Syllabus of M.Sc Department of Computer Science
University of Peshawar

M.Sc Final
PAPER-7   ANALYSIS OF ALGORITHMS & ADVANCED PROGRAMMING

ANALYSIS OF ALGORITHMS:

Introduction, Properties of algorithms, features of algorithms, factors influencing the performance of algorithms (not in control of the programmer), Analysis of Algorithms, classification of algorithms, computational complexity, Asymptotic Notations, usefulness and limitations of the Asymptotic notation, Basic Recurrences, Recurrence Solutions, Factors influencing the execution time of an algorithm, some examples to calculate the T(n) of algorithms (including examples from searching and sorting), implementation of algorithms, rules for implementation, empirical analysis, Introduction to Generation functions, system approach, algorithms and systems, dynamic programming, greedy algorithms, divide and conquer approach.

Books:
1. Introduction to Algorithms by Thomas H. Corman et al, The MIT Press, 2nd Ed, 2001.
2. An Introduction to the Analysis of Algorithms by Robert Sedgewick et al, Addison-wesley Publishing Company, 1995.

ADVANCED PROGRAMMING:

Overview, Advanced programming techniques and application in Java.
Exception Handling in Java. Multithreading, Networking Basics, InetAddress, TCP/IP Client Sockets, URL, Datagrams, Servlets, Java Beans,   RMI, JDBC, Introduction to JSP
Books:
1. Patric Naughton, Herbert Schildt "The Complete Reference, Java 2 "5th   ed, Osborne, MC Graw Hill corp.2002)
2. Advanced Java 2 Platform: How to Program
   by Harvey M. Deitel, Paul J. Deitel, Harvey M. Deitel   Prentice Hall;2001
3. JDBC API Tutorial and Reference, Third Edition
   by Maydene Fisher, Jon Ellis, Jonathan Bruce Addison-Wesley Professional; 3 edition (June 11, 2003)
4. Java RMI by William Grosso O'Reilly; 1 edition (October 15, 2001)

PAPER-8   SOFTWARE ENGINEERING

Software Engineering Concepts and Principles: Introduction, Software process Models, and Software Process Management. Functional-Oriented Software Engineering: System Engineering, Analysis Concepts and Principles, Analysis Modeling, Design Concepts and Principles, Design Methods, Software Testing. Object-Oriented Software Engineering: Object-Oriented Concepts and Principles, Object-Oriented Analysis, Modeling, and Design using UML Approach, Object-Oriented Software Testing. Technical Matrices for Software: Case Studies with Functional-Oriented and Object-Oriented Software Engineering: Practical work in CASE Tools
Like Visio, Rational rose, and MS-Project.
Recommended Books:
1. Software Engineering: A Practitioner's Approach 5th Edition by Roger S. Pressman, Mc-Graw-Hill International, 2001.
2. Software Engineering By lan Sommerville, 5th Edition, Addison Wesley Instant UML by Pierre-Alain Muller, Wrox Publications,2002.

PAPER-9   COMPILER CONSTRUCTION

Automata Theory
        Languages, Defining Languages
        Regular Expressions
        Finite Automata, NFA, DFA, Conversion, Optimization
        Push-Down Automata, Grammars, Types, CFG
        Turing Machines
Introduction to Compilers
        Logical and Physical Organization, Compiler-Like Tools
Lexical Analysis
        Role, Issues, Implementation
Syntax Analysis
        Grammars, Parsing, Implementation
Semantic Analysis and Type Checking
        Error Handling
        Symbol Tables
        Run-Time Environments
Intermediate Code Generation
Code Optimization
Code Generation
Compiler-Compilers

Recommended Readings:

1.   Compilers: Principles, Techniques, and Tools
        By Alfred V. Aho, Ravi Sethi, Jeffery D. Ulman, 1989, Prentics Hall
2.   Crafting a Compiler by Charles N. Fischer, Rechard J. LeBlanc, Prentics Hall, 1990.
3.   Theory and practice of Compiler Writing
        By Jean Paul Tremblay, Paul G. Sorenson, McGrawHill, 1992
5.   Introduction to Computer Theory by Daniel I. A. Chen, McGrawHil, 1992
6.   Formal Languages and Automata Theory by Vladimir Drobot., Prentics Hall, 1992

PAPER-10   ELECTRONIC COMMERCE

-Introduction to E-Commerce
-Understanding E-Commerce
-E-Commerce applications
-Firewalls and transaction security
-Electronic payment systems
-Electronic Commerce and banking
-Vendor management systems
-Extended supply chain management
-Component-based development for E-Commerce
-Technology issues and strategies
-Intranets and web technology

Recommended Readings

1.   Electronic Commerce by M. Greenstein and T.M. Feinman, Mc Graw-Hill
        International Editions, 2000
2.   Beginning E-Commerce by M. Reynolds.
        Shroff Publishers and Distributers Pvt. Lmt., 2000
3.   Electronic Commerce –A manager's guide by R.Kalakota and
        A.B. Whinston Addison-Wesley, 1997

PAPER-11   ARTIFICIAL INTELLIGENCE

Intelligence, Artificial Intelligence (AI), Introduction to difference branches of AI e.g. Natural Language Processing, Expert Systems, Speech Processing, Computer Vision, robotics, Machine Learning, Pattern Recognition and Neural Networks.

Natural Language Processing: Difference with computer language, understanding: syntax, semantics, phonetics, morphology discourse analysis, anaphora, cataphors, cohesion, coherence, ellipse, ambiguity, Generation

Machine Translation (MT): Steps, strategies, units, and some existing MT systems.

Expert Systems: State transition model, the structure of a state space, search, functions for handling lists, knowledge elicitation, knowledge representation, existing expert systems, knowledge-bases systems

Propositional/Predicate logic, Visual Prolog language.

Recommended Readings:
1.   Understanding Natural languages by Terry Winograd,
        Edinburgh University Press 1972
2.   Language as cognitive process by Terry Winograd, Addison-Wesley Publishing
        Company, 1983.
3.   Artificial Intelligence by Elain Rich, McGraw-Hill books Company, 1989.
4.   Crash Course in Artificial Intelligence and Expert systems by Louise E. Frenzel,
        Jr. Howard W. Sams & Co, 1987.
5.   Text based machine translation by M.A. Khan, 1995
6.   Speech and Language Processing by Daniel Jurafsky and Martin; Pearson Education: 2000