SARDAR PATEL UNIVERSITY
VALLABH VIDYANAGAR

MASTER OF PHILOSOPHY (Computer Science)
Effective from June – 2017-18
Syllabus Semester –I

COURSE NO: MS01CCST21
Research Methodology – I

(Total Credits : 2 Lectures per week : 2 Total Marks: 100)

Unit – I: Introduction to Research Methodology

Meaning of Research
Objectives of Research
Motivation in Research
Types of Research
Research approaches
Significance of Research
Research method versus methodology
Research and scientific method
Importance of knowing how research is done
Research process
Criteria to good research

Unit – II: Defining the Research Problem

What is research problem?
Selecting the problem
Necessity of defining the problem
Techniques involved in defining a problem

Unit – III: Research Design

Meaning of Research Design
Need for Research Design
Features of a good design
Important concepts relating to research design
Different research designs
Basic principles of experimental designs
Developing a research plan

Unit – IV: Sampling Design

Census and sample survey
Implications of sample design
Steps in sampling design
Criteria of selecting sampling procedure
Characteristics of good sample design
Different types of sample designs

Reference:

1. C.R. Kothari., Research Methodology, Methods and Techniques, New Age International Publishers.

COURSE NO: MS01CCST22
Recent Trends in ICT - I

(Total Credits : 3 Lectures per week : 3 Total Marks: 100)

Unit – I: Trends in Operating System Design

Survey of different kinds of operating systems
Real-time systems
Distributed operating systems
Embedded systems

Unit – II: Trends in Communication Technology-I

IPv6
Bluetooth technology
Gigabit Ethernet

Unit – III: Trends in Communication Technology-II

Wireless Networks
Mobile communication
Wireless Geolocation, Global Positioning System (GPS)
Virtual Private Networks

Unit – IV: Trends in Software Development Methodologies

Agile computing
Web Application Development Methodologies-An Introduction
Service Oriented Architecture
New development tools, languages and technologies

References:

1. Tanenbaum A.S., Computer Networks, Fourth Edition, Prentice-Hall of India Pvt. Ltd., 2003.
2. Comer Douglas E., Computer Networks and Internets, Prentice-Hall Pub., 2000.
3. Pahlavan K.and Krishnamurthy P., Principles of Wireless Networks, Pearson Education,
4. Quinn Michael J., Parallel Computing – Theory and Practice, McGraw-Hill Pub., 1994.
5. Tanenbaum A.S., Modern Operating Systems, Prentice-Hall of India Pvt. Ltd., 1999.

COURSE NO: MS01CCST23

Advanced Technologies in Computer Science - I

(Total Credits : 3 Lectures per week : 3 Total Marks: 100)

1. Computer Graphics

Introduction of Computer Graphics, Graphics Functions,
Introduction of Display devices, Input devices, Output Primitives and Attributes of output primitives,
Two Dimensional Transformations (with examples)
Clipping Algorithms,
Two dimensional viewing.
3D coordinate systems, 3-D display methods: Parallel projection, perspective projection.
3D Object representations: Polygon Surfaces,
Curved lines and surfaces, Quadratic surfaces,
Introduction of blobby objects and Spine representations,
3D geometric transformations (with examples) Introduction of 3D viewing

2. Introduction to Artificial Intelligence Techniques

Problem Solving through AI: Definitions and History of AI, Turing Test,
AI based Search Methods,
Knowledge Based Systems,
Categories of Knowledge Based Systems, Structure of KBS,
Introduction to Natural Language Processing and Soft Computing Systems such as Artificial Neural Network and Genetic Algorithms.

3. Data Mining - I

Data Mining - Introduction
Introduction to Data Warehouse Architecture (System Process)
Process flow within an data warehouse
Extract and Load Process
Clean and Transform data
Backup and Archive Process
Query Management Process

4 Software Testing

Definition of Software, Software Engineering Phases,
Testing as a Major Quality Control,
Top-down and Bottom up Testing Approaches,
Unit Testing and Integrated Testing,
Black Box and White Box Testing,
Special System Tests,
Test Matrices.

MAIN REFERENCE BOOKS:

1. Donald Hearn & M. Pauline Baker: Computer Graphics, PHI, 1995.
2. Akerkar RA and Sajja P S, Knowledge-Based Systems, Jones & Bartlett Publishers, Sudbury, MA, USA, 2009
3. S. Anahory & D. Murray: Data Warehousing in the real world – Addison Wesley
4. Jalote Pankaj: Integrated Approach to Software Engineering, 3rd Edition, Narosa Publishing House, 2005

BOOKS FOR ADDITIONAL READING

1. Foley J. D., Van Dam A.: Fundamentals of Interactive Computer Graphics, Addison-Wesley, 1982.
2. Rushell and Norvig, Modern Approach to Artificial Intelligence, Prentice Hall of India Ltd., 2006
3. Pieter Adriaans, Dolf Zantinge, "Data Mining", Addison Wesley, 1996.
4. Roger S. Pressman: Software Engineering, A Practice Approach, 6th Edition, Mc-Graw Hill International Edition, 2005

COURSE NO: MS02CCST21
Research Methodology – II

(Total Credits : 2 Lectures per week : 2 Total Marks: 100)

Unit – I: Methods of Data Collection

Collection of primary data
Observation method
Interview method
Collection of data through questionnaires
Collection of data through schedules
Difference between questionnaires and schedules
Collection of secondary data
Selection of appropriate method for data collection

Unit – II: Processing and Analysis of Data - I

Statistics in Research
Measures of Central Tendency
Measures of Dispersion
Measures of Asymmetry

Unit – III: Processing and Analysis of Data - II

Measures of relationship
Simple regression analysis
Multiple correlation and regression
Partial correlation

Unit – IV: Testing of Hypotheses

What is a hypothesis?
Basic concepts concerning testing of hypothesis
Procedure for hypothesis testing
Flow diagram for hypothesis testing
Measuring the power of hypothesis test
Tests of hypothesis

Reference:

6. C.R. Kothari., Research Methodology, Methods and Techniques, New Age International Publishers.

COURSE NO: MS02CCST22
Recent Trends in ICT – II

(Total Credits : 3 Lectures per week : 3 Total Marks: 100)

Unit – I: Trends in System Security

Security and Protection in Information Systems
Cyber crime - an introduction
Firewalls
Computer viruses – an introduction
Cryptology
Fundamental algorithms used in cryptography
Substitutional and transposition ciphers
Digital signatures

Unit – II: Trends in Database Technology

Traditional DBMS
Big Data: Introduction, Elements, Analytics.
Applications of Big Data
Technologies for Handling Big Data
Future of Big Data

Unit – III: Trends in Internet-Based Computing

Cloud Computing: Introduction, Elements of Cloud, Management of Cloud, Securing the Cloud, Introduction to Mobile Cloud Computing
Internet of Things (IoT): Introduction, Technological Framework of IoT, IoT applications of Home, Office, Fashion, Transport, Healthcare
Web of Things (WoT): Introduction, Architecture and Framework, Applications of WoT

Unit –IV: Trends in Hardware Technology

Trends in processor technology
Trends in storage technology
Trends in I/O technology

References:

1. Tanenbaum A.S., Computer Networks, Fourth Edition, Prentice-Hall of India Pvt. Ltd., 2003.
2. Kris Jamsa, Cloud Computing, Jones & Bartlett Learning, 2013
3. Big Data; Black Book, Comprehensive Problem Solver, Dreamtech Press

COURSE NO: MS02CCST23
Advanced Technologies in Computer Science - II

(Total Credits : 3 Lectures per week : 3 Total Marks: 100)

1. Image Processing

Introduction, applications and components of Image processing system, Human vision system,
Image Representation (Graphics file formats: BMP, JPEG, GIF, TIFF, PNG),
Image Digitization,
Image Enhancement: Contrast Intensification (with examples) and smoothing (with examples),
Sharpening and noise reduction,
Color image processing: Color theory, color models and conversion between color models,
Introduction to Image compression & Registration,
Multi-Valued Image processing (Multi-spectral & Multi-modal) with applications, Image fusion,
Introduction of Image restoration, Image analysis and Image understanding.

2 Fuzzy Logic Based Systems

Fuzzy Logic, Fuzzy Sets
Membership Functions
Fuzzification and Defuzzification Methods
Operations on Fuzzy Sets
Types of Fuzzy Functions
Fuzzy Rule Based Systems
Applications and Examples

3 Data Mining - II

Introduction to Data Warehouse Architecture (Process Architecture)
Load and Warehouse Manager
Query Manager
Detailed and Summary Information
Metadata
Data Marting

4 Principles of Object Oriented Technologies

Key Concepts: Object, Messages, Classes
Key Mechanism: Encapsulation, Inheritance, Polymorphism.
Key Advantages: Productivity, Quality, Adoptibility.
Key Success Factors: Motivation, Education, Determination.

MAIN REFERENCE BOOKS:

1. B. Chanda, D. Dutta Majumder: Digital Image Processing and Analysis:, PHI, 2000.
2. S. Rajasekaran and G. A. Vijayalakshmi Pai: Neural Networks, Fuzzy Logic, and Genetic Algorithms - Synthesis and Applications: PHI, 2012.
3. S. Anahory & D. Murray: Data Warehousing in the real world – Addison Wesley.
4. Saba Zamer, Handbook of Object Technology, CRC Press< Washington DC, 1999.

BOOKS FOR ADDITIONAL READING

1. Rafael C. Gonzalez. Richard E. Woods: Digital Image Processing, Pearson Education, 2002.
2. Akerkar RA and Sajja P S, Knowledge-Based Systems, Jones & Bartlett Publishers, Sudbury, MA, USA, 2009
3. Pieter Adriaans, Dolf Zantinge, "Data Mining", Addison Wesley, 1996.

Course NO: MS03CCST21
Title of Paper: Project Work – I

(Total Credits : 4 *Total Marks: 100)*

COURSE CONTENT :

It is a full time project work of one semester duration. Students are supposed to get the dissertation definition as well as analyze and understand the problem and/or understand the design and develop the system function(s). The work done in the documented form is to be submitted at the end of the dissertation duration.

Course NO: MS04CCST21
Title of Paper: Project Work – II

(Total Credits : 4 *Total Marks: 100)*

COURSE CONTENT :

It is a full time dissertation work of one semester duration. Students are supposed to get the dissertation definition as well as analyze and understand the problem and/or understand the design and develop the system function(s) or they can extend the dissertation work carried out in third semester. The work done in the documented form is to be submitted at the end of the dissertation duration.