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**ANNA UNIVERSITY, CHENNAI**  
**AFFILIATED INSTITUTIONS**  
**R-2008**  
**B.TECH. INFORMATION TECHNOLOGY**  
**II - VIII SEMESTERS CURRICULA AND SYLLABI**

**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 IV	3	0	0	3
	Elective V	3	0	0	3
<b>PRACTICAL</b>					
IT2451	Project Work	0	0	12	6
<b>TOTAL</b>		<b>6</b>	<b>0</b>	<b>12</b>	<b>12</b>

**SEMESTER VIII – Elective IV**

Code No.	Course Title	L	T	P	C
IT2050	<u>Principles of Compiler Design</u>	3	0	0	3
IT2051	<u>Knowledge Engineering</u>	3	0	0	3
GE2025	<u>Professional Ethics in Engineering</u>	3	0	0	3
GE2071	<u>Intellectual Property Rights</u>	3	0	0	3
IT2052	<u>Management Information System</u>	3	0	0	3
IT2053	<u>Software Design</u>	3	0	0	3
CS2053	<u>Soft Computing</u>	3	0	0	3

**SEMESTER VIII – Elective V**

Code No.	Course Title	L	T	P	C
GE2022	<u>Total Quality Management</u>	3	0	0	3

GE2072	<u>Indian Constitution and Society</u>	3	0	0	3
IT2061	<u>System Modeling and Simulation</u>	3	0	0	3
CS2035	<u>Natural Language Processing</u>	3	0	0	3
CS2056	<u>Distributed Systems</u>	3	0	0	3
GE2023	<u>Fundamental of Nano Science</u>	3	0	0	3
IT2064	<u>Speech Processing</u>	3	0	0	3

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**UNIT I**  
**9****BASICS OF COMPILATION**

Compilers – Analysis of source program – Phases of a compiler – Grouping of phases – Compiler Construction tools – Lexical Analyzer: Token specification -Token Recognition- A language for Specifying lexical analyzer– Top down parser : Table implementation of Predictive Parser - Bottom-up Parser : SLR(1) Parser - Parser generators.

**UNIT II TYPE CHECKING AND RUNTIME ENVIRONMENTS 9**

Syntax directed definitions – Construction of syntax trees – Type systems – Specification of a simple type checker - Equivalence of type expressions – Type conversions – Attribute grammar for a simple type checking system – Runtime Environments: Source language issues – Storage organization – Storage allocation strategies – Parameter passing.

**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 – Runtime 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 DAG – Dynamic programming code generation algorithm – Code-generator generators.

**UNIT V CODE OPTIMIZATION 9**

Principal sources of optimization – Peephole optimization – Optimization of basic blocks – Loops in flow graphs – Introduction to global data flow analysis – Iterative solution of data flow equations – Code improving transformations – Dealing with aliases.

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

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman. "Compilers Principles, Techniques and Tools". Pearson Education, 2008.

**REFERENCES**

1. Steven S. Muchnick, "Advanced Compiler Design Implementation", Morgan Koffman, 1997.
2. Charles N. Fischer, Richard J. Leblanc, "Crafting a Compiler with C", Benjamin Cummings, 1991.
3. Allen Holub, "Compiler Design in C", Prentice Hall of India, 1990.

**UNIT I INTRODUCTION 9**

Key concepts – Why knowledge Representation and Reasoning – Language of first order Logic – Syntax, Semantics Pragmatics – Expressing Knowledge – Levels of Representation – Knowledge Acquisition and Sharing – Sharing Ontologies – Language Ontologies –Language Patterns – Tools for Knowledge Acquisition

**UNIT II RESOLUTION AND REASONING 9**

Proportional Case – Handling Variables and Qualifies – Dealing with Intractability – Reasoning with Horn Clauses - Procedural Control of Reasoning – Rules in Production – Description Logic - Vivid Knowledge – Beyond Vivid.

**UNIT III REPRESENTATION 9**

Object Oriented Representations – Frame Formalism – Structured Descriptions – Meaning and Entailment - Taxonomies and Classification – Inheritance – Networks – Strategies for Defeasible Inheritance – Formal Account of Inheritance Networks.

**UNIT IV DEFAULTS, UNCERTAINTY AND EXPRESSIVENESS 9**

Defaults – Introduction – Closed World Reasoning – Circumscription – Default Logic Limitations of Logic – Fuzzy Logic – Nonmonotonic Logic – Theories and World – Semiotics – Auto epistemic Logic - Vagueness – Uncertainty and Degrees of Belief – Noncategorical Reasoning – Objective and Subjective Probability.

**UNIT V ACTIONS AND PLANNING 9**

Explanation and Diagnosis – Purpose – Syntax, Semantics of Context – First Order Reasoning – Modal Reasoning in Context – Encapsulating Objects in Context – Agents – Actions – Situational Calculus – Frame Problem – Complex Actions – Planning – Strips – Planning as Reasoning – Hierarchical and Conditional Planning.

**TOTAL: 45 PERIODS**

## REFERENCES

### TEXT BOOK

1. Ronald Brachman, Hector Levesque "Knowledge Representation and Reasoning", the Morgan Kaufmann Series in Artificial Intelligence 2004

## REFERENCES

1. John F. Sowa, "Knowledge Representation: Logical, Philosophical, and Computational Foundations", 2000
2. Arthur B. Markman, "Knowledge Representation", Lawrence Erlbaum Associates, 1998

<b>GE2025</b>	<b>PROFESSIONAL ETHICS IN ENGINEERING</b>	<b>LTPC</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		
<b>UNIT II</b>	<b>ENGINEERING AS SOCIAL EXPERIMENTATION</b>	<b>9</b>
Engineering as Experimentation – Engineers as responsible Experimenters – Research Ethics - Codes of Ethics – Industrial Standards - A Balanced Outlook on Law – The Challenger Case Study		
<b>UNIT III</b>	<b>ENGINEER'S RESPONSIBILITY FOR SAFETY</b>	<b>9</b>
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		
<b>UNIT IV</b>	<b>RESPONSIBILITIES AND RIGHTS</b>	<b>9</b>
Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) - Discrimination		
<b>UNIT V</b>	<b>GLOBAL ISSUES</b>	<b>9</b>
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)

**GE2071**

**INTELLECTUAL PROPERTY RIGHTS (IPR)**

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

### UNIT I

**5**

Introduction – Invention and Creativity – Intellectual Property (IP) – Importance – Protection of IPR – Basic types of property (i). Movable Property ii. Immovable Property and iii. Intellectual Property.

### UNIT II

**10**

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

**10**

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

### UNIT IV

**10**

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

**10**

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).

**UNIT I INFORMATION SYSTEM AND ORGANIZATION 9**

Matching the Information System Plan to the Organizational Strategic Plan – Identifying Key Organizational Objective and Processes and Developing an Information System Development – User role in Systems Development Process – Maintainability and Recoverability in System Design.

**UNIT II REPRESENTATION AND ANALYSIS OF SYSTEM STRUCTURE 9**

Models for Representing Systems: Mathematical, Graphical and Hierarchical (Organization Chart, Tree Diagram) – Information Flow – Process Flow – Methods and Heuristics – Decomposition and Aggregation – Information Architecture – Application of System Representation to Case Studies.

**UNIT III SYSTEMS, INFORMATION AND DECISION THEORY 9**

Information Theory – Information Content and Redundancy – Classification and Compression – Summarizing and Filtering – Inferences and Uncertainty – Identifying Information needed to Support Decision Making – Human Factors – Problem characteristics and Information System Capabilities in Decision Making.

**UNIT IV INFORMATION SYSTEM APPLICATION 9**

Transaction Processing Applications – Basic Accounting Application – Applications for Budgeting and Planning – Other use of Information Technology: Automation – Word Processing – Electronic Mail – Evaluation Remote Conferencing and Graphics – System and Selection – Cost Benefit – Centralized versus Decentralized Allocation Mechanism.

**UNIT V DEVELOPMENT AND MAINTENANCE OF INFORMATION SYSTEMS 9**

Systems analysis and design – System development life cycle – Limitation – End User Development – Managing End Users – off-the shelf software packages – Outsourcing – Comparison of different methodologies.

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

1. Laudon K.C, Laudon J.P, Brabston M.E, “Management Information Systems - Managing the digital firm”, Pearson Education, 2004.

**REFERENCES**

1. Turban E.F, Potter R.E, “Introduction to Information Technology”; Wiley, 2 004.
2. Jeffrey A.Hoffer, Joey F.George, Joseph S. Valachich, “Modern Systems Analysis and Design”, Third Edition, Prentice Hall, 2002.

**UNIT I GENERAL DESIGN FUNDAMENTALS 9**

The nature of Design process – Objectives – Building Models – Constructs, Design qualities – Assessing the design – Design viewpoints for software – The object Model –

Classes and Objects – Complexity – Classification – Notation – Process – Pragmatics.

**UNIT II                 STRUCTURED SYSTEM ANALYSIS AND DESIGN                 9**

Structured Design – Design Principles – Problem Partitioning and Hierarchy – Abstraction, Modularity – Top-down and Bottom-up Strategies – Transformation of a DFD to a Structure Chart – Transform Analysis – Transaction Analysis – Coupling – Cohesion – Multiple types of Cohesion in a module – Data Design – Normalization – Denormalization – Procedural Design.

**UNIT III                 OBJECT ORIENTED ANALYSIS AND DESIGN                 9**

Overview of Object Oriented Analysis – Shaler/Mellor – Coad/ Yourdon – Rumbaugh – Booch – UML – Use case – Conceptual model – Behaviour – Class Analysis Patterns – Overview – Diagrams – Aggregation – UML – Diagrams – Collaboration – Sequence – Class – Design patterns and Frameworks – Comparison with other design methods – Managing analysis and design – Evaluation testing – Coding – Maintenance – Metrics.

**UNIT IV                 SOFTWARE DESIGN                 9**

The Architecture Concepts – Design Methods – Design Patterns – Rationale for Methods – Design Processes and Strategies – Design by Template – Designing with Patterns – Stepwise Refinement – Incremental Design – Prototyping – DSDM – Structured Systems Analysis and Structured Design – JSP – JSD.

**UNIT V                 CASE STUDIES                 9**

Domain Name System – Email – World Wide Web (HTTP) – Simple Network Management Protocol – File Transfer Protocol – Security – Mutimedia applications.

**TOTAL: 45 PERIODS**

**REFERENCES**



1. David Budgen, "Software Design", Second Edition, Pearson Education, 2004.
2. R. S. Pressman, "Software Engineering", Fifth Edition, McGraw Hill Inc., 2001.
3. Steve McConnell, "Code Complete ", Word Power Publishers, 2001.
4. Ed Downs, Peter Clare, Jan Coe, "Structured System Analysis and Design Methods Application and Context ", Prentice Hall, 1998.
5. A. G. Sutcliffe, "Human Computer Interface Design ", Second Edition Macmillan, 1995.

**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:**

[www.AnnaUnivEdu.Org](http://www.AnnaUnivEdu.Org)

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, 200UNIT III
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.

<b>GE2022</b>	<b>TOTAL QUALITY MANAGEMENT</b>	<b>L T P C</b>
		<b>3 0 0 3</b>
<b>UNIT I</b>	<b>INTRODUCTION</b>	<b>9</b>
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.		
<b>UNIT II</b>	<b>TQM PRINCIPLES</b>	<b>9</b>
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.		
<b>UNIT III</b>	<b>TQM TOOLS &amp; TECHNIQUES I</b>	<b>9</b>
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.		
<b>UNIT IV</b>	<b>TQM TOOLS &amp; TECHNIQUES II</b>	<b>9</b>
Quality circles – Quality Function Deployment (QFD) – Taguchi quality loss function – TPM – Concepts, improvement needs – Cost of Quality – Performance measures.		
<b>UNIT V</b>	<b>QUALITY SYSTEMS</b>	<b>9</b>
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, 2000 UNIT III
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.

**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.

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

**IT2061**  
**C**

**SYSTEM MODELING AND SIMULATION**

**L T P**

**3 0 0 3**

**UNIT I INTRODUCTION TO SIMULATION**

**9**

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**

:

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

<b>CS2035</b>	<b>NATURAL LANGUAGE PROCESSING</b>	<b>L T P C</b>
		<b>3 0 0 3</b>

<b>UNIT I</b>		<b>9</b>
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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>
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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>
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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>
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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>
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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.

**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.tS. 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.

**IT2064**

**SPEECH 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

**TOTAL: 45 PERIODS****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, 1990

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