

**Department of Computer Science
University of Peshawar**

UNDERGRADUATE CURRICULUM

BCS

Code: BCS481

Cred Hrs: 3

Software Project Management

Introduction to Software Project Management

- a) Introduction, the increasing Demand for Software
- b) The Role of Management in Software Development
- c) Gaining acceptance for New Development Procedures

Software Development Problems

Basic Problem, Risk analysis

Software Development under Contract

- a) The Customer-Developer Relationship, the Cost-Pls vs Fixed Price Dilemma
- b) Other Customer-Developer Relationships, the Request for Proposal (RFP)
- c) The Proposal, F) the Proposal Review and STECTION Process, the Proposal Selection Board
- d) Proposal Evaluation Methods Some Additional Proposal Considerations

The Software Development Cycle

- a) Variations on a Waterfall Theme, the concept Phase, the Software Requirements Phase
- b) The Design Phase, the Implementation Phase, the Integration Test Phase
- c) The Atmosphere During the Integration and Test phase
- d) Problems During the Integration and Test Phase

The Maintenance Phase

- a) The Atmosphere During the Maintenance Phase, Problem During the Maintenance Phase
- b) IEEE standrad1074: a standard for Software Life Cycle process
- c) The Selection of the Project software Life Model Project Management Processes
- d) Pre-Development Process, Development Process, Post-Development process
- e) Integral Processes

Managing Software Engineering and handling Large Projects

- a) The Software Project Organizational Structure, the Team Structure
- b) Basic reporting Techniques, Status Report, Project Status meetings
- c) General Guidelines for Managing Software Engineers, Large Need Not Mean Difficult
- d) Stepwise Refinement, the Work Breakdown Structure, Handling Large Project

Software Project Management in a Clint/Server Environment

- a) An Introduction to Clint/Server Environments, the Network
- b) Project Management Advantages and Disadvantage of a Clint/Server Environment
- c) Selecting a Clint/Server Environments, Project Management
- d) Tips for Managing Clint/Server Environments

Project Support Functions & Software Development Standards

- a) Project management Support, Software Configuration Control (SCC)

- b) Software Quality Assurance (SQA), Development Standard: the Necessary Evil
- c) An Overview of Software Development Standards, US DOS Standard 2167
- d) The IEEE Software Engineering Standards, European Software Standards
- e) The Ada standards, Other software Development Standards

Project Scheduling and Preparation of Estimates

- a) Scheduling: the Problem, the Project Development Plan, Scheduling Activities and Milestones
- b) Gantt Charts, PERT Charts and the Critical Path, Scheduling Personnel
- c) Scheduling Resources, Monitoring and updating the Schedule
- d) Some General Guideline for Scheduling and Planning
- e) Estimation the Problem, Project Estimates Stepwise Estimation
- f) Estimating New Development, the Constructive Cost Model
- g) Function Point Analysis, the Constructive Cost Model (COCOMO)
- h) Non-Development Overhead

Books:

Edwin M. Bennatan, Software Project Management: A Practitioner's Approach, 2nd Edition, Computing McGraw-Hill, 1992.

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Natural Language Processing

Monolingual Natural Language Processing:

Difference between natural and formal languages.

Natural language understanding: syntax, semantics, phonetics, morphology, discourse analysis.

anaphora/cataphora, cohesion/coherence, ellipses, ambiguity (structural, lexical, transient, discourse).

Natural language Generation: steps in generation.

Natural Language Interfaces.

Machine Translation:

Translation steps: analysis, transfer and generation.

Translation Strategies: direct translation, interlingua and transfer.

Types: Bilingual, Multi-lingual.

Dictionary design: monolingual, bilingual.

Units of translation: word, sentence, discourse.

Some operational and R&D machine translation systems.

Speech translation, benefits of machine translation, integration of machine translation to other fields of computer science, Urdu, Pashto and machine translation.

Books:

1. *Terry Winograd, Understanding Natural language, Addison-Wesley Publishing Company, 1972.*
2. *M. A. Khan, Text Based Machine Translation, 1995.*
3. *Daniel Jurafsky and James H. Martin, SPEECH and LANGUAGE PROCESSING: An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition, Pearson Education, Inc, 2000.*

Code: BCS483

Cred Hrs: 3

Software Project-II

Code: BCS484

Cred Hrs: 3

Introduction

Images as Digital Objects
Images Storage and Display
Image Acquisition
Image Types and Application

Bi-Level Images

Usefulness of Bi-Level Images
Connectivity and Geometry
Measurable Properties of Regions
 Area
 Perimeter
 Length
 Moments – Center of Mass
 Simple Shapes
 Derivative and Complex Shape Measures
Operations on Bi-Level Image
 Boundary enhancement
 Erosion and dilation
 Sketonization
 Chain Code
 Run-Length Coding

Grey-Level Images

Introduction to Multiple Levels and Histograms
Thresholding
 Selecting a Single Threshold
 Selecting Multiple Threshold
 Grey-Level Modification
 Line and Edges
Geometric Operation
Noise
Color

Classifying and Recognizing Object

Features
Statistical Pattern Analysis
Decision Functions
Template Matching
Structural Methods
 1. Representing Relationship
 2. Identifying Components

Counting and Classifying Objects

Counting Simple Objects
Classifying Seeds
Classifying Galaxies
Detecting Forged Signatures

Computer Readable Codes

The Universal Product Code
Fonts for Machine Readable Text
Reading Printed Text
The General OCR Problem

Scientific Images

Chromatography and DNA Sequencing: Biology

Stellar Image: Astronomy

Voyager Image Color Synthesis

Making Distance Measurements: Archaeology

Books:

1. *J. R. Parker, Practical Computer Vision Using C, John Wiley & Sons, 1993.*
2. *R. C Gonzalez and R. E. Woods, Digital Image Processing, Addison-Wesley Publishing Company, 1992.*

Code: BCS485

Cred Hrs: 3

Network Security

Principles and practices of Network Security, potential threats in connected environment and strategies to avoid, classical and contemporary cryptographic theories, cryptography as a tool to secure network communication, Modern SPN ciphers, block and stream ciphers. DES algorithm and public key cryptography. Linear cryptanalysis, key distribution and management, digital signatures and authentication. Data communication security protocols like IPSec, SSL etc. Secure voice communications, viruses and worms, denial of service attacks, firewalls. Digital Cash. Bio Authentication Algorithms.

Books:

1. *Mark Rhodes-Ousley, Roberta Bragg, Keith Strassberg, Network Security: The Complete Reference, 1st Edition, McGraw Hill, 2003.*
2. *Eric Maiwald, Network Security: A Beginner's Guide, 2nd Edition, McGraw Hill Osborne Media, 2003.*

Code: BCS486

Cred Hrs: 3

Modeling and Simulation

Introduction to OPNET: Introduction, Tool Environment, System Buttons, Tools, Online Documentation.

Introduction to Network Simulation: M/M/1 Queue Example, objectives, M/M/1 Queue Extensions. Automatic Request Repeat (ARQ) Protocols: Objectives, Preparation, Stop and Wait, Go-Back-N, Selective Repeat, Conclusions.

Multiple Access Protocols: Objectives, Preparation, Aloha, CSMA, Ethernet, Token Ring, Conclusions.

Frame Relay: Objectives, Preparation, Network Model, Specify Probes, Prepare a simulation Set Object, Conclusions, extensions.

Fiber Distributed Data Interface: Objectives, Network Model, Specify Probes, Simulation, Execution and Result Analysis, Conclusions.

Job Service Disciplines: First-in-First-out, Priority Job Discipline, Preempt and Resume, Processor sharing, Shortest –job First discipline, Conclusions.

Books

1. *Modeling and Simulation Communication Networks: A hands on Approach Using OPNET, 1st Edition, Prentice Hall Inc, 1998.*
2. *Andrew S. Tanenbaum, Computer Networks, 3rd Edition, Prentice Hall, 1996.*

Code: BCS487

Cred Hrs: 3

Database Administration

Data administration objectives and functions. Data dictionary: Management uses and features. Developing a Data Dictionary System. Database security: Threats Analysis, Cryptographic controls. Database Integrity. Auditing of databases. Evaluation of Controls. Case histories.

Books:

1. *Craig S. Mullins, Database Administration: The Complete Guide to Practices and Procedures, 1st Edition, Addison Wesley Professional, 2002.*
2. *Jeffery A.Hoffer, Mary Prescott, Fred McFadden, Modern Database Management, 7th Edition, Prentice Hall, 2004.*

Code: BCS488

Cred Hrs:3

Telecommunication systems

Introduction to media, bandwidth and noise, twisted pair (UTP, STP), coaxial cables (types and specification), optical fibers (types), introduction to optical sources and detectors, microwave links, satellite communication and infrared links, switching, circuit and packet switching, introduction to mobile and cellular communication, block diagram and current trend.

Analog modulation schemes: AM, DSBSC, SSB, FM and PM; FDM and FDMA concepts; carrier frequency recovery and phase locked loop. Analog Mobile System (AMPS). Partial digital systems, PAM, PCM, DPCM, Delta Modulation. Frame synchronization. Telephone systems(TDM); Digital satellite systems(TDMA).Simple Digital systems: Binary modulation, QPSK, Binary FSK. Digital Mobile Systems (GSM, CDMA and GPRS). Satellite Mobile Systems. Simple network concepts, Telephone network.

Books:

1. *Annabel Z. Dodd, The Essential Guide to Telecommunications, 2nd Edition, Prentice Hall incorp, 1999.*
2. *William Stallings, Data and Computer Communications, 5th Edition, Prentice Hall, 1994.*
3. *Andrew S. Tanenbaum, Computer Networks, 2nd Edition, Prentice Hall Inc, 1995.*

Code: BCS489

Cred Hrs: 3

Multimedia Technologies

Introduction to multimedia programming, scope of multimedia programming, convention and trends, media used in current application (including digital video, audio, and graphics), system level

issues of performance synchronization, storage and server schemes, dynamic Interactivity, hyperlinking, multimedia, device control, distributed media development and delivery, non-standard media and programming frame works, introduction to multi-media networks.

Books:

1. *Stephen M. Alessi, Stanley R. Trollip, Multimedia for Learning: Methods and Development, 3rd Edition, Allyn & Bacon, 2000.*
2. *Richard E. Mayer, Multimedia Learning, New Edition, Cambridge University Press, 2001.*