

3. Distributed Operating Systems : Concept and Design by P.K. Sinha, PHI
4. Distributed Operating System by Tenenbaum. Pearson Education

05 1x16 COMPILER DESIGN

L-T-P : 3-0-3

Credit : 5

1. **Introduction to Compilers** : Compilers and translators, The phases of a compiler, Compiler writing tools, The lexical and System structure of a language, Operators, Assignment statements and parameter translation.
Lecture : 2
2. **Lexical Analysis** : The role of the lexical analyzer, Specification of tokens, Lexical analysis tool.
Lecture : 2
3. **Syntax Analysis** : Role of Parser, CFG, Top – down parsing, Operator – precedence parsing, LR Parsers, The Canonical Collection of LR (0) items, Constructing SLR, Canonical LR and LALR parsing tables, Use of ambiguous grammars in LR parsing, An automatic parser generator, Implementation of LR parsing tables and constructing LALR sets of items.
Lecture : 10
4. **Syntax Directed Translation** : Syntax tree, Bottom-up evolution of S-attributed definitions, L-attributed common top-down translation, Bottom-up evaluation of inherited attributed, Recursive evaluators.
Lecture : 5
5. **Type Checking** : Static Dynamic Checking, Type expression, Type Checking, Type Equivalence, Type Conversion.
Lecture : 2
6. **Symbol Tables** : Structure of Symbol Table, Simple Symbol Table (Linear Table, Ordered List, Tree, Hash Table, Scoped Symbol Table (Nested Lexical Scoping, One Table per Scope, One Table for all Scopes).
Lecture : 3
7. **Intermediate Code Generation** : Intermediate Language, Intermediate representation Technique, Three-address code, Translation of assignment statements, Boolean expressions, Control Flow, Case Statement and Function Call.
Lecture : 4
8. **Code Generation** : Factors affecting code generation, Basic Block, Code generation for tree, Register and assignment, DAG representation, Code generation using dynamic programming, code- generator generators.
Lecture : 4
9. **Error Detection and Recovery** : Errors, Lexical-Phase errors, Syntactic-Phase errors, Semantic errors.
Lecture : 2
10. **Code Optimization** : Need for optimization of Basic Blocks, Loops in flow graph, Optimizing transformation Compile time evaluation, common sub-expression elimination, Variable Propagation, Code Movement Optimization, Strength Reduction, Dead code optimization, Loop Optimization), Local Optimization, Global Optimization, Computing Global data flow equation, Setting up data flow Equations, Data Flow Analysis.
Lecture : 10

Text Books:

1. Compilers Principles .Techniques. And Tools by Alfred V. Aho. Ravi Sethi Jeffery D. Ullman. Pearson Education.
2. Compiler Design by Santanu Chattopadhyay. PHI

Reference Book

Modern Compiler Design by Dick Grune . E. Bal. Criel J.H.Jacobs. And Koen G. Langendoen Viley Dreamtech.

Programming Lab (System Programming)

Design of lexical analyzers. Design of parsers like recursive – descent parser for a block structured language with typical constructs, Typical exercises using LEX and YACC, Quadruples/Triplex generation using LAX and YACC for a subset of a block structured language, LR (0), SLR, LALR error detection and recovering with code optimization.

05 1x17 ARTIFICIAL INTELLIGENCE

L-T-P : 3-0-3

Credit : 5

1. **Introduction** : Why AI, Importance of AI. LISP, Prolog and other programming language for AI.
Lecture : 3
2. **Search Strategies** : Representation Scheme, Blind Search technique, Heuristic Search technique, Game search, Graph search (algorithm A and A*), Properties of A* algorithm, monotone – Specialized production systems – AO * algorithm.
Lecture : 15
3. **Searching Game Trees** : Minimax procedure, alpha-beta pruning – Introduction to predicate calculus – Resolution refutation systems – Answer extraction.
Lecture : 4

4. **Knowledge Representation, Reasoning** : Knowledge representation, Knowledge acquisition, Logical Representation scheme, procedural representation schema, network representation scheme, STRIPS robot problem solving system, Structured representations of knowledge (Semantic Nets, Frames, Scripts), KRR system, KR language, Domain modeling, Semantic net. **Lecture : 8**
5. **Uncertainty** : Non monotonic & monotonic reasoning, confidence factors, Bayes theorem, Dempster & Shafer's, Theory of evidence, Non-classical logic, Fuzzy reasoning. **Lecture : 6**
6. **Natural Language Processing** : An Introduction to Natural language Understanding, Perception, Learning. **Lecture : 4**
7. **Applications of Artificial Intelligence** : AI in E-commerce, AI in Industry, AI in Medicine **Lecture : 2**

Text Books:

1. Introduction to Artificial Intelligence by Rajendra Akerkar, PHI
2. Introduction to Artificial Intelligence by Eugene Charniak, Pearson Education.
3. Artificial Intelligence by Rich & Knight. Tata McGraw Hills.
4. Introduction to Artificial Intelligence & Expert system by Dan W. Patterson, PHI

Reference Book:

1. Artificial Intelligence. A Modern Approach by Stuart Russell. Peter Norving and Pearson Education.
2. Introduction to Expert System, Peter Jackson. Pearson Education.
3. Artificial Intelligence application programming by M. Tim Jones, Dreamtech Press

Programming Lab (AI)

Implementation in all algorithms in LISP/Prolog

05 1x18 CRYPTOGRAPHY

L-T-P : 3-0-0

Credit : 3

1. **Introduction** : The OSI Security Architecture, Security attack, Security Services, Security Mechanism, A model for Network Security. **Lecture : 4**
2. **Symmetric Cipher** : Classical Encryption Techniques, Symmetric Cipher Model, Block Cipher Principles, DES, Cryptanalysis, Block Cipher Design Principle, The Euclidean Algorithm, Finite field of Form $GF(p)$, Advance Encryption Standard (AES), AES Cipher, Multiple Encryption and Triple DES, Stream, Placement of Encryption Function, Traffic Confidentiality, Key Distribution, Random number generation. **Lecture : 15**
3. **Public Key Encryption and Hash Function** : Fermat's & Euler's Theorems, The Chinese Remainder Theorem, RSA Algorithm, Diffe-Hellman Key Exchange, Elliptic Curve Cryptography, Message authentication code, Security of Hash Functions and MACs, Secure Hash algorithm, Whirlpool, HMAC, CMAC, Digital Signature. **Lecture : 12**
4. **Network Security Applications** : Kerberos, X.509 Authentication Service, S/MIME, IP Security Architecture, Encapsulating Security Payload, Secure Socket Layer (SSL), Transport layer security, Secure Electronic Transaction. **Lecture : 6**
5. **System Security** : Intrusion detection, Password Management, Virus countermeasure, Denial of Service Attack, Firewall design principles, Trusted System. **Lecture : 6**

Text Book :

1. Cryptography and Network Security : Principle and Practice, 4e by William Stallings, Pearson Education/PHI.

Reference Books :

1. Beginning Cryptography with Java by David Hook, Wiley Dreamtech.
2. Modern Cryptography Theory & Practices by Wenbo Mao, Pearson Education.
3. Cryptography for Database and Internet Application by Nick Galbreath, Wiley Dreamtech.
4. Network Security : Private Communication in a Public World, 2e, by Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson Education.

05 1x19 MOBILE AND WIRELESS COMPUTING

L-T-P : 3-0-0

Credit : 3

1. **Introduction** : Mobile computing, Middleware and Gateway **Lecture : 1**