

Tilak Maharashtra University
Bachelor of Computer Applications
Syllabus 2018

BCA – 240 -18 Statistics

Course Outline

1. Statistics

Importance of statistics, scope of statistics in industry Economics, social sciences, management's sciences

2. Statistical Data

Types, variable, raw data attributes, primary and secondary data, Graphical representation of data, histogram, frequency, polygon, Ogive curves, diagrammatic representation of data. Simple bar diagram, subdivided bar diagram, pie diagram.

3. Measures Of Central Tendency

Concepts of central tendency of data, arithmetic mean, median, mode, Effects of change of origin scale on mean, numerical problems.

4. Measures Of Dispersion

Measures of dispersion absolute and relative measure of depression, Range, mean, variance, standard deviation coefficient of variation. Numerical problems.

5. Correlation

Correlation concept, Covariance, Coefficient of Correlation and Numerical problems

6. Linear Regression

7. Index Numbers

Price and quantity index numbers, Laspeyre's, Paasche's and Fisher's properties and Numerical, cost of Living Index Number.

Reference Books:

Mathematics and Statistics:	-M. L. Vaidya, M. K. Kelkar
Statistical Analysis:	-A Computer Oriented Approach
Introduction to Mathematical Statistics	-S.C. Gupta
Introduction to calculus of finite differences	-Richardson C.

BCA – 241-18 Communication Skills

Course Outline

1. The Types of Business Communication

Business Communication

The Classification, Functions & Scope of Business Communication

Internal Communication

External Communication

2. The Communication Process

Elements of Communication

The Communication Cycle

The Barriers To Communication

3. The Principles of Communication

The Medium of Communication

Accuracy

Brevity

Clarity

Courtesy

4. The Modes of Communication

Introduction

The Types of Communication

Oral Communication

Written Communication

Non-Verbal Communication

Visual Signs in Non-Verbal Communication

Audio Signals in Non-Verbal Communication

Silence

Time

Touch

The Functions of Non-Verbal Communication

The Merits & Demerits of Non-Verbal Communication

5. Verbal Skills

Introduction

The Language used in Oral Communication

Verbal & Linguistic Modifiers & Regulators & Voice Culture

The Techniques of Delivery

6. The Art of Listening

Listening & Hearing

The Value of Listening

The Functions of Listening

The Pitfalls involved in Listening

The Process of Listening / The Principles of Listening

How to Listen Efficiently

The Barriers to Efficient Listening

The Types of Listening

7. Body Language

Introduction

The Types of Body Language

Facial Expressions

Kinesics Related To The Body

Touch

8. How to conduct Oral Communication

The Classification of Oral Communication

Dyadic Communication

Group Communication

Requests

Complaints

Inquiries

Introduction

Dictation

The Telephone

Interviews An Overview

At the Interview Venue

9. The Essentials of Written Communication

Introduction

Alignment

Font Style

Bold, Italics & Normal

Font Size

Indentation & Block Style

Items

Emphasis

Letter Heads

Continuation Sheets

Stationery

Presentation

Reference Books:

1. Communication Skills : Dr. Rao & Dr. Das- Himalaya Publishing House
2. Communication Skills : Dr. Urmila Rai, S.M. Rai – Himalaya Publishing house
3. Communication : By C.S. Rayadu - Himalaya Publishing House
4. Developing Communication Skills : Mohan Banerjee, Macmillan, India
5. Business Correspondance & report : R. C. Sharma, Krishna Mohan Writing- A Practical approach to Business & technical communication
6. Communication Skills for : Dr. Anjali Ghanekar, Everest Publishing

BCA – 242-18 Object Oriented Programming using C++

Course Outline

INTRODUCTION

C++ programming Basic

Object Oriented programming, Characteristics, Advantages of object Oriented programming over procedural language.

INTRODUCTION TO C++, EXTENSION OF C

Data types, constants, references, Variable, Loops and decisions

Arrays, strings and Structures Revision

Classes and objects

INTRODUCTION TO C++ CLASSES:

Data Members, Functions, Scope resolution operator,

Access specifier

New, delete operator, Static members.

CONSTRUCTOR and DESTRUCTOR

Encapsulation, Inline functions, and default parameters

Pointers and '*This*' pointer

OVERLOADING:

Function Overloading, Operator Overloading

Default Arguments

INHERITANCE:

Base class, derived class, Virtual Class, Abstract class.

POLYMORPHISM

Virtual functions, Pure Virtual functions and abstraction

Function Overloading and ambiguities

All remaining types of functions

STREAM CLASS, FILE INPUT/OUTPUT.

FStream classes, working with files with functions for reading and writing

EXCEPTION HANDLING.

Fundamental, Multiple catch statements, catching all exception

Templates concept

Revision and completion of all theory and practical assignments

Reference Books:

The complete reference

- Herbert Schildt

Object Oriented Programming in C++

- Robert Lafore

BCA – 243-18 Structured System Analysis and Design

Course Outline

1. System Concept and the information system environment

System concept definition, Characteristics of system, Boundaries and interface, Open and closed system, Types of system

2. Phases of Software Development Life Cycle

What are problem, Feasibility study, analysis, design, implementation, and maintenance

3. The role of System analyst

Academic and professional qualifications, the multifaceted role of the analyst, Change agent, Investigation and monitoring, Architect, Psychologist, The analyst/ User Interface, MIS organization

4. Different approaches to Software Development

Waterfall model, Spiral Model, Prototyping, RAD, Object oriented

5. Structured System Analysis Tools and Techniques

Fact finding tools and techniques, Functional Decomposition Diagram (FDD)

6. Application System Modeling

ER model (Data Modeling), Data Flow Diagram (Process Modeling)

7. Database Design Methods

Mapping ER diagram, Data Normalization techniques

8. Logic representation techniques

Decision trees, Decision tables, Structured English

9. Input/output form design

Input data, input media and devices, output design, form design, classification of form, form control

10. System testing and quality assurance

Nature of test data, test plan, system testing, quality assurance, audit trail

11. Hardware and software selection

Hardware suppliers, software suppliers, service suppliers, procedure for hardware and software selection

12. Implantation and software maintenance

Request for review, review plan, software maintenance, Maintenance procedure, reducing maintenance cost.

13. Project scheduling and software

Why do system fails, project management

14. Security and Recovery of systems

System security, Recovery planning

Reference Books:

System Analysis and Design	-	V. Raja Raman
Introduction to system Analysis	-	Skidmore
Introduction to system Design	-	Skidmore
System Analysis and Design	-	Elias M. Awad

BCA – 244-18 Principles and Practice of Management -1 Course Outline

1. Management an Overview:

- a. Meaning , Definition
- b. Nature of mgmt.
- c. Importance of mgmt.
- d. Functions of mgmt.
- e. Management as an art , a science and a profession
- f. Levels of management
- g. Managerial skills
- h. Distinguish between management, organization and administration

2. Evolution of Mgmt. thought :

- a. Contribution of F.W.Taylor
- b. Contribution of Henry Fayol
- c. Contribution of Elten Mayo
- d. management thoughts today(other contributions)

3. Planning :

- a. Meaning, definitions
- b. Nature , characteristics
- c. Process of planning
- d. Types of planning
- e. Essentials of good plan
- f. Importance, Advantages, Disadvantages

4. Forecasting:

- a. Meaning, definitions
- ~~b.~~ Importance
- c. Techniques
- d. Advantages and limitations

5. Decision making:

- a. Meaning and definitions
- b. Importance of decision making
- c. Types of decisions
- d. Process of decision making
- e. Styles of decision making
- f. Techniques used in decision making

6. Organizing:

- a. Meaning and definitions
- b. Features of organizational structure
- c. Types of organization:
 - a. Line
 - b. Line and staff
 - c. Functional
 - d. matrix
 - e. Committee
- e. Departmentalization
- f. Span of management
- g. Delegation of authority
- h. Centralization and decentralization

Reference Books:

1. Herald Koontz & O'Donnel : Principles of Management; McGraw Hill
2. L. M. Prasad : Principles & Practice of Management, Sultan Chand, Delhi
3. Dr. P. C. Pardeshi : Business Management, Nirali Prakashan, Pune

Course Outline

CHAPTER 1- INTRODUCTION TO NETWORKING

1.1 TYPES OF NETWORK CONFIGURATION

1.1.1 Peer-to-peer networks

1.1.2 Client/server networks

1.2 NETWORK TRANSMISSION TECHNOLOGIES

Broadcast network, Point – to- point network

1.3 TYPES OF NETWORK

1.3.1 Local area networks

1.3.2 Metropolitan area networks

1.3.3 Wide area networks

1.4 BASIC TYPES OF TOPOLOGIES

Star, Ring, Mesh, Tree, Hybrid

1.4.1 Physical Topologies,

1.4.2 Classification of Physical Topologies:

Linear Bus, Distributed Bus, Extended Star, Distributed Star, Dual-ring, Hierarchical Star, Star-wired Ring, Hybrid Mesh

1.5 NETWORK HARDWARE COMPONENTS

1.5.1 Network Interface Cards

Network Interface Cards (NICs), Bridges, Hubs, Switches, Routers

1.5.2 Cabling The OSI Reference Model

OSI Layer 1: The Physical Layer, OSI Layer 2: The Data Link Layer, OSI Layer 3: The Network Layer, OSI Layer 4: The Transport Layer, OSI Layer 5: The Session Layer, OSI Layers 6: The Presentation Layers, OSI Layers 7: The Application Layer

1.6 THE TCP/IP REFERENCE MODEL

The Internet Layer, The Transport Layer

1.7 PROTOCOLS AND NETWORKS IN THE TCP/IP MODEL INITIALLY

1.7.1 The Application Layer

1.7.2 The Host-to-Network Layer

1.8 IP ADDRESS CLASSES AND STRUCTURE

1.8.1 Understanding the Classes

1.8.2 Introducing Network ID and Node ID concepts

1.8.3 The Network and Node ID of each Class

1.8.4 What is Subnetting?

1.8.5 Understanding the concept

1.8.6 Subnetting Analysis

Understanding the use, and analysing different subnet masks, Common Subnet Masks

CHAPTER 2-INTRODUCTION TO CYBER SECURITY AND ETHICAL HACKING

2.1 WHY IS CYBER SECURITY A PROBLEM?

2.2 WHAT IS HACKING?

2.2.1 Who are Hackers?

2.2.2 What is Ethical Hacking?

2.2.3 Who are Ethical Hackers?

2.2.4 Who are crackers?

2.2.5 Hacker Vs Crackers

Features of Hackers, Features of Crackers

2.2.6 Classes of Hackers

Black Hat hacker, White Hat hackers, Grey hat hackers

2.3 ESSENTIAL TERMINOLOGY USED IN HACKING

2.4 WHAT DOES A MALICIOUS HACKER / CRACKERS DO?

2.5 WHAT DO ETHICAL HACKERS DO?

2.6 TYPES OF ATTACKS

2.6.1 Non-Technical Attacks

2.6.1.1 Bribery

2.6.1.2 Social Engineering

2.6.1.3 Shoulder Surfing

2.6.1.4 Dumpster Diving

2.6.2 Technical attacks

2.6.2.1 Network Infrastructure Attacks

2.6.2.2 Operating System Attacks

2.6.2.3 Application and Other Specialized Attacks

2.7 HACKTIVISM

2.8 COMPUTER CRIMES AND IMPLICATIONS

2.9 TYPES OF CYBER CRIME

2.10 INDIAN IT ACT 2000

AMENDS, RECOGNIZES ELECTRONIC EVIDENCE, JURISDICTION

SECTION 65: SOURCE CODE, SECTION 66: HACKING, SECTION 67: PORNOGRAPHY

WHAT IS SOCIAL ENGINEERING?

2.11 WHAT IS SOCIAL ENGINEERING?

2.11.1 Art of Manipulation

2.11.2 Human Weakness

2.11.3 Common Types of Social Engineering

2.11.4 Human based - Impersonation

2.11.5 Dumpster Diving

2.11.6 Shoulder Surfing

2.11.7 Computer Based Social Engineering

2.11.8 Reverse Social Engineering

2.11.9 Policies and Procedures

CHAPTER 3 – FOOTPRINTING

3.1 STEPS FOR GATHERING INFORMATION

3.2 SOME UTILITIES AND TECHNIQUES ARE:

3.2.1 Some Utilities and Techniques are:

Physical Ports like, Virtual Ports, Some software like:

3.3 THE SOFTWARE AND UTILITIES ARE

Nmap, Port Scan, Shadow Scan etc.

3.4 UNEARTHING INITIAL INFORMATION

Domain name lookup, Locations, Contacts (Telephone /mail), open source, Whois, Nslookup

3.5 What Is WHOIS?

A directory service, Protocol and application, Client/Server based, InterNIC and DDN (Defense Data Network) directories, Other WHOIS directories

3.5.1 WHOIS actually refers to three things:

3.5.2 WHOIS is used:

3.5.3 WHOIS can be accessed in a number of ways:

3.5.4 The WHOIS Command

3.6 NSLOOKUP

3.7 USING SAM SPADE

3.7.1 Basics Configuration

3.7.2 Header analysis

3.7.3 More advanced tools

3.8 ARIN

3.9 TRACEROUTE

3.10 NEOTRACE PRO

3.11 TOOL: VISUALROUTE TRACE

3.11.1 Running VisualRoute

3.12 TOOL: SMARTWHOIS

3.13 TOOL: CALLERIP

3.14 TOOL: MAIL TRACKING (MAILTRACKING.COM)

3.15 SUMMARY SCANNING

- 3.16 OBJECTIVES OF SCANNING:
- 3.17 SCANNING IS DONE TO DETECT LIVE SYSTEM ON THE TARGET NETWORK TO:
- 3.18 TOOLS USED:
 - 3.18.1 War Dialers
 - 3.18.1.1 Tool: THC Scan
 - 3.18.2 Ping
 - 3.18.2.1 Detecting Ping Sweeps
 - 3.18.2.2 Ping Utilities include:
 - 3.18.2.3 Ping Sweep Detection Utilities include:
- 3.19 HACKING TOOL: PINGER
- 3.20 HACKING TOOL: WS_PING_PRO
- 3.21 PORT SCANNING
- 3.22 TCPS 3-WAY HANDSHAKE
 - 3.22.1 Tcp Scan Types
 - 3.22.2 TCP connect ()
 - 3.22.3 Strobe
 - 3.22.4 Stealth port scan
 - 3.22.5 Fragmented packet Port Scan
 - 3.22.6 SYN scan
 - 3.22.7 FIN scan
 - 3.22.8 UDP scanning
- 3.23 TOOLS:
 - 3.23.1 Tool: ipEye, IPsecScan
 - 3.23.2 Tool: NetScan Tools Pro 10
 - 3.23.3 Tool: NMap (Network Mapper)
- 3.24 ACTIVE STACK FINGERPRINTING
- 3.25 PASSIVE FINGERPRINTING
- 3.26 HACKING TOOL: CHEOPS
- 3.28 PROXY SERVERS
 - 3.28.1 LIST OF FREE PROXIES ON WEB
- 3.29 ANONYMIZERS
- 3.30 BYPASSING FIREWALL USING HTTP TUNNEL
 - 3.30.1 Hacking Tool: HTTPort
- 3.31 SUMMARY

CHAPTER 4 - EMAIL HACKING

- 4.1 SENDING E-MAIL VIA TELNET
- 4.2 E-MAIL TRACING CASE
 - 4.2.1 Header Protocol
 - 4.2.1.1 Sample header
- 4.3 CONVERTING AN IP ADDRESS INTO A NAME
- 4.4 CONVERTING A DOMAIN ADDRESS
 - 4.4.1 Domain addressing
 - 4.4.2 The outer most Domains.
- 4.5 TOOLS FOR EMAIL TRACING
 - 4.5.1 Ping (Packet InterNet Groper)

CHAPTER 5 OPERATING SYSTEM ATTACKS

- 5.1 WINDOWS VULNERABILITIES
- 5.2 PASSWORD VULNERABILITIES
- 5.3 TECHNICAL PASSWORD VULNERABILITIES
- 5.4 CRACKING PASSWORDS
 - 5.4.1 Cracking passwords the old-fashioned way
 - 5.4.2 Social engineering
 - 5.4.2.1 Techniques
 - 5.4.2.2 Countermeasures
 - 5.4.3 Shoulder surfing

- 5.4.3.1 Techniques
- 5.4.3.2 Countermeasures
- 5.5 INFERENCE
 - 5.5.1 Weak authentication
 - 5.5.2 Bypassing authentication
 - 5.5.3 Countermeasures
- 5.6 HIGH-TECH PASSWORD CRACKING
- 5.7 PASSWORD CRACKING SOFTWARE
- 5.8 WINDOWS USUALLY STORES PASSWORDS IN THESE LOCATIONS:
- 5.9 LINUX AND OTHER UNIX VARIANTS TYPICALLY STORE PASSWORDS IN THESE FILES:
- 5.10 DICTIONARY ATTACKS
- 5.11 BRUTE-FORCE ATTACKS
- 5.12 CRACKING PASSWORD WITH LOPTH CRACK
- 5.13 OBTAINING THE PASSWORD HASHES
- 5.14 GENERAL PASSWORD-HACKING COUNTERMEASURES
 - 5.14.1 Storing passwords
 - 5.14.2 Policy considerations
- 5.15 LINUX VULNERABILITIES
 - 5.15.1 Information Gathering
 - 5.15.2 System scanning
 - 5.15.3 Countermeasures
 - 5.15.4 Searches
 - 5.15.5 Vulnerabilities
- 5.16 TOOLS
 - 5.16.1 Countermeasures
- 5.17 UNIX/LINUX
 - 5.17.1 Physical Security
 - 5.17.2 Hacks
 - 5.17.3 Countermeasures
 - 5.17.4 Patching Linux
- 5.18.5 Distribution updates
 - 5.18.5.1 Red Hat
 - 5.18.5.2 Debian
 - 5.18.5.3 Slackware
- 5.19 SUSE/NOVELL
 - 5.19.1 Mitigating SAM and SysKey Cracking

CHAPTER 6 APPLICATION ATTACKS

- 6.1 PASSWORD-PROTECTED FILES
 - 6.1.1 Countermeasures
- 6.2 OTHER WAYS TO CRACK PASSWORDS
 - 6.2.1 Keystroke logging
 - 6.2.2 Logging tools
 - 6.2.3 Countermeasures
 - 6.2.3.1 Weak password storage
 - 6.2.3.2 Searching
 - 6.2.3.3 Countermeasures

CHAPTER 7 – MALWARES

- 7.1 IMPLICATIONS OF MALWARE ATTACKS
- 7.2 TYPES OF MALWARE
 - 7.2.1 Trojan horses
 - 7.2.2 Spyware
 - 7.2.3 Security tools
- 7.3 HACKING TOOL: QAZ
- 7.4 HACKING TOOL: NETCAT
- 7.5 HACKING TOOL: SUB SEVEN

- 7.6 HACKING TOOL: DONALD DICK
- 7.7 HACKING TOOL: NETBUS
- 7.8 VARIOUS DEADLY VIRUSES
- 7.9 INDICATIONS OF INFECTION
- 7.10 HOW MALWARE PROPAGATES
- 7.11 MALWARE COUNTERMEASURES

CHAPTER 8 - NETWORK BASED ATTACKS

- 8.1 DENIAL OF SERVICE
 - 8.1.1 What is Denial of Service Attack?
- 8.2 TYPES OF DOS ATTACKS
 - 8.2.1 Ping of Death
 - 8.2.2 Teardrop
 - 8.2.3 SYN Attack
 - 8.2.4 Land Attack
 - 8.2.5 Smurf Attack
- 8.3 HOW DOS WORKS?
- 8.4 WHAT IS DDOS?
- 8.5 HACKING TOOL: PING OF DEATH
- 8.6 TOOLS FOR RUNNING DDOS ATTACKS
- 8.7 SESSION HIJACKING
 - 8.7.1 What is Session Hijacking?
- 8.8 SNIFFERS
- 8.9 TOOLS USED FOR SNIFFING:
 - 8.9.1 Tool: Ethereal
 - 8.9.2 Tool: Snort
 - 8.9.3 Tool: Windump
 - 8.9.4 Tool: Etherpeek
 - 8.9.5 EtherFlood
 - 8.9.6 Dsniff
 - 8.9.7 ARP Spoofing
 - 8.9.8 Sniffing HTTPS and SSH
 - 8.9.9 Man in the Middle Attack
 - 8.9.10 Ettercap
 - 8.9.11 SMAC
 - 8.9.12 Mac Changer
 - 8.9.13 Iris
 - 8.9.14 DNS Sniffing and Spoofing
 - 8.9.15 WinDNSSpoof

CHAPTER 9- CRYPTOGRAPHY WITH DIFFERENT APPLICATIONS

- 9.1 Introduction To Cryptography
 - 9.1.1 What Is Pki?
- 9.2 Rsa (Rivest Shamir Adleman)
 - 9.2.1 Setting Up Rsa
- 9.3 Md5
- 9.4 Sha (Secure Hash Algorithm)
 - 9.4.1 What Is Ssh?
 - 9.4.2 Hacking Tool: Pgp Crack
- 9.5 Steganography
 - 9.5.1 Tool: Mp3Stego

CHAPTER 10 – IDS & FIREWALLS

- 10.1 Intrusion Detection Systems (Ids)
- 10.2 System Integrity Verifiers (Siv)
- 10.3 How Does Ids Match Signatures With Incoming Traffic?
- 10.4 Evading Ids Systems

- 10.4.1 Complex Ids Evasion
- 10.5 Hacking Tool:
 - 10.5.1 Fragrouter
 - 10.5.2 Hacking Tool: Tcpreplay
 - 10.5.3 Hacking Tool: SideStep.exe
 - 10.5.4 Hacking Tool: Anzen NIDSbench
 - 10.5.5 Hacking Tool: ADMutate
 - 10.5.6 Hacking through firewalls
 - 10.5.7 Bypassing Firewall using Httptunnel
- 10.6 Placing Backdoors Through Firewalls
 - 10.6.1 The Reverse Www Shell
 - 10.6.2 Hiding Behind Covert Channel: Loki
- 10.7 Hacking Tool:
 - 10.7.1 007 Shell
 - 10.7.2 Hacking Tool: Icmp Shell
 - 10.7.3 Ack Tunneling
- 10.8 What Is A Honeypot?
 - 10.8.1 Advantages Of Honeypots
 - 10.8.2 Disadvantages Of Honeypots
 - 10.8.3 Types Of Honeypots
 - 10.8.4 Low-Interaction Honeypots
 - 10.8.5 High-Interaction Honeypots
 - 10.8.6 Honeypot Software Vendors
 - 10.8.7 Honeypot-KFSensor

CHAPTERS 11- REVERSE ENGINEERING

- 11.1 Reverse Engineering
- 11.2 Reverse Engineering And Other Types Of Engineering
- 11.3 Stages Involved In The Reverse Engineering Process
- 11.4 Disassembly Or Decompilation
- 11.5 Source Code And Object Code
- 11.6 Uses Of Reverse Engineering
- 11.7 Reverse Engineering
 - 11.7.1 How To Crack Any Type Of Software Protection
 - 11.7.2 Tool: Hex Workshop

Reference Books:

1. Computer Networks - Abndrew S. Tanenbaum
2. Cyber-Forensics The Basics -Tim Vidas (CERTConf2006)
3. Digital Evidence - Harley Kozushko
4. Guidelines on Cell Phone Forensics - Wayne Jansen Rick Ayers (NIST Special Publication 800-10)