IT– 701 AUTOMATA & COMPILER DESIGN

UNIT – I

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

UNIT – II

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

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

UNIT – IV

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

UNIT – V

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

REFERENCES:
1.Principles of compiler design -A.V. Aho . J.D.Ullman; Pearson Education.
2.Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.
3.A. C. Holub. Compiler Design in C , Prentice-Hall Inc., 1993.
4.Raghavan, Compiler Design, TMH Pub.

List of Experiments:

1. Develop a lexical analyzer to recognize a few patterns.

2.Write a programme to parse using Brute force technique of Topdown parsing.

3. Develop LL (1) parser (Construct parse table also).

4. Develop an operator precedence parser (Construct parse table also)

5.Develop a recursive descent parser

6. Write a program for generating for various intermediate code forms i) Three address code ii) Polish notation

7. Write a program to simulate Heap storage allocation strategy

8. Generate Lexical analyzer using LEX

9 Generate YACC specifications for a few syntactic categories.

10 Given any intermediate code form implement code optimization techniques

IT - 702- OBJECT ORIENTED ANALYSIS AND DESIGN

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

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

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

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

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

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

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

IT – 703 NETWORK & WEB SECURITY

UNIT-I

Symmetric Ciphers **-** Overview: Services, Mechanisms and Attacks, The OSI Security Architecture, A Model of Network Security. Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography. System Security**-** Intruders, Malicious Software, Viruses and Related Threats, Counter Measures, Firewalls and its Design Principles.

UNIT-II

Block Cipher and the Data Encryption Standard: Simplified DES, Block Cipher Principles, The DES, The Strength of DES, Differential and Linear Cryptanalysis. Symmetric Ciphers: Triple DES, Blowfish. Confidentiality using Conventional Encryption: Placement of Encryption Function, Traffic Confidentiality, Key Distribution, Random Number Generation

UNIT-III

Public Key Encryption, Digital Signatures **-** Number Theory, Prime Numbers, Format‟ s and Euler ‟ s Theorems. Public Key Cryptography and RSA: Principles of Public Key Cryptosystems, The RSA Algorithms, Key Management, Diffie Hellman Key Exchange.

UNIT-IV

Authentication Protocols **-** Message Authentication:- Authentication Requirements, Authentication Functions, Message Authentication Codes, MD5 Message Digest Algorithms, Digital Signatures and Authentication Protocols: - Digital Signatures, Authentication Protocols, Digital Signature Standards.

UNIT-V

Network Security **-** Authentication Applications: Kerberos, X.509 Directory, Authentication Service. Electronic Mail Security: Pretty Good Privacy. IP Security: - Overview, IP Security Architecture, Authentication Header, Encapsulation Security Payload. Web Security : Web Security Requirements, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction.

REFERENCES:

1.Charlie Kaufman, Radia Perlman, Mike Speciner, Network Security: Private Communication

in Public World, 2nd Edition,2011, Pearson Education.

2.Atul Kahate, Cryptography and Network Security, TMH. (2003)

3. William Stallings, Cryptography and Network Security,4 Edition, Pearson Education/PHI.

2006

IT–704 ARTIFICIAL INTELLIGENCE

UNIT-I

Meaning and definition of artificial intelligence, Various types of production systems, Characteristics of production systems, Study and comparison of breadth first search and depth first search. Techniques, other Search Techniques like hill Climbing, Best first Search. A* algorithm, AO* algorithms etc, and various types of control strategies.

UNIT II

Knowledge Representation, Problems in representing knowledge, knowledge representation using propositional and predicate logic, comparison of propositional and predicate logic, Resolution, refutation, deduction, theorem proving, inferencing, monotonic and nonmonotonic reasoning.

UNIT III

Probabilistic reasoning, Baye's theorem, semantic networks, scripts, schemas, frames, conceptual dependency, fuzzy logic, forward and backward reasoning.

UNIT IV

Game playing techniques like minimax procedure, alpha-beta cut-offs etc, planning, Study of the block world problem in robotics, Introduction to understanding and natural languages processing.

UNIT V

Introduction to learning, Various techniques used in learning, introduction to neural networks, applications of neural networks, common sense, reasoning, some example of expert systems.

References:

- Rich E and Knight K, Artificial Intelligence, TMH New Delhi.
- Nelsson N.J., Principles of Artificial Intelligence, Springer Verlag, Berlin.
- Barr A, Fergenbaub E.A. and Cohen PR. Artificial Intelligence, Addison Wesley, Reading
- Waterman D.A., A guide to Expertsystem, Adision - Wesley, Reading
- Artificial Intelligence Hand book, Vol. 1-2, ISA, Research Triangle Park.

ELECTIVE-I (IT – 705(A))- E-COMMERCE & GOVERNANCE

UNIT I

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

UNIT II

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

UNIT III

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

UNIT IV

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

UNIT V

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

REFERENCES:-
1. Gary P. Schneider, "E-commerce", Cengage Learning India.
2. C.S.R. Prabhu, "E-governence: concept and case study", PHI Learning Private Limited.
3. V. Rajaraman, "Essentials of E-Commerce Technology", PHI Learning Private Limited.
4. David Whiteley, "E-commerce study, technology and applications", TMH.

ELECTIVE-I (IT – 705(B))- SIMULATION & MODELING

UNIT I

Modeling and simulation: Models types, principles used in modeling, Modeling and simulation methodology, system modeling , concept of simulation, continuous and discrete time simulation, steps in computer simulation, advantages and disadvantages of simulation, simulation study, classification of simulation languages.

UNIT II

Simulation of Queuing System AND Applications: Queuing system, Characteristics Poisson arrival patterns, birth- death system, equilibrium of queuing system, analysis of M/M/1 queues. Application of queuing theory in computer system like operating systems, computer networks etc.

UNIT III

Probability concepts in simulation: Basic concept of probability , discrete and continuous probability function, continuous and discrete random variables, distribution of random variables: discrete and continuous, Compartmental models: linear, nonlinear and stochastic models Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of a Random numbers, Generating Discrete distributions, Non-Uniform Continuously Distributed Random Numbers, Rejection Method.

UNIT IV

System Dynamics & Probability concepts in Simulation: Exponential growth and decay models, logistic curves, Generalization of growth models, System dynamics diagrams, Multi segment models, Representation of Time Delays.

UNIT V

Verification and validation: Design of simulation experiments, validation of experimental models, testing and analysis. Simulation languages comparison and selection, study of Simulation sw -SIMULA, DYNAMO, STELLA, POWERSIM.

Reference:
1. Gorden G., System simulation, Printice Hall.
2. Payer T., Introduction to system simulation, McGraw Hill.
3. Seila, Applied Simulation Modeling, Cengage
4. Spriet, Computer Aided Modeling and Simulation, W.I.A.

ELECTIVE-I (IT – 705(C))- CYBER LAW & FORENSIC
UNIT-I

Cyber world: an overview, internet and online resources, security of information, digital signature, intellectual property (IP), historical background of IP, IPR governance, National patent offices, the world intellectual property organization (WIPO).

UNIT-II

Introduction about the cyber space, cyber law, regulation of cyber space, scope of cyber laws: ecommerce; online contracts; IPRs (copyright, trademarks and software patenting), etaxation; e-governance and cyber-crimes, cyber law in India with special reference to Information Technology Act, 2000.

UNIT-III

Introduction to computer and cyber-crimes, Cyber-crimes and related concepts, distinction between cyber-crimes and conventional crimes, Cyber criminals and their objectives. Kinds of cyber-crimes cyber stalking; cyber pornography, forgery and fraud, crime related to IPRs, cyber terrorism; computer vandalism etc. Cyber forensics, computer forensics and the law, forensic evidence, computer forensic tools.

UNIT-IV

Regulation of cyber-crimes, Issues relating to investigation, issues relating to jurisdiction, issues relating to evidence, relevant provisions under Information Technology Act 2000, Indian penal code, pornography Act and evidence Act etc.

UNIT-V

Copyright issues in cyberspace: linking, framing, protection of content on web site, international treaties, trademark issues in cyberspace: domain name dispute, cyber-squatting, uniform dispute resolution policy, computer software and related IPR issues.

REFERENCES:
1. Nelson, Phillips, "Computer Forensics and Investigations", Cengage Learning India.
2. Vinod V. Sople, "Managing Intellectual Property" PHI Learning Private Limited.
3. Dr.R.K.Tiwari P.K.Sastri,K.V. Ravikumar, "Computer crime and Computer Forensics", First Edition 2002, Select publishers.
4. NIIT, Understanding Forensics in IT, PHI Learning.

IT 706- INDUSTRIAL TRAINING

SCHEME OF STUDIES
Duration: 2 weeks after the VI semester in the summer break, Assessment in VII semester.

SCHEME OF EXAMINATION
For the assessment of industrial training undertaken by the students, following components are considered with their weightage.
 (a) Term work
In Industry Marks allotted
1. Attendance and General Discipline
2. Daily diary Maintenance
3. Initiative and participative attitude during training
4. Assessment of training by Industrial Supervisor

(b) Practical/Oral Examination (Viva-Voce) In Institution Marks allotted
1. Training Report
2. Seminar and cross questioning (defense)

Marks of various components in industry should be awarded to the students, in consultations with the Training and Faculty of Institute and I/c of training from Industry. During training students will prepare a first draft of training report in consultation with section in-charge. After training they will prepare final draft with the help of Faculty of the institute. Then they will present a seminar on their training and they will face viva-voce on training in the institute.

1.1 OBJECTIVE OF INDUSTRIAL TRAINING

The objective of undertaking industrial training is to provide work experience so that student's engineering knowledge is enhanced and employment prospects are improved. The student should take this course as a window to the real World of Work and should try to learn as much as possible from real life experiences by involving and interacting with industry staff. Industrial training also provides an opportunity to students to select an engineering problem and possibly an industry guide for their Major Project in final semester.

Industrial training of the students is essential to bridge the wide gap between the classroom and industrial environment. This will enrich their practical learning and they will be better equipped to integrate the practical experiences with the classroom learning process.

1.2 LEARNING THROUGH INDUSTRIAL TRAINING

During industrial training students must observe following to enrich their learning:

- Industrial environment and work culture.
- Organizational structure and inter personal communication.
- Machines/ equipment/ instruments - their working and specifications.
- Product development procedures and phases.
- Project planning, monitoring and control.
- Quality control and assurance.
- Maintenance system.
- Costing system.
- Stores and purchase systems.
- Layout of Computer/ EDP/MIS centres.
- Roles and responsibilities of different categories of personnel.
- Customer services.
- Problems related to various areas of Work etc.