997) “Indian Political System”, S.Chand and Company, New Delhi.
3. Maciver and Page, “ Society: An Introduction Analysis “, Mac Milan India Ltd., New Delhi.
4. K.L.Sharma, (1997) “Social Stratification in India: Issues and Themes”, Jawaharlal Nehru University, New Delhi.

**REFERENCES:**

1. Sharma, Brij Kishore, “ Introduction to the Constitution of India:, Prentice Hall of India, New Delhi.
2. U.R.Gahai, “Indian Political System “, New Academic Publishing House, Jalaendhar.
3. R.N. Sharma, “Indian Social Problems “, Media Promoters and Publishers Pvt. Ltd.

**IT2033**

**BIO INFORMATICS**

**L T P C**  
**3 0 0 3**

**UNIT I** **9**  
Introduction to molecular biology – the genetic material – gene structure – protein structure – chemical bonds – molecular biology tools – genomic information content

**UNIT II** **9**  
Data searches – simple alignments – gaps – scoring matrices – dynamic programming – global and local alignments – database searches – multiple sequence alignments  
Patterns for substitutions – estimating substitution numbers – evolutionary rates – molecular clocks – evolution in organelles

**UNIT III** **9**  
Phylogenetics – history and advantages – phylogenetic trees – distance matrix methods – maximum likelihood approaches – multiple sequence alignments – Parsimony – ancestral sequences – strategies for faster searches – consensus trees – tree confidence – comparison of phylogenetic methods – molecular phylogenies

**UNIT IV** **9**  
Genomics – prokaryotic genomes: prokaryotic gene structure – GC content - gene density – eukaryotic genomes: gene structure – open reading frames – GC content – gene expression – transposition – repeated elements – gene density

**UNIT V****9**

Amino acids – polypeptide composition – secondary structure – tertiary and quaternary structure – algorithms for modeling protein folding – structure prediction – predicting RNA secondary structures

Proteomics – protein classification – experimental techniques – inhibitors and drug design – ligand screening – NMR structures – empirical methods and prediction techniques – post-translational modification prediction

**TOTAL: 45 PERIODS****TEXT BOOK:**

1. D. E. Krane and M. L. Raymer, “Fundamental concepts of Bioinformatics”, Pearson Education, 2003.

**REFERENCES:**

1. Arthur M. Lesk, “Introduction to Bioinformatics”, Second Edition, Oxford University Press, 2005.
2. T. K. Attwood, D. J. Parry-Smith, and S. Phukan, “Introduction to Bioinformatics”, Pearson Education, 1999.
3. Vittal R. Srinivas, “Bioinformatics – A Modern Approach”, Prentice-Hall of India Pvt. Ltd., 2005.

**IT2064****SPEECH SIGNAL PROCESSING****L T P C  
3 0 0 3****UNIT I MECHANICS OF SPEECH****9**

Speech production: Mechanism of speech production, Acoustic phonetics - Digital models for speech signals - Representations of speech waveform: Sampling speech signals, basics of quantization, delta modulation, and Differential PCM - Auditory perception: psycho acoustics.

**UNIT II TIME DOMAIN METHODS FOR SPEECH PROCESSING****9**

Time domain parameters of Speech signal – Methods for extracting the parameters Energy, Average Magnitude, Zero crossing Rate – Silence Discrimination using ZCR and energy – Short Time Auto Correlation Function – Pitch period estimation using Auto Correlation Function.

**UNIT III FREQUENCY DOMAIN METHOD FOR SPEECH PROCESSING****9**

Short Time Fourier analysis: Fourier transform and linear filtering interpretations, Sampling rates - Spectrographic displays - Pitch and formant extraction - Analysis by Synthesis - Analysis synthesis systems: Phase vocoder, Channel Vocoder - Homomorphic speech analysis: Cepstral analysis of Speech, Formant and Pitch Estimation, Homomorphic Vocoders.

**UNIT IV LINEAR PREDICTIVE ANALYSIS OF SPEECH****9**

Basic Principles of linear predictive analysis – Auto correlation method – Covariance method – Solution of LPC equations – Cholesky method – Durbin’s Recursive algorithm – Application of LPC parameters – Pitch detection using LPC parameters – Formant analysis – VELP – CELP.

## **UNIT V          APPLICATION OF SPEECH & AUDIO SIGNAL PROCESSING          9**

Algorithms: Dynamic time warping, K-means clustering and Vector quantization, Gaussian mixture modeling, hidden Markov modeling - Automatic Speech Recognition: Feature Extraction for ASR, Deterministic sequence recognition, Statistical Sequence recognition, Language models - Speaker identification and verification – Voice response system – Speech synthesis: basics of articulatory, source-filter, and concatenative synthesis – VOIP

### **TEXT BOOKS:**

1. L. R. Rabiner and R. W. Schaffer, "Digital Processing of Speech signals", Prentice Hall, 1978.
2. Ben Gold and Nelson Morgan, "Speech and Audio Signal Processing", John Wiley and Sons Inc., Singapore, 2004.

### **REFERENCES:**

1. Quatieri, "Discrete-time Speech Signal Processing", Prentice Hall, 2001.
2. L.R. Rabiner and B. H. Juang, "Fundamentals of speech recognition", Prentice Hall, 1993.