

**UNIVERSITY OF JAMMU, JAMMU**  
**Syllabus of B.A./B.Sc. Computer Applications**

(Semester System)

(Effective from session 2014-15)

This course shall be offered in BA/BSc programme along with other courses and combinations available for the students of BA/B.Sc. programmes. Computer Application shall be one course along with other three courses which may be opted by the students as per the combinations offered by the University/College. Minimum marks for passing a course shall be same as prescribed for other courses of B.A/B.Sc programme of the University.

**Semester-wise Course Distribution of Computer Applications is given as:-**

**Semester – I**

Paper Code	Paper Name	No. of Contact hours	Max. Marks		Total
			External Exam.	Internal Assessment	
CA-101	Computer Fundamentals and IT tools	40	80	20	100
CA-102	Practicals (Based on Course BSCA-101)	50	50	50	100

**Semester – II**

Paper Code	Paper Name	No. of Contact hours	Max. Marks		Total
			External Exam.	Internal Assessment	
CA-201	Programming Concepts using C language	40	80	20	100
CA-202	Practicals (Based on Course CA-201)	50	50	50	100

**Semester – III**

Paper Code	Paper Name	No. of Contact hours	Max. Marks		Total
			External Exam.	Internal Assessment	
CA-301	Data and file structure	40	80	20	100
CA-302	Practicals (Based on Course CA-301)	50	50	50	100

**Semester – IV**

Paper Code	Paper Name	No. of Contact hours	Max. Marks		Total
			External Exam.	Internal Assessment	
CA-401	Database Management System & SQL	40	80	20	100
CA-402	Practicals (Based on Course CA-401)	50	50	50	100

**Semester – V**

Paper Code	Paper Name	No. of Contact hours	Max. Marks		Total
			External Exam.	Internal Assessment	
CA-501	Networking and Internet	40	80	20	100
CA-502	Practicals (Based on Course CA-501)	50	50	50	100

**Semester –VI**

Paper Code	Paper Name	No. of Contact hours	Max. Marks		Total
			External Exam.	Internal Assessment	
CA-601	Fundamentals of Operating System	40	80	20	100
CA-602	Practicals (Based on Course CA-601) (Windows & Unix/Linux)	50	50	50	100

**DETAILED SYLLABUS**  
**COMPUTER APPLICATION**  
**B.A/B.Sc. SEMESTER -1<sup>ST</sup>**

**(For the Examinations to be Held in the year 2014, 2015 & 2016)**

**Course No.: CA-101**                      **TITLE: COMPUTER FUNDAMENTALS AND IT TOOLS**  
**Duration of the Examination: 3 Hrs**

No. of Credits	= 4	Total Marks	= 100
		Semester Exam.	= 80
		Int. Assessment	= 20

**Unit – I**

Computer and its characteristics, application of computers, digital and analog computer, Generation of computers, Storage devices: primary storage devices (RAM,ROM,PROM,EPROM,EEPROM) , secondary storage devices(Floppy disk, Hard disk, optical disk, magnetic tapes), Input and output devices (keyboard, mouse, light pen, joystick, scanner, monitor, printers,etc.)

10 HRS

**Unit - II**

Software and its types ( System Software, Application Software, Firmware Softwares) Computer Languages and its types ( Machine Language, Assembly Language, High Level Language: advantages and disadvantages of computer languages),Translators :Compiler, Linker, Interpreter .

Number system and its types, conversion from one base to another and vice versa, arithmetic operations, r's, (r - 1)'s complement methods.

10 HRS

**Unit – III**

Operating system and its functions, types of operating system ( Single user, multi-user, multitasking, time sharing , distributed). Fundamental of DOS, internal and external commands.Windows fundamentals: Anatomy of windows, desktop elements, managing files and folders, installing softwares

10 HRS

**Unit – IV**

Word Processor and its features, Editing of Text, Find and Replace, Bullets and Numbering, Spell Checker, Grammar Checker, Auto Correct, Auto Complete, Auto Text, Header and footer, tables, mail merge, border and shading, page setup, printing.

Spread sheet and its features, Entering Information in Worksheet, Editing Cell Entry, Moving and Copying Data, deleting or Inserting Cells, Rows and Columns, Custom Numeric Formats, Using Formulas and functions, Creating charts.

Presentation Softwares and its uses, steps for creating PowerPoint Presentation, PowerPoint Views, Assigning Slide Transitions, Using Preset Animations, Hiding Slides, Slide Show, Controlling the Slide Show with a Keyboard, Setting Slide Show Timings

10 HRS

### **Suggested Readings:**

1. P.K Sinha & Priti Sinha, Computer Fundamentals, BPB Publications.
2. Alexix Leon, Mathewes Leon, Fundamentals of Information Technology,
3. Suresh K. Basandra, Computer Systems Today, Galgotia Publications.
4. V. Rajaraman, Fundamentals of Computers,EEE.
5. Peter Norton, Introduction to Computers, Tata Mcgraw Hill
6. Joyce Coax , Joan Preppernau,,Steve Lambert and Curtis Frye,2007 Microsoft Office System step by step, Microsoft Press
7. R.K. Taxali, PC Software for Windows

### **Instructions for paper setter for courses with CA codes**

The examination in each paper shall be of 3 hours duration. There shall be a total of nine questions of 16 marks each and the candidate has to answer five questions selecting one question from each unit. Question No.1 shall be a compulsory question.

The guidelines for paper setting are given below as:

- a. Q. No. 1 will be a compulsory question and shall consist of 4 sub-parts (each of 4 marks) distributed over the entire syllabus.
- b. The paper setter shall set other eight questions selecting two from each unit.

**Distribution of Internal Assessment of 20 Marks :**

Class Test = 10 marks

Two written assignments = 10 marks ( 5 marks each)

**Course No.: CA-102** TITLE: PRACTICALS (BASED ON CA-101)

Duration of the Examination: 3 Hrs/shift (External exam. be conducted  
in shifts of 20-25 students)

No. of Credits = 6

Total Marks = 100

External Examination = 50 marks

Internal Examination = 50 marks

In this course the students shall be exposed to various practical problems based on course CA-101. The Teacher-in-Charge shall design 30-40 problems based on these courses. The students shall be required to systematically work out the solution of those problems and implement using relevant tool in the computer laboratory. The 50% of the total marks in this paper shall be reserved for internal assessment. The Teacher-in-Charge shall conduct at least two internal evaluation tests for awarding the students for internal assessment. The students shall also be required to maintain proper record of their practicals in a Practical File which shall be regularly checked by the concerned teacher-in-charge. The internal assessment shall be based on regular tests, practical file and attendance in the laboratory. For the rest of 50% of the total marks there shall be an external examination which shall be conducted jointly by an internal examiner and an external examiner to be appointed by the University. The distribution of marks to various components is given below as:-

**Breakup for Internal Examination/Assessment:**

- Regular Tests = 30 marks
- Practical File = 10 marks
- Attendance = 10 marks

# COMPUTER APPLICATION

## B.A/B.Sc. SEMESTER -2<sup>ND</sup>

**(For the Examinations to be Held in the year 2015, 2016 & 2017)**

**Course No: CA-201**      TITLE: PROGRAMMING CONCEPTS USING C LANGUAGE

Duration of Examination: 3 Hrs

No. of Credits = 4

Total Marks = 100

Semester Exam. = 80

Int. Assessment = 20

### **Unit - I**

Algorithm, Representation of Algorithm, Flowcharts, Flowchart Symbols, Flowchart Rules, Advantages and Limitations of Flowcharts, Pseudo Code

Character Set, C Tokens, Keywords and Identifiers, Constants, Variables, Data Types,

Format of c program, Arithmetic ,Relational & Logical Operators, Assignment Operators, Increment & Decrement Operators, Operator Precedence & Associativity.

10 HRS

### **Unit - II**

Formatted Input, Formatted Output, escape sequences, Simple if Statement, if..... else Statement, Nesting of if....else Statements, , Switch Statement, conditional Operator, goto Statement, loops, break and continue statement

10 HRS

### **Unit – III**

Qualifiers, Storage classes, Pointers definition, Declaring Pointer Variables, using pointer variable, **Arrays: One, Two and Multi Dimension Arrays**, Initialization of one and two dimensional Arrays, Declaring and Initializing String Variables, String Handling Functions.

10 HRS

### **Unit - IV**

Preprocessor directives, Function Definition, Function Calls ( call by value & call by address method) Returning Value, Types of Functions, Recursion, Passing Arrays to Functions, Macros, Defining Structure, Declaring and Accessing Structure Variables, Structures and Unions.

10 HRS

### **Suggested Readings:**

1. E. Balaguruswami, Programming in C, PHI
2. Gottfried. B, Theory and problems of Programming with C Language, Tata Mc Graw Hill.
3. Kenneth. A, C Problem Solving and Programming, PHI.
4. Dan Gookin, C Programming, Wiley Dreamtech.
5. Y. P. Kanetkar, Understanding Pointers In C, BPB Publications.
6. Shubhnandan S. Jamwal; Programming in C; Pearson Publications; 1e, 2014
7. H.M. Deitel and P.J. Deitel, C How to Program, PHI.

### **Instructions for paper setter for courses with CA codes**

The examination in each paper shall be of 3 hours duration. There shall be a total of nine questions of 16 marks each and the candidate has to answer five questions selecting one question from each unit. Question No.1 shall be a compulsory question.

The guidelines for paper setting are given below as:

- a. Q. No. 1 will be a compulsory question and shall consist of 4 sub-parts (each of 4 marks) distributed over the entire syllabus.
- b. The paper setter shall set other eight questions selecting two from each unit.

Distribution of Internal Assessment of 20 Marks :

Class Test = 10 marks

Two written assignments = 10 marks ( 5 marks each)



**Course No.: CA-202**

TITLE: PRACTICALS (BASED ON CA-201)

Duration of the Examination: 3 Hrs/shift (External exam. be conducted  
in shifts of 20-25 students)

No. of Credits = 6

Total Marks = 100

External Examination = 50 marks

Internal Examination = 50 marks

In this course the students shall be exposed to various practical problems based on course CA-201. The Teacher-in-Charge shall design 30-40 problems based on these courses. The students shall be required to systematically work out the solution of those problems and implement using relevant tool in the computer laboratory. The 50% of the total marks in this paper shall be reserved for internal assessment. The Teacher-in-Charge shall conduct atleast two internal evaluation tests for awarding the students for internal assessment. The students shall also be required to maintain proper record of their practicals in a Practical File which shall be regularly checked by the concerned teacher-in-charge. The internal assessment shall be based on regular tests, practical file and attendance in the laboratory. For the rest of 50% of the total marks there shall be an external examination which shall be conducted jointly by an internal examiner and an external examiner to be appointed by the University. The distribution of marks to various components is given below as:-

**Breakup for Internal Examination/Assessment:**

- Regular Tests = 30 marks
- Practical File = 10 marks
- Attendance = 10 marks

# COMPUTER APPLICATION

## B.A/B.Sc. SEMESTER -3<sup>RD</sup>

(For the Examinations to be Held in the year 2015, 2016 & 2017)

Course No. :CA-301

TITLE: DATA AND FILE STRUCTURE

Duration of Examination: 3 Hrs

No. of Credits = 4

Total Marks =100

Semester Exam. = 80

Int. Assessment =20

### Unit – I

Introduction and Classification of Data Structures, Data Structure Operations, Time and Space Complexity of Algorithms, Rate of Growth: Big *O* Notation.

Arrays, Stacks, Queues, Recursion

10 HRS

### Unit - II

Pointers, Dynamic Memory Allocation, Self-Referential Structures, Linked list, Type of Lists, Applications.

Trees, Binary Trees, Binary Tree Traversal, Binary Search Trees, Heaps.

10 HRS

### Unit - III

**Sorting:** Bubble Sort, Insertion Sort, Selection Sort, Heap Sort, and Merge Sort & Quick Sort.

**Searching:** Linear Search & Binary Search.

Time and Space Complexity of Sorting & Search Algorithms.

10 HRS

### Unit - IV

**File Structures:** Concepts of Fields, Records and Files, Files: File Organization, Sequential Files, Structure, Operations, Disadvantages, Areas of Use, Direct File Organization, Indexed Sequential File Organization and Text files. Indexing structures like B – trees, ISAM. Hashing Techniques for Direct Files.

10 HRS

### **Suggested Readings**

- 1) Data Structures with C- Seymour Lipschutz, Schaum's Outline Series.
- 2) An Introduction to Data Structures with Applications, Jean Paul Tremblay & Paul G. Sorenson, Tata McGraw Hill.
- 3) Fundamental of Data Structure in C, Ellis Horowitz, Sartaj Sahni, and Susan Anderson-Freed, Silicon Press.
- 4) Data Structures and algorithm in C++ - Adam Drozdek, Cengage Learning.
- 5) Data Structures, Algorithms and applications in C++ - Sartaj Sahni, Universities Press.
- 6) Data Structures Using C and C++ - Aaron M. Tenenbaum, Moshe J. Augenstein, Yedidiah Langsam, PHI.
- 7) Data Structure using C++ - D.S Malik, Cengage Learning.

### **Instruction for paper setter for courses with CA codes**

The examination in each paper shall be of 3 hours duration. There shall be a total of nine questions of 16 marks each and the candidate has to answer five questions selecting one question from each unit. Question No. 1 shall be a compulsory question.

The guidelines for paper setting are given below as:

- a. Q. No. 1 will be a compulsory question and shall consist of 4 sub-parts (each of 4 marks) distributed over the entire syllabus.
- b. The paper setter shall set other eight questions selecting two from each unit.

Distribution of Internal Assessment of 20 Marks :

Class Test = 10 marks

Two written assignments = 10 marks ( 5 marks each)

**Course No. :CA-302**

**TITLE: PRACTICALS (BASED ON CA-301)**

Duration of the Examination: 3 Hrs/shift (External exam. be conducted  
in shifts of 20-25 students)

**No. of Credits = 6**

**Total Marks =100**

External Examination=50 marks

Internal Examination =50 marks

In this course the students shall be exposed to various practical problems based on course CA-301. The Teacher-in-Charge shall design 30-40 problems based on these courses. The students shall be required to systematically work out the solution of those problems and implement using relevant tool in the computer laboratory. The practicals can be implemented in C or C++ language. The 50% of the total marks in this paper shall be reserved for internal assessment. The Teacher-in-Charge shall conduct at least two internal evaluation tests for awarding the students for internal assessment. The students shall also be required to maintain proper record of their practical work in a Practical File which shall be regularly checked by the concerned teacher-in-charge. The internal assessment shall be based on regular tests, practical file and attendance in the laboratory. For the rest of 50% of the total marks there shall be external examination which shall be conducted jointly by an internal examiner and an external examiner to be appointed by the University. The distribution of marks to various components is given below as:-

- Regular Tests =30 marks
- Practical File =10 marks
- Attendance =10 marks

# COMPUTER APPLICATION

## B.A/B.Sc. SEMESTER -4<sup>TH</sup>

**(For the Examinations to be Held in the year 2016, 2017 & 2018)**

**Course No. :CA-401**

**TITLE: DATABASE MANAGEMENT  
SYSTEM & SQL**

Duration of Examination: 3 Hrs

No. of Credits = 4

Total Marks = 100

Semester Exam. = 80

Int. Assessment = 20

### **Unit- I**

Introduction to Data, Field, Record, File, Database, Traditional File Approach (File Management System) Vs Database Management System. Structure of DBMS, Advantages and Disadvantages of DBMS, Database Facilities, Database Users, DBA and its Responsibilities, Schema, Instance, Data Independence, Three Level Architecture of Database.

10 HRS

### **UNIT – II**

Different Types of Entities and Attributes. Overview of Hierarchical, Network, and Relational database Model, Comparison of these Models. Concept of Keys (primary key, alternate key, candidate key, composite key, super key and foreign key). Fundamental Integrity Constraints (entity integrity, domain integrity & referential integrity).

10 HRS

### **Unit – III**

Relational Algebra and Relational Calculus (Set theoretic operations & select, project, join (equi join, theta join, natural join), aggregate functions & grouping). Database Anomalies, CODD Rules, Normalization: Informal Design Guidelines for Relational Schema, Functional Dependencies, Normal Forms Based on Primary Keys (1NF, 2NF, 3NF & BCNF).

10 HRS

### **Unit – IV**

DDL, DML, and DCL commands, Overview of SQL, Data Type in SQL, Simple and Nested Query in SQL, Basic SQL Functions, SQL Joins, Data Integrity Constraints, Views.

10 HRS

### **Suggested Readings**

1. An Introduction to Database Systems- Bipin.C.Desai, West Group Publisher.
2. Fundamentals of Database Management System- Elmasri & Navathe, Pearson Education.
3. Introduction to Database Management System- C.J Date, Pearson
4. Simplified Approach to DBMS- Prateek Bhatia, Kalyani Publisher
5. PL/SQL- Ivan Bayros, BPB Publications.
6. Database Systems - Concept, Design and Applications- S.K.Singh, Pearson Education

### **Instruction for paper setter for courses with CA codes**

The examination in each paper shall be of 3 hours duration. There shall be a total of nine questions of 16 marks each and the candidate has to answer five questions selecting one question from each unit. Question No. 1 shall be a compulsory question.

The guidelines for paper setting are given below as:

- a. Q. No. 1 will be a compulsory question and shall consist of 4 sub-parts (each of 4 marks) distributed over the entire syllabus.
- b. The paper setter shall set other eight questions selecting two from each unit.

Distribution of Internal Assessment of 20 Marks :

Class Test = 10 marks

Two written assignments = 10 marks ( 5 marks each)

**Course No. :CA-402**

**TITLE: PRACTICALS (BASED ON CA-401)**

Duration of the Examination: 3 Hrs/shift (External exam. be conducted  
in shifts of 20-25 students)

**No. of Credits = 6**

**Total Marks =100**

External Examination=50 marks

Internal Examination =50 marks

In this course the students shall be exposed to various practical problems based on course CA-401. The Teacher-in-Charge shall design 30-40 problems based on these courses. The students shall be required to systematically work out the solution of those problems and implement using relevant tool in the computer laboratory. The practicals can be implemented either in mySql or in Oracle or in any similar platform. The 50% of the total marks in this paper shall be reserved for internal assessment. The Teacher-in-Charge shall conduct at least two internal evaluation tests for awarding the students for internal assessment. The students shall also be required to maintain proper record of their practical work in a Practical File which shall be regularly checked by the concerned teacher-in-charge. The internal assessment shall be based on regular tests, practical file and attendance in the laboratory. For the rest of 50% of the total marks there shall be external examination which shall be conducted jointly by an internal examiner and an external examiner to be appointed by the University. The distribution of marks to various components is given below as:-

**Breakup for Internal Assessment:**

- Regular Tests =30 marks
- Practical File =10 marks
- Attendance =10 marks

# COMPUTER APPLICATION

## B.A/B.Sc. SEMESTER -5<sup>TH</sup>

**(For the Examinations to be Held in the year 2016, 2017 & 2018)**

**Course No. :CA-501**

**TITLE: NETWORKING AND INTERNET**

Duration of Examination: 3 Hrs

**No. of Credits = 4**

**Total Marks = 100**

**Semester Exam. = 80**

**Int. Assessment = 20**

### **Unit – I**

Networking and its Types, Advantages of Networking, Topologies, Transmission Medium, Transmission Modes (simplex half duplex and full duplex), Components (Hub, Connector, Switch, router, Gateway, Bridge)

10 HRS

### **Unit – II**

IP Addresses, Classes of IP Addresses, Domain Name System, Intranet and Internet, Features & Services, OSI Reference Model, Browser, Web server, Web page.

10 HRS

### **Unit – III**

Introduction to HTML, Format of HTML Program , Formatting Tags, Image Tags, Linking of Documents, List Tag, Tables Tag, Frames, Forms, Introduction to Cascading Style sheet, Defining Style, Inline Styles, Internal and External Style sheet.

10 HRS

### **Unit – IV**

Introduction to JavaScript, Variables, Conditional and Loops Control Statement, Functions, Strings and Mathematical Functions, Window and Document Object and Basic Events.

10 HRS

### **Suggested Readings**

1. Computer Networks- Andrew.S. Tannenbaum, Pearson
2. Data and Computer Communication- Williams Stallings, Pearson
3. Data Communication and Networking- Forouzan, McGraw Hill Professional Publication.
4. The Internet- Doulas and E. Corner, Pearson
5. Beginning Web Programming with HTML, CSS and JavaScript – Jon Duckett,Wiley



### **Instruction for paper setter for courses with CA codes**

The examination in each paper shall be of 3 hours duration. There shall be a total of nine questions of 16 marks each and the candidate has to answer five questions selecting one question from each unit. Question No. 1 shall be a compulsory question.

The guidelines for paper setting are given below as:

- a. Q. No. 1 will be a compulsory question and shall consist of 4 sub-parts (each of 4 marks) distributed over the entire syllabus.
- b. The paper setter shall set other eight questions selecting two from each unit.

Distribution of Internal Assessment of 20 Marks :

Class Test = 10 marks

Two written assignments = 10 marks ( 5 marks each)

**Course No. : CA-502**

**TITLE: PRACTICALS (BASED ON CA-501)**

Duration of the Examination: 3 Hrs/shift (External exam. be conducted  
in shifts of 20-25 students)

**No. of Credits = 6**

**Total Marks =100**

External Examination=50 marks

Internal Examination =50 marks

In this course the students shall be exposed to various practical problems based on course CA-501. The Teacher-in-Charge shall design 30-40 problems based on these courses. The students shall be required to systematically work out the solution of those problems and implement using relevant tool in the computer laboratory. The 50% of the total marks in this paper shall be reserved for internal assessment. The Teacher-in-Charge shall conduct at least two internal evaluation tests for awarding the students for internal assessment. The students shall also be required to maintain proper record of their practical work in a Practical File which shall be regularly checked by the concerned teacher-in-charge. The internal assessment shall be based on regular tests, practical file and attendance in the laboratory. For the rest of 50% of the total marks there shall be external examination which shall be conducted jointly by an internal examiner and an external examiner to be appointed by the University. The distribution of marks to various components is given below as:-

**Breakup for Internal Assessment:**

- Regular Tests =30 marks
- Practical File =10 marks
- Attendance =10 marks

## COMPUTER APPLICATION

### B.A/B.Sc. SEMESTER -6<sup>TH</sup>

(For the Examinations to be Held in the year 2017, 2018 & 2019)

Course No. :CA-601

### TITLE: FUNDAMENTALS OF OPERATING SYSTEM

Duration of Examination: 3 Hrs

No. of Credits = 4

**Total Marks = 100**

**Semester Exam. = 80**

**Int. Assessment = 20**

#### **Unit – I**

**Introduction to Operating System:** Definition, Evolution of Operating Systems, Types of Operating System: Batch Processing, Time Sharing, Real Time, Multiprogramming, Multiprocessing, Networking, Distributed, Embedded Systems.

**Concept of Process & Threads,** Process States, Process Management. Inter Process Communication: Race Conditions, Critical Regions, Mutual Exclusion, Sleep and wake Up, Semaphores, Deadlock- Overview and Prevention

10 HRS

#### **Unit-II**

**Memory Management:** Memory Partitioning, Swapping, Paging, Segmentation. Virtual Memory: Concepts, Overlays, Demand Paging, Page Replacement Algorithms- FIFP, SC, LRU, OPT, LFU.

**I/O & File Management:** Disk: Structure, Scheduling & Disk Space Management. Organisation of the I/O Function, I/O Buffering, Spooling and Caching. File System: Concept, Allocation Method, Protection & Free Space Management.

10 HRS

#### **Unit-III**

**Linux Introduction & File System-** Basic Features, Advantages, Basic Architecture of UNIX/LINUX System, Kernel, Shell.

**Commands for files & Directories-** cd, cp, mv, rm, mkdir, more, less, Creating and Viewing Files using cat, File View and Comparisons etc. Understanding Shell, Processes in LINUX – Process Fundamentals, Connecting Processes with Pipes, Redirecting Input Output, Batch Commands- Kill, ps, who ,sleep. Printing Commands- grep, fgrep ,find, sort, cal ,banner. File related Commands-ws, sat, cut, grep, dd etc.

10 HRS

#### **Unit-IV**

**Shell Programming:** Basics, Various Types of Shell, Conditional & Looping Statements, Case Statements, Parameter Passing and Arguments, Shell Variables, Shell Keywords, Creating Shell Programs for Automate System Tasks.

10 HRS

### **Suggested Readings**

1. Operating Systems -D.M. Dhamdhere, McGraw Hill Education.
2. Operating Systems - Achyut S. Godbole, Tata McGraw Hill.
3. Operating Systems - D.M. Dhamdhere, Tata McGraw Hill.
4. Understanding Operating System - Flynn & Mctloes, Thomson.
5. Operating Systems – Internals and Design Principles by William Stallings, Prentice Hall.
6. Modern Operating Systems -Andrew S Tanenbaum,Pearson
7. UNIX Concepts And Applications – Sumitabha Das, Tata McGraw-Hill Education.
8. UNIX Shell Programming – Yashwant Kanetkar, BPB Publications.
9. Advanced concepts in Operating Systems - Mukesh Singhal & N.G.Shivaratri, TMH

### **Instruction for paper setter for courses with CA codes**

The examination in each paper shall be of 3 hours duration. There shall be a total of nine questions of 16 marks each and the candidate has to answer five questions selecting one question from each unit. Question No. 1 shall be a compulsory question.

The guidelines for paper setting are given below as:

- a. Q. No. 1 will be a compulsory question and shall consist of 4 sub-parts (each of 4 marks) distributed over the entire syllabus.
- b. The paper setter shall set other eight questions selecting two from each unit.

Distribution of Internal Assessment of 20 Marks :

Class Test = 10 marks

Two written assignments = 10 marks ( 5 marks each)

**Course No. : CA-602**

**TITLE: PRACTICALS**

(Based on Course CA-601-Windows & Unix/Linux )

**Duration of the Examination: 3 Hrs/shift (External exam. be conducted in shifts of 20-25 students)**

**No. of Credits = 6**

**Total Marks =100**

**External Examination=50 marks**

**Internal Examination =50 marks**

In this course the students shall be exposed to various practical problems based on course CA-601. The Teacher-in-Charge shall design 25-30 problems based on these courses. The students shall be required to systematically work out the solution of those problems and implement using relevant tool in the computer laboratory. The 50% of the total marks in this paper shall be reserved for internal assessment. The Teacher-in-Charge shall conduct at least two internal evaluation tests for awarding the students for internal assessment. The students shall also be required to maintain proper record of their practical work in a Practical File which shall be regularly checked by the concerned teacher-in-charge. The internal assessment shall be based on regular tests, practical file and attendance in the laboratory. For the rest of 50% of the total marks there shall be external examination which shall be conducted jointly by an internal examiner and an external examiner to be appointed by the University. The distribution of marks to various components is given below as:-

**Breakup for Internal Assessment:**

- Regular Tests =30 marks
- Practical File =10 marks
- Attendance =10 marks