ST. ALOYSIUS' COLLEGE(AUTONOMOUS) JABALPUR			
PART A: Introduction			
PROGRAM: Certificate	CLASS: BCA	SEMESTER: I	SESSION 2023-24
Subject: Computer Science			

1.	Course Code	S I - BCAA I T
2.	Course Title	Computer Fundamental Organization and Architecture
3.	Course Type	Major – Paper-I
4.	Pre-Requisite (if any)	To study this course, a student must have basic knowledge of Computers.
5.	Course Learning Outcomes(CO)	On completion of this course, learners will be able to: CO1. Understand the basic structure, operation and characteristics of digital computer. CO2. Be able to design simple combinational digital circuits based on given parameters. CO3. Understand the working of arithmetic & logic unit CO4. Know about hierarchical memory system including cache memories and virtual memory. CO5. Understand concept and advantages of parallelism, multi-processors and multi-core processors.
6.	Credit Value	Theory 4 Credits Practical 2 Credits
7.	Total Marks	Max. Marks : 100 Min. Passing Marks: 35

PART B: Content of the Course

No. of Lectures (in hours per week): 2 Hrs. per week

Total No. of Lectures: 60 Hrs.

Module	Topics	No. of
I	Fundamentals of Computer – Definition, Characteristics, Block Diagram of a Computer, Input devices - Output Devices- Keyboard, Scanner, Mouse, light pen, Bar Code Reader, OMR, OCR. MICR, Printers- types of Printer, Monitors, Plotters-types of plotters, Computer Memory- Types of Memory.	10
II	Fundamentals of Digital Electronics: Number System-Binary, Decimal, Octal, Hexa-Decimal, Conversions, Binary Arithmetic-Addition, Subtraction, Multiplication, Division, Underflow, Overflow, Sign Magnitude, Complements-1's and 2's, Fixed-Point Representation, Floating-Point Representation.	10
III	Boolean Algebra, Reducing Boolean Expression, Logic Gates-AND, OR, NOT, Universal Gates-NAND, NOR, Analog and Digital Signals, Clock Waveform Timing, Map Simplification, K-Map- Two, Three and Four variables.	10

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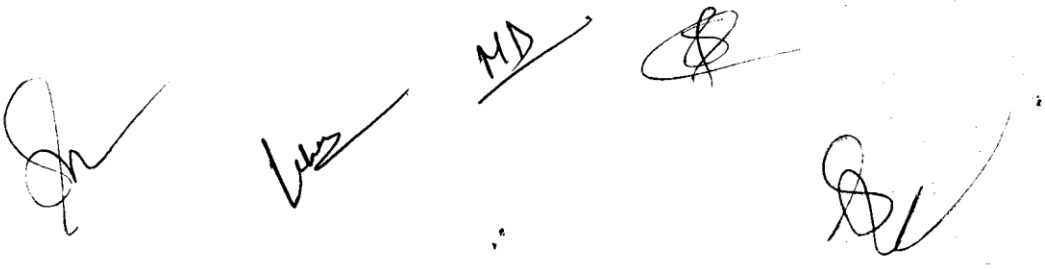
IV	Combinational Circuits- Adder, Subtractor, Multiplexer, De-multiplexer, Decoders, Encoders. Binary Codes – Gray Codes, ASCII code, BCD code, EBCDIC, Error Detection Code and Correction Code, Hamming Code.	10
V	Sequential Circuits - Flip - Flops, SR, D, T, JK, Master-Slave, Registers, Shift Registers- SISO, SIPO, PISO, PIPO, Counters, Instruction, Instruction Format, Instruction Codes, Handshaking, DMA Data Transfer, Auxiliary Memory, Cache Memory, Associative Memory, Flynn's classification - Introduction to SISD, SIMD, MISD, MIMD, Parallelism, Multicore processors.	10
Keywords/Tags: Digital Electronics, Logic Gates, Circuits, Instruction formats, Parallelism, Memory hierarchy, Multicore, Multi-threading, SISD, SIMD, MISD, MIMD.		

PART C: Content of the Course		
No. of Lab. Practical s (in hours per week): 2 Hrs. per week		
Total No. of Labs: 30 Hrs.		
	Suggestive list of Practical	No. of labs
	PART-I (Computer Fundamentals) 1. Various parts of a Computer 2. Identify various parts inside the CPU like motherboard, SMPS, Ports, Buses, IC chip, Processor, HDD, RAM. 3. Identify various I/O devices **PART-II (Digital Electronics)** 1. To study basic gates (AND, OR, NOT) and verify their truth tables. 2. To study and verify NAND as Universal gate using IC 7400. 3. To realize basic gate AND from Universal gate NAND. 4. To realize basic gate OR from Universal gate NAND. 5. To realize basic gate N OT from Universal gate NAND. 6. To study and verify NOR as Universal gate 7. To realize basic gate AND from Universal gate NOR. 8. To realize basic gate OR from Universal gate NOR. 9. To realize basic gate NOT from Universal gate NOR. 10. Verification and Interpretation of truth table for XOR gate. 11. To study Half Adder using basic gates and verify its truth table. 12. To study Full Adder using basic gates and verify its truth table. 13. To design and construct RS flip Flop using gates and verifies the truth table. 14. To design and construct JK Flip Flop using gates and verifies the truth table. 15. To verify De-Morgan's First Law Theorem. 16. To verify De-Morgan's Second Law Theorem.	15

	Keywords/Tags: Digital Electronics, Logic Gates, AN D, OR, NOT, IC7486, IC 7400, NAND, NOR, IC 7483, Circuits, Flip Flop, De-Morgan's Theorem.	

PART D: Assessment and Evaluation			
Internal Assessment : Continuous Comprehensive Evaluation (CCE) : 40 **Marks**		**External Assessment**: University Exam (UE) : **60 Marks** Time : **02.00 Hours**	
Internal Assessment	**Marks**	**External Assessment**	**Marks**
Lab Attendance	10 Marks	Practical record file	25 Marks
		Viva voce practical	10 Marks
Internal Viva	10 Marks	Execution	5 Marks
Practical File	20 Marks	Answer script	20 Marks
Total	**40 Marks**	**Total**	**60 Marks**



St. Aloysius College (Autonomous), Jabalpur, Madhya Pradesh

PART A				
Program: **Certificate**		Class: **B.C.A.**	Semester :**1st**	SESSION 2023-24
1.	Course Code	**BCA-102**		
2.	Course Title	**Programming and Problem Solving through 'C'**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Minor**		
4.	Pre-Requisite (if any)	**10+2 Maths (opted as an elective by the students of Computer Application)**		
5.	Course Learning Outcomes (CLO)	**After the completion of this course, a student shall be able to do the following:** CO1. Identify situations where computational methods and computers would be useful. CO2. Given a computational problem, identify and abstract the programming task involved. CO3. Approach the programming tasks using techniques learned and write pseudo code. CO4. Choose the right data representation formats based on the requirements of the problem. CO5. Use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand. CO6. Write the program on a computer, edit, compile, debug, correct, recompile and run it. CO7. Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task.		
6.	Credit Value	**Theory - 4 Credits**		
7.	Total Marks	Max. Marks : **40+60**	Min. Passing Marks: **35**	

PART B: Content of the syllabus

No. of Lectures (in hours per week): **4 Lectures per week**

Total No. of Lectures: **60**

Unit	Topics	No. of Lectures
I	**Classification of programming language:** Structured programming concepts, modular programming, top-down programming approach. **Problem solving using computer**: coding, compilation, debugging and testing, documentation, implementation and maintenance. **Problem- Solving Techniques**: Steps for Problem-Solving, Design of Algorithms, Definition, Features of Algorithm. Flowcharts, Basic	12

	Symbols used in Flowchart Design. **Basics of C**: History of C, salient Features of C, C language IDE'S: What is IDE's Types of IDE's, Structure of a C Program, a Simple C Program, Compiling a C Program, Link and Run the C Program.	
II	**Variables and Constants**: Character Set, Identifiers and Keywords, Rules for Forming Identifiers, Qualifiers, **Variables**, Declaring Variables, Initializing Variables, **Constants**, Types of Constants, **Data Types, Operators**, expressions, operator precedence and associativity. **Managing input/output function**: formatted and unformatted. **Conditional Statements and Loops:** Decision Control Statements: if Statements, switch Statement, Loop Control Statements: while Loop, do-while Statement, for Loop, Nested Loop, goto Statement, Break Statement, Continue Statement.	12
III	**Array:** one dimensional array Declaration, Initialization, insertion, deletion of an element form an array, finding the largest/smallest element in an array, two dimensional arrays, addition / multiplication of matrices. **String:** Declaration and Initialization of Strings, String formatted specifiers, Array of Strings, Use of <string.h>, String library function (strlen, strcpy, strcmp,strcat, strlwr, strrev), **Storage Class:** Need & types of Storage class,	12
IV	**Functions:** Definition of a Function, types of function, Declaration of a Function, Function Prototypes, passing arguments to a function, call by value, call by reference, command line argument, recursion. **Pointers:** pointers and their characteristics, address and indirection operators, pointer type declaration and assignment, pointer arithmetic, passing pointers to functions, array of pointers, introduction to pointer to pointer.	12
V	**Structures**: declaration of structure, accessing the members of a structure, initializing structures, structures as function arguments, structures and arrays, **Preprosessor**: What is pre-processor, Types of Pre-processor, Macros, File Inclusion., Conditional Compilation. **Dynamic memory allocation** Memory management, Types of memory allocation, Allocation (malloc, calloc, realloc), Deallocation(free) **Command Line' Arguments, Enumeration**, typedef.	12

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

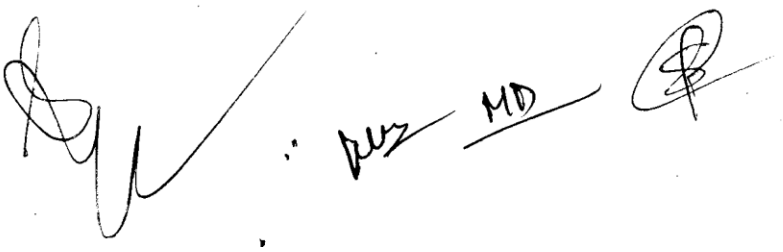
Suggested Readings

Textbooks:

- D. Ravichandran, programming New Age International, 1996.
- E. Balaguruswamy, Tata McGraw Hill Pub.

Reference Books:

- Y.Kanitkar, Let us C. BPB Publication, 4th Ed. 2002.
- Rajiv Dharaskar, Hidden Treasure of C, BPB Publication, 1995.



• Shridhar B. Dandin, Programming – Pragya Publication (Hindi Medium)
Suggestive digital platform web links
https://www.cprogramming.com/ https://www.linuxtopia.org/online_books/programming_books/gnu_c_programming_tutorial/index.html https://www.codewithharry.com/videos/c-tutorial-in-hindi-with-notes
Suggested equivalent online courses
https://nptel.ac.in/courses/106/105/106105171/
PART D: Assessment and Evaluation
Internal Assessment: Continuous Comprehensive Evaluation (CCE): **40 Marks** Shall be based on allotted assignments and Class Tests based on the Course outcomes.

Attainment Expressions	PO Mapping	PSO mapping	Cognitive level
Identifying basic problem of real world with abstract requirement (CO1, CO2)	PO1, PO2	PSO4	R, U
Applying algorithm, flowchart and pseudocode on basic real-world problems (CO3)	PO3	PSO5	AP
Applying input output operations and basic programming constructs on basic real problems (CO4, CO5)	PO1, PO2	PSO4, PSO6	AP
Writing basic programs for enhancing programming skills (CO6, C07)	PO1, PO2, PO3	PSO9	AN, C

External Assessment: 60 Marks Time: **03.00 Hours**

Section	Mark x No. of Questions
A: Very Short Questions	1 x 5
B: Short Questions	4 x 5
C: Long Questions	7 x 5

PART A:			
Program: **Certificate**	Class: **BCA**	Semester Ist	SESSION 2023-24
Subject: **Computer**			

1.	Course Code		
2.	Course Title	**C Programming Lab**	
3.	Course Type (Core	**Lab**	
4.	Pre-Requisite (if any)	**10+2 Maths (opted as an elective by the students of Computer Application)**	
5.	Course Learning Outcomes (CLO)	**After the completion of this course, a student shall be able to:** • Basic Concepts of programming • Build Logic • Knowledge of problem solving skills	
	Credit Value	**2 Credits**	
	Total Marks	Max. Marks : **40+60**	Min. Passing Marks: **35**

PART B: Content of the Course

No. of Lab. Practicals (in hours per week): 1 **Lab. per week (1 hr 25 mins)**

Total No. of Lab.: **30 Hrs.**

SNo	**Suggestive List of Practical**	**No. of Labs**
1	Basic C commands on computer	**30**
2	Write a program to check given year is leap or not	
3	Write a program to find maximum from given three number without using	
4	Write a program to find area of a circle, rectangle, and square using switch-	
5	Write a program whether a given number is prime or not.	
6	Write a program to input 10 numbers add it and find its average.	
7	Write a program to generate even/odd series from 1 to 100.	
8	Write a program to create a pyramid structure	
9	Write a program to reverse a string.	
10	Write a program to find whether a given string is PALINDROME or not.	
11	Write a program to change the case of string.	
12	WAP to print Fibonacci series	
13	Write a program to generate a series 1+1/1!+2/2!+3/3!+---------- +n/n!	
14	Write a program to generate series 1+1/2!+1/3!+---------- +1/n!	
15	WAP to find length of string without using built in function.	
16	Write a program for call by value and call by reference.	
17	Write a recursive program to calculate factorial of a given number.	
18	Write a program to print sum of two matrices.	
19	Write a program to demonstrate different storage	
20	Write a program to demonstrate concept of command line argument.	
21	Write a program to demonstrate concept of structure.	
22	Write a program to draw Line, Circle, Rectangle by using built in function.	
23	Write a program to check given year is leap or not	

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

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Textbooks:
• D. Ravichandran, programming New Age International, 1996. • E. Balaguruswamy, Tata McGraw Hill Pub. • Computer Fundamentals and Programming in C by R.Thareja.
Suggestive digital platform web links
https://codeforwin.org/ http://learn-c.org/
Suggested equivalent online courses
https://nptel.ac.in/courses/106/105/106105171/ https://www.youtube.com/watch?v=OHCMfsNpqCc

PART D: Assessment and Evaluation			
Internal Assessment : Continuous Comprehensive Evaluation (CCE) : 40 **Marks**		**External Assessment**: University Exam (UE) : **60 Marks** Time : **02.00 Hours**	
Internal Assessment	**Marks**	**External Assessment**	**Marks**
Lab Attendance	10 Marks	Practical record file	25 Marks
		Viva voce practical	10 Marks
Internal Viva	10 Marks	Execution	5 Marks
Practical File	20 Marks	Answer script	20 Marks
Total	**40 Marks**	**Total**	**60 Marks**

ST. ALOYSIUS' COLLEGE(AUTONOMOUS) JABALPUR				
PART A: Introduction				
Program: Certificate		Class: B.C.A.	Year: I Semester	Session: 2022-23
Subject: Computer Application				
1.	Course Code	S1-COSC1G		
2.	Course Title	**Data Analysis & Visualization through spreadsheet**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Elective**		
4.	Pre-Requisite (if any)	To study this course. a student must have prior basic Knowledge of using computer and internet, This course is open for all.		
5.	Course Learning Outcomes (CLO)	**On completion of this course, learners will be able to:** 1. Prepare a spreadsheet file and enter data into the sheet 2. Illustrate formatting and editing capabilities on the data 3. Demonstrate basic calculations and save data 4. Demonstrate basic visualizing, analyzing, organizing and sharing techniques		
6.	Credit Value	**Theory** — 2 **Credits**		
7.	Total Marks	Max. Marks; 40+60	Min. Passing Marks: 35	

PART B: Content of the Course		
No. of Lectures (in hours per week): 1 **Lecture per week**		
Total No. of Lectures: **30 Hrs.**		
Module	**Topic**	No. of Lectures
I	**Introduction to Spreadsheet:** What is Spreadsheet, User interface, **Basics of Spreadsheet:** *Overview* of spreadsheet. opening new file and saving spreadsheet (through menu and keyboard shortcut). rows, columns, cells, workbooks and worksheets, merging cells; Selecting rows and columns. Non-contiguous cells: How to enter data (numeric. text. date). Working with multiple sheets, inserting and deleting sheets. Renaming sheets. **Number formatting** - Introduction. General and text. Number and fraction. Currency. Accounting. Percentage. Date. Time. Inserting and deleting rows, columns and cells. **Formatting cells** - Introduction. Bold. Italics and Underline. Border, Fill and Font. Alignment. Format painter and clear format. Editing the cell content. Entering multiple lines of text using ALT+Enter, auto fill, copy and paste, cut and paste, auto fill series, use of fill handle through mouse.	6
II	**Printing worksheet:** Select print area. see print preview, adjusting margin During print preview. **Page Formatting:** ***Page*** layout—Orientation. Size. Margins; watermark, page color, page borders; inserting headers and footer, inserting page numbers, date, path and filename. **Viewing:** split windows, layout view (normal. page break and Print). **Protecting/Securing using file properties:** Protect Workbook. Protect Sheet. Lock Cells. Read-only Workbook. **Saving a File and use of Template.**	6

	Calculations: Entering formula, editing formula, copying formula. Cell references (absolute, relative and mixed), paste formula (using keyboard shortcut and fill handle). **Data Validation:** Reject Invalid Dates. Budget Limit; Prevent Duplicate Entries, Product Codes. Drop-down List, Dependent Drop-down Lists.	
III	**Introduction to Functions:** What is function, entering functions, types of Functions. **Count and Sum**: Countif, Count, Count Characters. Not Equal To, Sum, Total, Sumif, Sumproduct. **Date & Time:** DateDif, Today's Date. Date and Time Formats, Calculate Age. Time Difference. Weekdays, Days until Birthday, Last Day of the Month, Add or Subtract Time, Quarter. Day of the Year **Text:** Separate Strings. Count Words. Text to Columns, Find. Search. Change Case. Remove Spaces. Compare Text. Substitute vs Replace. Text. Concatenate. Substring. **Statistical:** Average, Negative Numbers to Zero. Random Numbers. Rank, Percentiles and Quartiles, Box and Whisker Plot. Averageif, Forecast. MaxIfs and MinIfs, Weighted Average, mode, Standard Deviation, Frequency.	6
IV	**Data Visualization:** Introduction to charts. various type of charts (Column, Bar. Pie. Area, XY Scatter. Bubble. Net. Stock. Column & Line); 3-D Shape (Bar, Cylinder, Cone. Pyramid), Chart elements (Title. Subtitle. X-axis. Y-axis, Z-axis. Display grids, Legends, Display data series); Creating a Chart: Selecting data series, select chart components – labels, background, axis, format and design. **Conditional Formatting:** Manage Rules. Formula based. Data Bars. Colour Scales. Icon Sets, Find Duplicates. Shade Alternate Row s. Compare Two Lists. Conflicting Rules. Heat Map. **Data Analysis:** Sort and Filter **Pivot Tables:** Creating pivot table. Group pivot table items, pivot table summarization. Multi-level pivot table, Frequency distribution, pivot chart. Slicers, update pivot table, calculated field/item, GetPivotData, **If analysis**.	6
Keywords/Tags: Excel, Calc. Formatting. Protecting range, sheet, Functions. Sort, Filter. Freeze. Pivot. Analysis, Visualization. Charts.		

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings :

- Jacek Artymiak. Beginning OpenOffice Cale: Prom Setting Up Simple Spreadsheets to Business Forecasting, 2011, Apress. ISBN: 9781430231592
- Jacek Artymiak. OpenOffice.org Cale Functions and Formulas Tips. Essential OpenOffice.org Cale Skills. 1st ed., 2011
- Michael Alexander. Richard Kusleika. John Walkenbach.: Microsoft Excel 2019 Bible: The Comprehensive Tutorial Resource; John Wiley & Sons Inc.
- Walkenbach J.: Microsoft Excel 2016 Bible: The Comprehensive Tutorial Resource; Wiley.
- Fischer W., Excel: Quick Start Guide from Beginner to Expert (Excel, Microsoft Office); CreateSpace Independent Publishing Platform.
- Harvey G., Excel 2016 for Dummies (Excel for Dummies): John Wiley & Sons.
- Kalmstrom P.: Excel 2016 from Scratch: Excel course with demos and exercises; CreateSpace Independent Publishing Platform.
- Walkenbach J.: Excel Charts: John Wiley & Sons

Suggestive digital platform web links

https://wiki.documentfoundation.org/images/c/c2/CG62-CalcGuide.pdf
http://www.ogenoffice.org/documentation/manuals/userguide3/0309CG3-DataAnalysis.pdf
https://wiki.documentfoundation.org/images/c/c2/CG62-CalcGuide.pdf
https://documentation.libreoffice.org/assets/Uploads/Documentation/en/CG4.1/PDF/CG4109-DataAnalysis.pdf
https://help.libreoffice.org/6.1/en-US/text/scalc/01/statistics.html?DbPAR=CALC
https://www.vfu.bg/en/e-Learning/MS-Office--excel.pdf
https://guides.library.duke.edu/excel/visualization

Suggested equivalent online courses

https://www.classcentral.com/course/edx-analyzing-and-visualizing-data-with-excel-4480\

PART A: Introduction

Program: **Certificate**	Class: B.C.A.	Year: I Semester	SESSION 2023-24
Subject: **Computer Application**			

1.	Course Code	SI-COSC IR	
2.	Course Title	**Data Analysis & Visualization Lab**	
	Course Type (Core Course/Elective/Generic Elective/ Vocational	Elective	
4.	Pre-Requisite (if any)	To study this course. a student must have prior basic knowledge of Using computer and internet. This course is open for all.	
5.	Course Learning Outcomes (CLO)	**On completion of this course, learners will be able to:** 1. Prepare a spreadsheet file and enter data into the sheet 2. Illustrate formatting and editing capabilities on the data 3. Demonstrate basic calculations and save data 4. Demonstrate basic visualizing, analyzing, organizingand sharing techniques	
6	Credit Value	**Practical** - 2 **Credits**	
7.	Total Marks	Max. Marks: **40+60**	Min. Passing Marks: 35

PART B: Content of the Course

No. of Lab. Practical's (in hours per week): 2 Hrs. per week

Total No. of Lab. 16 hrs.

	Suggestive List of Practicals	No. of Labs.
	Note: In the first day of the lab instructor must make the students get familiar with the interface of the Calc/Excel along with the movement of cursor, rows, columns, cells, cell number identification, formula bar, use of fill handle (drag as well double click), setting width of columns and height of rows. Selecting rows and columns. Students must entry some data and practice above. **1. Simple data entry in a workbook and Perform the following operations as given below.** i. Inserting column and rows and deleting columns and rows. ii. Selecting range of columns and rows. iii. Change the width of column and height of rows by usingmenu. iv. Hiding and unhide the rows and columns. v. Entering multiple lines of text. vi. Rename the worksheet as BCA 1st semester" and Save the workbook as "Practical 1". **2. Cell formatting , Auto Fill Series and Advance Fill** i. Enter random data and perform a cell formatting operation. ii. Filling a series with formatting (rollno as 1 to 20). iii. Filling a series without formatting (rollno as 21 to 40). iv. Fill days. v. Filling a weekdays. vi. Perform an advance fill operation.	8

3. Create your mark sheet (as format given) and perform the following operations.

i. Merge and center operation.
ii. Cell formatting
iii. Use Sum, percentage and nested if function for calculations.

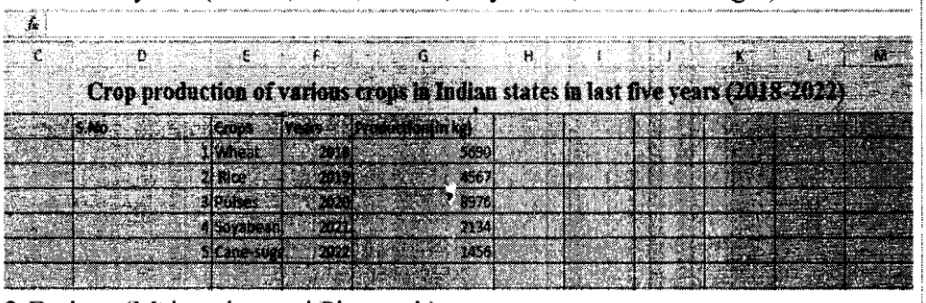
4. Working with formulas.

i. Find the number of students having percentage more than 60%. Max
ii. Find the number of students having percentage less than 45% Min
iii. Text
iv. Date and Time

5. Experiment related to the data validation (Use of drop-down list).

6. Experiment related to the data visualization.

Create worksheet related to crop production of various crops in Indian states in last five years (Wheat, Rice, Pulses, Soyabean, and Cane-sugar).



Crop production of various crops in Indian states in last five years (2018-2022)

S.No	Crops	Year	Production (in kg)
1	Wheat	2018	5690
2	Rice	2019	4567
3	Pulses	2020	8976
4	Soyabean	2021	2134
5	Cane-sugar	2022	1456

i. 2-D chart (Make a bar and Pie graph)
ii. 3-D chart (Make a cone and pyramid graph)

7. Use of conditional formatting.

8. Data analysis using Sort and Filters.

Create a random 5 students mark sheet and perform the following operations.

i. Find the name of the student got highest marks.
ii. Find the name of the student who got highest marks in both Theory and practical in subject.
iii. Sort the data on percentage and show only the top 3 highest rank students.

9. Data analysis using Pivot tables.

10. Data analysis and forecasting using what-if-analysis.

PART D: Assessment and Evaluation			
Internal Assessment : Continuous Comprehensive Evaluation (CCE) : 40 **Marks**		**External Assessment**: University Exam (UE) : **60 Marks** Time : **02.00 Hours**	
Internal Assessment	**Marks**	**External Assessment**	**Marks**
Lab Attendance	10 Marks	Practical record file	25 Marks
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Total	**40 Marks**	**Total**	**60 Marks**

MD

St. Aloysius College (Autonomous), Jabalpur, Madhya Pradesh

PART A: Introduction				
Program: **Certificate**		Class: **BCA**	Semester: I	SESSION 2023-24
1.	Course Code	**S1-BCA1G**		
2.	Course Title	**Computational Mathematics**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Elective**		
4.	Pre-Requisite (if any)	Students must have basic analytical aptitude.		
5.	Course Outcomes (CO)	**On successful completion of the course the students shall be able to:** 1. Implement trigonometric solutions for measurements in real world scenarios. 2. Implement simultaneous & quadratic equations to solve complex problems 3. Use Mathematical Logic and Predicate calculus for solving problems 4. Apply the concepts of set theory for finding solutions to set related problems		
6.	Credit Value	**Theory - 4 Credits**		
7.	Total Marks	Max. Marks: **40+60**	**Min. Passing Marks: 35**	

PART B: Content of the Course

No. of Lectures (in hours per week): **4 lectures Per week**

Total No. of Lectures: **60 Hrs.**

Unit	Topics	No. of Lectures
I	**Trigonometry:** Values of Trigonometric Ratios, Height and Distances. **Elementary Matrices:** Definition of types of matrices.	20
II	**Equations:** Simultaneous Linear equations, Methods of solving Simultaneous Equations, Quadratic equations.	10
III	**Mathematical Logic:** Statements, Connectives: Negation, Conjunction, Disjunction, Truth Tables, Tautologies, Tautological implications, contradiction.	15
IV	**Set Theory:** Definition of a set, notations, subset, equal set, types of sets, and operations on set- Venn Diagrams.	15

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Text Books:

1. Plane Trigonometry Part I S. L. Loney, Arihant Prakashan
2. Textbook of Matrix Algebra S. Biswas, Prentice Hall India Learning Private Limited

3. Business Mathematics S.M. Shukla, Sahitya Bhawan Publications.
4. Business Mathematics D C Agrawal, Sree Sai Prakashan.
3. S. K. Sarkar: A Text Book of Discrete Mathematics, S Chand, 2005.
4. A text book of Discrete Mathematics,9/E, Sarkar S. K. Chand New Delhi,2016
5. मध्य प्रदेश हिन्दी ग्रंथ अकादमी से प्रकाशित विषय से संबंधित पुस्तकें।

Reference Books:

1. Business Mathematics, J. K. Singh, Himalaya Publishing House, 2017
2. Business Mathematics, 9/E, Sancheti and Kapoor, Sultan Chand & Sons ,2014
3. Discrete Mathematical, 2/E, J.K. Sharma, Macmillan Publication, 2005

Suggestive digital platform web links

https://freevideolectures.com/university/iit-roorkee/
https://www.highereducation.mp.gov.in/?page=xhzIQmpZwkylQo2b%2Fy5G7w%3D%3D
https://epathshala.ncert.org.in/

Suggested equivalent online courses

S. No.	Course Title	Duration	Provider
1	Algebra and Trigonometry	15 weeks	Swayam
2	Mathematics	8 weeks	Mitopen Courseware

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.

PART D: Assessment and Evaluation

Internal Assessment: Continuous Comprehensive Evaluation (CCE): **40 Marks**
Shall be based on allotted assignments and Class Tests based on the Course outcomes.

Attainment Expressions	PO Mapping	PSO Mapping	Cognitive level
Understanding mathematical concepts and deriving solutions (CO1, CO2, CO3, CO4)	PO1, PO2	PSO1	U, AN, AP
Identifying and analyzing real world problems and applying necessary mathematical concepts for providing a solution. (CO1, CO2, CO4)	PO3, PO4	PSO1, PSO2	AP, C

External Assessment: 60 Marks	**Time:** 03.00 Hours
Section	**Marks x No. of Questions**
A: Very Short Questions	1 x 5 = 05
B: Short Questions	4 x 5 = 20
C: Long Questions	7 x 5 = 35

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ST. ALOYSIUS' COLLEGE(AUTONOMOUS) JABALPUR			
PART A: Introduction			
Program: **Certificate**	Class: **B.C.A.**	Year: **I (sem 2)**	SESSION 2023-24
Subject: **Computer Applications**			

1.	Course Code	
2.	Course Title	**Programming using C++ and Data Structure**
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Major**
4.	Pre-Requisite (if any)	To study this course, a student must have basic knowledge of Computers.
5.	Course Learning Outcomes(CLO)	**After the completion of this course, a successful student will be able to do the following**: 1. Develop simple algorithms and flow charts to solve a problem with programming using top down design principles. 2. Writing efficient and well-structured computer algorithms/programs. 3. Learn to formulate iterative solutions and array processing algorithms for problems. 4. Use recursive techniques, pointers and searching methods in programming. 5. Will be familiar with fundamental data structures, their implementation; become accustomed to the description of algorithms in both functional and procedural styles. 6. Have knowledge of complexity of basic operations like insert, delete, search on these data structures. 7. Possess ability to choose a data structure to suitably model any data used in computer applications. 8. Design programs using various data structures including hash tables, Binary and general search trees, heaps, graphs etc. 9. Assess efficiency tradeoffs among different data structure implementations. 10. Implement and know the applications of algorithms for searching and sorting.
6.	Credit Value	**Theory – 4 Credits Practical – 2 Credits**
7.	Total Marks	Max. Marks : 40+**60** / Min. Passing Marks: **35**

PART B: Content of the Course

No. of Lectures (in hours per week): **4 Hrs. per week**

Total No. of Lectures: **60.**

Module	Topics	No. of Lectures
I	**Basics of OOPs:** Features and Characteristics of OOPs, History of C++, Application of C++, Data Types, Operator in C++, C++ Stream Classes, Unformatted and Formatted I/O Operation, Managing Output with Manipulators, Scope Resolution Operator	12
II	**Functions In C++:** The Main Function, Function Prototyping, Call by Reference Call by Address, Call by Value, Return by Reference, Inline Function, Default Arguments, Constant Arguments, Function Overloading, **Classes & Objects:** A Sample C++ Program with class, Defining	12

	Member Functions (Private & Public), Static Data Members, Static Member, Functions, Array of Objects, Object as Function Arguments, Friend Functions.	
III	**Arrays:** Representation of single, two-dimensional arrays **Constructor & Destructor:** Constructor, Constructors with Default Arguments, Parameterized Constructor, Copy Constructor, Multiple Constructors in a Class, Destructor. **Searching**(linear & binary) and **sorting** (bubble sort, selection sort & insertion sorting)	12
IV	**Inheritance:** Defining Derived Classes, Single Inheritance, Making a Private Member Inheritable, Multilevel Inheritance, Hierarchical Inheritance, Multiple Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes, Operator Overloading. **Polymorphism:** Virtual functions. **Pointers, Exception Handling**	12
V	**Data Structure:** Basic concepts, Linear and Non-Linear data structures **Stacks:** Operations, Array and Linked Implementations, Applications- Infix to Postfix Conversion, Infix to Prefix Conversion, Postfix Expression Evaluation. **Queues:** Definition, Operations, Array and Linked Implementations. Circular Queue-Insertion and Deletion Operations, Dequeue (Double Ended Queue), Priority Queue- Implementation. **Linked Lists:** Singly Linked Lists, Operations, Circularly linked lists-Operations Doubly Linked Lists- Operations, Doubly Circular Linked List.	12

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Textbooks:

- J. R. Hanly and E. B. Koffman, "Problem Solving and Program Design in C", Pearson, 2015
- E. Balguruswamy, "C++ ", TMH Publication ISBN O-07-462038-X
- Herbert Shildt, "C++ The Complete Reference "TMH Publication ISBN 0-07-463880-7

Reference Books:

- R. Lafore, 'Object Oriented Programming C++"
- N. Dale and C. Weems, "Programming and problem solving with C++: brief edition", Jones & Bartlett Learning.
- Adam Drozdek, "Data Structures and algorithm in C++", Third Edition, Cengage Learning.
- Sartaj Sahani, "Data Structures, Algorithms and Applications with C++", McGraw Hill.
- Robert L. Kruse, "Data Structures and Program Design in C++", Pearson.
- D.S. Malik, "Data Structure using C++", Second edition, Cengage Learning.
- M. A. Weiss, "Data structures and Algorithm Analysis in C", 2nd edition, Pearson.
- Lipschutz, "Schaum's outline series Data structures", Tata McGraw-Hill

Suggestive digital platform web links

https://www.youtube.com/watch?v=BCIS40yzssA
https://www.youtube.com/watch?v=vLnPwxZdW4Y&vl=en
https://www.youtube.com/watch?v=Umm1ZQ5ltZw

Suggested equivalent online courses

S.No.	Online Course	Duration	Platform
1	Programming in C++ https://nptel.ac.in/courses/106/105/106105151/	8 weeks	NPTEL

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2	Beginning C++ Programming - From Beginner to Beyond https://www.udemy.com/course/beginning-c-plus-plus-programming/	Self paced	Udemy

PART D: Assessment and Evaluation

Internal Assessment : Continuous Comprehensive Evaluation (CCE) : 40 **Marks** Three test will be taken of which best of two marks will be considered		**External Assessment**: University Exam (UE) : 60 **Marks** Time : **03.00 Hours**	
Objective type Text I	20 Marks	Section (A) : Very short questions (1 from each unit)	1 x 5 = 5 Marks
Class Test II (Subjective)	20 Marks	Section (B) : 5 Short Questions (200 Words Each)	4 x 5 = 20 Marks
Class Test III (**Subjective**)	20 Marks	Section (C): 5 Long Questions (500 Words Each)	7 x 5 = 35 Marks
Total	**40 Marks**	Total	**60 Marks**

Any remarks/suggestions: **Focus of the course/teaching should be on developing ability of the student in analyzing a problem, building the logic and efficient code for the problem.**

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PART A: Introduction				
Program: **Certificate**		Class: **B.C.A.**	Year: **I (sem 2)**	SESSION 2023-24
Subject: **Computer Application**				
1.	Course Code			
2.	Course Title	**Programming using C++ Lab**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Core Course**		
4.	Pre-Requisite (if any)	To study this course, a student must have basic logical and analytical skills.		
5.	Course Learning Outcomes(CLO)	**After the completion of this course, a successful student will be able to do the following:** 1. Develop simple algorithms and flow charts to solve a problem with programming using top down design principles. 2. Writing efficient and well-structured computer algorithms/programs. 3. Learn to formulate iterative solutions and array processing algorithms for problems. 4. Use recursive techniques, pointers and searching methods in programming. 5. Possess ability to choose a data structure to suitably model any data used in computer applications. 6. Implement and know the applications of algorithms for searching and sorting etc.		
6.	Credit Value	**Practical – 2 Credits**		
7.	Total Marks	Max. Marks : 40+**60**	Min. Passing Marks: **35**	

PART B: Content of the Course		
No. of Lab Practicals (in hours per week): **2 hours per week**		
Total No. of Lab.: **15 (30 hrs)**		
	Suggestive list of Practicals	**No. of Labs.**
	Given the problem statement, students are required to formulate problem, develop flowchart/algorithm, write code in C++, execute and test it. Students should be given assignments on following : 1. Write a program to find area of a circle, rectangle, square using switch case. 2. Write a program to convert decimal (integer) number into equivalent binary number. 3. Write a program to check given string is palindrome or not. 4. Write a program to print digits of entered number in reverse order. 5. Write a program to print sum of two matrices. 6. Write a program whether a given number is prime or not. 7. Write a program to check entered number is Armstrong or not. 8. Write a program to find the area and volume of a rectangular box using constructor. 9. Write a program to implement single inheritance. 10. Write a program to find largest element from an array. 11. Write a program to implement push and pop operations on a stack using array.	15

	12. Write a program to perform insert and delete operations on a queue using array. 13. Write a program for Linear search. 14. Write a program for Binary search. 15. Write a program for Bubble sort. 16. Write a program for Selection sort. 17. Write a program for Insertion sort. 18. Write a program to implement linked list.	

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

- J. R. Hanly and E. B. Koffman, "Problem Solving and Program Design in C", Pearson, 2015
- E. Balguruswamy, "C++ ", TMH Publication ISBN O-07-462038-X
- Herbert Shildt, "C++ The Complete Reference "TMH Publication ISBN 0-07-463880-7

Reference Books:

- R. Lafore, 'Object Oriented Programming C++"
- N. Dale and C. Weems, "Programming and problem solving with C++: brief edition", Jones & Bartlett Learning.
- Adam Drozdek, "Data Structures and algorithm in C++", Third Edition, Cengage Learning.
- Sartaj Sahani, "Data Structures, Algorithms and Applications with C++", McGraw Hill.
- Robert L. Kruse, "Data Structures and Program Design in C++", Pearson.
- D.S. Malik, "Data Structure using C++", Second edition, Cengage Learning.
- M. A. Weiss, "Data structures and Algorithm Analysis in C", 2nd edition, Pearson.
- Lipschutz, "Schaum's outline series Data structures", Tata McGraw-Hill

Suggestive digital platform web links

https://www.youtube.com/watch?v=BCIS40yzssA
https://www.youtube.com/watch?v=vLnPwxZdW4Y&vl=en
https://www.youtube.com/watch?v=Umm1ZQ5ltZw

Suggested equivalent online courses

S.No.	Online Course	Duration	Platform
1	Programming in C++ https://nptel.ac.in/courses/106/105/106105151/	8 weeks	NPTEL
2	Beginning C++ Programming - From Beginner to Beyond https://www.udemy.com/course/beginning-c-plus-plus-programming/	Self paced	Udemy

PART D: Assessment and Evaluation

Internal Assessment : Continuous Comprehensive Evaluation (CCE) : 40 **Marks**

External Assessment: University Exam (UE) : **60 Marks**
Time : **02.00 Hours**

Internal Assessment	**Marks**	**External Assessment**	**Marks**
Lab Attendance	10 Marks	Practical record file	25 Marks
		Viva voce practical	10 Marks
Internal Viva	10 Marks	Execution	5 Marks
Practical File	20 Marks	Answer script	20 Marks
Total	**40 Marks**	**Total**	**60 Marks**

ST. ALOYSIUS COLLEGE (AUTONOMOUS) JABALPUR M.P.

PART A: Introduction			
Program: **Certificate**	Class: **B.C.A**	Semester: II	SESSION 2023-24
Subject- Computer Application			
1.	Course Code	S1-BCAB2T	
2.	Course Title	**Operating System**	
3.	Course Type (Core Course/Elective/Generic Elective/Vocational	**Minor**	
4.	Pre-Requisite (if any)		
5.	Course Learning Outcomes	**After the completion of this course, a student shall be able to do the following:** 1. Describe the importance of computer system resources and the role of operating system in their management policies and algorithms. 2. Specify objective of modern operating system and describe how operating systems and describe how operating systems have evolved over time. 3. Understand various process management concept and can compare various scheduling techniques, synchronization, ad deadlocks. 4. Describe the concepts of multithreading and memory management techniques. 5. Identify the best suited memory management techniques for any process. 6. Describe various file operations, file allocation methods and disk space management. 7. To understand and identify potential threats to operating systems and the security features design to guard against them. 8. Learn to operate the Linux system.	
6.	Credit Value	Theory – 4 Credits	
7.	Total Marks	Max.MARKS:30+70	Min. Passing Marks:33

PART B: Content of the Course		
No. of Lectures (in hours per week): **2hr Lecture per week**		
Total No. of Lectures: **60 Hrs**		
Module	**Topics**	**No. of Lectures**
I	**Introduction to Operating System**: What is Operating System? History and Evolution of OS, Basic OS functions, Resource Abstraction, Types of Operating Systems- Multiprogramming Systems, Time Sharing system, Distributed Operating System, Real time system, Operating System for Personal Computers, Workstation and Hand-held Devices,	10

	Application of various Operating System in real life. Some prevalent operating system – Windows, UNIX/Linux, Android, MacOS, Blackberry OS, Symbian, Bada etc.	
II	**Process Management**: Process Concepts, Process state & Process Control Block. **Process Scheduling**: Scheduling Criteria, Scheduling Algorithms (Preemptive & Non- Preemptive) – FCFS, SJF, SRTN, RR, Priority, Multiple-Processor, Real –Time, Multilevel Queue and Multilevel Feedback Queue Scheduling. **Deadlock** – Definition Characterization, Necessary and Sufficient Conditions for Deadlock. **Deadlock Handling Approaches**: Prevention, Avoidance, Detection and Recovery.	
III	**Memory Management**: Introduction, Address Binding, Logical versus Physical Address Space, Swapping, Contiguous & Non-Contiguous Allocation, Fragmentation (Internal & External), Compaction, Paging, Segmentation, Virtual Memory, Demand Paging, Performance of Demand Paging, Page Replacement Algorithms. **File Management**: Concept of File System (File Attributions, Operations, Types), Functions of File System, Types of File System, Access Methods (Sequential, Direct & other methods), Directory Structure (Single-Level, Two-Level, Tree-Structured, Acyclic-Graph, General Graph). Allocation Methods (Contiguous, Linked, Indexed)	12
IV	**Disk Management**: Structure, Disk Scheduling Algorithms (FCFS, SSTF, SCAN, C-SCAN, LOOK), Swap Space Management, Disk Reliability, Recovery. **Security**: Security Threats, Security policy mechanism, Protection, Trusted Systems, Authentication and Internal Access Authorization, Windows Security.	12
V	LINUX: Introduction, History and features of Linux, advantages, hardware requirements for installation, Linux architecture, file system of Linux – boot block, super block, inode table, data blocks. Linux standard directories, Linux kernel, Partitioning the hard drive for Linux, installing the Linux system, system – startup and shut-down process, init and run levels. Process, Swap, Paritition, fdisk, checking disk free spaces. Difference between CLI OS & GUI OS, Window v/s Linux, Importance of Linux Kernel, Files and Directories, Concept of Open Source Software.	12

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PART C : Learning Resources
Textbooks, Reference Books, Other Resources
Suggested Reading
Textbooks: • A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition John Willey Publications. • A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education. • Operating System by Peterson • Linux by Sumitabh Das. • Related books from MP Hindi Granth Akadami Publications.
Reference Book: • G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education. • W. Stallings, Operating Systems, Internals & Design Principles, 8th Edition, Pearson Education. • M. Milenkovic, Operating Systems- Concepts and design ,Tata McGraw Hill. • Operating System design and Concepts by Milan Milenkovie.
Suggestive digital platform web links
https://web.iitd.ac.in/-minati/MTL458.html https://www.cse.iitb.ac.in/-mythili/os/ https://www.youtube.com/watch?v=aCJ3YgoolHQ
Suggested Equivalent online courses
https://nptel.ac.in/courses/106/102/106102132

PART A: Introduction			
Program: **Degree**	Class: **B.C.A.**	Year: **I Year**	SESSION 2023-24
Subject- Computer Application			
1.	Course Code	S1-BCAB2P	
2.	Course Title	**Operating System Lab**	
3.	Course Type (Core Course/ Elective/Generic Elective/Vocational	**Minor**	
4.	Pre-Requisite (if any)	This course can be opted as an elective by the students of Computer Science.	
5.	Course Learning Outcomes (CLO)	**After the completion of this course, a student shall be able to:** • Operating Linux system • Understanding system administration using Vi editor	
6.	Credit Value	**Practical – 2 Credits**	
7.	Total Marks	Max. Marks:**30+70**	Min. Passing Marks:**33**

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PART B: Content of the Course		
No. of Lab. Practicals (in hours per week): 1 Hr **Lab. Per week**		
Total No. of Lab: **30 Hrs.**		
	Suggestive List od Practicals	No. of Labs
	Linux: 1. **Linux Directory Commands** : pwd ,mkdir ,rm – rf, ls, cd, cd/, cd ~ 2. **Linux File Commands**: touch, cat, cat>, cat>>, rm, cp, mv, rename 3. **Linux Permission Commands**: su, id, useradd, passwd, groupadd, chmod, groupdel, chown, chgrp 4. **Linux File Content & Filter Commands**: head, tail, tac, more, less, grep, cat, cut, grep, comm, sed, tee, tr, uniq, wc, od, sort, diff. 5. **Linux Utility Commands**: find, bc, locate, date, cal, sleep, time, df, mount, exit, clear, gzip, gunzip. 6. **Linux Networking Commands**: ip, ssh, mail, ping, host 7. **Edit Crontab file**: To wall message on system on particular time automatically. 8. **Vi editor**: Create file, edit, save and quit. Highlighting the searched term within a file, cut, yank, undo.	30

PART C : Learning Resources
Textbooks, Reference, Books, Other Resources
Suggested Reading
Textbooks: • Linux by Sumitabh Das • Linux Bible • Topic Related books from MP Hindi GranthAkandami Publication
Suggestive digital platform web links
https://web.iitd.ac.in/-minati/MTL458.html https://www.cse.iitb.ac.in/-mythili/os/ https://www.youtube.com/watch?v=aCJ3YgoolHQ
https://nptel.ac.in/courses/106/102/106102132

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PART D: Assessment and Evaluation			
Internal Assessment : Continuous Comprehensive Evaluation (CCE) : 40 **Marks**		**External Assessment**: University Exam (UE) : **60 Marks**	
Internal Assessment	**Marks**	**External Assessment**	**Marks**
Lab Attendance	10 Marks	Practical record file	25 Marks
		Viva voce practical	10 Marks
Internal Viva	10 Marks	Execution	5 Marks
Practical File	20 Marks	Answer script	20 Marks
Total	**40 Marks**	**Total**	**60 Marks**

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ST. ALOYSIUS' COLLEGE(AUTONOMOUS) JABALPUR			
PART A: Introduction			
Program: Certificate	Class: B.C.A.	Year: II Semester	SESSION 2023-24
Subject: Computer Science			

1.	Course Code	S1-COSC1G	
2.	Course Title	**Multimedia & Animation**	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Elective**	
4.	Pre-Requisite (if any)	To study this course. a student must have prior basic Knowledge of using computer and internet. This course is open for all.	
5.	Course Learning Outcomes (CLO)	**On completion of this course, learners will be able to:** 1. Describe the various elements and aspects of multimedia and animation. 2. Understand the role played by various multimedia platforms. 3. Learn to add pictures, graphics, sound and animation to prepare a project. 4. Learn the presentation skills and ideas with creativity by using multimedia tools. 5. Apply tools and techniques to create basic 2D and 3D animation.	
6.	Credit Value	**Theory — 2 Credits**	
7.	Total Marks	Max. Marks: 40+60	Min. Passing Marks: 35

PART B: Content of the Course

No. of Lectures (in hours per week): 1 **Lecture per week**

Total No. of Lectures: **30 Hrs.**

Module	Topic	No. of Lectures
i	**Introduction to Multimedia:** What is multimedia, Multimedia and Hypermedia, Components of multimedia -textual, images, graphics, animation, audio and video, Linear and Non-Linear Multimedia, Application of Multimedia, Requirement of Multimedia System **Multimedia Authoring Tools**: Multimedia Authoring, Multimedia Production, Multimedia Presentation and tools, Editing and Authoring tools, Multimedia Hardware, Compression & Decompression.	6
II	**Fonts and Hypertext:** Usage of text in Multimedia, Families and faces of fonts, outline fonts, bitmap fonts, International character sets and hypertext, Digital font's techniques. **Image fundamentals:** Image formats, Bitmap and Vector, Color Models, Color palettes, 20 Graphics, Image Compression and File Formats: GIF, JPEG, JPEG 2000, PNG, TIFF, EXIF, PS, PDF. Basic Image Processing, Use of image editing software, Photo Retouching, Image resolution, Colour, Raster and Vector Graphics.	6

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III	**Corel Draw**- Drawing-lines, shapes, inserting pictures, objects, tables, templates, Use of various tools such as Pick tools, Zoom tools, Free hand tool, square tool, rectangle tool, Text tool, Fill tool etc. Working of Menu bar options. Design Principles & Color Harmony Introduction to colors -Primary and Secondary in both RGB & CMYK schemes/modes.	6
IV	**Photoshop**- Introduction of Photoshop, Anatomy of Photoshop, Concept of White, Background and Layer, Basic operations on image-Altering Size, Working of tools, Changing of mode of an image, Save Selection, Effects on image by Adjustment, Flatten image, preparation of image, Effect of filter on image, Animation using Image Ready	6
Keywords/Tags: Multimedia, Hardware, Software, Images, GIF, JPEG, JPEG 2000, PNG, TIFF, EXIF, PS, PDF, Video, Compression, Animation, 2D, 3D		

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings :

- Tay Vaughan, "Multimedia Making It Works", Tata McGraw-Hill.
- Ze-Nian Li and Mark S. Drew "Fundamentals of Multimedia" Pearson Education International.
- Rajneesh Aggarwal & B. B Tiwari, "Multimedia Systems", Excel Publication, New Delhi
- Li & Drew, "Fundamentals of Multimedia", Pearson Education.
- Parekh Ranjan, "Principles of Multimedia", Tata McGraw-Hill.
- M.Mahalakshmi, "Multimedia", Margham Publications.
- Pakhira, Malay K. "Computer Graphics, Multimedia and Animation", Prentice Hall India Pvt. Ltd.
- Liz Blazer "Animated Storytelling: Simple Steps for Creating Animation and Motion Graphics."
- Andy Beane "JD Animation Essentials" John Wiley.

Suggestive digital platform web links

https://eggg.inflibnet.ac.in/Home/ViewSubject?catid=7
https://onlinecourses.swayam2.ac.in/cec2

Suggested equivalent online courses

https://www.classcentral.com/course/swayam-animations-13880

PART A: Introduction			
Program: **Certificate**	Class: B.C.A.	Year: II SEMESTER	SESSION 2023-24
Subject: **Computer Science**			
1.	Course Code	SI-COSC IR	
2.	Course Title	**Multimedia & Animation Lab**	
	Course Type (Core Course/Elective/Generic Elective/ Vocational	Elective	
4.	Pre-Requisite (if any)	To study this course. a student must have prior basic knowledge of Using computer and internet. This course is open for all.	
5.	Course Learning Outcomes (CLO)	**On completion of this course, learners will be able to:** 2. Describe the various elements and aspects of multimedia and animation. 3. Understand the role played by various multimedia platforms. 4. Learn to add pictures, graphics, sound and animation to prepare a project. 5. Learn the presentation skills and ideas with creativity by using multimedia tools. 6. Apply tools and techniques to create basic 2D and 3D animation.	
6	Credit Value	**Practical - 2 Credits**	
7.	Total Marks	Max. Marks: **40+60**	Min. Passing Marks: 35

PART B: Content of the Course		
No. of Lab. Practical's (in hours per week): 2 Hrs. per week		
Total No. of Lab. 16 hrs.		
	Suggestive List of Practical's	No. of Labs.
	Note: In the first week of the lab, the instructor must facilitate the students with the basic operation of multimedia tools and software like Coreldraw, Photoshop, Picasa, Sound forge, Waveform Editor, Moviemaker, Dreamweaver, Macromedia Flash, 3D Max, Blender etc. or any other open source suitable multimedia tools. 1. Design an identity card in corel draw. 2. Design a certificate in corel draw. 3. Design a template card in corel draw. 4. Design a logo in corel draw. 5. Design a greeting card in corel draw. 6. Create an identity card in photoshop. 7. Create an ATM card in photoshop. 8. Design a certificate in photoshop. 9. Design an invitation card in photoshop. 10. Create an animated in photoshop.	8

	Keywords/Tags: Multimedia, Hardware, Software, Images, GIF, JPEG, JPEG 2000, PNG, TIFF, EXIF, PS, PDF, Video, Compression, Animation, 2D, 3D.	

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings :

- Tay Vaughan, "Multimedia Making It Works", Tata McGraw-Hill.
- Ze-Nian Li and Mark S. Drew "Fundamentals of Multimedia" Pearson Education International.
- Rajneesh Aggarwal & B. B Tiwari, "Multimedia Systems", Excel Publication, New Delhi
- Li & Drew, "Fundamentals of Multimedia", Pearson Education.
- Parekh Ranjan, "Principles of Multimedia", Tata McGraw-Hill.
- M.Mahalakshmi, "Multimedia", Margham Publications.
- Pakhira, Malay K, "Computer Graphics, Multimedia and Animation", Prentice Hall India Pvt. Ltd.
- Liz Blazer "Animated Storytelling: Simple Steps for Creating Animation and Motion Graphics."
- Andy Beane "JD Animation Essentials" John Wiley.

Suggestive digital platform web links

https://eggg.inflibnet.ac.in/Home/ViewSubject?catid=7
https://onlinecourses.swayam2.ac.in/cec2

Suggested equivalent online courses

https://www.classcentral.com/course/swayam-animations-13880

PART D: Assessment and Evaluation

Internal Assessment : Continuous Comprehensive Evaluation (CCE) : 40 **Marks**		**External Assessment**: University Exam (UE) : **60 Marks** Time : **02.00 Hours**	
Internal Assessment	**Marks**	**External Assessment**	**Marks**
Lab Attendance	10 Marks	Practical record file	25 Marks
		Viva voce practical	10 Marks
Internal Viva	10 Marks	Execution	5 Marks
Practical File	20 Marks	Answer script	20 Marks
Total	**40 Marks**	**Total**	**60 Marks**