

UNIVERSITY OF MADRAS
BACHELOR OF COMPUTER APPLICATIONS (BCA)
DEGREE PROGRAMME
SYLLABUS WITH EFFECT FROM 2023-2024

Year: I	Semester: I
Core-I: Python Programming (Common to B.Sc.-CS, CS with AI, CS with DS, Software Appl.)	120C1A
Credits 5	Lecture Hours:4 per week

Learning Objectives: (for teachers: what they have to do in the class/lab/field)

- Describe the core syntax and semantics of Python programming language.
- Discover the need for working with the strings and functions.
- Illustrate the process of structuring the data using lists, dictionaries, tuples and sets.
- Understand the usage of packages and Dictionaries

Course Outcomes: (for students: To know what they are going to learn)

CO1: Develop and execute simple Python programs

CO2: Write simple Python programs using conditionals and looping for solving problems

CO3: Decompose a Python program into functions

CO4: Represent compound data using Python lists, tuples, dictionaries etc.

CO5: Read and write data from/to files in Python programs

UNITS	CONTENTS
I	Introduction: The essence of computational problem solving – Limits of computational problem solving-Computer algorithms-Computer Hardware-Computer Software-The process of computational problem solving-Python programming language - Literals - Variables and Identifiers - Operators - Expressions and Data types, Input / output.
II	Control Structures: Boolean Expressions - Selection Control - If Statement- Indentation in Python- Multi-Way Selection -- Iterative Control- While Statement- Infinite loops- Definite vs. Indefinite Loops- Boolean Flag. String, List and Dictionary, Manipulations Building blocks of python programs, Understanding and using ranges.
III	Functions: Program Routines- Defining Functions- More on Functions: Calling Value-Returning Functions- Calling Non-Value-Returning Functions- Parameter Passing - Keyword Arguments in Python - Default Arguments in Python-Variable Scope. Recursion: Recursive Functions.
IV	Objects and their use: Software Objects - Turtle Graphics – Turtle attributes- Modular Design: Modules - Top-Down Design - Python Modules - Text Files: Opening, reading and writing text files – Exception Handling.
V	Dictionaries and Sets: Dictionary type in Python - Set Data type. Object Oriented Programming using Python: Encapsulation - Inheritance – Polymorphism. Python packages: Simple programs using the built-in functions of packages matplotlib, NumPy, pandas etc.

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Learning Resources:

Recommended Texts

1. Charles Dierbach, “Introduction to Computer Science using Python - A computational Problem-solving Focus”, Wiley India Edition, 2015.
2. Wesley J. Chun, “Core Python Applications Programming”, 3rd Edition , Pearson Education, 2016

Reference Books

1. Mark Lutz, “Learning Python Powerful Object Oriented Programming”, O’reilly Media 2018, 5th Edition.
2. Timothy A. Budd, “Exploring Python”, Tata McGraw Hill Education Private Limited 2011, 1 st Edition.
3. John Zelle, “Python Programming: An Introduction to Computer Science”, Second edition, Course Technology Cengage Learning Publications, 2013, ISBN 978-1590282410
4. Michel Dawson, “Python Programming for Absolute Beginners” , Third Edition, Course Technology Cengage Learning Publications, 2013, ISBN 978-143545500

Web resources

1. https://onlinecourses.swayam2.ac.in/cec22_cs20/preview

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Year: I	Semester:I
Core-II: Python Programming Practical (Common to B.Sc.-CS, CS with AI, CS with DS, Software Appl.)	120C11
Credits 5	Lecture Hours:5 per week
<p>Learning Objectives: (for teachers: what they have to do in the class/lab/field)</p> <ul style="list-style-type: none"> • Acquire programming skills in core Python. • Acquire Object-oriented programming skills in Python. • Develop the skill of designing graphical-user interfaces (GUI) in Python. • Develop the ability to write database applications in Python. • Acquire Python programming skills to move into specific branches <p>Course Outcomes: (for students: To know what they are going to learn)</p> <p>CO1: To understand the problem solving approaches</p> <p>CO2: To learn the basic programming constructs in Python</p> <p>CO3: To practice various computing strategies for Python-based solutions to real world problems</p> <p>CO4: To use Python data structures - lists, tuples, dictionaries.</p> <p>CO5: To do input/output with files in Python.</p>	

List of Programs						
<ol style="list-style-type: none"> 1. Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice. 2. Write a Python program to construct the following pattern, using a nested loop <pre style="text-align: center;">* ** *** **** ***** **** *** ** *</pre> 3. Program to calculate total marks, percentage and grade of a student. Marks obtained in each of the five subjects are to be input by user. Assign grades according to the following criteria: <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Grade A: Percentage ≥ 80</td> <td style="width: 50%;">Grade B: Percentage ≥ 70 and < 80</td> </tr> <tr> <td>Grade C: Percentage ≥ 60 and < 70</td> <td>Grade D: Percentage ≥ 40 and < 60</td> </tr> <tr> <td>Grade E: Percentage < 40</td> <td></td> </tr> </table> 4. Program, to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user. 5. Write a Python script that prints prime numbers less than 20. 	Grade A: Percentage ≥ 80	Grade B: Percentage ≥ 70 and < 80	Grade C: Percentage ≥ 60 and < 70	Grade D: Percentage ≥ 40 and < 60	Grade E: Percentage < 40	
Grade A: Percentage ≥ 80	Grade B: Percentage ≥ 70 and < 80					
Grade C: Percentage ≥ 60 and < 70	Grade D: Percentage ≥ 40 and < 60					
Grade E: Percentage < 40						

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- 6. Program to find factorial of the given number using recursive function.
- 7. Write a Python program to count the number of even and odd numbers from array of N numbers.
- 8. Write a Python class to reverse a string word by word.
- 9. Given a tuple and a list as input, write a program to count the occurrences of all items of the list in the tuple. (Input: tuple = ('a', 'a', 'c', 'b', 'd'), list = ['a', 'b'], Output: 3)
- 10. Create a Savings Account class that behaves just like a Bank Account, but also has an interest rate and a method that increases the balance by the appropriate amount of interest (Hint: use Inheritance).
- 11. Read a file content and copy only the contents at odd lines into a new file.
- 12. Create a Turtle graphics window with specific size.
- 13. Write a Python program for Towers of Hanoi using recursion
- 14. Create a menu driven Python program with a dictionary for words and their meanings.
- 15. Devise a Python program to implement the Hangman Game.

Learning Resources:

Recommended Texts

- 1. Charles Dierbach, “Introduction to Computer Science using Python - A computational Problem-solving Focus”, Wiley India Edition, 2015.
- 2. Wesley J. Chun, “Core Python Applications Programming”, 3rd Edition , Pearson Education, 2016

Reference Books

- 1. Mark Lutz, “Learning Python Powerful Object Oriented Programming”, O’reilly Media 2018, 5th Edition.
- 2. Timothy A. Budd, “Exploring Python”, Tata McGraw Hill Education Private Limited 2011, 1 st Edition.
- 3. John Zelle, “Python Programming: An Introduction to Computer Science”, Second edition, Course Technology Cengage Learning Publications, 2013, ISBN 978- 1590282410
- 4. Michel Dawson, “Python Programming for Absolute Beginners”, Third Edition, Course Technology Cengage Learning Publications, 2013, ISBN 978-1435455009

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Year: I

Semester: I

Elective: Statistics-I (Common to B.Sc.-CS, CS with AI, CS with DS, Software Appl.) Lecture Hours: 5 per week		120E1B Credits: 3
Learning Objectives: (for teachers: what they have to do in the class/lab/field)		
Course Outcomes: (for students: To know what they are going to learn)		
1. Know the uses of statistics in society 2. Organize, manage and present data 3. Analyze the statistical data graphically using frequency distribution and cumulative frequency distribution. 4. Analyze statistical data using measures of central tendency, dispersion and location. 5. To understand correlation between continuous variables and association between categorical variables.		
Units	Contents	
I	Methods of collection: Complete enumeration – Sample Survey - Primary data - Secondary data sources - Types of variables. Nominal, ordinal and scale data. Presentation of Data: Presentation of data by tables - construction of tables (Univariate and Bivariate) – frequency table and contingency table	
II	Diagrammatic presentation: Line diagram, Bar diagrams: Simple, multiple, subdivided and Percentage-Pie chart, comparative pie chart - Graphical representation of a frequency distribution by histogram and frequency polygon and Ogives	
III	Analysis of Data (Univariate): Measures of central tendency: Arithmetic mean- Median and Mode choice of an average-characteristic of a good average	
IV	Measures of dispersion: Range-Quartile deviation-mean deviation - standard deviation - relative measures of dispersion - Coefficient of Variance	
V	Analysis of Data (Bivariate): Correlation- Scatter plot-coefficient of correlation- Pearson's Correlation Coefficient, Spearmen's rank correlation coefficient- correlation coefficient for bivariate frequency table- Association of attributes: Chi-square test of independence of attributes	
Suggested Readings: Books for study: <ol style="list-style-type: none"> 1. Gupta, S.C and Kapoor, V. K (2002), <i>Fundamentals of Mathematical Statistics</i>, Sultan Chand and Sons, New Delhi. 2. Goon A.M., Gupta M.K. and Dasgupta B. (2002): <i>Fundamentals of Statistics</i>, Vol. I & II, 8th Edn. The World Press, Kolkata. 3. Irwin Miller, Marylees Miller (2006): <i>John E. Freund's Mathematical Statistics with Applications</i>, (7th Edn.), Prentice Hall International INC. 4. Mood, A.M. Graybill, F.A. and Boes, D.C. (2007): <i>Introduction to the Theory of Statistics</i>, 3rd Edn., (Reprint), Tata McGraw-Hill Pub. Co. Ltd Books for reference: <ol style="list-style-type: none"> 1. Saxena H.C.: <i>Elementary Statistics</i>. S. Chand & Co., 2009. 		

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Year: I **Semester:I**

Skill Enhancement Course: Office Automation (Common to B.Sc.-CS, CS with AI, CS with DS, Software Appl.)	120S1A
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Credits 2	Lecture Hours:2 per week
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Learning Objectives: (for teachers: what they have to do in the class/lab/field)

- The major objective in introducing the Computer Skills course is to impart training for students in Microsoft Office which has different components like MS Word, MS Excel and Power point.
- The course is highly practice oriented rather than regular class room teaching.
- To acquire knowledge on editor, spread sheet and presentation software.

Course Outcomes: (for students: To know what they are going to learn)

CO1: Understand the basics of computer systems and its components.

CO2: Understand and apply the basic concepts of a word processing package.

CO3: Understand and apply the basic concepts of electronic spreadsheet software.

CO4: Understand and apply the basic concepts of database management system.

CO5: Understand and create a presentation using PowerPoint tool.

UNITS	CONTENTS
I	Introductory concepts: Hardware and Software - Memory unit – CPU-Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems - Introduction to Programming Languages.
II	Word Processing: File menu operations - Editing text – tools, formatting, bullets and numbering - Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, printing – Preview, options, merge.
III	Spreadsheets: Excel – opening, entering text and data, formatting, navigating; Formulas – entering, handling and copying
IV	Charts – creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics.
V	Power point: Introduction to Power point - Features – Understanding slide typecasting & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition – Animation effects, audio inclusion, timers.

Learning Resources:

Recommended Texts

1. Peter Norton, “Introduction to Computers” –Tata McGraw-Hill.

Reference Books

1. Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, “Microsoft 2003”, Tata McGraw- Hill.

Web resources : Web content from NDL / SWAYAM or open source web resources

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Year: I

Semester:I

Foundation Course: Fundamentals of Computers (Common to B.Sc.-CS, CS with AI, CS with DS, Software Appl.)	120B1A
Credits 2	Lecture Hours:2 per week
<p>Learning Objectives: (for teachers: what they have to do in the class/lab/field)</p> <ul style="list-style-type: none"> • to understand fundamentally the general scope of the computer system • to interact effectively with the computer • to know the uses of the basic components of the computer • to manage the system to some extent before involving an expert • to know some basic things about the computer and the world <p>Course Outcomes: (for students: To know what they are going to learn)</p> <p>CO1:Fundamental concepts of computer</p> <p>CO2: Fundamental mathematical techniques and how they relate to computer</p> <p>CO3: The architecture of processing and file storage in a computer system</p> <p>CO4: Basic operations of operating systems</p> <p>CO5: A variety of software packages applicable to an academic, software development and business environment</p>	

Units	Contents
I	<p>Understanding the Computer: - Introduction - Evolution of Computers - Generations of Computers - Classification of Computers - Computing Concepts - The Computer System - Applications of Computers. Computer Organisation and Architecture: - Introduction - Central Processing Unit - Internal Communications - Machine Cycle - The Bus - Instruction Set. Memory and Storage Systems: - Introduction - Memory Representation - Random Access Memory - Read Only Memory - Storage Systems - Magnetic Storage Systems - Optical Storage Systems - Magneto Optical Systems - Solid-state Storage Devices - Storage Evaluation Criteria. Input Devices: - Introduction - Keyboard - Pointing Devices - Scanning Devices - Optical Recognition Devices - Digital Camera - Voice Recognition System - Data Acquisition Sensors - Media Input Devices. Output Devices: - Introduction - Display Monitors - Printers - Impact Printers - Non-impact Printers - Plotters - Voice Output - Systems - Projectors - Terminals</p>
II	<p>Computer Codes: - Introduction - Decimal System - Binary System - Hexadecimal System - Octal System - Binary Coded Decimal (BCD) Systems – Unicode. Computer Arithmetic: - Introduction - Binary Addition - Binary Multiplication - Binary Subtraction - Binary Division - Signed/unsigned Numbers - Complements of Binary Numbers - Binary Subtraction Using Complements - Representing Numbers - Integer Arithmetic - Floating-point Arithmetic</p>

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III	Boolean Algebra of Switching Circuits: - Introduction - Elements of Boolean Algebra - Basic Postulates of Boolean Algebra - Boolean Operations - Principle of Duality - Basic Laws of Boolean Algebra - De Morgan's Theorem - Boolean Expressions. Logic Gates and Digital Circuits: - Introduction - Basic Logic Gates - Derived Logic Gates - Conversion of Boolean Functions - Adder Circuits - Flip-flop Circuits - Application of Flip-flops. Computer Software: - Introduction - Types of Computer Software - System Management Programs - System Development Programs - Standard Application Programs - Unique Application Programs - Problem Solving - Structuring the Logic - Using the Computer
IV	Operating Systems: - Introduction - History of Operating Systems - Functions of Operating Systems - Process Management - Memory Management - File Management - Device Management - Security Management - Types of Operating Systems - Providing User Interface - Popular Operating Systems. Programming Languages: - Introduction - History of Programming Languages - Generations of Programming Languages - Characteristics of a Good Programming Language - Categorisation of High-level Languages - Popular High-level Languages - Factors Affecting the Choice of a Language - Developing a Program - Running a Program
V	Data Communications and Networks: - Introduction - Data Communication Using Modem - Computer Network - Network Topologies - Network - Protocols and Software - Applications of Network. The Internet and World Wide Web: - Introduction - History of Internet - Internet Applications - Understanding the World Wide Web - Web Browsers - Browsing the internet - Using a Search Engine - Email Service - Protocols Used for the Internet

Learning Resources:

Recommended Texts

1. E Balagurusamy. Fundamentals Of Computers, Tata McGraw Hill Publishing Company Limited
2. Fundamentals of Computers (Paperback), 2019, Manaullah Abid, Mohammad Amjad, Dreamtech Press

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Year : I

Semester: II

Object Oriented Programming using C++ Common for B.C.A. , B.Sc.-SA		120C2A
Credits 5		Lecture Hours:4 per week
<p>Learning Objectives: (for teachers: what they have to do in the class/lab/field)</p> <ul style="list-style-type: none"> • To engender an appreciation for the need and characteristics of Object-orientation. • To impart knowledge of the C++ language grammar in order to design and implement programming solutions to simple problems by applying Object-oriented thinking. 		
<p>Course Outcomes: (for students: To know what they are going to learn)</p> <p>CO1: Explain the various basic concepts of Object-orientation.</p> <p>CO2: Write programs to implement static binding</p> <p>CO3: Write programs to implement inheritance and dynamic binding</p> <p>CO4: Write programs to implement templates and exception handling and learn how to use STL class library.</p> <p>CO5: Write programs implementing File and Stream I/O.</p>		

Units	Contents
I	Object Oriented Programming Concepts: Complexity in software - The need for object-orientation – Abstraction – Encapsulation – Modularity – Hierarchy. Basic Elements of C++: Classes – Objects – Data members and member functions – private and public access specifiers - Static members - Constructors – Singleton class - Destructors - Friend Functions and Friend Classes - Array of objects – Pointer to objects - this pointer – References – Dynamic memory allocation - Namespaces.
II	Function Overloading: Overloading a function - Default arguments – Overloading Constructors. Operator Overloading: Overloading an operator as a member function – Overloading an operator as a friend function – Overloading the operators [], (), -> and comma operators – Conversion Functions.
III	Inheritance: Types of inheritance – protected access specifier –Virtual Base Class – Base class and derived class constructors. Run-time Polymorphism: Virtual Functions – Function overriding - Pure virtual function – Abstract base class.
IV	Templates: Function templates – Overloading a function template – Class templates. Standard Template Library (STL): Containers: vector, list – Iterators: forward, backward – Algorithms: removing and replacing elements, sorting, counting, reversing a sequence. Exception Handling: Exceptions – try, catch, throw – Rethrowing an exception – Restricting exceptions - Handling exceptions in derived classes - terminate(), abort(), unexpected(), set_terminate().
V	I/O Streams: Formatted I/O with ios class functions - Manipulators – Creating own manipulator – Overloading << and >> operators. File I/O: fstream class – Opening and closing a file – Reading from and writing to a text file - Unformatted and Binary I/O – Random access I/O.

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Learning Resources:

Recommended Texts

1. Herbert Schildt, *C++ - The Complete Reference*, Third Edition, TMH, 1999.
2. Grady Booch, *Object Oriented Analysis and Design*, Pearson Education, 2008.
(For Unit I)

Reference Books

1. Bjarne Strousstrup, *The C++ Programming Language*, Addison Wesley, 2000.
2. J. P. Cohoon and J. W. Davidson, *C++ Program Design – An Introduction to Programming and Object-Oriented Design*, Second Edition, McGraw Hill, 1999.
3. C. J. Lippman, *C++ Primer*, Third Edition, Addison Wesley, 2000.

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Year: I	Semester: II
Object Oriented Programming using C++ Practical Common for B.C.A. , B.Sc.-SA	120C21
Credits 5	Lecture Hours:5 per week
<p>Learning Objectives: (for teachers: what they have to do in the class/lab/field)</p> <ul style="list-style-type: none"> • Design classes for the given problems. • Write programs in C++. • Code, debug and execute a C++ program to solve the given problems using an IDE. 	
<p>Course Outcomes: (for students: To know what they are going to learn)</p> <p>CO1: Design and create classes. Implement Stream I/O as appropriate.</p> <p>CO2: Design appropriate data members and member functions.</p> <p>CO3: Implement functions, friend functions, static members, constructors and compile-time polymorphism.</p> <p>CO4: Implement inheritance, run-time polymorphism and destructors.</p> <p>CO5: Implement templates and exceptions. Use STL class library. Implement File I/O.</p>	

List of Programs	
1.	Write a class to represent a complex number which has member functions to do the following
	<ol style="list-style-type: none"> a. Set and show the value of the complex number b. Add, subtract and multiply two complex numbers c. Multiplying the complex number with a scalar value
2.	Write a Point class that represents a 2-d point in a plane. Write member functions to <ol style="list-style-type: none"> a. Set and show the value of a point b. Find the distance between two points c. Check whether two points are equal or not
3.	Design and implement a class that represents a Harmonic Progression (HP). Implement functions to do the following: <ol style="list-style-type: none"> a. Generate the HP up to a specified number of terms b. Calculate the sum of the HP to n terms and to infinity c. Generate the nth term of the HP d. Generate the corresponding Arithmetic Progression. (Design and implement a class that encapsulates an AP, and allow the HP class to use its facilities by implementing friend functions.)
4.	Design and implement a class to represent a Solid object. <ol style="list-style-type: none"> a. Apart from data members to represent dimensions, use a data member to specify the type of solid. b. Use functions to calculate volume and surface area for different solids.
5.	Design a class representing time in hh:mm:ss. Write functions to <ol style="list-style-type: none"> a. Set and show the time b. Find the difference between two time objects c. Adding a given duration to a time d. Conversion of the time object to seconds

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<p>6. Design a 3x3 matrix class and demonstrate the following:</p> <ul style="list-style-type: none">a. Addition and multiplication of two matrices using operator overloadingb. Maintaining a count of the number of matrix object created <p>7. Design a class called cString to represent a string data type. Create a data member in the class to represent a string using an array of size 100. Write the following functionality as member functions:</p> <ul style="list-style-type: none">a. Copy Constructorb. Concatenate two stringsc. Find the length of the stringd. Reversing a stringe. Comparing two strings <p>8. Design a class called cString to represent a string data type. Create a data member in the class to represent a string whose size is dynamically allocated. Write the following as member functions:</p> <ul style="list-style-type: none">a. Copy Constructorb. Destructorc. Concatenate two stringsd. Find the length of the stringe. Reversing a stringf. Comparing two strings <p>9. Create a class to represent a 2-d shape and derive classes to represent a triangle, rectangle and circle. Write a program using run-time polymorphism to compute the area of the figures.</p> <p>10. Define a class template representing a single-dimensional array. Implement a function to sort the array elements. Include a mechanism to detect and throw an exception for array-bound violations.</p> <p>11. Demonstrate the use of the vector STL container.</p> <p>12. Implement a telephone directory using files</p>
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Year: I

Semester: II

Elective: Statistics-II (Common to B.Sc.-CS, CS with AI, CS with DS & Software Appl.)		120E2B
Lecture Hours: 5 per week		Credits:3
Learning Objectives: (for teachers: what they have to do in the class/lab/field)		
Course Objectives:		
<ol style="list-style-type: none"> 1. Understand Probability and its properties 2. Learn characteristics of different discrete and continuous distributions. 3. Know situation to which different distributions can be applied. 4. Comprehend the Sampling distributions. 5. Learn how to apply statistical tests to get information from data 		
Units	Contents	
I	Basic concepts of Probability: Random Experiments, Sample space, Trial, Events, - Classical and empirical approach to probability and their limitations -Types of events: Exhaustive, mutually exclusive, equally likely and Independent events - Axiomatic approach to probability - Basic theorems on probability using axiomatic approach. Bayes Theorem (statement only)	
II	Discrete probability mass function, cumulative distribution function- Theory and problems based on it. Bernoulli distribution, Binomial Distribution and Poisson Distribution	
III	Continuous probability density function, cumulative distribution function - Theory and problems based on it. Normal Distribution and its properties, Standard Normal distribution, Problems based on it. Exponential Distribution	
IV	Introduction of Sampling distributions- student's t and chi-square distributions, distribution of sample mean from normal distribution. Density function and Properties only.	
V	Testing of Hypothesis, Single mean test and double means test based on normal distribution and students t-distribution. Proportion test, Chi-square test, ANOVA test.	

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Course Outcomes: Upon finishing point of this course, students will be able to

1. understand the basic concept of Probability
2. identify the characteristics of different discrete and continuous distributions.
3. identify the type of statistical situation to which different distributions can be applied comprehend the Sampling distributions.
4. understand how to apply statistical tests to get information from data.

Suggested Readings:

Books for study:

1. Gupta,S.CandKapoor,V.K(2002),*Fundamentals of Mathematical Statistics*,SultanChandSons,NewDelhi.
2. GoonA.M.,GuptaM.K.andDasguptaB.(2002):*Fundamentals of Statistics*,Vol.I&II,8thEdn.TheWorldPress,Kolkata.
3. IrwinMiller,MaryleesMiller(2006):*JohnE.Freund's Mathematical Statistics with Applications*,(7thEdn.),PrenticeHallInternationalINC.
4. Mood,A.M.Graybill,F.A.andBoes,D.C.(2007):*Introduction to the Theory of Statistics*,3rdEdn.,(Reprint),TataMcGraw-HillPub.Co.Ltd

Books for reference:

- 1.SaxenaH.C.:*Elementary Statistics*.S.Chand&Co.,2009.

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Year: I	Semester: II
Office Automation Practical	120S21
Common for B.C.A. , B.Sc.-SA , B.Sc.-CSc-wAI , B.Sc.-CSc-wDS	
Credits 2	Lecture Hours:2 per week
<p>Learning Objectives: (for teachers: what they have to do in the class/lab/field)</p> <ul style="list-style-type: none"> • The major objective in introducing the Computer Skills course is to impart training for students in Microsoft Office which has different components like MS Word, MS Excel and Power point. • The course is highly practice oriented rather than regular class room teaching. • To acquire knowledge on editor, spread sheet and presentation software. <p>Course Outcomes: (for students: To know what they are going to learn)</p> <p>CO1: Understand the basics of computer systems and its components.</p> <p>CO2: Understand and apply the basic concepts of a word processing package.</p> <p>CO3: Understand and apply the basic concepts of electronic spreadsheet software.</p> <p>CO4: Understand and apply the basic concepts of database management system.</p> <p>CO5: Understand and create a presentation using PowerPoint tool.</p>	

Contents
WORD
<ol style="list-style-type: none"> 1. Create and save a document using MSWORD Deletion of Character, Word, line and block of text - Undo and redo process - Moving, Copying and renaming 2. Format the Text document Character formatting - Paragraph formatting - Page formatting 3. Spell check the document Finding and Replacing of text - Bookmarks and Searching for a Bookmarks - Checking Spelling and Grammar automatically - Checking Spelling and Grammar using Dictionary 4. Print the document Print Preview - Print Dialog box 5. Mail Merge in Ms-word Create main document and data file for mail merging - Merging the files - From letters using mail merging - Mailing labels using mail merging 6. Table creation in Ms-word Create a table in the document - Add row, column to a table - Changing column width and row height - Merge, split cells of table - Use formulae in tables - Sorting data in a table - Formatting a table.
EXCEL
<ol style="list-style-type: none"> 1. Create and save a new work book in Excel 2. Entering Data into Work sheet 3. Editing data of Worksheet 4. Formatting the text in the cells 5. Formatting the numbers in the cells.

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- 6. Formatting cells.
- 7. Copying format of cell along with data format.
- 8. Changing the height and width of cells.
- 9. Freezing Titles, splitting screen
- 10. Enter formulae for calculation in the cells.
- 11. Copying the formula over a range of cells.
- 12. Inserting built-in functions in to the cells.
- 13. Create graphs for the data using ChartWizard.
- 14. Format graphs in Excel.
- 15. Printing of work sheet.

POWER POINT

- 1. Create and save a new presentation using MS Power Point
 - a) layout of opening screen in PowerPoint
 - b) the tool bars in MS PowerPoint
- 2. Choose Auto Layout for a new slide.
- 3. Insert text and pictures into a blank slide.
- 4. Insert new slides into the presentation.
- 5. Apply slide transition effects.
- 6. Slide show.
Set animation to text and pictures in a slide - Set the sounds, order and timing for animation

Learning Resources:

Learning Resources:

Recommended Texts

- 1. Peter Norton, "Introduction to Computers" –Tata McGraw-Hill.

Reference Books

- 1. Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, "Microsoft 2003", Tata McGraw- Hill.

Web resources : Web content from NDL / SWAYAM or opensource web resources

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BACHELOR OF COMPUTER APPLICATIONS (BCA)
DEGREE PROGRAMME
SYLLABUS WITH EFFECT FROM 2023-2024

Year: I	Semester: II
Quantitative Aptitude	120S2A
Common for B.C.A. , B.Sc.-SA , B.Sc.-CSc , B.Sc.-CSc-wAI , B.Sc.-CSc-wDS	
Credits 2	Lecture Hours: 2 per week
<p>Learning Objectives: (for teachers: what they have to do in the class/lab/field) To improve the quantitative skills of the students To prepare the students for various competitive exams</p>	
<p>Course Outcomes: (for students: To know what they are going to learn) CO1: To gain knowledge on LCM and HCF and its related problems CO2: To get an idea of age, profit and loss related problem solving. CO3: Able to understand time series simple and compound interests CO4: Understanding the problem related to probability, and series CO5: Able to understand graphs, charts</p>	

Units	Contents
I	Numbers - HCF and LCM of numbers - Decimal fractions - Simplification - Square roots and cube roots - Average - problems on Numbers
II	Problems on Ages - Surds and Indices - percentage - profits and loss - ratio and proportion - partnership - Chain rule.
III	Time and work - pipes and cisterns - Time and Distance - problems on trains - Boats and streams - simple interest - compound interest - Logarithms - Area - Volume and surface area - races and Games of skill.
IV	Permutation and combination - probability - True Discount - Bankers Discount - Height and Distances - Odd man out & Series.
V	Calendar - Clocks - stocks and shares - Data representation - Tabulation - Bar Graphs - Pie charts - Line graphs

<p>Learning Resources:</p> <p>Recommended Texts</p> <ol style="list-style-type: none"> “Quantitative Aptitude”, R.S. AGGARWAL., S. Chand & Company Ltd., <p>Web resources: Authentic Web resources related to Competitive examinations</p>
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Year: II

Semester: III

Data Structures Common for B.C.A. , B.Sc.-CSc-wAI , B.Sc.-CSc-wDS	220C3A
Credits 5	Lecture Hours:4 per week
Learning Objectives: (for teachers: what they have to do in the class/lab/field) <ul style="list-style-type: none"> • To impart the basic concepts of data structures and algorithms. • To acquaint the student with the basics of the various data structures • This course also gives insight into the various algorithm design techniques 	
Course Outcomes: (for students: To know what they are going to learn) <p>CO1: To introduce the concepts of Data structures and to understand simple linear data structures.</p> <p>CO2: Learn the basics of stack data structure, its implementation and application</p> <p>CO3: Use the appropriate data structure in context of solution of given problem and demonstrate a familiarity with major data structures.</p> <p>CO4: To introduce the basic concepts of algorithms</p> <p>CO5: To give clear idea on algorithmic design paradigms like Divide and conquer and Backtracking,</p>	

Units	Contents
I	<p>INTRODUCTION TO DATA STRUCTURES:</p> <p>Representation of arrays, Applications of arrays, sparse matrix and its representation - Linear list: Singly linked list implementation, insertion, deletion and searching operations on linear list</p>
II	<p>Circular linked list: implementation, Double linked list implementation, insertion, deletion and searching operations.</p> <p>STACKS and QUEUES:</p> <p>Operations, array and linked representations of stack, stack applications, infix to postfix conversion, postfix expression evaluation</p>
III	<p>Queues: operations on queues, array and linked representations - Circular Queue: operations, applications of queues.</p> <p>TREES & GRAPHS:</p> <p>Trees: Definitions and Concepts- Representation of binary tree, Binary tree traversals (Inorder, Postorder, preorder), Binary search trees in arrays</p>
IV	<p>Heaps - AVL Trees – B Trees</p> <p>Graphs: Representation of Graphs- Types of graphs</p>
V	<p>Graph Applications: Breadth first traversal – Depth first traversal- -Single source shortest path – Minimal spanning trees – prim's and kruskal's algorithms</p>

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Learning Resources:

Recommended Texts

1. Ellis Horowitz , Sartaj Sahni, Susan Anderson Freed, Second Edition , “Fundamentals of Data in C”, Universities Press
2. E. Horowitz, S. Sahni and S. Rajasekaran, Second Edition ,“Fundamentals of Computer Algorithms “ Universities Press

Reference Books

1. Seymour Lipschutz ,”Data Structures with C”, First Edition, Schaum’s outline series in computers, Tata McGraw Hill.
2. R.Krishnamoorthy and G.Indirani Kumaravel, Data Structures using C, Tata McGrawHill – 2008.
3. A.K.Sharma, Data Structures using C , Pearson Education India,2011.
4. G. Brassard and P. Bratley, “Fundamentals of Algorithms”, PHI, New Delhi, 1997.
5. A.V. Aho, J.E. Hopcroft, J.D. Ullmann,, “The design and analysis of ComputerAlgorithms”, Addison Wesley, Boston, 1974
6. Thomas H. Cormen, C.E. Leiserson, R L.Rivest and C. Stein, Introduction to Algorithms, Third edition, MIT Press, 2009
7. Sanjoy Dasgupta, C.Papadimitriou and U.Vazirani , Algorithms , Tata McGraw-Hill, 2008.

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SYLLABUS WITH EFFECT FROM 2023-2024

Year: II

Semester: III

Data Structures Practical Common for B.C.A. , B.Sc.-CSc-wAI , B.Sc.-CSc-wDS	220C31
Credits 5	Lecture Hours:5 per week

Learning Objectives: (for teachers: what they have to do in the class/lab/field)

- To understand and implement basic data structures using C++
- To apply linear and non-linear data structures in problem solving.
- To learn to implement functions and recursive functions by means of data structures
- To implement searching and sorting algorithms

Course Outcomes: (for students: To know what they are going to learn)

CO1: Implement data structures using C++

CO2: Implement various types of linked lists and their applications

CO3: Implement Tree Traversals

CO4: Implement various algorithms in C++

List of Programs

Implement the following exercises using Java Programming language:

1. Array implementation of stacks
2. Array implementation of Queues
3. Linked list implementation of stacks
4. Linked list implementation of Queues
5. Covert infix expression to postfix.
6. Binary Tree Traversals (Inorder, Preorder, Postorder)
7. Implementation of Linear search and binary search
8. Implementation of Depth-First Search & Breadth-First Search of Graphs.
9. Finding single source shortest path of a Graph.

Learning Resources:

Learning Resources:

Recommended Texts

1. Ellis Horowitz , Sartaj Sahni, Susan Anderson Freed, Second Edition , “Fundamentals of Data in C”, Universities Press
2. E. Horowitz, S. Sahni and S. Rajasekaran, Second Edition , “Fundamentals of Computer Algorithms “ Universities Press

Reference Books

1. Seymour Lipschutz ,”Data Structures with C”, First Edition, Schaum’s outline series in computers, Tata McGraw Hill.
2. R.Krishnamoorthy and G.Indirani Kumaravel, Data Structures using C, Tata McGrawHill – 2008.
3. A.K.Sharma, Data Structures using C , Pearson Education India,2011.
4. G. Brassard and P. Bratley, “Fundamentals of Algorithms”, PHI, New Delhi, 1997.

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DEGREE PROGRAMME
SYLLABUS WITH EFFECT FROM 2023-2024

COST AND MANAGEMENT ACCOUNTING – I
Common for B.C.A. , B.Sc.-SA

Subject Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
220E3C	5				3	5	25	75	100

Learning Objectives

LO1	To understand the various concepts of cost accounting.
LO2	To gain knowledge regarding valuation methods of material.
LO3	To familiarize with the different methods of calculating labour cost.
LO4	To understand the basic concepts of Management Accounting and Financial Statements
LO5	To know the various methods of calculation of Accounting Ratios

Unit	Contents	No. of Hours
I	Introduction of Cost Accounting Cost Accounting – Definition – Nature and Scope – Principles of Cost Accounting – Cost Accounting and Financial Accounting – Cost Accounting Vs Management Accounting – Installation of Costing System – Classification of Costs – Preparation of Cost Sheet. (Simple Problems Only)	15
II	Material Costing Material Control – Meaning and Objectives – Purchase of Materials – EOQ – Stores Records – Reorder Levels – ABC Analysis - Issue of Materials – Methods of Issue – FIFO – LIFO – Base Stock Method – Specific Price Method – Simple and Weighted Average Method. (Simple Problems Only)	15
III	Labour Costing Direct Labour and Indirect Labour – Time Keeping – Methods and Calculation of Wage Payments – Time Wages – Piece Wages – Incentives – Different Methods of Incentive Payments - Idle time – Overtime – Labour Turnover - Meaning, Causes and Measurement. (Simple Problems Only)	15
IV	Introduction to Management Accounting & Financial Statements Management Accounting – Meaning – Scope – Importance – Limitations – Analysis and Interpretation of Financial Statements – Nature and Significance – Types – Tools of Analysis – Comparative – common – Trend Percentages.	15
V	Ratio Analysis Ratio Analysis - Meaning – Advantages – Limitations – Types of Ratios – Liquidity Ratios – Profitability Ratios – Turnover Ratios – Calculation of Ratios (Direct Methods only) (Simple Problems Only)	15
	TOTAL	75

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SYLLABUS WITH EFFECT FROM 2023-2024

THEORY 20% & PROBLEMS 80%	
Course Outcomes	
CO1	Remember the various concepts of cost accounting and preparation of Cost sheet
CO2	Analyse the various valuation methods of issue of materials.
CO3	Examine the different methods of calculating labour cost.
CO4	Remember and recall basics in Management Accounting and Financial Statements
CO5	Apply the knowledge of preparation of various Accounting Ratios
Textbooks	
1	Jain S.P. and Narang K.L, Cost Accounting. Kalyani Publishers, New Delhi
2	Khanna B.S., Pandey I.M., Ahuja G.K., and Arora M.N., Practical Costing, S. Chand & Co, New Delhi,
3	S.N. Maheswari, Principles of Cost Accounting, Sultan Chand Publications, New Delhi
4	A.Murthy & S. Gurusamy, Cost Accounting, Vijay Nicole Imprints Private Limited, Chennai
5	T.S. Reddy and Y. Hari Prasad Reddy, Cost Accounting, Margham Publications, Chennai
6	S.P. Iyengar, Cost Accounting, Sultan Chand Publications, New Delhi
7	Maheswari, Cost and Management Accounting, Sultan Chand & Sons Publications, New Delhi.
8	Sharma and Shashi K. Gupta, Management Accounting, Kalyani Publishers, Chennai.
Reference Books	
1	Polimeni, Cost Accounting: Concepts and Applications for Managerial Decision Making, 1991, McGraw-Hill, New York.
2	Jain S.P. and Narang K.L. Cost Accounting, Latest Edition.2013, Kalyani Publishers, New Delhi,
3	V.K.Saxena and C.D.Vashist, Cost Accounting, Sultan Chand publications, New Delhi
6	A Murthy and S. Gurusamy, Management Accounting, Vijay Nicole Imprints Private Limited, Chennai
7	T.S.Reddy and Y. Hari Prasad Reddy, Management Accounting, Margham Publications, Chennai.
NOTE: Latest Edition of Textbooks May be Used	
Web Resources	
1	https://study.com/learn/lesson/cost-accounting-principles-examples-what-is-cost-accounting.html
2	https://www.accountingtools.com/articles/what-is-material-costing.html
3	https://www.accountingnotes.net/cost-accounting/labour-cost/14743
4	https://egyankosh.ac.in/bitstream/123456789/84020/3/Unit-1.pdf
5	https://egyankosh.ac.in/handle/123456789/10308

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SYLLABUS WITH EFFECT FROM 2023-2024

Year: II

Semester: III

Web Page Design Practical Common for B.C.A. , B.Sc.-SA , B.Sc.-CSc , B.Sc.-CSc-wAI , B.Sc.-CSc-wDS		220S31
Credits 1		Lecture Hours:1 per week
Learning Objectives: (for teachers: what they have to do in the class/lab/field)		
<ul style="list-style-type: none"> • To develop the skill & knowledge of Web page design. • Students will understand the knowhow and can function either as an entrepreneur or can take up jobs in the multimedia and Web site development studio and other information technology sectors. 		
Course Outcomes: (for students: To know what they are going to learn)		
CO1: Define the principle of Web page design CO2: Define the basics in web design CO3: Visualize the basic concept of HTML. CO4: Recognize the elements of HTML. CO5: Introduce basics concept of CSS.		

Units	Contents
I	What is HTML? - HTML Documents - Basic structure of an HTML document - Creating an HTML document - Mark up Tags - Heading-Paragraphs - Line Breaks - HTML Tags.
II	Introduction to elements of HTML: Working with Text - Working with Lists, Tables and Frames - Working with Hyperlinks, Images and Multimedia - Working with Forms and controls.
III	Concept of CSS: Creating Style Sheet - CSS Properties - CSS Styling(Background, Text Format, Controlling Fonts) - Working with block elements and objects - Working with Lists and Tables - CSS Id and Class - Box Model(Introduction, Border properties, Padding - Properties, Margin properties) -
IV	CSS Advanced (Grouping, Dimension, Display,Positioning, Floating, Align,Pseudo class, Navigation Bar,Image Sprites, Attribute sector)- CSS Color- Creating page Layout and Site Designs
V	Introduction to Web Graphics: Creating a Web Photo Album - Creating a Button- Creating a Web Page Banner

Learning Resources:

Text Books

1. Kogent Learning, Solutions Inc., HTML 5 in simple steps Dreamtech Press
2. A beginner's guide to HTML NCSA,14th May,2003
3. Murray,Tom/Lynchburg Creating a Web Page and Web Site College,2002

Reference Books

1. Web Designing & Architecture-Educational Technology Centre, University of Buffalo
2. Steven M. Schafer HTML, XHTML, and CSS Bible, 5ed Wiley India
3. John Duckett Beginning HTML, XHTML, CSS, and JavaScript, Wiley India

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Year: II

Semester: IV

Java Programming Common for B.C.A. , B.Sc.-SA , B.Sc.-CSc , B.Sc.-CSc-wAI , B.Sc.-CSc-wDS		220C4A
Credits 5		Lecture Hours:4 per week
Learning Objectives: (for teachers: what they have to do in the class/lab/field)		
<ul style="list-style-type: none"> • To provide fundamental knowledge of object-oriented programming. • To equip the student with programming knowledge in Core Java from the basics up. • To enable the students to use AWT controls, Event Handling and Swing for GUI. 		
Course Outcomes: (for students: To know what they are going to learn)		
CO1: Understand the basic Object-oriented concepts. Implement the basic constructs of Core Java		
CO2: Implement inheritance, packages, interfaces and exception handling of Core Java.		
CO3: Implement multi-threading and I/O Streams of Core Java		
CO4: Implement AWT and Event handling.		
CO5: Use Swing to create GUI.		

Units	Contents
I	Introduction: Review of Object-Oriented concepts - Java buzzwords (Platform independence, Portability, Threads)- JVM architecture –Java Program structure - –Java main method - Java Console output(System.out) - simple java program - Data types - Variables - type conversion and casting- Java Console input: Buffered input - operators - control statements - Static Data - Static Method - String and String Buffer Classes
II	Java user defined Classes and Objects – Arrays – constructors - Inheritance: Basic concepts - Types of inheritance - Member access rules - Usage of this and Super key word - Method Overloading - Method overriding - Abstract classes - Dynamic method dispatch - Usage of final keyword -Packages: Definition - Access Protection - Importing Packages - Interfaces: Definition – Implementation – Extending Interfaces
III	Exception Handling: try – catch - throw - throws -- finally – Built-in exceptions - Creating own Exception classes - garbage collection, finalise -Multithreaded Programming: Thread Class - Runnable interface – Synchronization – Using synchronized methods – Using synchronized statement - Interthread Communication – Deadlock.
IV	The AWT class hierarchy - Swing: Introduction to Swing - Hierarchy of swing components. Containers - Top level containers - JFrame - JWindow - JDialog - JPanel - JButton - JToggleButton - JCheckBox - JRadioButton - JLabel,JTextField - JTextArea - JList - JComboBox – JScrollPane - Event Handling: Events - Event sources - Event Listeners - Event Delegation Model (EDM) - Handling Mouse and Keyboard Events
V	Adapter classes - Inner classes -Java Util Package / Collections Framework:Collection & Iterator Interface- Enumeration- List and ArrayList- Vector- Comparator

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SYLLABUS WITH EFFECT FROM 2023-2024

Learning Resources:

Recommended Texts

Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition, 2010.
Gary Cornell, Core Java 2 Volume I – Fundamentals, Addison Wesley, 1999.

Reference Books

Head First Java, O’Rielly Publications, Y. Daniel Liang, Introduction to Java Programming, 7th Edition, Pearson Education India, 2010.

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SYLLABUS WITH EFFECT FROM 2023-2024

Year: II

Semester: IV

Java Programming Practical Common for B.C.A. , B.Sc.-SA , B.Sc.-CSc , B.Sc.-CSc-wAI , B.Sc.-CSc-wDS		220C41
Credits 5		Lecture Hours:4 per week
Learning Objectives: (for teachers: what they have to do in the class/lab/field)		
<ul style="list-style-type: none"> • To gain practical expertise in coding Core Java programs • To become proficient in the use of AWT, Event Handling and Swing. 		
Course Outcomes: (for students: To know what they are going to learn)		
CO1: Code, debug and execute Java programs to solve the given problems		
CO2: Implement multi-threading and exception-handling		
CO3: Implement functionality using String and String Buffer classes		
CO4: Demonstrate Event Handling.		
CO5: Create applications using Swing and AWT		

List of Programs

1. Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer?
2. Write a Java program to multiply two given matrices.
3. Write a Java program that displays the number of characters, lines and words in a text?
4. Generate random numbers between two given limits using Random class and print messages according to the range of the value generated.
5. Write a program to do String Manipulation using Character Array and perform the following string operations:
 - a) String length
 - b) Finding a character at a particular position
 - c) Concatenating two strings
6. Write a program to perform the following string operations using String class:
 - a) String Concatenation
 - b) Search a substring
 - c) To extract substring from given string
7. Write a program to perform string operations using StringBuffer class:
 - a) Length of a string
 - b) Reverse a string
 - c) Delete a substring from the given string
8. Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.

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9. Write a threading program which uses the same method asynchronously to print the numbers 1 to 10 using Thread1 and to print 90 to 100 using Thread2.
10. Write a program to demonstrate the use of following exceptions.
 - a) Arithmetic Exception
 - b) Number Format Exception
 - c) Array Index Out of Bound Exception
 - d) Negative Array Size Exception
11. Write a Java program that reads on file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes?
12. Write a program to accept a text and change its size and font. Include bold italic options. Use frames and controls.
13. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. (Use adapter classes).
14. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.
15. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “stop” or “ready” or “go” should appear above the buttons in a selected color. Initially there is no message shown.

Learning Resources:

Recommended Texts

Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition, 2010.
Gary Cornell, Core Java 2 Volume I – Fundamentals, Addison Wesley, 1999.

Reference Books

Head First Java, O’Rielly Publications, Y. Daniel Liang, Introduction to Java Programming, 7th Edition, Pearson Education India, 2010.

Web resources: Web resources from NDL Library, E-content from open-source libraries

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DEGREE PROGRAMME
SYLLABUS WITH EFFECT FROM 2023-2024

COST AND MANAGEMENT ACCOUNTING – II
Common for B.C.A. , B.Sc.-SA

Subject Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
220E4C	5				3	5	25	75	100

Learning Objectives

LO1	To know the procedure for reconciliation of Cost and Financial Accounts
LO2	To gain knowledge regarding computation of Machine Hour Rate and Contract Account
LO3	To familiarize with the concept of Process Costing
LO4	To learn about Budget and Budgetary Control
LO5	To gain insights into Marginal Costing

Unit	Contents	No. of Hours
I	Reconciliation of Cost and Financial Accounts Meaning – Importance of Reconciliation Statement – Reconciliation of Cost and Financial Accounts (Simple Problems Only)	15
II	Machine Hour Rate and Contract Costing Machine Hour Rate – Computation of Machine Hour Rate – Contract Costing – Calculation of Profit on Contracts – Preparation of Contract Account (Simple Problems Only)	15
III	Process Costing Features of Process Accounting – Process Loss – Normal and Abnormal Loss – Abnormal gain – Preparation of Process Accounts (Simple Problems Only)	15
IV	Budgets and Budgetary Control Budget and Budgetary Control – Meaning – Preparation of various Budgets – Cash Budget - Flexible Budget – Production Budget – Sales Budget (Simple Problems Only)	15
V	Marginal Costing Meaning – Features – Absorption Costing – Marginal Costing Vs Absorption Costing – Contribution – PV Ratio – Break Even point – Key Factor – Margin of Safety – Preparation of Marginal Cost Statement (Simple Problems Only)	15
	TOTAL	75
THEORY 20% & PROBLEMS 80%		

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Course Outcomes	
CO1	Remember the various aspects of reconciliation of Cost and Financial Accounts
CO2	Apply the Knowledge in Machine hour rate and Contract Costing
CO3	Analyse and assimilate concepts in Process Costing
CO4	Evaluate techniques of Budgetary Control
CO5	Formulate criterial for decision-making using technique of Marginal Costing
Textbooks	
1	Jain S.P. and Narang K.L, Cost Accounting. Kalyani Publishers, New Delhi
2	Khanna B.S., Pandey I.M., Ahuja G.K., and Arora M.N., Practical Costing, S. Chand & Co, New Delhi,
3	S.N. Maheswari, Principles of Cost Accounting, Sultan Chand Publications, New Delhi
4	A.Murthy & S. Gurusamy, Cost Accounting, Vijay Nicole Imprints Private Limited, Chennai
5	T.S. Reddy and Y. Hari Prasad Reddy, Cost Accounting, Margham Publications, Chennai
6	S.P. Iyengar, Cost Accounting, Sultan Chand Publications, New Delhi
7	Maheswari, Cost and Management Accounting, Sultan Chand & Sons Publications, New Delhi.
8	Sharma and Shashi K. Gupta, Management Accounting, Kalyani Publishers, Chennai.
Reference Books	
1	Polimeni, Cost Accounting: Concepts and Applications for Managerial Decision Making, 1991, McGraw-Hill, New York.
2	Jain S.P. and Narang K.L. Cost Accounting, Latest Edition.2013, Kalyani Publishers, New Delhi,
3	V.K.Saxena and C.D.Vashist, Cost Accounting, Sultan Chand publications, New Delhi
6	A Murthy and S. Gurusamy, Management Accounting, Vijay Nicole Imprints Private Limited, Chennai
7	T.S.Reddy and Y. Hari Prasad Reddy, Management Accounting, Margham Publications, Chennai.
NOTE: Latest Edition of Textbooks May be Used	
Web Resources	
1	https://egyankosh.ac.in/bitstream/123456789/13676/1/Unit-11.pdf
2	https://egyankosh.ac.in/bitstream/123456789/71365/1/Unit-10.pdf https://www.accountingnotes.net/cost-accounting/contract-costing/contract-costing-meaning-features-and-procedure-cost-accounting/15071
3	https://egyankosh.ac.in/bitstream/123456789/71371/1/Unit-15.pdf
4	https://egyankosh.ac.in/handle/123456789/7193
5	https://egyankosh.ac.in/bitstream/123456789/84038/3/Block-4.pdf

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DEGREE PROGRAMME
SYLLABUS WITH EFFECT FROM 2023-2024

Year: II

Semester: IV

Emotional Intelligence	220S4A
Common for B.C.A. , B.Sc.-SA , B.Sc.-CSc , B.Sc.-CSc-wAI , B.Sc.-CSc-wDS	
Credits 2	Lecture Hours: 2 per week
<p>Learning Objectives: (for teachers: what they have to do in the class/lab/field)</p> <ul style="list-style-type: none"> • To enable the students to understand the concepts of emotional intelligence • To teach the students on aspects relating to personality Analysis Self-analysis, Positive and Negative traits <p>Course Outcomes: (for students: To know what they are going to learn)</p> <ol style="list-style-type: none"> 1. After completion of subjects students understand and application of Emotional Intelligence. 	

Units	Contents
I	Introduction – Emotional Intelligence – Meaning, Benefits, *Importance of emotions – Self –awareness and competencies Psychological Needs, Emotional quotient Vs. IntelligenceQuotient.
II	Personality Analysis – Distinct Personality Type – Handwriting Analysis, color preference,listening, profile, self-esteem, *Will Power, Confidence.
III	Negative Traits – Anger Management – Negative Syndrome and Attitude - Negativethinking – Guilt Quotient Stress and Emotion, Adapting to Loneliness.
IV	Positive Traits – Humor and Happiness – Empathetic ability - Sensitivity profile – Empowered personality, Self – Empowerment.
V	Self-analysis: Psychological growth and adjustment - Personal Development Plan – Successful negotiator personal SWOT Analysis, Celebrating Life.

Reference Books:

1. Dr. Aparna Chattopadhyaym What's Your Emotional IQ, Pustak Mahal, May 2004.
2. Jill Dann, Hodder & Stoughton, Emotional Intelligence In a Week, 10 Edition, 2007.
3. Daniel Goleman, Emotional Intelligence: Why It can matter More than IQ.

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Year: II

Semester: IV

Technical Writing	220S4B
Common for B.C.A. , B.Sc.-SA , B.Sc.-CSc , B.Sc.-CSc-wAI , B.Sc.-CSc-wDS	
Credits 2	Lecture Hours: 2 per week

Learning Objectives: (for teachers: what they have to do in the class/lab/field)

- This course is designed to guide students towards rhetorical, professional, and compositional competencies necessary to ethically and effectively create and analyse technical documents and communication.
- Technical communication competency will be accomplished through a structured exploration of professional/technical contexts and through the production of several documents and projects typical to many forms of technical writing

Course Outcomes: (for students: To know what they are going to learn)

1. Students will learn to analyse communication-related problems and develop solutions through the composition of technical documents from a number of genres and within several settings (i.e., print, web, interactive software) and contexts (e.g., academic, corporate, non-profit, governmental).
2. Students will explore rhetorical and professional strategies in order to discover howto clearly identify and address audiences and stakeholders, organizational contexts, and ethical concerns in the act of communication

Units	Contents
I	What is technical writing?Difference between technical writing and other forms of writing. Qualities and qualifications of technical writers.
II	End products of technical writing.professionalsinvolved-projectmanager/editor,writers, graphic artists; liaison with product engineers/scientists and clients.
III	Roles and responsibilities of writers, editors/project managers.7 Cs of effective writing:Document formats – hard and soft copy versions designs.
IV	Principlesoftechnicalwriting;stylesintechicalwriting;clarity,precision,coherenceand logical sequence in writing.
V	Stages of Technical writing. Document development process, Technical documentation, Planning, Tools, architecture, templates, content development, technical reviews, editorial reviews. Quality control.

Books for References

1. Technical writing style by – Dan Jones , Sam Dragga
2. Handbook of Technical writing by- Walter.E.ollu -1976
3. Technical Writing by- Serena Henning
4. Technical writing process by – Kieran Morgan and Sanja Spejic -2015
5. A guide to technical writing by – T.A. Rickard

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN COMPUTER SCIENCE
SYLLABUS WITH EFFECT FROM 2020-2021

BCE-CSC14

CORE-XIV: SOFTWARE ENGINEERING

(Common paper to B.Sc.Software Applications-V Sem. & B.C.A.-V Sem.)

III YEAR / VI SEM

OBJECTIVES:

- To introduce the software development life cycles
- To introduce concepts related to structured and object oriented analysis & design co
- To provide an insight into UML and software testing techniques

OUTCOMES:

- The students should be able to specify software requirements, design the software using tools
- To write test cases using different testing techniques.

UNIT- I

Introduction – Evolution – Software Development projects – Emergence of Software Engineering.
Software Life cycle models – Waterfall model – Rapid Application Development – Agile Model – Spiral Model

UNIT- II

Requirement Analysis and Specification – Gathering and Analysis – SRS – Formal System Specification

UNIT- III

Software Design – Overview – Characteristics – Cohesion & Coupling – Layered design – Approaches
Function Oriented Design – Structured Analysis – DFD – Structured Design – Detailed design

UNIT- IV

Object Modeling using UML – OO concepts – UML – Diagrams – Use case, Class, Interaction, Activity, State Chart – Postscript

UNIT- V

Coding & Testing – coding – Review – Documentation – Testing – Black-box, White-box, Integration, OO Testing, Smoke testing.

TEXT BOOK:

1. Rajib Mall, “*Fundamentals of Software Engineering*”, PHI 2018, 5th Edition.

REFERENCE BOOKS:

1. Roger S. Pressman, “*Software Engineering - A Practitioner's Approach*”, McGraw Hill 2010, 7th Edition.
2. Pankaj Jalote, “*An Integrated Approach to Software Engineering*”, Narosa Publishing House 2011, 3rd Edition.

WEB REFERENCES:

- NPTEL online course – Software Engineering - <https://nptel.ac.in/courses/106105182/>

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN COMPUTER SCIENCE
SYLLABUS WITH EFFECT FROM 2020-2021

BCE-CSC10

CORE: OPERATING SYSTEM

(Common paper to B.Sc.Software Applications, B.Sc.Computer Science with
Data Science, Computer Science with AI & B.C.A.)

III YEAR / V SEM

OBJECTIVES:

- To understand the fundamental concepts and role of Operating System.
- To learn the Process Management and Scheduling Algorithms
- To understand the Memory Management policies
- To gain insight on I/O and File management techniques

OUTCOMES:

- Understand the structure and functions of Operating System
- Compare the performance of Scheduling Algorithms
- Analyze resource management techniques

UNIT - I

Introduction: Views - Types of System - OS Structure – Operations - Services – Interface- System Calls- System Structure - System Design and Implementation. Process Management: Process - Process Scheduling - Inter-process Communication. CPU Scheduling: CPU Schedulers - Scheduling Criteria - Scheduling Algorithms.

UNIT - II

Process Synchronization: Critical- Section Problem - Synchronization Hardware Semaphores - Classical Problems of Synchronization - Monitors. Deadlocks: Characterization - Methods for Handling Deadlocks - Deadlock Prevention - Avoidance - Detection - Recovery.

UNIT - III

Memory Management: Hardware - Address Binding – Address Space - Dynamic Loading and Linking – Swapping – Contiguous Allocation - Segmentation - Paging – Structure of the Page Table.

UNIT - IV

Virtual Memory Management: Demand Paging - Page Replacement Algorithms - Thrashing. File System: File Concept - . Access Methods - Directory and Disk Structure - Protection - File System Structures - Allocation Methods - Free Space Management.

UNIT - V

I/O Systems: Overview - I/O Hardware - Application I/O Interface - Kernel I/O Subsystem - Transforming I/O Requests to Hardware Operations - Performance. System Protection: Goals - Domain - Access matrix. System Security: The Security Problem - Threats – Encryption- User Authentication.

TEXT BOOK:

1. Abraham Silberschatz, Peter B Galvin, Greg Gagne, “*Operating System Concepts*”, Wiley India Pvt. Ltd 2018, 9th Edition,.

REFERENCES:

1. William Stallings, “*Operating Systems Internals and Design Principles*”, Pearson, 2018, 9th Edition.
2. Andrew S. Tanenbaum, Herbert Bos, “*Modern Operating Systems*”, Pearson 2014, 4th Edition.

WEB REFERENCES:

- NPTEL & MOOC courses titled Operating Systems
- <https://nptel.ac.in/courses/106106144/>

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN COMPUTER SCIENCE
SYLLABUS WITH EFFECT FROM 2020-2021

BCE-CSC11

CORE: RELATIONAL DATABASE MANAGEMENT SYSTEM

(Common paper to B.Sc.Software Applications, B.Sc.Computer Science with
Data Science, Computer Science with AI & B.C.A.)

II / III YEAR
III / V SEM

OBJECTIVES:

- Gain a good understanding of the architecture and functioning of Database Management Systems
- Understand the use of Structured Query Language (SQL) and its syntax.
- Apply Normalization techniques to normalize a database.
- Understand the need of transaction processing and learn techniques for controlling the consequences of concurrent data access.

OUTCOMES:

- Describe basic concepts of database system
- Design a Data model and Schemas in RDBMS
- Competent in use of SQL
- Analyze functional dependencies for designing robust Database

UNIT - I

Introduction to DBMS – Data and Information - Database – Database Management System – Objectives – Advantages – Components - Architecture. ER Model: Building blocks of ER Diagram – Relationship Degree – Classification – ER diagram to Tables – ISA relationship – Constraints – Aggregation and Composition – Advantages

UNIT - II

Relational Model: CODD's Rule- Relational Data Model - Key - Integrity – Relational Algebra Operations – Advantages and limitations – Relational Calculus – Domain Relational Calculus - QBE.

UNIT - III

Structure of Relational Database. Introduction to Relational Database Design - Objectives – Tools – Redundancy and Data Anomaly – Functional Dependency - Normalization – 1NF – 2NF – 3NF – BCNF. Transaction Processing – Database Security.

UNIT - IV

SQL: Commands – Data types – DDL - Selection, Projection, Join and Set Operations – Aggregate Functions – DML – Modification - Truncation - Constraints – Subquery.

UNIT - V

PL/SQL: Structure - Elements – Operators Precedence – Control Structure – Iterative Control - Cursors - Procedure - Function - Packages – Exceptional Handling - Triggers.

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SYLLABUS WITH EFFECT FROM 2020-2021

TEXT BOOK:

1. S. Sumathi, S. Esakkirajan, “*Fundamentals of Relational Database Management System*”, Springer International Edition 2007.

REFERENCE BOOKS:

1. Abraham Silberchatz, Henry F. Korth, S. Sudarshan, “*Database System Concepts*”, McGrawHill 2019, 7th Edition.
2. Alexis Leon & Mathews Leon, “*Fundamentals of DBMS*”, Vijay Nicole Publications 2014, 2nd Edition.

WEB REFERENCES:

- NPTEL & MOOC courses titled Relational Database Management Systems
- <https://nptel.ac.in/courses/106106093/>
- <https://nptel.ac.in/courses/106106095/>

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN SOFTWARE APPLICATION
SYLLABUS WITH EFFECT FROM 2020-2021

BSA-CSE1B

ELECTIVE-I(B): MULTIMEDIA AND ITS APPLICATIONS
(Common paper to B.C.A.)

III YEAR / V SEM

OBJECTIVES:

- To understand the basic concepts of Multimedia Systems
- To learn representations, perceptions and applications of Multimedia

OUTCOMES:

- To understand the technologies behind multimedia applications

UNIT- I

Definition - Classification - Multimedia application -Multimedia Hardware - Multimedia software - CDROM - DVD.

UNIT-II

Multimedia Audio: Digital medium - Digital audio technology - sound cards - recording - editing - MP3 - MIDI fundamentals - Working with MIDI - audio file formats - adding sound to Multimedia project.

UNIT-III

Multimedia Text: Text in Multimedia -Multimedia graphics: coloring - digital imaging fundamentals - development and editing - file formats - scanning and digital photography

UNIT-IV

Multimedia Animation: Computer animation fundamentals - Kinematics - morphing - animation s/w tools and techniques.

Multimedia Video : How video works - broadcast video standards - digital video fundamentals – digital video production and editing techniques - file formats.

UNIT-V

Multimedia Project : stages of project - Multimedia skills - design concept - authoring - planning and costing –Multimedia Team.

Multimedia-looking towards Future: Digital Communication and New Media, Interactive Television, Digital Broadcasting, Digital Radio, Multimedia Conferencing

TEXT BOOKS:

1. S.Gokul, “*Multimedia Magic*”, BPB Publications, 2nd Edition.
2. Tay Vaughen , “*Multimedia Making it Work*”, TMH, 6th Edition.

REFERENCE BOOKS:

1. Kiran Thakrar, Prabhat k. andleugh, “*Multimedia System Design*”, Prentice Hall India.
2. Malay k Pakhira, “*Computer graphics, Multimedia and Animation*”, Prentice Hall India, 2nd Edition.

WEB REFERENCES:

- NPTEL & MOOC courses titled Multi media
- <https://nptel.ac.in/courses/106105163/>
- W3schools.com/html/html-media.asp

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN COMPUTER SCIENCE
SYLLABUS WITH EFFECT FROM 2020-2021

BCE-CSC12

CORE-XII: PRACTICAL – V (OPERATING SYSTEM LAB)

(Common paper to B.Sc.Software Applications & B.C.A.)

III YEAR / V SEM

OBJECTIVES:

- To learn Process management and scheduling.
- To understand the concepts and implementation of memory management policies.
- To understand the various issues in Inter Process Communication.

OUTCOMES:

- Understand the process management policies and scheduling process by CPU.
- Analyze the memory management and its allocation policies.
- To evaluate the requirement for process synchronization.

PROGRAM LIST:

1. Basic I/O programming.
To implement CPU Scheduling Algorithms:
2. Shortest Job First Algorithm.
3. First Come First Served Algorithm.
4. Round Robin and Priority Scheduling Algorithms.
5. To implement reader/writer problem using semaphore.
6. To implement Banker's algorithm for Deadlock avoidance.
Program for page replacement algorithms:
7. First In First Out Algorithm.
8. Least Recently Used Algorithm.
9. To implement first fit, best fit and worst fit algorithm for memory management.
10. Program for Inter-process Communication.

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN COMPUTER SCIENCE
SYLLABUS WITH EFFECT FROM 2020-2021

BCE-CSC13

PRACTICAL:- PL / SQL LAB

(Common paper to B.Sc.Software Applications, B.Sc.Computer Science with
Data Science, Computer Science with AI & B.C.A.)

II / III YEAR
III / V SEM

OBJECTIVES:

- Learn the various DDL and DML commands
- Understand queries in SQL to retrieve information from data base
- Understand PL/SQL statements: Exception Handling, Cursors, and Triggers.
- Develop database applications using front-end and back-end tools.

OUTCOMES:

- Implement the DDL , DML Commands and Constraints
- Create, Update and query on the database.
- Design and Implement simple project with Front End and Back End.

LIST OF EXERCISES

- 1) DDL commands with constraints.
- 2) DML Commands with constraints.
- 3) SQL Queries: Queries, sub queries, Aggregate function
- 4) PL/SQL : Exceptional Handling
- 5) PL/SQL : Cursor
- 6) PL/SQL : Trigger
- 7) PL/SQL : Packages
- 8) Design and Develop Application for Library Management
- 9) Design and Develop Application for Student Mark Sheet Processing
- 10) Design and Develop Application for Pay Roll Processing

UNIVERSITY OF MADRAS

U.G. DEGREE COURSE

PART – IV - VALUE EDUCATION

Common for all U.G. & Five Year Integrated Courses
(Effective from the Academic Year 2012 – 2013)

SYLLABUS

CREDITS: 2

III YEAR / V SEM

Objective: Value are socially accepted norms to evaluate objects, persons and situations that form part and parcel of sociality. A value system is a set of consistent values and measures. Knowledge of the values are inculcated through education. It contributes in forming true human being, who are able to face life and make it meaningful. There are different kinds of values like, ethical or moral values, doctrinal or ideological values, social values and aesthetic values. Values can be defined as broad preferences concerning appropriate courses of action or outcomes. As such, values reflect a person's sense of right and wrong or what "ought" to be. There are representative values like, "Equal rights for all", "Excellence deserves admiration". "People should be treated with respect and dignity". Values tend to influence attitudes and behavior and help to solve common human problems. Values are related to the norms of a culture.

UNIT I: Value education-its purpose and significance in the present world – Value system – The role of culture and civilization – Holistic living – balancing the outer and inner – Body, Mind and Intellectual level – Duties and responsibilities.

UNIT II: Salient values for life – Truth, commitment, honesty and integrity, forgiveness and love, empathy and ability to sacrifice, care, unity, and inclusiveness, Self esteem and self confidence, punctuality – Time, task and resource management – Problem solving and decision making skills – Interpersonal and Intra personal relationship – Team work – Positive and creative thinking.

UNIT III: Human Rights – Universal Declaration of Human Rights – Human Rights violations – National Integration – Peace and non-violence – Dr.A P J Kalam's ten points for enlightened citizenship – Social Values and Welfare of the citizen – The role of media in value building.

UNIT IV: Environment and Ecological balance – interdependence of all beings – living and non-living. The binding of man and nature – Environment conservation and enrichment.

UNIT V: Social Evils – Corruption, Cyber crime, Terrorism – Alcoholism, Drug addiction – Dowry – Domestic violence – untouchability – female infanticide – atrocities against women – How to tackle them.

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U.G. DEGREE COURSE

Books for Reference :

1. M.G. Chitakra: Education and Human Values, A.P.H. Publishing Corporation, New Delhi, 2003.
2. Chakravarthy, S.K: Values and ethics for Organizations: Theory and Practice, Oxford University Press, New Delhi, 1999.
3. Satchidananda, M.K: Ethics, Education, Indian Unity and Culture, Ajantha Publications, Delhi, 1991.
4. Das, M.S. & Gupta, V.K.: Social Values among Young adults: A changing Scenario, M.D. Publications, New Delhi, 1995.
5. Bandiste, D.D.: Humanist Values: A Source Book, B.R. Publishing Corporation, Delhi, 1999.
6. Ruhela, S.P.: Human Values and education, Sterling Publications, New Delhi, 1986.
7. Kaul, G.N.: Values and Education in Independent Indian, Associated Publishers, Mumbai, 1975.
8. NCERT, Education in Values, New Delhi, 1992.
9. Swami Budhananda (1983) How to Build Character A Primer : Rmkrishna Mission, New Delhi.
10. A Culture Heritage of India (4 Vols.), Bharatiya Vidya Bhuvan, Bombay, (Selected Chapters only)
11. For Life, For the future : Reserves and Remains – UNESCO Publication.
12. Values, A Vedanta Kesari Presentation, Sri Ramakrishna Math, Chennai, 1996.
13. Swami Vivekananda, Youth and Modern India, Ramakrishna Mission, Chennai.
14. Swami Vivekananda, Call to the Youth for Nation Building, Advaita Ashrama, Calcutta.
15. Awakening Indians to India, Chinmayananda Mission, 2003.

UNIVERSITY OF MADRAS
BACHELOR OF COMPUTER APPLICATIONS (B.C.A.)
SYLLABUS WITH EFFECT FROM 2020-2021

BCA-DSC18

CORE-XVIII: WEB DESIGN AND DEVELOPMENT

III YEAR / VI SEM

OBJECTIVES:

- To understand Web based programming and scripting languages.
- To learn the basic web concepts and to create rich internet applications that use most recent client-side programming technologies.
- To learn the basics of HTML, DHTML, XML, CSS, Java Script and AJAX.

OUTCOMES:

- Ability to Develop and publish Web pages using Hypertext Markup Language (HTML).
- Ability to optimize page styles and layout with Cascading Style Sheets (CSS).
- Ability to Understand, analyze and apply the role of languages to create a capstone
- Website using client-side web programming languages like HTML, DHTML, CSS, XML, JavaScript, and AJAX.

UNIT I:

HTML: HTML-Introduction-tag basics- page structure-adding comments working with texts, paragraphs and line break. Emphasizing test- heading and horizontal rules-list-font size, face and color-alignment-links-tables-frames

UNIT II:

Forms & Images Using Html: Graphics: Introduction-How to work efficiently with images in web pages, image maps, GIF animation, adding multimedia, data collection with html forms textbox, password, list box, combo box, text area, tools for building web page front page

UNIT III:

XML & DHTML: Cascading style sheet (CSS)-what is CSS-Why we use CSS-adding CSS to your web pages-Grouping styles-extensible markup language (XML). Dynamic HTML: Document object model (DCOM)-Accessing HTML & CSS through DCOM Dynamic content styles & positioning-Event bubbling-data binding.

UNIT IV:

JavaScript : Client side scripting, What is JavaScript, How to develop JavaScript, simple JavaScript, variables, functions, conditions, loops and repetition, Advance script, JavaScript and objects, JavaScript own objects, the DOM and web browser environments, forms and validations

UNIT V:

Ajax: Introduction, advantages &disadvantages, Purpose of it, ajax based web application, alternatives of ajax

Java Script & AJAX: Introduction to array-operators, making statements-date & time-mathematics-strings-Event handling-form properties. AJAX. Introduction to jQuery and AngularJS.

TEXT BOOKS:

1. Pankaj Sharma, “*Web Technology*”, Sk Kataria & Sons Bangalore 2011.(UNIT I, II, III & IV).
2. Mike McGrath, “*Java Script*”, Dream Tech Press 2006, 1st Edition. (UNIT V: JAVASCRIPT)
3. Achyut S Godbole & Atul Kahate, “*Web Technologies*”, 2002, 2nd Edition. (UNIT V: AJAX)

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REFERENCE BOOKS:

- Laura Lemay, Rafe Colburn , Jennifer Kyrnin, “*Mastering HTML, CSS & Javascript Web Publishing*”, 2016.
- DT Editorial Services (Author), “*HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery)*”, Paperback 2016, 2nd Edition.
- C. Xavier, “*World Wide Web Design with HTML*”, TMH Publishers 2001.
- Wendy Willard, “*A Beginners Guide HTML*”, Tata McGraw Hill 2009, 4th Edition.

WEB REFERENCES:

- NPTEL & MOOC courses titled Web Design and Development.
- <https://www.udemy.com/topic/web-design/>

UNIVERSITY OF MADRAS
BACHELOR OF COMPUTER APPLICATIONS (B.C.A.)
SYLLABUS WITH EFFECT FROM 2020-2021

BCA-DSC19

CORE-XIX: DATA MINING

III YEAR / VI SEM

OBJECTIVES:

- To learn about data mining Concepts
- To study the different data mining techniques

OUTCOMES:

- To have knowledge in Data mining concepts
- To apply Data mining concepts in different fields

UNIT - I

Basic Data Mining Tasks – Data Mining Versus Knowledge Discovery in Data Bases – Data Mining Issues – Data Mining Matrices – Social Implications of Data Mining – Data Mining from Data Base Perspective.

UNIT - II

Data Mining Techniques – a Statistical Perspective on data mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms.

UNIT - III

Classification: Introduction – Statistical – Based Algorithms – Distance Based Algorithms – Decision.

UNIT - IV

Clustering Tree – Based Algorithms – Neural Network Based Algorithms – Rule Based Algorithms – Combining Techniques: Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms. Partitioned Algorithms.

UNIT - V

Association Rules: Introduction - Large Item Sets – Basic Algorithms – Parallel & Distributed Algorithms – Comparing Approaches – Incremental Rules – Advanced Association Rules Techniques – Measuring the Quality of Rules.

TEXT BOOK:

1. Jiawei Han & Micheline Kamber, “*Data Mining Concepts & Techniques*”, 2011, 3rd Edition.

REFERENCE BOOK:

1. Margaret H.Dunbam, “*Data Mining Introductory and Advanced Topics*”, Pearson Education 2003.

WEB REFERENCES:

- NPTEL & MOOC courses titled Data Mining
- <https://nptel.ac.in/courses/106105174/>

UNIVERSITY OF MADRAS
BACHELOR OF COMPUTER APPLICATIONS (B.C.A.)
SYLLABUS WITH EFFECT FROM 2020-2021

BCA-DSC20

CORE-XX: MOBILE APPLICATION DEVELOPMENT

III YEAR / VI SEM

OBJECTIVES:

- To make the student understand the basic concepts of mobile application development, be aware of Characteristics of mobile applications, User-interface design, basics of graphics and multimedia.
- To gain knowledge about testing and publishing of Android application

OUTCOMES:

- To explain the basics of mobile application development
- Develop Android application with User interface, networking and animation.
- Use simulator tools to test and publish the application.

UNIT - I

Mobile Application Development - Mobile Applications and Device Platforms - Alternatives for Building Mobile Apps -Comparing Native vs. Hybrid Applications -The Mobile Application Development Lifecycle-The Mobile Application Front-End-The Mobile Application Back-End-Key Mobile Application Services-What is Android-Android version history-Obtaining the Required Tools- Launching Your First Android Application-Exploring the IDE-Debugging Your Application-Publishing Your Application

UNIT - II

Understanding Activities-Linking Activities Using Intents-Fragments-Displaying Notifications-Understanding the Components of a Screen-Adapting to Display Orientation-Managing Changes to Screen Orientation- Utilizing the Action Bar-Creating the User Interface Programmatically Listening for UI Notifications

UNIT - III

Using Basic Views-Using Picker Views -Using List Views to Display Long Lists-Understanding Specialized Fragments - Using Image Views to Display Pictures -Using Menus with Views-Using WebView- Saving and Loading User Preferences-Persisting Data to Files-Creating and Using Databases.

UNIT - IV

Sharing Data in Android-Creating Your Own Content Providers -Using the Content Provider-SMS Messaging -Sending Email-Displaying Maps- Getting Location Data- Monitoring a Location.

UNIT - V

Consuming Web Services Using HTTP-Consuming JSON Services- Creating Your Own Services - Binding Activities to Services -Understanding Threading .

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SYLLABUS WITH EFFECT FROM 2020-2021

TEXT BOOK:

1. Jerome DiMarzio, “*Beginning Android Programming with Android Studio*”, 4th Edition.

REFERENCE BOOKS:

1. Dawn Griffiths, David Griffiths, “*Head First Android Development: A Brain-Friendly Guide*”, 2017.
2. Neil Smyth , “*Android Studio 3.0 Development Essentials: Android*”, 8th Edition.
3. Pradeep Kothari, “*Android Application Development (With Kitkat Support)*”, Black Book 2014.

WEB REFERENCES:

- <https://developer.android.com/guide>
- https://en.wikipedia.org/wiki/Android_10
- [Develop App for Free](https://www.developapp.com/)
- <https://flutter.dev/>
- <http://ai2.appinventor.mit.edu>
- https://en.wikipedia.org/wiki/Android_version_history
- <https://aws.amazon.com/mobile/mobile-application-development/> (Unit 1)
- https://en.wikipedia.org/wiki/Mobile_app_development

UNIVERSITY OF MADRAS
BACHELOR OF COMPUTER APPLICATIONS (B.C.A.)
SYLLABUS WITH EFFECT FROM 2020-2021

BCA-DSE2C

ELECTIVE-II(C): SOFTWARE PROJECT MANAGEMENT

III YEAR / VI SEM

OBJECTIVES:

- To define and highlight importance of software project management.
- To formulate and define the software management metrics & strategy in managing projects

OUTCOMES:

- Knowledge gained to train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process

UNIT - I

Introduction to Competencies - Product Development Techniques - Management Skills - Product Development Life Cycle - Software Development Process and models - The SEI CMM - International Organization for Standardization.

UNIT - II

Managing Domain Processes - Project Selection Models - Project Portfolio Management - Financial Processes - Selecting a Project Team - Goal and Scope of the Software Project -Project Planning - Creating the Work Breakdown Structure - Approaches to Building a WBS - Project Milestones - Work Packages - Building a WBS for Software.

UNIT - III

Tasks and Activities - Software Size and Reuse Estimating - The SEI CMM - Problems and Risks - Cost Estimation - Effort Measures - COCOMO: A Regression Model - COCOMO II - SLIM: A Mathematical Model - Organizational Planning - Project Roles and Skills Needed.

UNIT - IV

Project Management Resource Activities - Organizational Form and Structure - Software Development Dependencies - Brainstorming - Scheduling Fundamentals - PERT and CPM - Leveling Resource Assignments - Map the Schedule to a Real Calendar - Critical Chain Scheduling.

UNIT - V

Quality: Requirements – The SEI CMM - Guidelines - Challenges - Quality Function Deployment - Building the Software Quality Assurance - Plan - Software Configuration Management: Principles - Requirements - Planning and Organizing - Tools - Benefits - Legal Issues in Software - Case Study

TEXT BOOK:

1. Robert T. Futrell, Donald F. Shafer, Linda I. Safer, “*Quality Software Project Management*”, Pearson Education Asia 2002.

REFERENCE BOOKS:

1. Pankaj Jalote, “*Software Project Management in Practice*”, Addison Wesley 2002.
2. Hughes, “*Software Project Management*”, Tata McGraw Hill 2004, 3rd Edition.

WEB REFERENCES:

- NPTEL & MOOC courses titled Software Project Management
- www.smartworld.com/notes/software-project-management

UNIVERSITY OF MADRAS
BACHELOR OF COMPUTER APPLICATIONS (B.C.A.)
SYLLABUS WITH EFFECT FROM 2020-2021

BCA-DSC21

CORE-XXI: PRACTICAL - VII
MOBILE APPLICATION DEVELOPMENT LAB

III YEAR / VI SEM

OBJECTIVES:

- To give overall view of Mobile application development
- Develop and Publish Android applications using Graphical user interface
- Develop and Publish Android application which can use Location and network services

OUTCOMES:

At the end of the course, the student should be able to:

- Use Emulator tools to design and develop applications

Exercises

1. Develop an application that finds greatest among three numbers using GUI Components
2. Develop an application to display your personal details using GUI Components
3. Develop an application that uses the radio button
4. Develop an application that uses the image button
5. Develop an application that uses Alert Dialog Box
6. Develop an application that uses Layout Managers.
7. Develop an application that uses audio mode (NORMAL, SILENT, VIBRATE)
8. Develop an application that uses to send messages from one mobile to another mobile.
9. Develop an application that uses to send email
10. Develop an application for mobile calls.
11. Develop an application for Student Mark sheet processing
12. Develop an application for Login Page in Database.
13. Develop an application for Google map locator (optional)

WEB REFERENCES:

Develop the App online

- <https://flutter.dev/>
- <http://ai2.appinventor.mit.edu>

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN COMPUTER SCIENCE
SYLLABUS WITH EFFECT FROM 2020-2021

BCE-CSC18

PRACTICAL: MINI PROJECT

(Common paper to B.Sc.Software Applications, B.Sc.Computer Science with
Data Science and Computer Science with AI & B.C.A.)

III YEAR / VI SEM

OBJECTIVES:

The aim of the mini project is that the student has to understand the real time software development environment. The student should gain a thorough knowledge in the problem, he/she has selected and the language / software, he/she is using.

Project planning:

B.Sc (Computer Science / Software Application)/BCA Major Project is an involved exercise, which has to be planned well in advance. The topic should be chosen in the beginning of final year itself. Related reading training and discussions of first internal project viva voce should be completed in the first term of final year.

I Selection of the project work

Project work could be of three types.

a) Developing solution for real life problem

In this case a requirement for developing a computer-based solution already exists and the different stages of system development life cycle is to be implemented successfully. Examples are accounting software for particular organization, computerization of administrative function of an organization, web based commerce etc.

b) System Software Project

Projects based on system level implementation. An example is a Tamil language editor with spell checker, compiler design.

b) Research level project

These are projects which involve research and development and may not be as a structured and clear cut as in the above case. Examples are Tamil character recognition, neural net based speech recognizer etc. This type of projects provides more challenging opportunities to students.

II Selection of team

To meet the stated objectives, it is imperative that major project is done through a team effort. Though it would be ideal to select the team members at random and this should be strongly recommended, due to practical consideration students may also be given the choice of forming themselves into teams with three members. A team leader shall be selected. Team shall maintain the minutes of meeting of the team members and ensure that tasks have been assigned to every team member in writing. Team meeting minutes shall form a part of the project report. Even if students are doing project as groups, each one must independently take different modules of the work and must submit the report.

III Selection of Tools

No restrictions shall be placed on the students in the choice of platform/tools/languages to be utilized for their project work, though open source is strongly recommended, wherever possible. No value shall be placed on the use of tools in the evaluation of the project.

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IV Project management

Head of the Department / Principal of the college should publish the list of student's project topic, internal guide and external organization and teams agreed before the end of July. Changes in this list may be permitted for valid reasons and shall be considered favorably by the Head of the department / Principal of the college any time before commencement of the project. Students should submit a fortnightly report of the progress, which could be indication of percentage of completion of the project work. The students should ideally keep a daily activity book. Team meeting should be documented and same should be submitted at the end of the project work.

V Documentation

Three copies of the project report must be submitted by each student (one for department library, one for the organization where the project is done and one for the student himself/herself). The final outer dimensions of the project report shall be 21cm X 30 cm. The color of the flap cover shall be light blue. Only hard binding should be done. The text of the report should be set in 12 pt, Times New Roman, 1.5 spaced.

Headings should be set as follows: CHAPTER HEADINGS 16 pt, Arial, Bold, All caps, Centered.

1. Section Headings 14 pt Bookman old style, Bold, Left adjusted.

1.1 Section Sub-heading 12 pt, Bookman old style.

Title of figures tables etc are done in 12 point, Times New Roman, Italics, centered.

Content of the Project should be relevant and specify particularly with reference to the work. The report should contain the requirement specification of the work, Analysis, Design, Coding, testing and Implementation strategies done.

- Organizational overview (of the client organization, where applicable)
- Description of the present system
- Limitations of the present system
- The Proposed system - Its advantages and features
- Context diagram of the proposed system
- Top level DFD of the proposed system with at least one additional level of expansion
- Program List (Sample code of major functions used)
- Files or tables (for DBMS projects) list. List of fields or attributes (for DBMS projects) in each file or table.
- Program – File table that shows the files/tables used by each program and the files are read, written to, updated, queried or reports were produced from them.
- Screen layouts for each data entry screen.
- Report formats for each report.

Some general guidelines on documentation are:

1. Certificate should be in the format: "**Certified that this report titled.....is a bonafide record of the project work done by Sri/ Kumunder our supervision and guidance, towards partial fulfillment of the requirement for award of the Degree of B.Sc Computer Science/BCA/BSc Software Applications of XXX College**" with dated signature of internal guide, external guide and also Head of the Department/ College.

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2. If the project is done in an external organization, another certificate on the letterhead of the organization is required: **“Certified that his/her report titledis a bonafide record of the project work done by Sri/Kum.....under my supervision and guidance, at thedepartment of..... (Organization) towards partial fulfillment of the requirement for the award of the Degree of B.Sc (Computer Science/Software Applications) / BCA of XXX College.**
3. Page numbers shall be set at right hand bottom, paragraph indent shall be set as 3.
4. Only 1.5 space need be left above a section or subsection heading and no space may be left after them.
5. References shall be IEEE format (see any IEEE magazine for detail) While doing the project keep note of all books you refer, in the correct format and include them in alphabetical order in your reference list.

VI Project Evaluation:

Internal Assessment

There shall be six components that will be considered in assessing a project work with weightage as indicated.

1. Timely completion of assigned tasks as evidenced by team meeting minutes 20%
2. Individual involvement, team work and adoption of industry work culture 10%
3. Quality of project documentation (Precision, stylistics etc) 10%
4. Achievement of project deliverables 20%
- 5 Effective technical presentation of project work 10%
6. Viva 30%

Based on the above 6 components internal mark 40 can be awarded.

External Assessment

Dissertation/Project submitted at the end of third year shall be valued by two examiners appointed by the Controller for the conduct of practical exam. The board of examiners shall award 60 marks based on the following components.

1. Achievement of project deliverables	- 20 Marks
2. Effective technical presentation of project work	- 20 Marks
3. Project Viva	- 20 Marks

There shall be a common written examination conducted for all the candidates in each group together for a minimum of 10 minutes.

- (i) Requirement Specification of Project
- (ii) Design of Project
- (iii) Testing and Implementation of Project
