NAAC 'B+' Accredition

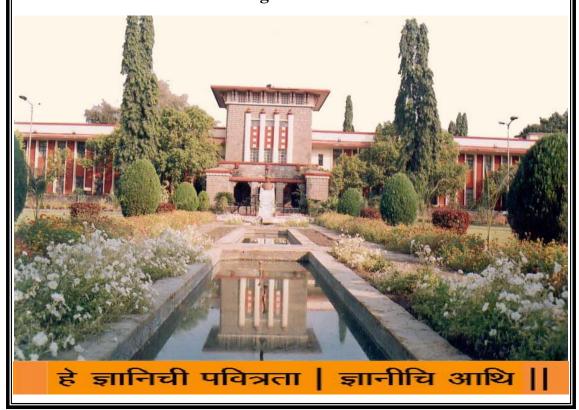# Dr.Babasaheb Ambedar Marathwada University

Aurangabad-431004

SYLLABUS

B.C.A(Science)
Three Year Integrated Semester Course

हे ज्ञानिची पवित्रता | ज्ञानीचि आथि ||

Dr. Babasaheb Ambedkar Marathwada University
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Dr. Babasaheb Ambedkar Marathwada University.
Appendix 'A'

A Candidate shall be admitted to the I year of the B.C.A.(Science) degree course only if he/she satisfies the following condition:

1. He/ She must have passed the higher secondary (multipurpose) examination conducted by H.S.C. board Government of Maharashtra with science / technical subjects Or an Examination of any statutory University and Board recognized as equivalent thereto.

<div align="center">OR</div>

He/She must have passed examination prescribed at the end of second year of the junior college conducted by the H.S.C. board, Government of Maharashtra with English, Second language, Physics, Chemistry, Mathematics and or Biology or one of the technical subjects prescribed at the said examination as the optional or elective subjects or an examination recognized as equivalent thereto.

<div align="center">OR</div>

Candidate having offered prescribed vocational course (MCVC) with Computer techniques/I.T./Electronics.

<div align="center">OR</div>

Three years Diploma Course in engineering conducted by the board of technical Education, Maharashtra State.

2. He/ She must have passed at qualifying examination.

A candidate who has passed the B.C.A.(Science) examination of this university may be allowed to present himself subsequently at the degree examination in a subject or subjects other than those he has taken earlier provided that he puts in three years of attendance as a regular candidate for First, Second and Third year in the subject or subjects concerned excluding compulsory English, Second Language and remaining optional subject(s).

A candidate shall not be allowed to appear for such examination if he has passed the higher examination.

The Degree of B.C.A. (Science) shall be conferred on candidate who has pursued a regular course of study consisting of six semesters in the relevant subject as prescribed and has appeared at the end examination and passed under the credit based system in all the examination prescribed for the Degree course in the faculty.

The pattern of the examination and the scope is indicated in the syllabus.[Annexure B]

1. The Number of students in a theory class shall not exceed 60.

2. Maximum number of students in a batch for practicals in first four semesters shall consist of 20 students and for fifth & sixth semester the batch shall consist of 15 students.

3. The rules for admission to the subsequent(next) semesters will be the same as per the University guidelines.

4. For Each course the concerned teacher will have to conduct Class tests after completion of 15 and 20 lectures. The mark list of the same is to be submitted to the university authority within 7 working days after the completion of class tests.

5. Final Examination will be conducted by the University based on the complete syllabus.

6. Final Practical Examination will be conducted by the university and examiners will submit the mars in the prescribed format of students for practical examination to the university.

7. There will be 40% weightage internally at college level(Class test + Tutorial) and 60% for the final theory examination. The concerned teachers have to take class test in their teaching schedule. There shall not be separate timetable for the class test.

8. **The Number of Teaching Staff required to run the course will be as follow :-**

> The graduation is very important phase in the life of our young students. The college responsibly is not only to deliver a quality syllabus based education, but also to motivate them to be a good healthy citizen. In this direction, the college must have sufficient facilities to run the course. A guideline is listed below. The College must have following minimum facilities :

Infrastructure:

1. One Class room to accommodate 60 students. (approximately 250 sq.ft.)

2. A well equipped software Laboratory having a LAN system of 30 nodes and having internet connectivity with broad band. All legal software, antivirus software, firewall be available for smooth functioning of the laboratory.

3. A hardware laboratory having twenty microprocessor kits with add on cards as per their syllabus. Staff room of 100 sq.ft. with one table and one Almeria for each faculty member.

4. One office space of 100 sq.ft. with appropriate furniture.

5. One lady room of 100 sq.ft. with attached toilet.

6. One reading room of 200 sq.ft. with seating arrangements for at least 30 people. The library may be accommodated in the library.

7. One copy of every text book among five student for each subject be available along with one copy of reference book as per the syllabus.

8. Library must subscribe for computer and scientific magazines. Appropriate general reading materials must be available for overall development of students.

9. An open space for sports activities. The college must be encouraged to have sport equipments.

Staff:

1. The head of the department in the scale of reader/Professor.

2. The minimum number of teachers must be appointed as per the work load.Per semester, the work load may be computed on the basis of theory classes, tutorials and practical class per batch. Minimum number of teachers to run the course must be five excluding the head. Teachers must be appointed by the university/UGC norms. The quality of the course is directly related to quality of teachers for the course.

3. There must be one clerk in the office to look after administrative work. The placement of all staffs must be maintained properly.

4. One qualified librarian

5. An appropriate number of class IV employees.

PATTERN OF QUESTION PAPERS

A) Internal Class Test :

- A class tests is to be conducted after completion of 15-20 Lecturers.

B) THEORY :-

➢ Each theory paper will carry Maximum 30 marks; duration of examination of theory paper will be 1.5 hours.

C) PRACTICALS: -   **Total marks 50 marks**

➢ Each Practical paper will carry Maximum 50 marks, duration of examination of each practical paper will be 1.5 hours.
➢ Internal Distribution of marks for each practical paper will be as follows.
   - Journal/ Record book (certified) 10 marks.
   - Oral/ viva 10 marks.
   - Practical Test 30 marks.

D) PROJECT:-

➢ Students of semester VI will have to perform ONE project of 150 marks. (A group of maximum 3 candidates will allow working on one project work)
➢ Internal Distribution of project marks will as follows.
   - Review 1 Report : 25
   - Review 2 Report : 25
   - Project work (certified) 25 marks.
   - Project work Presentation. 50marks.
   - Viva/ Oral. 25 marks.

B.C.A.(Sci.)
Three Years Integrated Course

Semester-I

Course: B.C.A.(Sci.) – I Seme.	Paper Code: BCA301T

Computer Fundamentals

Objective: *To impart basic introduction to computer hardware components, computer numbering, how the CPU works, fundamental about algorithms and flowchart as well as different type of software.*

Sr. No	Topic	Ref.	No. of Lect.
UNIT – 1			**15**
	1. Fundamentals of Computer System		
	• Introduction.	1/1	
	• Characteristics & features of Computers.		
	• Components of Computers.		
	• Organization of Computer.		
	2. Algorithm and Flowcharts		
	• Algorithm	2/1	
	▪ Definition		
	▪ Characteristics		
	▪ Advantages and disadvantages		
	▪ Examples		
	• Flowchart	3/3	
	▪ Definition		
	▪ Define symbols of flowchart	3/ 4	
	▪ Advantages and disadvantages		
	▪ Examples		
	3. Computer Generation & Classification		
	• Generation of Computers : First to Fifth	2/12	
	• Classification of Computers		
	• Distributed & Parallel computers		
UNIT – II			**15**
	4. Computer Languages		
	• Types of Programming Languages	2/9	
	o Machine Languages		
	o Assembly Languages		
	o High Level Languages		
	• Assembler, Linker, Loader, Interpreter & Compiler.	2/9	
	5. Computer Memory		
	• Memory Cell & Organization	2/4	
	• Types of Memory (Primary And Secondary)	2/4	
	o RAM		
	o ROM		
	o PROM		
	o EPROM		
	o Secondary Storage Devices (FD, CD, HD, Pen drive, DVD, Tape Drive, DAT)		

6. **I/O Devices**
   - Input Devices :   1/4
     - Touch screen , OMR, OBR , OCR, Light pen , Scanners
   - Output Devices :   1/4
     - Digitizers, Plotters, LCD
     - Plasma Display, Printers

UNIT – III   **15**
7. **Processor**
   - Structure of Instruction   2/5
   - Description of Processor
   - Processor Features
   - RISC & CISC
8. **Operating system Concepts**
   - Why Operating System   2/10
   - Functions of Operating System
   - Types of Operating System   2/10
     - Batch O.S.
     - Multiprogramming O.S.
     - Time Sharing O.S
     - Personal Computers O.S.
     - Network O.S.

Core Reference:

1. Fundamentals of Information Technology
   By Chetan Srivastava, Kalyani Publishers
2. Fundamentals of Computers
   By V.Rajaraman, PHI Publication , IVth Edition.
3. Fundamentals of Programming
   By Raj K.Jain, S.Chand Publication

Additional Reference:

1. Computer Today
   By Suresh K. Basandra, Galgotia Publication,Updated Edition
2. Computer Fundamental
   By B.Ram, BPB Publication.

Digital Electronics

Objective: *To impart basic knowledge in digital logic and circuits and to introduce basic concepts of data communications. Student will be able to learn basic concepts of digital logic and the design of basic logic circuits using commonly used combinational and sequential circuits*

Sr. No	Topic	Ref.	No. of Lect.
UNIT-I			**15**
1.	**Number Systems and Arithmetic**	1/1	
	Decimal Number System & Binary Number System		
	Decimal to Binary conversion(Double-dabble method only)		
	Binary to Decimal Conversion		
	Binary Arithmetic : Binary addition, subtraction, multiplication & division		
	Hexadecimal number system , Hexadecimal to binary, binary to Hexadecimal, Hexadecimal to decimal conversion		
	Hexadecimal arithmetic: Addition, subtraction, multiplication & division		
	Binary subtraction using 1' complement, 2's complement method		
2.	**Boolean Algebra and Logic Gates**	1/3	
	Postulates of Boolean Algebra		
	Theorems of Boolean Algebra: Complementation , commutative, AND, OR,		
	Associative,Distributive,Absorption laws , De morgan's theorems		
	Reducing Boolean expressions		
	Logic Gates : AND, OR, NOT, Ex-OR, Ex-NOR		
	NAND as Universal building block		
	Logic diagrams of Boolean expressions Boolean expressions for logic diagrams		
UNIT – II			**15**
3.	**Minimization Techniques**	1/5	
	Introduction , Minterms and Maxterms		
	K-Map, K-map for 2 variables		
	K-map for 3 variables		
	K-map for 4 variables		
4.	**Combinational and Arithmetic Logic Circuits**	1/6	
	Half Adder & Full Adder		
	Binary parallel Adder		
	Half Subtractor, Full Subtractor		
	Adder/Subtractor in 2's complement system		
	BCD to Decimal decoder		
	2 : 4 demultiplexer		
	4 line to 1 line multiplexer		

UNIT – III   **15**

    5. Flip Flops   1/7
       Introduction : RS FF
       Clocked RS FF, D FF
       Triggering, preset and clear
       JK FF , T FF , Race around condition
       Master slave FF

    6. Counters   1/8
       Introduction : Asynchronous/ ripple counter
       Modulus Counter , MOD-12 counter
       Synchronous counter : Synchronous serial & synch
       parallel counter
       BCD counter
       Ring counter
       Johnson counter

    7. Shift Registers   1/9
       Introduction, Buffer register
       Serial- in serial -out Serial-in parallel-out
       Parallel-in serial-out, parallel-in paralle-out

Core Reference:
    1. Digital Electronics and Micro-Computers – R.K.Gaur , Dhanpat Rai
Publication

Additional Reference:
    1. Digital Electronics and Logic Design – N.G.Palan, Technova Publication

8085:Microprocessor

Objective: *To introduce 8085 assembly language and thereby familiarize the student with architecture of microprocessors.*

Sr. No	Topic	Ref.	No. of Lect.
UNIT – I			**15**
1.	**Microprocessor, Microcomputers and Assembly language**	1/1	
	• Microprocessors		
	• Microprocessor Instruction set and computer languages		
	• From large Computers to Single chip microcontrollers		
2	**Building Concept of Microprocessor**	2/3	
	• Introduction , Study of human body		
	• Memory, input, output devices		
	• Central processing unit		
3	**8085 Microprocessor**	2/4	
	• Features of intel 8085 microprocessor		
	• Pin diagram and pin functions of 8085		
	• 8085 CPU architecture		
	• Functions internal blocks		
UNIT - II			**15**
4	**Introduction to 8085 Assembly Language Programming**	1/5	
	• The 8085 programming model		
	• Instruction Classification		
	• Instruction and Data formats		
	• How to write assembly and execute simple programs		
5	**8085 Instruction Set-I**	2/6	
	• Addressing Modes		
	• Classification of Instruction set		
	• Data Transfer group of Instructions		
	• Program examples for data transfer group		
6	**8085 Instruction Set-II**	2/6	
	• Arithmetic instructions group		
	• Program examples		
	• Logical instruction group		
	• Program examples		

UNIT – III   **15**

7   8085 Instruction Set-III   2/6
      • Conditional and unconditional Jump
      • Conditional and unconditional CALL
      • Conditional and unconditional RET

8   Concept of Looping   2/6
      • Flowchart
      • Programs using loop : Examples
      • Stack and Machine control group

Core Reference:
    1.   Microprocessors : Architecture, programming and Applications with 8085–
                                By R.S.Gaonkar.
    2.   8- it Microprocessors –
                        By V.J.Vibhute, P.B.borole

Programming in C

Objective: *To expose students to algorithmic thinking and problem solving and impart moderate skills in programming using C Language in a industry-standard. Introduce students to learn basic features, Create, execute simple C programs using conditional statements, loops and arrays.*

Sr. No	Topic	Ref.	No. of Lect.
UNIT – I			**15**
1.	**Introduction**	2/1, 1/1,	
	• An Overview of C , History of C language,		
	• C as a Structured Language, Features of C.		
2.	**Basic Elements & Operators**	2/2,3, 1/1	
	• Character set, C Token, Identifier & Keywords, Variables		
	• Constant and its types. Integer constant, floating point constant, character constant, string constants.		
	• Operators: Arithmetic, Relational, Logical, Unary operators: Increment & decrement Assignment and Conditional operator.		
	• Precedence & Associatively of Operators		
3.	**Data Types**	2/2, 1/1, 1/6	
	• Data Types: *int, char, float, double.* Declaration & Initialization.		
	• Type modifier: long, short, signed & unsigned		
UNIT – II			**15**
4.	**C Program & I/O statements**	2/4, 2/3, 1/1	
	• Structure of C Program, Compilation & Execution of C program		
	• I/O: Introduction, Formatted Input/Output function: *scanf & printf*, Escape sequence characters.		
	• Library functions: General & Maths.		
5.	**Control and Iterative Statements :**	2/5, /6, 1/3, 1/4	
	• Simple if, nested if, if-else, else if ladder		
	• Switch-case statement		
	• The conditional expression (? : operator)		
	• *while* and *do-while* loop, and *for* loop		
	• *break* & *continue* statement, *goto* statement		

6.   Arrays: 2/7, 2/8, 1/8, 3

- Introduction, Declaration and initialization Accessing array elements, Memory representation of array.
- One dimension and multidimensional arrays, character array, Introduction to string.

Core Reference:

1.   Let us C   : Y.P. Kanetkar   [bpb publication]

2.   Programming in C   : E. Balaburuswamy   [Tata macgraw hill]

3.   Programming in C   : Goterfried   [Shaums' Series]

Additional References:

1.   Spirit of "C"   : Moolish Kooper.

Objective: To equip students of computer science with effective speaking and listening skills in English To help them develop their soft skills and people skills, which will make the transition from college to workplace smoother and help them to excel in their jobs. & to enhance students' performance at Placement Interviews, Group Discussions and other recruitment exercises.

Sr. No	Topic	Ref.	No. of Lect.
UNIT – I			**15**
1.	**Concept of Communication**	1/1	
	• Attributes of Communication		
	• Process of Communication		
	• Feedback		
2.	**Objective of Communication**	½	
	• Upward Communication		
	• Downward Communication		
	• Horizontal Communication		
3.	**Method of Communication**	1/3	
	• Verbal , Oral , Written		
UNIT – II			**15**
4.	**Written Communication**		
	• Punctuation marks, Capitals, Abbreviations	1/11	
	• Grammar: Parts of Speech, tenses, vocabulary building, reduction of sentence length, summarization, constructing para.		
	• CS of good communication	1/12	
	• Language of business writing		
5.	**Oral Communication**		
	• Speeches and Presentation	1/29	
	• Dialogues	1/30	
UNIT – III (English Language Lab)			**15**

6. Listening Comprehension
 - ➢ Listening and typing – Listening and sequencing of sentences –
 - ➢ Filling in the blanks – Listening and answering the questions

7. Reading Comprehension and Vocabulary
 - ➢ Filling in the blanks - Cloze Exercises – Vocabulary building –
 - ➢ Reading and answering questions.

8. Speaking
 - ➢ **Phonetics:** Intonation – Ear Training – Correct Pronunciation – Sound recognition exercises - Common Errors in English
 - ➢ **Conversations:** Face to Face Conversation - Telephone conversation –
 - ➢ Role play activities (Students take on roles and engage in conversation)

Core Books

1. Business Communication , By urmila Rai & S.M.Rai. Himalaya Pub.
2. Communication Skill for Effective Management By Dr.Anjali Ghanekar. Everest Pub. House.
3. Developing Communication Skill By Krishna Mohan, Meera Banerji. McMillan

Course: B.C.A.(Sci.) – I Seme.	Paper Code: BCA306AT

Mathematical Foundation

Objective: Main objective of this course is to introduce mathematical concepts and techniques that have applications in comp. sci. and Info. Tech.

Sr. No	Topic	Ref.	No. of Lect.
UNIT – I			15
1.	**Set Theory**	1/1,2/1	
	• **Basic Definitions**: Set, Finite set, Infinite set, Singleton Set, Empty set, Subset, Proper Subset, Universal set, Power set, Venn diagram.		
	• **Combinations of Sets**: Union of sets, Intersection of Sets, Complement of a set, Equality of two sets, Disjoint sets, Difference of two sets, Symmetric Difference, Cartesian Product; explanation of each using Venn-diagram and simple examples.		
	• **Rules of Set Theory**.		
	• **Algebraic Properties of Set Operations**: Statement and proof of Commutative Laws, Associative Laws, Distributive Laws, Idempotent Laws, Properties of Compliment, Properties of Universal set, Properties of Empty set, Principal of Inclusion and Exclusion		
UNIT - II			15
2.	**Permutation and Combination**	1/3,2/3	
	• **Permutation**: The Multiplication Principal of Counting, Counting Methods		
	• **Combination**: Theorems and Examples.		
	• **Pigeonhole Principal** without proof, Examples.		
	• **Probability**: Sample Spaces, Events, Assigning Probabilities to Events, Equally Likely Outcomes.		
UNIT - III			15
3.	**Relation and Function**	2/4	
	• **Introduction**: Binary Relation, Tabular Form, Graphical Form, Ternary Relation, Quaternary Relation.		
	• **Properties of Binary Relations**: Reflexive Relation, Symmetric Relation, Antisymmetric Relation, Transitive Relation, Transitive Closure.		
4.	**Boolean Algebra**	2/12	
	• **Lattice:** Introduction, Sublattices , Properties of Lattices, Distributive and Complimented Lattices		
	• **Principle of Duality.**		

Core Reference:

[1] "Discrete Mathematical Structures" by Bernard Kolman, Robert C. Busby, Sharon Cutler Ross, Pearson Education Asia.

[2] "Elements of Discrete Mathematics" by C.L. Liu, Tata McGraw-Hill

[3] "Discrete Mathematics" by Dr. Bembalkar.

Office Lab

Objective: To impart the student hands on practice so that students should be able to: *Create, Save, Copy, Delete, Organize various types of files and manage the desk top in general, use a standard word and spread-sheet processing package exploiting popular features.*

- **GUI Operating System :** Mouse Practice, Starting, Login, Shutdown, Exploring Directories, Resizing, Moving, Minimizing, closing of software windows, familiarization with file icons, Launching Applications, Deleting, Renaming files, Managing Directories, Searching for files, Using Accessories.

- **Web Browser:** Basic Browsing, Buttons: forward, backward, home, adding to favorites, stop, save, save as, Saving an Image from the Web, printing, Specifying a Home Page, **Browsing**: Using Web URLs, Anatomy of a URL, Membership Websites: Signing up for email service, **Searching:** Academic Search on the web**.**

- **Word Processing Tool**: Menus, Shortcut menus, Toolbars, Customizing toolbars, Creating and opening documents, Saving documents, Renaming documents, Working on multiple documents, Close a document ; **Working With Text** :Typing and inserting text, Selecting text, Deleting text, Undo, Formatting toolbar, Format Painter, Formatting Paragraphs: Paragraph attributes, Moving, copying, and pasting text, The clipboard, Columns, Drop caps; **Styles** : Apply a style, Apply a style from the style dialog box, Create a new styles from a model, Create a simple style from the style dialog box, Modify or rename a style, Delete a style; **Lists** : Bulleted and numbered lists, Nested lists, Formatting lists **Tables** :Insert Table button, Draw a table, Inserting rows and columns, Moving and resizing a table, Tables and Borders toolbar, Table properties **Graphics** :Adding clip art, Add an image from a file, Editing a graphic, AutoShapes; **Spelling and Grammar**: AutoCorrect, Spelling and grammar check, Synonyms, Thesaurus; **Page Formatting**: Page margins, Page size and orientation, Headers and footers, Page numbers, Print preview and printing.

- **Spreadsheet Basics**: Screen elements, Adding and renaming worksheets, The standard toolbar - opening, closing, saving, and more; **Modifying A Worksheet**, Moving through cells, Adding worksheets, rows, and columns, Resizing rows and columns, Selecting cells, Moving and copying cells,, Freeze panes; **Formatting Cells:** Formatting toolbar, Format Cells dialog box, Dates and times; **Formulas and Functions:** Formulas, Linking worksheets, Relative, absolute, and mixed referencing, Basic functions, Function Wizard, Autosum, **Sorting and Filling:** Basic ascending and descending sorts, Complex sorts, Autofill; Alternating text and numbers with Autofill, Autofilling functions; Graphics; Adding clip art; Add an image from a file; Editing a graphics; AutoShapes; **Charts:** Chart Wizard; Resizing a chart; Moving a chart, Chart formatting toolbar; **Page Properties and Printing:** Page breaks, Page orientation, Margins, Headers, footers, and page numbers, Print Preview, Print; Keyboard Shortcuts.

- **Presentation Tool**: AutoContent Wizard, Create a presentation from a template, Create a blank presentation, Open an existing presentation, AutoLayout, Presentation Screen: Screen layout, Views, Working with Slides: Insert a new slide, Applying a design template, Changing slide layouts, Reordering slides, Hide slides, Create a custom slide show, Edit a custom slide show Adding Content: Resizing a text box, Text box properties, Delete a text box, Bulleted lists, Numbered lists, Adding notes, Video and Audio Working with Text: Adding text, Editing options, Formatting text, Replace fonts, Line spacing, Change case Spelling check   Color & Background: Color schemes, Backgrounds, Graphics, Adding clip art, Adding an image from a file, Editing a graphic, AutoShapes, WordArt Slide Effects: Action buttons, Slide animation, Animation preview, Slide transitions, Slide show options, Master Slides, Slide master, Header and footer, Slide numbers, Date and time Saving and Printing, Save as a web page, Page setup, Print

- **Integrating Programs** Word, spreadsheet and Presentation.

Note:
  The above practical is to be conducted using the either Microsoft-Office or OpenOffice.

Digital Electronics Lab

Objective: *To provide hands-on practice of the basic knowledge in digital logic and circuits and to provide hands-on practice in some commonly used combinational and sequential circuits*

Instruction: The Laboratory work will have to be performed during the semester consisting of any of the 8 experiments from the given list below***:***

List of Experiments:

1. Study and Testing of measuring instruments: Digital and Analog multimeters, CROs and Signal Generators – measurement of AC & DC voltages, measurement of frequency.
2. Study of Components: Identification and testing of resistors, capacitors, inductors, diodes, LEDs & transistors
3. Study of Logic Gates: Study of truth table of basic gates, realization of Boolean functions
4. Study of Half adder and Full Adder
5. Study of Half Subtractor and Full Subtractor
6. Study of Implementation of a 3:8 decoder,
7. Study of 4-line to 16 bit decoder
8. Study of BCD to 7-segment decoder
9. Study of Generating a Boolean expression with a multiplexer
10. Study of Clocked JK Flip Flop
11. Study of 4-bit ripple counter
12. Study of Parallel-in, serial-out, 4-bit shift register

Lab: <u>8085: Microprocessor</u>

Instruction: Any ten experiments from the list given below are to be performed on the 8085 Microprocessor Kit:

1. Addition and subtraction of two 8-bit numbers with programs based on different Addressing modes of 8085.
2. Addition and subtraction of two 16-bit numbers. (Using 2's complement method, also programs which access numbers from specified memory locations)
3. Multiplication of two 8-bit numbers using the method of successive addition and Shift & add.
4. Division of two 8-bit numbers using the method of successive subtraction and shift & subtract.
5. Block transfer and block exchange of data bytes.
6. Finding the smallest and largest element in a block of data.
7. Arranging the elements of a block of data in ascending and descending order.
8. Generating delays of different time intervals using delay subroutines and
9. measurement of delay period on CRO using SOD pin of 8085.
10. Program for Summation of First n Number.
11. Program for Factorial of n.
12. Program for Addition of Array elements.
13. Program for Reversing the Array elements.

Lab: <u>Programming in 'C'</u>

List of Experiments:
1. Find Area, Perimeter of Triangle & Rectangle.
2. Find maximum amongst 3 numbers.
3. Program for nested loops.
4. Program to Calculate x^y
5. Program to check Prime Number, Program reverse of digit.
6. Program to find Armstrong Number.
7. Program to print the Fibonacci Series
8. Searching and element from array.
9. Transpose of matrices
10. Multiplication of matrices
11. Sorting array using bubble sort technique
12. Program for factorial.

Note : Any other five program of faculty's interest.

B.C.A.(Sci.)
Three Years Integrated Course

Semester-II

Introduction to Data Structure

Objective: *This course provides students an opportunity to develop and refine their programming skills. In particular, the emphasis of this course is on the organization of information, the implementation of linear data structures such as arrays, lists, stacks, queues, and techniques of data abstraction, including searching and sorting.*

Sr. No	Topic	Ref	No. of Lect.
UNIT - I			**15**

1. **Introduction to Data Structure:**
   - Introduction
   - Basic Terminology : Data item, Fields, Records, Files, Entity, Attributes
   - Data Organization and Data Structure

2. **Arrays**
   - Representation of Linear Arrays
   - Traversing, Insertion and Deletions
   - Sorting & Searching Algorithms
   - Multidimensional Arrays : 2D & M-D Concept
   - Record: Record Structures, Representation in Memory

UNIT – II			**15**

3. **Linked List**
   - Concept of Linked List
   - Representation of linked List in memory
   - Traversing a linked list
   - Searching a linked list : sorted and unsorted
   - Insertion & Deletion in Linked List
   - Header Linked List & Two way List

UNIT - III			**15**

4. **Stacks, Queues , Recursion**
   - Stack: Operation , Array Representation of Stack, linked representation of stack, Arithmetic Expression POLISH & POSTFIX,
   - Application of stacks: Quicksort, Recursion.
   - Queue: Representation of queues & link.
   - Types of Queues : Deques & Priority Queues

Core References:

1. Data Structures : By Seymour Lipschutz, Tata Mcgraw- Hill Publication.

Advance Reference:
1. Fundamentals of Data structures, by Horowitz and Sahani (Galgotia publications).
2. An introduction to data structures and application, by Jean Paul Tremblay & Pal G. Sorenson (McGraw Hill).
3. Data Structures, by Tannenbaum, (PHI).

Operating Systems

Objectives: To introduce students the basic functioning *of operating systems as resource manager and its Salient features. Also to study about process states, scheduling, Memory and I/O Management techniques.*

Sr. No	Topic	Ref	No. of Lect.
UNIT – I			**15**
1.	**Introduction to Software:**		
	• **Software:** Definition, classification of software, operating system as the main component of system software;		
2.	**Operating System Fundamental**	2/1	
	• **Operating Systems**: OS as a resource manager, Structure of OS, Evolution of OS, OS functions, Characteristics of modern OS.		
	• **Types of O.S.:** Early systems, simple batch systems, multi-programmed batch systems, Time sharing system, Personal Computer systems, Parallel systems, Distributed systems, Real time systems		
	• **OS Structures:** Components of OS: Process management, Memory management, Storage management, File management, I/O management.		
UNIT – II			**15**
3.	**Process Management**	1/2	
	• **Concept of Process**: Process State, Operation on Processes, thread.		
	• **CPU Scheduling** : Types of Schedulers, Criteria for scheduling, Scheduling Algorithms.		
	• **Process Synchronization:** Need for synchronization, Critical Section, Hardware Synchronization, Semaphores, Monitors, Problem of synchronization.		
	• **Deadlocks:** Concept of Deadlock, Deadlock Modeling, Methods for Handling Deadlock		
UNIT – III			**15**
4.	**Storage Management**	1/3	
	• **Memory Management**: Address Binding, Logical Vs. Physical Address space, Memory Allocation, Paging, Segmentation, Segmentation and paging of Intel Pentium.		
	• **Virtual Memory:** Demand Paging, Page replacement Algorithms (FIFO, Optimal, LRU), Virtual Memory in windowsXp.		
	• **File System Interface**: Files, File Access, Directory Structure, Protection		
	• Implementation of File System: Allocation Methods, Free space Management		

Core References:

1. "Operating System", By S.R.Sathe & Anil S.Mokhade , MacMillan Publication.

2. "Operating System", By Stuart E.Madnick, John J.Donovan.

Additional References:

1. Operating System Concepts- A. Silberzchaz & P.B. Galvin, Addison – Wesley Publishing Company.

8086: Microprocessor

Objectives: *Make the student aware about the functional organization of physical components and architecture of a 8086 Microprocessor Kit. Also give the brief about instruction set of 8086.*

Sr. No	Topic	Ref	No. of Lect.
UNIT – I			**15**
1.	**1. Introduction to Microprocessor and Microcomputer**	**1/1**	
	• Historical background		
	• Microprocessor based personal computer system		
	• Computer data formats		
2	**2. 8086 Hardware specification**		
	• Microcomputer structure and operation		
	• 8086 internal architecture		
	• Introduction to programming 8086 : Prog.lang.		
UNIT – II			**15**
3	**3. Addressing Modes**	**1/3**	
	• Data addressing modes		
	• Program memory addressing modes		
	• Stack memory addressing modes		
4	**4. Data Movement Instructions (Inst.related with 8086 only)**	**1/4**	
	• MOV revisited: Machine language,the op-code, MOD field, resister assignment,R/M memory addressing,special addr.mode		
	• PUSH/POP, initializing stack		
	• Miscellaneous data transfer instructions: XCHG, LAHF & SAHF		
UNIT – III			**15**
5	**5. Arithmetic instructions**		
	○ Addition, subtraction and comparison		
	○ Multiplication and division		
	○ BCD and ASCII arithmetic		
6	**6. Logic instructions**		
	○ Basic logic Instructions		
	○ Shift and rotate		
7	**7. Program control Instructions**		
	○ The JUMP group		
	○ LOOP		
	○ CALL & RET		

Core Reference:

1. The Intel Microprocessors: Architecture, programming and interfacing –
   By Barry B. Brey
2. Microprocessors and Interfacing : Douglas Hall.

Advance Programming in C

Objective: After working through this paper the students should be able to
1) Learn some advance features of C language.
2) Write programs using pointers, file handling.
3) Aware of graphics functions of C.

Sr. No	Topic	References	No. of Lectures
UNIT – I			**15**
1	**Functions** • Introduction, types of functions. Defining functions, Arguments, Function prototype, actual parameters and formal parameters, Calling function, Returning function results, Call by value, Recursion.	2/9, 1/5, 3	
2.	**Structure & Union** • Structure: Introduction, Declaration and initializing structure, Accessing structure members, Nested structures, Arrays of structure, *typedef* statement. • Unions: Declaration, Difference between structure and union	2/10, 1/10,	
UNIT - II			**15**
3.	**Pointers:** • Introduction, Memory organization. Declaration and initialization of pointers. The pointer operator * and &, De-referencing, Pointer expression and pointer arithmetic, Pointer to pointer.	2/11, 1/5	
4.	**Storage Class & Library Functions:** • Storage classes, Scope, visibility and lifetime of variable, block and file scope, auto, extern, static and register storage classes. • **String handling functions**: strcpy(), strcmp(), strcat(), strlen(), strupr(), strlwr(), gets(), puts() • **Data conversion functions from stdlib.h**: atoi(), atol(), atof(), itoa(), ltoa(), random(), calloc(),malloc(),exit(), abs(), toupper(), tolower()	2	
5.	**Preprocessor Directives:** • File inclusion and conditional compiler directives, Macro substitution, #define, #if, #ifdef, #else, #elif, #endif,	2/14, 1/7	

| 6. | **Miscellaneous Features:** | 2/App-I, |
| | | 1/15, |

- Bitwise Operators: Introduction, Masking, Internal representation of data, Bit fields, Enumerated data types, Type casting.

UNIT - III   **15**

| 7. | **File Handling** | 2/12, 1/12,13 |

- **File handling**: Introduction, Opening & closing a file, Input/Output operations on files, text and binary files, getc(), putc() function. File copy program, fprintf() and fscanf(). fread() and fwrite() function. Writing and reading records from binary file, Appending, modifying and deleting a record from file, Random access functions fseek(), rewind(), flushall(), remove(), rename().
- **Command line arguments**: use of argc and argv.

| 8. | **Graphics in C:** | 4 |

- Introduction: initgraph() and detectgraph() function, Drawing object in C, Line, Circle, Rectangle, Ellipse, Changing foreground & background colors, Filling object by color, outtextx() function.

Core Reference:

1. Let us C Solutions   : Y.P. Kanetkar   [bpb publication]

2. Programming in C   : E. Balagurusamy. [Tata macgraw hill]

3. Programming in C   : Goterfried   [Shaums Series]

4. Graphics Under C   : Y. Kanetkar

Additional References:

1. Spirit of "C"   : Moolish Kooper.
2. Test your Skills in C   : Y.Kanetkar

Communication Skill- II

Objective: To introduce advance topics to self-assess various components of communication skills as well as to improve listening, reading, writing, and speaking and presentation skills through practice.

Sr. No	Topic	Ref.	No. of Lect.
UNIT – I			**15**
1.	**Communication with Media**	2/5	

- Written media of Communication: Letters, Notices, Minutes, Manual, Leaflet, Complaints & Suggestion, Job Application.
- Visual Media of communication: slide presentation, Pictures & Photographs, Posters & Advertisement.
- Non-Verbal Media of Communication

2.	**Written Communication: Reports**	2/8	

- Types of Report, characteristics of Good Report , Essential Requisites of Good Report-Writing, Planning the Report, Outlining Issues for Analysis, Writing the Reports.

UNIT – II			**15**
3.	**Group Communication**	1/8	

- Problem of Group Communication- Meeting - types of meeting, Advantages & Disadvantages of Meeting, - Preparation for Meeting – conduct of a Meeting – Responsibility of participants.

4.	**Interview**	1/9	

- Purpose, Types of interviews – promotion, appraisal, exit, telephone.
- Employment or selection Interview : Candidate's preparation, Question commonly asked in interview, role of interviewer, Interviewer's preparation.

UNIT – III			**15**
5.	**Listening Comprehension**		

  - Cassettes: "*Tiger's Eye*" Series.(vol. 1 & 2) , "*Twist in the Tail*"
  - The Listening drill is to be given and question should be framed.

6. **Reading Comprehension and Vocabulary**
   Reading with proper pronunciation and ideal reading is to be recorded.

7. **Speaking:**
   CIEFL' Spoken English exercises part <u>one</u> and <u>two</u>.
   Drilling : Proper Pronunciation of word and sentences

Core Books
1. Business Communication,By urmila Rai & S.M.Rai. Himalaya Pub.(Tenth Ed.)
2. Communication Skill for Effective Management By Dr.Anjali Ghanekar. Everest Pub. House.

Note : 1. Teacher should demonstrate various format of concerned contents.
2. For Report writing practice demonstrate IEEE paper Format.(http:// www.ieee.org/portal/cms_docs/pubs/confpubcenter/pdfs/samplems.pdf , http://www.ieee.org/portal/cms_docs_iportals/iportals/publications/journmag /transactions/TRANS-JOUR.doc)

Numerical Computational Methods

Sr. No	Topic	Ref.	No. of Lect.
	UNIT – I		**15**
1	**Error in Calculation**	1/1	
	• Significant Error , Absolute, Percentage, Relative Error		
	• Chopping off and Rounding off Error.		
	• Truncation Error, Propagation Error.		
2	**Matrices and Determinants.**	3/2	
	• Definitions, Matrix Operations		
	• Determinant of Square Matrix, Cofactor		
	• Adjoint of Matrix, Inverse of Matrix, Rank of Matrix		
3	**Numerical Solutions of Transcendental Equations**	1/2	
	• Concept of Iterative Methods, Search Method for Initial Guess.		
	• Bisection Method		
	• False Position Method		
	• Newton-Raphson Method		
	UNIT – II		**15**
4	**Elimination Methods for Solving Simultaneous Equations**	1/3	
	• Introduction and Matrix Notation of set of Equations		
	• Gauss Elimination Method		
	• Matrix Inverse Method		
5	**Interpolation**	1/6	
	• Introduction and Polynomial Interpolation		
	• Newton-Gregory Forward Difference Interpolation Formula		
	• Newton-Gregory Backward Difference Interpolation Formula		
	UNIT – III		**15**
6	**Interpolation - II**		
	• Central Difference Formula		
	• Newton's divided Difference Interpolation		
	• Lagrange's Interpolation		
7	**Least Square Curve Fitting**	1/7	
	• Best Fit and Criteria for Best Fit and Least Square Fit.		
	• Linear Regression.		
	• Polynomial Regression.		

Core Reference Books:
1. "Numerical Computational Methods" - Dr. P.B.Patil, Narosa Publication Hous.

Advance Reference Books:
1. Numerical methods -S.C.Chapra, R.P.Canale-McGraw Hill
2. Numerical methods-E.Balguruswamy

Lab: <u>Data Structure & Operating System</u>

Assignments: Write the Program using C (if applicable) :

Data Structure:

1. Write a program using DIV(J,K) which reads a positive integer N>10 and determines whether or not N is a prime number.
2. Write a program which counts the number of particular character/word in the String.
3. Write a program which reads words WORD1 and WORD2 and then replaces each occurrence of word1 in text by word2
4. Write the programs for traversing of n item using the array.
5. Write the programs for insertion and deletion of n item using the array.
6. Implement Linear and binary search algorithm using C.
7. Implement Bubble sort using C.
8. Write the programs for traversing of n item from the linked list.
9. Write the programs for push and pop operation using the stacks.
10. Write the programs for insertion and deletion of n item from the queues.

Operating System:
      1. Study of Unix/Linux Command.
      2. Write a program to implement the FCFS Scheduling Algoithms.
      3. Write a program to implement the SJF Scheduling Algoithms.
      4. Write a program to implement the Priority Scheduling Algoithms.
      5. Write a program to implement the Round Robin Scheduling Algoithms.

Lab : <u>**8086: Microprocessor**</u>

Any ten experiments from the list given below:

1.   Addition and subtraction of two 8-bit numbers with programs based on different Addressing modes of 8086.
2.   Addition and subtraction of two 16-bit numbers. (Using 2's complement method, also programs which access numbers from specified memory locations)
3.   Multiplication of two 8-bit numbers using the method of successive addition and Shift & add.
4.   Division of two 8-bit numbers using the method of successive subtraction and shift & subtract.
5.   Block transfer and block exchange of data bytes.
6.   Finding the smallest and largest element in a block of data.
7.   Arranging the elements of a block of data in ascending and descending order.
8.   Generating delays of different time intervals using delay subroutines and measurement of delay period on CRO using SOD pin of 8086.
9.   Program for Summation of First n Number.
10. Program for Factorial of n.
11. Program for Addition of Array elements.
12. Program for Reversing the Array elements.

Lab: Advance Programming in C

1. Swapping of numbers by using call by reference
2. Program to pass array to function.
3. Program for passing structure pointer to function.
4. String manipulation function e.g. string copy, concatenation, compare, string length, reverse
5. Program for reading/writing text file.
6. Program for reading/writing binary file
7. File copy program.
8. Program to modify a record from binary file
9. Program to delete a record from binary file
10. Program on conditional compiling
11. Program on macro substitution.
12. Program for data conversion
13. Program to draw simple pictures (human face, clock, hut, etc.) using graphics functions.
14. Program using command line arguments.
15. Program to demonstrate the storage class.
16. Program to sort names.

Course: B.C.A.(Sci.) – II Seme.	Paper Code: BCA206BP

Implementation of Numerical Computational Methods Using C.

1. Program in C for representation of, Inverse of Matrix
2. Program in C for representation of, Bisection Method
3. Program in C for representation of, False Position Method
4. Program in C for representation of, Newton-Raphson Method
5. Program in C for representation of, Gauss Elimination Method
6. Program in C for representation of, Matrix Inverse Method
7. Program in C for representation of, Newton-Gregory Forward Difference Interpolation Formula
8. Program in C for representation of, Newton-Gregory Backward Difference Interpolation Formula
9. Program in C for representation of, Central Difference Formula
10. Program in C for representation of, Newton's divided Difference Interpolation
11. Program in C for representation of, Lagrange's Interpolation
12. Program in C for representation of, Spline Interpolation

B.C.A.(Sci.)
Three Years Integrated Course

Semester-III

Analysis of Algorithm

Sr.No.	Topics in Details	No. of Lect.
Unit I	Introduction, Binary Trees, Representing Binary, Trees in Memory, Traversing Binary Trees, Traversal Algorithms using Stacks, Header Nodes; Threads, Binary Search Trees Searching and Inserting in Binary Search Trees, Deleting in Binary Search Tree, AVL Search Trees, Insertion in an AVL Search Tree, Deletion in an AVL Search Tree.	**15**
Unit II	Introduction, Graph Theory Terminology, Sequential Representation of Graphs; Adjacency matrix, Path Matrix, Warshall's Algorithm, Shortest Paths, Linked Representation of a Graph, Operations on Graphs, Traversing a Graph, Posets; Topological Sorting.	**15**
Unit III	Introduction, Sorting, Insertion sort, Selection sort, Merging, Merge-Sort, Radix Sort, Searching and Data Modification, Hashing.	**15**

Assignment: Question to be Solved from supplementary problems from the book recommended above are:
7.1,7.2, 7.3, 7.4, 7.9, 8.1, 8.5, 8.6

Core References:
  1. Data Structures : By Seymour Lipschutz, Tata Mcgraw- Hill Publication.

Advance Reference:
  1. Fundamentals of Data structures, by Horowitz and Sahani (Galgotia publications).
  2. An introduction to data structures and application, by Jean Paul Tremblay & Pal G. Sorenson (McGraw Hill).
  3. Data Structures, by Tannenbaum, (PHI).

Operating Systems II

Sr. No	Topic	Ref	No. of Lect.
Unit-I			**15**

1. **I/O System**
   - I/O System Components : I/O Devices , I/O Hardware , Application I/O interface
   - Secondary Storage Structure : Disk fundamental, Disk Scheduling , Disk Management
2. **Device Management**
   - Introduction : Dedicated Devices, shared devices and virtual devices
   - Generalized strategies

Unit-II			**15**

Device Characteristics
- Input and Output devices
- Storage devices
- Device allocations
- Concept of I/O Traffic controller
- I/O scheduler
- Introduction to Virtual Devices

Unit-III			**15**

Information Management
- Concept of File system
- Symbolic file systme
- Access control verification
- Logical and physical file system

Case study

    IBM system : Memory , processor, Device and Information Management.

Assignments

1. 5-2   from "Operating System", By Stuart E.Madnick, John J.Donovan.
2. 5-5 from "Operating System", By Stuart E.Madnick, John J.Donovan.
3. 5-7 from "Operating System", By Stuart E.Madnick, John J.Donovan.
4. 6-1 from "Operating System", By Stuart E.Madnick, John J.Donovan.
5. 6-5 from "Operating System", By Stuart E.Madnick, John J.Donovan.
6. 6-9 from "Operating System", By Stuart E.Madnick, John J.Donovan.
7. Prepare a short report on the case study given in the syllabus.

Core Reference:
1. "Operating System", By S.R.Sathe & Anil S.Mokhade , MacMillan Publication.
2. "Operating System", By Stuart E.Madnick, John J.Donovan.

Books Recommended:

- Operating System Concepts- A. Silberzchaz & P.B. Galvin, Addison – Wesley Publishing Company.

Database Management System

Sr.No.	Topics in Details	No. of Lect.
Unit–I		15

1.   Introduction to Basic Concepts of DBMS:
1. Database System Application
2. Purpose of Database System
3. Database Architecture : 3-Level architecture
4. Database Users & Administrators Responsibilities
5. Functional Components of Database system : Storage & Query Processor
6. Transaction Management

Unit-II		15

2.   Data Modeling & Design:
1. Type of Data Model :
     i. Relation Data Model
     ii. E-R Data Model
     iii. Object Based Data Model
     iv. Semi-Structured Data Model
     v. Hierarchical & Network Data Model
2. E-R Data Model: Entity, Entity set, Entity types, Attributes, Types of Attributes, E-R diagram.
3. Mapping Cardinalities , Data Association
4. Constraints : Integrity constraints I & II
5. Database Design : Overview of Design Process, Designing Phase, Normalization(1NF,2NF,3 NF)

Unit-III		15

3.   Relational Data Model
1. Basic Structure
2. Database Schema
3. Integrity Rules
4. E.F.Codds Rules
5. Relational Algebra : Union , Intersection , Difference, Cartesian Product, Selection , Projection, Join : Natural & Outer Join, Division

Reference:
1.   **Database System concepts :** Korth, Siberschatz , Fifth Edition
2.   **An Introduction to Database System :** B.Desai, Revised Edition

Object Oriented Programming Using C++

Sr.No.	Topics in Details	No. of Lect.
Unit I		**15**
1	**Introduction of OOP** Procedural Vs Object Oriented Programming, Basic concepts of Object Oriented Programming, Class, Object, Data Abstraction, Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Message Passing. Benefits and applications of OOP, History and overview of C++, C++ program structure. Scope resolution operator, Member de-referencing operators, new and delete, cin and cout, The endl and setw manipulator	
2	**Function overloading:** Function prototype, Call by reference (using reference variable), default and const arguments, Inline function. Function overloading.	
Unit II		**15**
1	**Objects and Classes:** Specifying a class, private and public, Defining member functions, Array of objects, Objects as function argument, returning objects, Friend function and its characteristics.	
2.	**Constructors, Destructors & Operator Overloading:** Introduction, Types of constructors, Multiple constructors in a class, Destructors Overloading unary and binary operators, Rules for operator overloading, Overloading without friend function and using friend function.	
UNIT-III		**15**
1	**Inheritance:** Derived and base class, Specifying the derived class, Accessing base class members, public and private Inheritance, Single Inheritance, The protected access specifier, Derived class constructors, Multilevel and Hierarchical Inheritance, Multiple Inheritance, Ambiguity in multiple Inheritance, virtual base classes,	
2	**Virtual function & Polymorphism** Introduction, Pointer to object, Pointer to derived class, Overriding member functions, Virtual function, Rules for virtual functions	

Reference Books:

1.Object Oriented Programming with C++ E. Balagurusamy, Tata McGraw-Hill Publishing

2.Object Oriented Programming In C + + Robert Lafore, Galgotia

3.Let us C++ Yeshwant Kanetkar; bpb publication

Statistical Methods

Sr. No	Topic	No. of Lect.
Unit I	**Introduction and basic concepts of Statistics**	**15**
	• Definition of Statistics, Scope and importance of Statistics.	
	• Primary and Secondary data, Types of data : qualitative, quantitative, discrete, continuous, cross-section, time series, failure, industrial, directional data.	
	• Graphical presentation: Histogram, frequency polygon, frequency curves	
	• Diagrammatic presentation: Bar diagrams, Pie diagram, scatter diagram.	
	• Classification of data: Discrete and continuous frequency distributions, inclusive and exclusive methods of classification, relative and cumulative frequency distributions.	
Unit II	**Measures of Central Tendency**	**15**
	• Concept of central tendency. For group and Ungroup data	
	• Arithmetic mean (A.M.) simple and weighted	
	• Merits and demerits of A.M.	
	• Mode: Computation for frequency and non-frequency data.	
	• Computation of mode	
	• Merits and demerits of mode.	
	• Median: Computation for frequency and non-frequency data, computation.	
	• Merits & demerits of median.	
	• Geometric mean (G.M.) computation for G M	
	• Merits demerits and applications of G.M.	
	• Harmonic Mean (H M) computation for frequency, non-frequency data, merits, demerits.	
Unit III	**Measures of Dispersions**	**15**
	• Dispersion and measures of Dispersion	
	• Range (definitions and problems)	
	• Quartile Deviation (definitions and problems)	
	• Mean Deviation (definitions and problems)	
	• Standard Deviation (definitions and problems)	
	• Variance, different formulae for calculating Variance.	

Core Reference:
1. **Fundamental of Mathematical Statistics**
   By S.C.Gupta and V.K. Kapoor

Technical Writing

Objective: To enable students to write essential official documents and learn various formats and styles of technical writings To be excellent in written communication skills.

Sr. No	Topic	Ref.	No. of Lect.
1.	**Meeting Documents: Notice, Agenda Minutes;**	1/30	9
	• Notice of Meeting: Language, Style, Specimens		
	• Agenda of the Meeting: Language, Style, Specimens		
	• Minute in the Meeting: Language of Minutes and Resolutions		
2.	**Business Correspondence:**	2/12	9
	• Purpose: Structure; compulsory elements of Business correspondence, Layout and Form;		
	• Types: Job Application, Letter of Order, Complain Letter, Insurance Claim Letter, Response Letters and Interview call Letter.		
3	**Report Writing:**	2/9; 1/31	12
	• Formal Reports: Definitions; Preparatory Steps;		
	• Types of Reports; Structure of reports;		
	• Specimen Reports, AIEEE reports.		

Practice Sessions: (15 periods)

Writing Skills:

Practical knowledge of written communication and practice of writing of the taught written documents must be given to students.

Speaking Skills:

Teacher must give students the practice of speaking at formal occasions.

Drilling: Proper pronunciation of words and sentences must be drilled.

Core Books:
1. **Business Communication** by Urmila Rai and S. M. Rai, Himalaya Publication.(10th Edition).
2. **Devoeloping Communication Skills** by Krishna Mohan and Meera Banerji, Macmillan India Ltd.

Note: 1.Teacher should practically demonstrate various formats of of the documents   given in the syllabus.

2. Report writing involves IEEE paper format. Teacher must concentrate upon its style of writing and formats used practically.

3. Prepared record book containing all the documents learnt in the practical Session is compulsory for Internal Assessment of students.

Lab: **Analysis of Algorithm**

- Write a program which prints the nodes of T in (a) preorder (b) inorder (c) postorder.
- Write a program which prints the terminal nodes of T in (a) preorder (b) inorder
     1. (c) postorder. (note: all three lists should be the same).
- Translate heapsort into a subprogram HEAPSORT (A, N) which sorts the array A with N elements. Test the program using
     2. 44,33,11,55,77,90,40,60,99,22,88,66
- Write a program which prints the list of employee records in alphabetical order (Hint: print the records in inorder)
- Write a subprogram RANDOM (DATA, N, K) which assigns N random integers between 1 and K to the array DATA
- Translate insertion sort into a subprogram INSERTSORT (A, N) which sorts the array A with N elements. Test the program using:
     (a)   44,33,11,55,77,90,40,60,99,22,88,66
- Translate selection sort into a subprogram SELECTSORT (A, N) which sorts the array with N elements. Test the program using:
     (b)   44,33,11,55,77,90,40,60,99,22,88,66

Lab: **Operating System**

1. 5-2   from "Operating System", By Stuart E.Madnick, John J.Donovan.
2. 5-5 from "Operating System", By Stuart E.Madnick, John J.Donovan.
3. 5-7 from "Operating System", By Stuart E.Madnick, John J.Donovan.
4. 6-1 from "Operating System", By Stuart E.Madnick, John J.Donovan.
5. 6-5 from "Operating System", By Stuart E.Madnick, John J.Donovan.
6. 6-9 from "Operating System", By Stuart E.Madnick, John J.Donovan.

7. Prepare a short report on the case study given in the syllabus.

Course: B.C.A.(Sci.) – III Seme.	**Paper Code:** BCA212AP

Lab: <u>Database Management System</u>

1. Student should select any five applications and as per the guidance of the concerned teacher should prepare the E-R diagram for the applications.
2. Student should make the necessary Relational databases using the normalization for any two applications. Also they should solve at least twenty Queries using relational algebra based on relations drawn by them.

Course: B.C.A.(Sci.) – III Seme.	**Paper Code:** BCA204CP

Lab: <u>OOP using C++</u>

1. Program for inline function.
2. Program for function overloading.
3. Object oriented program to demonstrate class & object and member functions..
4. Object oriented program for friend function.
5. Object oriented program for constructor
6. Object oriented program for multiple constructors in a class.
7. Object oriented program to demonstrate the use of destructor
8. Object oriented program for unary operator overloading.
9. Object oriented program for arithmetic operator overloading.
10. Object oriented program for relational operator overloading.
11. Object oriented program for single inheritance
12. Object oriented program for hierarchical inheritance
13. Object oriented program for derived class constructors.
14. Object oriented program for multiple inheritance
15. Object oriented program for virtual base class.
16. Object oriented program for virtual function.

B.C.A.(Sci.)
Three Years Integrated Course

Semester-IV

Software Project Management

Sr. No.	Topics in Details	No. of Lect.
Unit I		**15**
	Introduction to Software Project Management Software project versus other types of project. Problems, Requirement specifications. Introduction to step wise project planning - Select - identify scope and objectives - identify project infrastructure - Analyse project characteristics - products and activities.	
Unit II		**15**
	Project evaluation - Introduction to Strategic assessment - technical assessment - cost benefit analysis - cash flow forecasting - cost benefit evaluation techniques - risk evaluation.	
Unit III		**15**
	Selection of an appropriate project approach - choosing technologies - technical plan contents list - choice of process models - structured methods - rapid application development - waterfall model - spiral model - software prototyping - ways of categorizing prototypes - tools - incremental delivery.	

Books for Study:

1. Bob Hughes and Mike Cotterell - Software project management - second edition - McGraw Hill

2. Walker Royce - Software Project Management - Addison Wesley.

Advance Database Using SQL

Sr.No.	Topics in Details	No. of Lect.
Unit-I		**15**

Introduction to SQL :
SQL Environment

Data Definition Language :
Naming Rules and Conventions, Data types, Constraints, Creating Table, Displaying Table Information, Altering an Existing Table, Dropping a Table, Renaming a Table

Unit-II		**15**

Data Management and Retrieval
1. Data Manipulation Language :
   Adding a New rows/records, Updating Existing records, Deleting records, Retrieving Data from a Table,
2. Working with Tables: Function & Grouping
3. Multiple Tables : Joins and Set Operators
4. Subqueries: Nested Queries
5. Objects, Transactions and Data Control

Unit-III		**15**

PL/SQL: An Introduction
PL/SQL: Syntax overview, block structure. Variables, program flow, procedures, functions, triggers, cursors.

TextBooks:

1. Database Systems Using Oracle: A simplified Guide to SQL & PL/SQL Nilesh Shah, PHI Publication , Second Edition.

2. Teach Yourself SQL in 21 Days: Ryan K. Stephens, Ronald R. Plew, Bryan Morgan, Jeff Perkins: SAMS Publication

Reference Website:
http://www.dmc.fmph.uniba.sk/public_html/doc/sql/index.htm

Data Communication and Networking – I

Sr.No.	Topics in Details	No. of Lect.
UNIT-I		**15**
1	**Introduction** Communication System, Components of communication system, Computer network Advantages and applications of computer n/w. point-to-point and multipoint line configuration, LAN, MAN and WAN. Analog and Digital signals, Data Transmission: Parallel and Serial, Synchronous and Asynchronous transmission, Transmission Mode: Simplex, half-duplex and full-duplex.	
2	**Network Topologies** Mesh, Star, Tree, Bus and Ring and Hybrid Topology (Advantages and disadvantages of each)	
UNIT-II		**15**
3	**Transmission media** Guided and unguided media, Twisted-pair, UTP and STP cable, coaxial cable, Optical Fiber cable, Radio waves, Microwaves, Satellite Communication (*Transmission characteristics and advantages of each type*)	
4	**Modulation** Concept of modulation and demodulation, Digital-to-analog conversion, Amplitude Shift Keying (ASK)/AM, Frequency Shift Keying (FSK)/FM, Phase Shift keying (PSK)/PM. Quadrature PSK, differential PSK.	
UNIT-III		**15**
5	**Multi channel Data Communication** Channels and Concept of multi channeling, Baseband and Broadband, Multiplexing: FDM and TDM (Synchronous and asynchronous TDM),	
6	**Data Networks and Protocols** Switching, Circuit Switching, Packet Switching and Message Switching. Network Protocol: syntax, semantics and timings, The OSI model, 7-layers of n/w model., Functions of each layer	

Text Book:

1. Computer Networks by A.S Tannenbaum.
2. Data Communication and Networking :: Behrouz A. Forouzan; Mc-Graw Hill Pub.
3. Introduction to Digital and Data Communications, Michal A Miller, JAICO, publishing.
4. Data Communication and Networking: C.S.V. Murthy, Himalaya Publishing House

Object Programming Using Java–I

Sr. No.	Topics in Details	No. of Lect.
UNIT I		**15**

1 **Object oriented paradigm**

Basic concepts of Object oriented programming: class & object, data abstraction and encapsulation, inheritance, polymorphism, dynamic binding, message communication. Benefits and applications of OOP. History and features of Java. Java Vs. C++. Java and Internet, Java and www. Java environment. Structure of java program, symbolic constants. Data types of java in brief.

2 **Arrays, Classes and Objects**

Declaration and initialization, one and multidimensional arrays
Defining a class, adding variables and methods, creating objects, static fields and static methods. Method overloading, Constructors: types and multiple constructors in class. Command line arguments.

UNIT II		**15**

1 **Inheritance**

Super and sub class, defining a subclass. Single inheritance, multilevel inheritance and hierarchical inheritance. Subclass constructors. super keyword, Visibility controls, Method overriding, Dynamic method dispatch, Abstract methods and class.

2 **Interfaces & String Class**

Defining interfaces, implementing interfaces, extending interfaces, accessing interface variables.
String class and its methods, Vectors

UNIT III		**15**

1 **Packages**

Introduction, Java API packages, Naming conventions, creating and accessing user defined package, using a package, adding a class to a package, importing classes from package.

2 **Exception handling**

Exceptions, syntax of exception handling code, multiple catch statements, throw: throwing own exceptions, throws and finally

Reference Books:

1. Prgramming with JAVA: E. Balagurusamy, Tata Mc-Graw Publishing Company Ltd.
2. The Complete Reference J2SE: Herbert Schildt, Tata Mc-Graw Publishing Company Ltd.
3. Core Java-2 Vol-I & Vol-II - Cray S. Horstmann, Gray Corneel; Pearson Education, Low Price edition

Financial Accounting

Sr.No.	Topics in Details	No. of Lect.
UNIT-I		**15**
	Double entry accounting system, Introduction, concept and advantages. Principles of accounts. Journalizing rules, types of accounts, subsidiary books, Ledgers, Trial balance, Journal	
UNIT-II		**15**
	Trading, Profit and loss a/c and balance sheet, trial a/c (simple exercise on sole trader, final a/c)	
UNIT-III		**15**
	Partnership A/c: Introduction, preparation of partnership, final a/c, depreciation, introduction, meaning, definition. Methods of depreciation. Fixed installment, reducing balance method	

Reference Books:

1. Advanced Accounts – Shukla and Fireval, S. Chand & Co.

2. Advanced Accountancy – M.C. Shukla & R.L. Gupta

Web Fundamentals-I

Sr. No	Topic	No. of Lect.
Unit I	**Basic concepts**	**15**
	• Web standard : Standard Process, Advantage of Standard, Current Web Standard.	
	• Basic web designing: Introduction to web browser, architecture of web browser, web page, Static & dynamic web pages, home page, web-site. Web-servers & clients.	
	• Basic's of Internet, Internet Domains	
	• Protocols definition, Overview of TCP/IP, Telnet, FTP	
	• Communication between browser and web server	
2.	**Introduction to HTML**	**15**
	• Structure of HTML program	
	• HTML paired tags	
	• Text formatting: paragraph, line break, headings , drawing lines.	
	• Text styles: Bold, italics, underline.	
	• Lists: types of lists viz. unordered, ordered, definition lists	
	• Adding graphics: image, background, border, using width and height attributes.	
	• Tables : creation and setting attributes of table.	
	• Linking documents (Links) : External document references, internal document references.	
	• Introduction to frames: frameset and frame tag.	
3.	**Introduction to DHTML**	**15**
	• Overview of dynamic HTML.	
	• Cascading Style Sheets, font ,color ,background, Text, border.	
	• Introduction to javascript.	
	• Working with java script style sheets.	
	• Adding form and controls ,Event handling.	
	• Decision making statements, loops.	
	• Built-in functions, user defined functions.	

Core Reference:

1. **Web Enabled commercial Application Development Using HTML, DHTML, JavaScript by -Ivon Bayross.**
2. **Complete reference HTML**

Principles of Management

Sr.No.	Topics in Details	No. of Lect.
UNIT-I		15

Introduction: Management administration, organization concepts, definition, scope and importance of management. Evaluation of management, early contribution and modern management thought and pattern

UNIT-II		15

Principles of Management, Division of work authority & responsibility, discipline – unity of command and direction centralization remuneration. Scar, chain order equity, initiative

Function of management

Planning: nature and purpose, objectives – planning premise, forecasting decision making, policy formulation and planning in action

Organizing: forms and complexities or organization in business, trading forms and modern forms. University of organization, nature and purpose of organization, organization charts – span of management, departmentation line, staff relationships, functional aspects, delegation and decentralization of authority making the organization work role of committee.

UNIT-III		15

Staffing: The managerial job selection of managers, appraisal of management, personnel, development and training of managers, developing the executive tomorrow

Direction: Nature of direction, motivation – Human factors in business administration, organization as a special behaviours, participation in management, communication leadership in administration, dimensions leadership role – leader –follower relationship

Controlling: Control process devices of control, overall control of performance ration analysis- management audit, cont control, quality control- advance control techniques, PERT, CPM etc.

Coordination : Need, principles and techniques

Reference Books

1. Principles of Management – T. Ramaswami, Himalaya Publication
2. Principles of Management – T.N. Chhabra – Dhanpat Rai & Co. Pvt. Ltd.
3. Principles of Management – L.M. Prasad – Sultan Chand & Sons, Delhi

Linux

Sr.No.	Topics in Details	No. of Lect.
Unit-I	**Introduction to Linux :**	15
1.	• What is Linux, Linux's & Unix , Features of Linux, Advantage of Linux, Open Source and the Philosphy of Linux ,Version of Linux, What is Red Hat Linux, Why Red Hat Linux.	
	• Getting Started with Desktop : Logging in to Red Hat Linux, Getting started with Desktop, Using GNOME and KDE Desktop Environment	
Unit-II	**Using Linux :**	15
2.	• Linux Commands : Understanding Red hat Linux Shell, Using the shell , Working with the Red Hat Linux file System, Using Vi text editor	
	• Accessing and Running Application: Running X Windows Application, Starting application from a menu, starting application from a run program window, starting application from a Terminal Window, Running remote X Application.	
	• Tools for using the Internet and Web: Understanding Internet tools, browsing the web, communicating via e-mails.	
Unit-III	**Administrating Linux :**	15
3.	• Understanding System Administrator : Using the Root login, Becoming the Super User, Role of Linux System Administrator, Configuring Hardware, Managing File System and Disk Space, Mounting file systems	
	• Creating User Account, Setting user defaults, Creating portable desktops, Deleting user accounts	
	• Setting up a LAN : wired and wireless LAN	
	• Connecting to the internet.	

Reference:

1. *Red Hat Linux 9 Bible*: Christopher Negus, Wiley dreamtech Pub.
2. *Learning Red Hat Linux :* Bill McCarty, O'Reilly Media Publication
3. *Running Linux :* Matt Welsh; Matthias Kalle Dalheimer; O'Reilly Media Publication

DBMS using SQL : Lab

The Queries to be implemented based on Previous Semester Study of DBMS by using SQL.
1. Write the queries for Data Definition and Data Manipulation language.
2. Write SQL queries using Logical operators (=,<,>,etc.).
3. Write SQL queries using SQL operators (Between…. AND, IN(List), Like, ISNULL and also with negating expressions).
4. Write SQL query using character, number, date.
5. Write SQL query using group functions.
6. Write SQL queries for Relational Algebra (UNION, INTERSECT, and MINUS, etc.).
7. Write SQL queries for extracting data from more than one table (Equi-Join, Non-Equi-Join , Outer Join)
8. Write SQL queries for sub queries , nested queries.
9. Write programs by the use of PL/SQL.
10. Concepts for ROLL BACK, COMMIT & CHECK POINTS.

- Students are advised to use **Oracle/MySql** version or other latest version for above listed experiments. However depending upon the availability of software's, students may use **SQL SERVER**. Mini Project may also be planned & carried out throughout the semester to understand the important various concepts of Database.

OOP Using Java - I: Lab

1 Program for one dimensional array. (sum and average of elements/finding maximum number from array)
2. Matrix addition and multiplication program using 2 dimensional arrays.
3. Program for static fields and static methods.
4. Program for method overloading
5. Program using constructor
6. Program to demonstrate the use of command line argument.
7. Program for single inheritance.
8. Program for multilevel inheritance.
9. Program to demonstrate the subclass constructor
10. Program for method overriding
11. Program for abstract class and methods.
12. Program for implementing interfaces.
13. Program for creating and importing user defined packages.
14. Program for exception handling
15. Program for create thread using extends Thread and implements Runnable.

Course: B.C.A.(Sci.) – IV Seme.	**Paper Code:** BCA235P

Financial Accounting : Lab

10 to 15 practical on any financial software

Course: B.C.A.(Sci.) – IV Seme.	**Paper Code:** BCA216AP

Web Fundamentals-I: Lab

1. Design a web page which gives information of your college and course. (Use various effects like alignment font heading etc).
2. Design a web page using 3 image files give various effects on each.
3. Create a web page giving following details of students using table and use cell padding to present following data with clarity,
   Roll number, Name, Date of birth, Blood group, Mobile, E-mail address

   Give proper title to the data and the web page
4. Design a web page which give links to various mailing sites(viz. Gmail, Yahoo, Rediff etc.)
5. Refer hand on exercise of reference book [*] page no. 155
6. Refer hand on exercise 1 of reference book [*] page no. 182
7. Refer hand on exercise 2 of reference book [*] page no. 182
8. Refer hand on exercise 1,2,3 of reference book [*] page no. 335
9. Refer hand on exercise 1 of reference book [*] page no. 537
10. Refer hand on exercise 2 of reference book [*] page no. 538

* **Reference Book** : Web Enabled commercial Application Development Using HTML, DHTML, JavaScript by -Ivon Bayross.

Course: B.C.A.(Sci.) – IV Seme.	**Paper Code:** BCA236AP

Principal of Management: Case Study

Two case studies on Unit 2 and Unit 3.

Course: B.C.A.(Sci.) – IV Seme.	**Paper Code:** BCA217P

Linux : Lab

10 Practical each based on Unit 1, Unit 2 and Unit 3.

B.C.A.(Sci.)
Three Years Integrated Course

Semester-V

Software Project Management

Sr.No.	Topic	No. of Lect.
Unit - I		**15**
	• **Software Efferts estimation** Introduction, where estimates done, problems with over and under estimates done, basics for software estimating, estimation techniques, function point analysis, COCOMO model. • **Activity Planing** Objectives, project schedule, projects and activities, sequence and shedule, adding time dimention, identifying the cretical path.	
Unit – II		**15**
	• **Risk Management:** Risk, category of risk, frame work for dealing with risk, risk identification, risk assesment, risk planing, risk management, PERT Technique. • **Resource Allocation** Nature of resources, identificying resource requirement, sheduling resources, counting the cost, sheduling sequence.	
Unit – III		**15**
	• **Monitoring and control** framework creation, data collection, visualizing progress, monitaring of cost and prioritizing. • Software Quality Importance, defining software quality, product versous process quality management, Quality plan.	

Books for Study:

1. Bob Hughes and Mike Cotterell - Software project management - fourth edition - McGraw Hill
2. Walker Royce - Software Project Management - Addison Wesley.

Data communication Networks -II

Sr.No.	Topics in Details	No. of Lect.
Unit-I	1) **Data Link Layer:** Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link protocols, Sliding Window Protocols, Protocol Performance, Protocol Specification and verification	15
	2) **Network Layer :** Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms, Internetworking.	
Unit-II		15
	1) **Transport layer:** Transport layer design issues, Connection management, A Simple transport on Top of X.25.	
	2) **Session Layer:** Session layer design issues, Remote procedure call.	
Unit-III	1) **Presentation layer:** Presentation layer design issues, Abstract syntax notation1(ASN.1), Data compression techniques, Cryptography.	15
	2) **Application Layer:** Application layer design issues, File Transfer, access and management, Electronic mail, Virtual Terminals.	

Text Book:
1. Computer Networks by A.S Tannenbaum.
2. Data Communication and Networking :: Behrouz A. Forouzan; Mc-Graw Hill Pub.
3. Introduction to Digital and Data Communications, Michal A Miller, JAICO, publishing.
4. Data Communication and Networking: C.S.V. Murthy, Himalaya Publishing House

Management Information System

Sr.No.	Topics in Details	No. of Lect.
Unit-I	**Strategic View Of MIS**	15
1.	• Management Information Systems in a Digital Firm • E-Business Enterprise: A Digital Firm • Strategic Management of Business Performance • Information Security Challenges in E-Enterprises	
Unit-II	**Basics Of Management Information System**	15
2.	• Decision- Making • Information, Knowledge, Business Intelligence • Systems Engineering: Analysis and Design • Development Process of MIS • Strategic Design of MIS	
Unit-III	**Applications Of Management Information System**	15
3.	• Applications in Manufacturing Sector • Applications in Service Sector • Decision Support Systems and Knowledge Management • Enterprise Management Systems	

Reference:
1. "Management Information Systems : Text & Cases" by Waman Jawadekar Mcgraw Hill Publication

Computer Graphics

Sr.No.	Topics in Details	No. of Lect.
Unit-I		15

Introduction to
Computer Graphics Application
Overview of Display Devices : CRT , Flat panel Display, LCD
Overview of Input devices for Interactive graphics.
Image Acquisition and Storage. Storage and file format for pictures. Image acquisition with a digital camera.
Programmers model of interactive graphics system.(Demonstrate use of graphics using C/Any other higher Level Programming Language)

Unit-II   **15**

2-D Transformation
Representation of points. Transformation & Matrices Representation. Transformation of Point. Transformation of Straight Line. Midpoint Transformation, Rotation, Reflection, Scaling, Combined Transformation.

Unit-III   **15**

Composite Transformation & Clipping
Line Drawing Algorithms. D.D.A., Bresenhems, Circle Generation Clipping : 2D clipping , Mid-point Sub-division algorithms

Reference:
1. **Procedural Elements for Computer Graphics :** D.F.Rogers
2. **Mathematical Elements for Computer Graphics:** D.F.Rogers and J.A.Adams

E-Business

Sr. No.	Topics in Details	No. of Lect.
UNIT I		**15**
	Introduction, IT and business, E-commerce: Concepts Electronic Communication, PCs and Networking, E-mail, Internet and intranets. EDI to E-commerce, EDI, UN/EDIFACT	
UNIT II		**14**
	Concerns for E-commerce Growth, Internet bandwidth, Technical issues, Security issues. India E-commerce Readiness, Legal issues. Security Technologies: Cryptography, Public Key Algorithms, Private Key Algorithms, Hashing techniques, Certification and key Distribution, Cryptographic	
UNIT III		**15**
	Applications, Encryption, Digital Signature Protocols for Transactions. SSL-Secure Socket Layer, SET-Secure Electronic Transaction, Credit Card Business Electronic Commerce providers. CyberCash, Digicash, VeriSign Software Package: PGP e-mail encryption software	

TEXT BOOK :

1. E-Commerce: The Cutting Edge of Business, Kamlesh K. Bajaj & Debjani Nag, Tata McGraw Hill

GUI-Programming

Sr.No.	Topics in Details	No. of Lect.
Unit-I	**Introduction:** Introduction to .NET and .NET Framework, Difference between CUI & GUI, Event Driven Programming, the VB IDE, Operators, Conditional statements and looping statements. Sub Procedure, functions and exception handling	15
Unit-II	**Windows Forms :** General Properties, Events handling events like mouse, keyboard, Types of forms MDI, adding removing controls at run time **Controls** : The control class, Text Box, Rich Text Box, Label, Buttons, Checkbox, Radio Button, Panels, Group Boxes, List Box, Combo Box, Picture Box, Scroll Bars, Splitters, Track Bars, Pickers, Timer	15
Unit-III	. **Object-Oriented Programming :** Class and Object, Class Vs. Object Members, Creating Classes, Objects, Structures, Modules, Constructors, Data Members, Methods, Properties, Event	15

Text Book:
1."Visual Basic .NET Programming Black Book" by Steven Holzner, Dreamtech Press
2. "Mastering in Visual Basic .NET" by Evangelos Petroutsos, Sybex Publication.

Internet Programming Using PHP

Sr.No.	Topics in Details	No. of Lect.
Unit-I	Introduction to PHP, Configuring Apache, Configuring PHP, The building Block of PHP.	15
Unit-II	Decision and loops, functions in PHP types of functions, Arrays in PHP, Objects in PHP.	
Unit-III	working with String, Date and Time, handling Forms (HTML).	15

Text Book:
- "BEGINNING PHP 5.3" by MATT DOYLE WROX publication
- "PHP, MySQL and Apache All in One" by Juliea C. Meloni, SAMS series

DataBase Administrator

Sr.No.	Topics in Details	No. of Lect.
Unit-I		**15**
	Oracle Overview and Architecture: An overview of logical an physical storage structures, Oracle memory structures, Oracle background processes, connecting to oracle instance, processing SQL command.	
	Managing Oracle: starting up the oracle instance, managing sessions, shutting down the oracle instance, instances messages and instance alerts.	
	Control and Redo Log Files: Managing the control files, Maintaining and monitoring redo log files	
Unit-II		**15**
	Managing tables, indexes and constraints: Storing data (create, alter, analyzing, querying table information), Managing indexes, Managing constraints	
	Managing Users and Security: Profiles, Managing users, managing privileges, managing roles, querying role information	
Unit-III		**15**
	Introduction to Network Administration: Network design considerations, network responsibilities for the DBA, network configuration, Overview of oracle Net features, Oracle Net Stack Architecture	
	Backup and Recovery Overview: Database backup, restoration and recovery, Types of failure in oracle environment, defining a backup and recovery strategy, Testing the backup and recovery plan	
	Introduction to performance tuning: brief overview of Tuning methodology, General tuning concepts	

Reference:
1. **Oracle 9i DBA Fundamental ,** Bob Bryla, Biju Thomas, I, BPB
2. **Oracle 9i DBA Fundamental,**Doug Stums, Matthew Weshan, I, BPB,

Note: Higher version of Oracle May also be referred if available.

Course: B.C.A.(Sci.) –V Seme.	**Paper Code:** BCA214BP

Data Communication & Networking

1. Study of Networking Devices & tools
2. Practical setup of Lab Intra-Network.
3. Installation of Server & Client System
4. Peripheral Device Sharing of Devices in LAN
5. Proxy Network Setting.
   Note : Any Five Addition practical Assignment as per faculty directive.

Course: B.C.A.(Sci.) –V Seme.	**Paper Code:** BCA215P

Computer Graphics : Lab

Ten programs based on theory unit as per faculty directive.

Course: B.C.A.(Sci.) –V Seme.	**Paper Code:** BCA230P

E-Business : Case Study

Case Study based on Theory units

Course: B.C.A.(Sci.) – V Seme.	**Paper Code:** BCA204EP

Graphical User Interface : Programming

Five practical Assignments based on each unit as per faculty directive.

Course: B.C.A.(Sci.) – V Seme.	**Paper Code:** BCA233P

Internet Programming Using PHP

Five practical Assignments based on each unit as per faculty directive.

Course: B.C.A.(Sci.) – IV Seme.	**Paper Code:** BCA238P

DataBase Administrator

Faculty is suppose to design the practical session work for DBA.

B.C.A.(Sci.)
Three Years Integrated Course

Semester-VI

Software Testing and Quality Assurance

Sr.No.	Topics in Details	No. of Lect.
Unit-I		15
	Introduction: Software Quality, Role of testing, verification and validation, objectives and issues of testing, Testing activities and levels, Sources of Information for Test Case Selection, White	
Unit-II		15
	Unit Testing: Concept of Unit Testing , Static Unit Testing ,Dynamic Unit Testing , Outline of Control Flow Testing, Overview of Dynamic Data Flow Testing, Data Flow Graph, Data Flow Terms, Data Flow Testing Criteria, Comparison of Data Flow Test Selection Criteria, Feasible Paths and Test Selection Criteria, Comparison of Testing Techniques.	
Unit-III		15
	System Integration Testing: Concept of Integration Testing, Different Types of Interfaces and Interface Errors, Test Plan for System Integration, System Test Categories: Basic Tests, Functionality Tests, Robustness Tests, Interoperability Tests, Performance Tests, Reliability Tests, and Documentation Tests.	

Text books:
1. "Effective methods for Software Testing "William Perry, Wiley.
2. "Software Testing and Quality Assurance: Theory and Practice", Sagar Naik, University of Waterloo, Piyu Tripathy, Wiley , 2008

Reference Books:
1. "Software Testing - A Craftsman's Approach", Paul C. Jorgensen, CRC Press, 1995.

2. "The Art of Creative Destruction", Rajnikant Puranik, SPD.

3. "Software Testing", Srinivasan Desikan and Gopalaswamy Ramesh - Pearson Education 2006.

Customer Relationship Management (CRM)

Sr.No.	Topics in Details	No. of Lect.
Unit-I		**15**
1.	**Basic Concepts:** the changing nature of marketing and customer service; building customer relationships; the nature of CRM; understanding customer differences; identifying the key customers; strategies for key customers; single customer view - personalization	
2.	**Planning for CRM:** Elements and relevant issues in the CRM plan; customer centricity; setting CRM objectives; planning the desired outputs.	
Unit-II		**15**
3.	**CRM Strategy:** strategic orientation for CRM; extending the concept of relationships; customer loyalty; customer retention strategies; win back and acquisition strategies; strategic frame work for CRM	
Unit-III		**15**
4.	**Role of IT and tools for CRM:** The technology orientation; managing shift to new technologies; CRM strategy and technology; collecting customer data; CRM data warehouse; steps in preparing IT systems for CRM; issues in CRM tool selection; tools for CRM	
5.	**eCRM:** basic concepts; steps in eCRM and success factors; establishing CRM on the internet; CRM implementation and guarding against failures	

Text books:

1. **Customer Relationship Management, A Strategic Approach to Marketing**, Mukherjee Kaushik,' PHI, 2007.
2. **The CRM Handbook, A business Guide to Customer Relationship Management:** Dyche Jill, Pearson Education, 2007

Reference Books:

1. **'Managing Customers As Investments'**Gupta Sunil and Lehmann R. Donald, , Pearson Education, 2008.
2. **Customer Relationship Management, Integrating Marketing strategy and Information Technology**, Zikmund G. William, McLeod Raymond , Jr., and Gilbert W. Faye, , Wiley Student Edn.,2004.
3. **The Ultimate CRM Handbook, Strategies & concepts for Building Enduring customer Loyalty & Profitability,** Freeland John G.,', TMH, 2004.

Ethics and Cyber Law

Sr.No.	Topics in Details	No. of Lect.
Unit-I		15
	Basic Concepts of Technology and Law , Understanding the Technology of Internet, Scope of Cyber Laws , Cyber Jurisprudence.	
Unit-II		15
	Law of Digital Contracts The Essence of Digital Contracts The System of Digital Signatures The Role and Function of Certifying Authorities The Science of Cryptography E-Governance Cyber Crimes and Cyber Laws.	
Unit-III		15
	Information Technology Act 2000 Cyber Law Issues in E-Business Management Major issues in Cyber Evidence Management Cyber Law Compliancy Audit, The Ethics of Computer Security	

Text books:
1. Godbole," Information Systems Security", Willey
2. Merkov, Breithaupt," Information Security", Pearson Education
3. Yadav, "Foundations of Information Technology", New Age, Delhi
4. Schou, Shoemaker, " Information Assurance for the Enterprise", Tata McGraw Hill
5. Sood,"Cyber Laws Simplified", Mc Graw Hill
6. Furnell, "Computer Insecurity", Springer

Multimedia Technology

Sr.No.	Topics in Details	No. of Lect.
Unit-I		15

Introduction to Multimedia Technology
Multimedia Elements, Multimedia Application, Multimedia System Architecture, Object for Multimedia Systems, Data Compression & its types

Multi-media Authoring System
Designing issue for Multimedia Authoring, Design Approached to Authoring, Types of Multimedia Authoring system: Dedicated, Timeline-Based, Structured, Programmable and Telephone Authoring System.

Unit-II		15

Multimedia authoring & Editing tools
Introduction & Basic of Editing Tools:
Macromedia director, Macromedia Flash, Dreamweaver
VRML
Graphics & Image Data Representation
Graphics / Image Data Types, Popular File Formats: GIF, JPEG, PNG, TIFF, BMP, WMF.

Unit-III	Audio and Video Technology	15

Audio:
Digitization of Sound, MIDI, Quantization and Transmission of Audio
Video:
Types of Video Signals, Analog Video, Digital Video

Reference:
1.   **Multimedia Technology :** Prabhat & thakker
2.   **Fundamental of Multimedia :** Ze-Nian Li & Mark S.Drew (Pearson)

Knowledge Discovery in Database

Sr. No.	Topics in Details	No. of Lect.
Unit-I		15

Fundamental of Knowledge Discovery :
- Introduction , Expanding universe of data , information as a product factor, computer system that can learn, Data mining , KDD & Data Mining , Data Mining verses query tools, Data Mining in marketing, application of data mining.
- What is Learning: Self learning computer system, machine learning & methodology of science , concept learning , complexity of search space.
- Data mining & data warehouse: Data warehouse & its need, Designing decision support, Integration with data mining, client/server & data ware housing, cost justification.

Unit-II   **15**

Knowledge Discovery Process:
- **Knowledge Discovery Process** : stages , Stages in details: Data Selection, Cleaning , Enrichment , Coding, Data mining, Visualization Techniques,
- **Introduction to :** Likelihood & distance, K-nearest neighbor, Decision tree, Association Rule, Neural Network, Genetic Algorithms.

Unit-III   **15**

Setting Up KDD Environment:
- Different forms of Knowledge, Steps to start KDD Project, Data Selection, Cleaning , Enrichment, Coding, Data Mining, Reporting.
- KDD Environment , Ten golden rules.
- Application example of DM techniques in marketing.

Text Books :

     1. Data Mining : Pieter Adriaans & Dolf Zantinge. Pearson Publication.

Refernce Books:

Reference:
1. Data Mining Techniques : Arun K. Pujari ,
2. Data Mining: Introductory and Advanced Topics: M.H.Dunham Pearson Education

PHP

Sr.No.	Topics in Details	No. of Lect.
Unit-I		**15**

Introduction to PHP :
Cookies and user sessions in PHP
File and directories in PHP

Unit-II		**15**

Introducing Database and SQL, Retrieving data,
Manipulating data from SQL

Unit-III		**15**

PEAR, working and generating Images,
Working with XML,
Introduction to AJAX and Integrating AJAX with PHP

Reference Books:

1. "BEGINNING PHP 5.3" by MATT DOYLE WROX publication
2. "PHP, MySQL and Apache All in One" by Juliea C. Meloni, SAMS series
3. "AJAX Black Book" by KOGENT SOLUTIONS INC.

ERP

Sr.No.	Topics in Details	No. of Lect.
Unit-I		**15**

Introduction To ERP
Evolution of ERP, What is ERP? Reasons for the growth of ERP, Scenario and Justification of ERP in India, Evaluation Of ERP, Various Modules Of ERP, Advantage of ERP.

Unit-II   **15**

An overview of Enterprise, Integrated Management Information, Business Modeling, ERP for Small Business, ERP for make to order companies, Business Process Mapping for ERP Module Design, Hardware Environment and its Selection for ERP Implementation.

Unit-III   **15**

ERP and Related Technologies, Business Process Reengineering (BPR), Management Information System (MIS), Executive Information System (EIS), Decision support System (DSS), Supply Chain Management (SCM)

Text Book :
1. "**ERP : Concepts and Planning**" V.K. Garg and N.K.Venkitakrishnan PHI , 1998

Mobile Computing

Sr.No.	Topics in Details	No. of Lect.
Unit-I		**15**
	Introduction to Mobile Computing, Mobile devices, wired network, Wireless Networks, Ad-Hoc Networks, limitations of mobile environment, Mobile Application	
Unit-II		**15**
	Radio communication basics, Radio frequency bands, propagation mechanism, Data communication using switching modes (circuit, packet switching), modulation (Analog – Amplitude, Frequency, Phase, Digital Modulation-PCM), Cellular networks, Advantages of Cellular network, Handoff.	
Unit-III		**15**
	Wireless LAN, MAC Structure, Mobile IP, Mobile Agents, Advantages of Mobile Agents, GSM, Technical Details of GSM, GSM Cells, GSM Network Structure, Components and Functions	

Reference:

1. Asoke K Talukder, Roopa Yavagal, Mobile Computing, TMH, 2006

Course: B.C.A.(Sci.) – VI Seme.	**Paper Code:** BCA740P

Project Work

Review-I

Review –II

Final

Course: B.C.A.(Sci.) – VI Seme.	**Paper Code:** BCA241P

Seminar

REVIEW-I

Final Seminar

ANNEXURE - B
Dr.Babasaheb Ambedkar Marathwada University, Aurangabad

Curriculum Structure and Scheme of Evaluation:B.C.A.(Sci.)

Sr. No.	Course Code	Name of the Subject	Scheme of Teaching			Scheme of Evaluation(Marks)				
			T hrs/week	P hrs/week	Total hrs/ week	Class Tests + Tutorial	Univ. Th. Exam.	Uni. Pract. Exam.	Uni.Exam Duration (in hrs.)	Total Marks
I Semester										
1	BCA301T	Computer Fundamentals	3	-	3	10+10	30	-	1.5	50
2	BCA302T	Digital Electronics	3	-	3	10+10	30	-	1.5	50
3	BCA303AT	8085:Microprocessor	3	-	3	10+10	30	-	1.5	50
4	BCA304AT	Programming in C	3	-	3	10+10	30	-	1.5	50
5	BCA305ATP	Communication Skill – I	3	-	3	10+10	30	-	1.5	50
6	BCA306AT	Mathematical Foundation	3	-	3	10+10	30	-	1.5	50
7	BCA301P	Office Suite	-	4	4		-	50	1.5	50
8	BCA202P	Digital Electronics	-	4	4		-	50	1.5	50
9	BCA203AP	8085:Microprocessor	-	4	4		-	50	1.5	50
10	BCA204AP	Programming in C	-	4	4		-	50	1.5	50
II Semester										
1	BCA307T	Data Structure	3	-	3	10+10	30	-	1.5	50
2	BCA308AT	Operating System I	3	-	3	10+10	30	-	1.5	50
3	BCA303BT	8086:Microprocessor	3	-	3	10+10	30	-		50
4	BCA304BT	Adv. Programming in C	3	-	3	10+10	30	-	1.5	50
5	BCA305BTP	Communication Skill – II	3	-	3	10+10	30	-	1.5	50
6	BCA306BT	Numerical Computation Method	3	-	3	10+10	30	-	1.5	50
7	BCA307P	Data Structure & O.S.	-	4	4		-	50	1.5	50
8	BCA208BP	8086:Microprocessor	-	4	4		-	50	1.5	50
9	BCA204BP	Adv. Programming in C	-	4	4		-	50	1.5	50
10	BCA206P	Numerical Methods	-	4	4		-	50	1.5	50

Curriculum Structure and Scheme of Evaluation:B.C.A.(Sci.)

Sr. No.	Course Code	Name of the Subject	Scheme of Teaching			Scheme of Evaluation(Marks)				
			T hrs/week	P hrs/week	Total hrs/week	Class Test + tutorial	University Exam.	Uni. Pract. Exam.	Uni.Exam Duration (in hrs.)	Total Marks
III Semester										
1	BCA309AT	Analysis of Algorithm	3	-	3	10+10	30	-	1.5	50
2	BCA308BT	Operating System II	3	-	3	10+10	30	-	1.5	50
3	BCA312AT	DBMS – I	3	-	3	10+10	30	-	1.5	50
4	BCA304CT	OOPs using C++	3	-	3	10+10	30	-	1.5	50
5	BCA306CT	Statistical Methods	3	-	3	10+10	30	-	1.5	50
6	BCA305CT	Technical Writing	3	-	3	10+10	30	-	1.5	50
7	BCA209AP	Pr. Based on BCA309AT	-	4	4	-	-	50	1.5	50
8	BCA208AP	Pr. Based on BCA308AT	-	4	4		-	50	1.5	50
9	BCA212AP	Pr. Based on BCA312AT	-	4	4		-	50	1.5	50
10	BCA204CP	Pr. Based on BCA304CT	-	4	4		-	50	1.5	50
IV Semester										
1	BCA326AT	Soft. Proj. Mgmt-I	3	-	3	10+10	30	-	1.5	50
2	BCA327T	DBMS using SQL	3	-	3	10+10	30	-	1.5	50
3	BCA314AT	DCN – I	3	-	3	10+10	30	-	1.5	50
4	BCA310AT	OOPs using Java–I	3	-	3	10+10	30	-	1.5	50
5*	BCA335T	Financial Accounting	3	-	3	10+10	30	-	1.5	50
6*	BCA316AT	Web fundamental	3	-	3	10+10	30	-	1.5	50
7*	BCA336T	Principal of Management	3	-	3	10+10	30	-	1.5	50
8*	BCA317T	Linux	3	-	3	10+10	30	-	1.5	50
9	BCA227P	Pr. Based on BCA327T	-	4	4		-	50	1.5	50
10	BCA210AP	Pr. Based on BCA310AT	-	4	4		-	50	1.5	50
11	BCA235P/ BCA 216AP/ BCA236P/ BCA217P	Pr. Based on BCA335T/ BCA316AT / BCA336AT/ BCA317T	-	4	4		-	50	1.5	50
12	BCA235P/ BCA 216AP/ BCA236P/ BCA217P	Pr. Based on BCA335T/ BCA316AT / BCA336AT/ BCA317T	-	4	4		-	50	1.5	50

* Indicate optional paper (any two from Sr.No. 5/6/7/8)

Revised Syllabus of B.C.A.(Science) w.e.f.: 2009-10   76/77

Dr.Babasaheb Ambedkar Marathwada University, Aurangabad

Curriculum Structure and Scheme of Evaluation:B.C.A.(Sci.)

Sr. No.	Course Code	Name of the Subject	Scheme of Teaching			Scheme of Evaluation(Marks)				
			T hrs/week	**P** hrs/ week	**Total** hrs/ week	**Class Test**	**University Exam.**	**Uni. Pract. Exam.**	**Uni.Exam Duration (in hrs.)**	**Total Marks**
SEMESTER V										
1	BCA326BT	Soft.proj.mgmt-II	3	-	3	20+20	60	-	1.5	100
2	BCA314BT	DCN - II	3	-	3	20+20	60	-	1.5	100
3	BCA337T	Management Information System	3	-	3	20+20	60	-	1.5	100
4	BCA315AT	Computer Graphics - I	3	-	3	20+20	60	-	1.5	100
5*	BCA330T	E-Business	3	-	3	20+20	60	-	1.5	100
6*	BCA304ET	GUI Programming	3	-	3	20+20	60	-	1.5	100
7*	BCA333T	Internet Programming Using PHP	3	-	3	20+20	60	-	1.5	100
8*	BCA338	Database Administrator	3	-	3	20+20	60	-	1.5	100
9	BCA214BP	Pr. Based on BCA314BT	-	4	4			50	1.5	50
10	BCA215AP	Pr. Based on BCA315AT	-	4	4	-	-	50	1.5	50
11	BCA230P/ BCA204EP/ BCA233P / BCA238P	Pr. Based on BCA230T / BCA304ET / BCA333T / BCA338T	-	4	4	-		50	1.5	50
12	BCA230P/ BCA204EP/ BCA233P / BCA238P	Pr. Based on BCA230T / BCA304ET / BCA333T / BCA338T	-	4	4	-		50	1.5	50
SEMESTER VI										
1	BCA313CT	Soft.Test.andQA	3		3	20+20	60	-	1.5	100
2	BCA332T	Cust Rela Mgmt	3		3	20+20	60	-	1.5	100
3	BCA323T	Ethics and Cyber law	3		3	20+20	60	-	1.5	100
4	BCA331AT	Multimedia Technology	3		3	20+20	60	-	1.5	100
5*	BCA321BT	Knowledge Discovery in Database	3		3	20+20	60	-	1.5	100
6*	BCA339T	PHP	3		3	20+20	60	-	1.5	100
7*	BCA334T	ERP	3		3	20+20	60	-	1.5	100
8*	BCA314CT	Mobile Computing	3		3	20+20	60	-	1.5	100
9**	BCA740P	PROJECT WORK	-	12	12			150	3	150
10***	BCA241P	SEMINAR	-	4	4			50	3	50

* Indicate optional paper (any two from 5/6/7/8)
** Indicates for review 1, review 2 and Actual Project Work.   *** Indicates for review 1 and Actual Seminar presentation.