DEPARTMENT OF COMPUTER SCIENCE

COURSE CURRICULUM & MARKING SCHEME

BCA – I & II SEMESTER

(BACHELOR OF COMPUTER APPLICATION)

(Based on Choice Based Credit System)

SESSION : 2024-25

ESTD: 1958

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG, 491001 (C.G.)

(Former Name – Govt. Arts & Science College, Durg)

NAAC Accredited Grade A^+, College with CPE - Phase III (UGC), STAR COLLEGE (DBT)

Phone : 0788-2212030

Website - www.govtsciencecollegedurg.ac.in, Email – autonomousdurg2013@gmail.com

CURRICULUM STRUCTURE

Scheme

Program: BCA

Discipline: Computer Application

Semester	Course Type	Course Code	Course Title	Total Credit	Total Marks	
					Max	Min
1st Semester	DSC (Major/Core)	CASC-01	Discrete Mathematics	4	100	40
		CASC-02T	Computer Fundamental and MS-Office	3	100	40
		CASC-02P	**Lab 1:** MS-Office	1	50	20
		CASC-03T	Operating System	3	100	40
		CASC-03P	**Lab 2:** Operating System	1	50	20
2nd Semester	DSC (Major/Core)	CASC-04	Digital Electronics	4	100	40
		CASC-05T	Programming in C++	3	100	40
		CASC-05P	**Lab 3:** Programming in C++	1	50	20
		CASC-06T	Data Structure	3	100	40
		CASC-06P	**Lab 4:** Data Structure Using C++	1	50	20
3rd Semester	DSC (Major/Core)	CASC-07	Software Engineering	4	100	40
		CASC-08T	Relational Database Management System	3	100	40
		CASC-08P	**Lab 5:** Relational Database Management System (Oracle/MySQL)	1	50	20
		CASC-09T	Programming in Java	3	100	40
		CASC-09P	**Lab 6:** Programming in Java	1	50	20
	DSE	CASE-01	Cyber Security and Cyber Law	4	100	40
4th Semester	DSC (Major/Core)	CASC-10	Theory of Computation	4	100	40
		CASC-11T	Web Technology	3	100	40
		CASC-11P	**Lab 7:** Web Technology	1	50	20
		CASC-12T	Python Programming	3	100	40
		CASC-12P	**Lab 8:** Python Programming	1	50	20

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	DSE	CASE-02	Artificial Intelligence and Expert System	4	100	40
5th Semester	DSC (Major/Core)	CASC-13	Data Mining and Data Warehousing	4	100	40
		CASC-14T	Programming in .Net	3	100	40
		CASC-14P	**Lab 9**: Programming in .Net	1	50	20
		CASC-15T	Machine Learning	3	100	40
		CASC-15P	**Lab 10:** Machine Learning	1	50	20
	DSE	CASE-03	Numerical Analysis	4	100	40
6th Semester	DSC (Major/Core)	CASC-16	Data Communication and Computer Networking	4	100	40
		CASC-17T	Advanced Java	3	50	20
		CASC-17P	**Lab 11:** Advanced Java	1	100	40
		CASC-18	Major Project-1	4	50	20
	DSE	CASE-04	Computer System Architecture	4	100	40
7th Semester	DSC (Major/Core)	CASC-19T	Mobile Application Development	3	100	40
		CASC-19P	**Lab 12:** Mobile Application Development	1	50	20
	DSE	CASE-05	Computer Graphics	4	100	40
		CASE-06T	Cloud Computing	3	100	40
		CASE-06P	**Lab 13:** Cloud Computing	1	50	20
		CASE-07	Cryptography and Network Security	4	100	40
		CASE-08	Advanced Operating systems	4	100	40
8th Semester	DSC (Major/Core)	CASC-20T	Fundamentals of IoT and Applications	3	100	40
		CASC-20P	**Lab 14:** Fundamentals of IoT and Applications	1	50	20
	DSE	CASE-09	Soft Computing	4	100	40
		CASE-10	Digital Image Processing	4	100	40
		CASE-11	Big Data Analytics	4	100	40
		CASE-12	Major Project - 2	4	100	40

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(Sushil Kumar Sahu) (Dr. Anamika Shukla Shaw)

(Shailendra Arya) ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Computer Application *(Certificate / Diploma / Degree/Honors)*		Semester – I	Session: 2024-2025
1	Course Code	CASC-01	
2	Course Title	**Discrete Mathematics**	
3	Course Type	**DSC (Discipline Specific Course)**	
4	Prerequisite (if, any)	*As per program*	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Analyze logical propositions via truth tables. • Understand sets and perform operations and algebra on sets • Determine properties of relations, identify equivalence and partial order relations, sketch relations. • Understand the fundamentals of Boolean algebra and its applications in switching circuit designing. • Understand and apply the group theory. • Understand the various graph theoretic concepts and familiarize with their applications.	
6	Credit Value	**4 Credits**	***Credit = 15 Hours - Learning & Observation***
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) – 60 Periods (60 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Sets and Relations, POSET and Lattices:** Definitions, Types of Sets, Operations on Sets, Inclusion and Exclusion Principle, Cartesian Product and properties, Relation, Types of Relation, Equivalence Relation, Partial Order Relation, Function: Injective, Subjective, Bijective Mapping, Properties of partially ordered sets (Poset), Hasse diagrams, Maximal and minimal elements, Join Semilattice, Meet Semilattice, Sub-lattices, Distributive lattices: Complemented Lattice	15
II	**Mathematical Logic, Boolean Algebra and switching circuits:** Propositional Logic, Logical Connector, Boolean algebras, Properties of Boolean Algebra, Conjunctive and Disjunctive Normal forms, Boole's Expansion Theorem, Boolean polynomials, Minimal forms of Boolean polynomials, Quine–McCluskey method, Karnaugh diagrams, Switching Circuits and their Applications.	15
III	**Group Theory:** Definition and Properties: Semi group, Monoid, Group, Sub-Group, Abelian Group, Finite and Infinite Group, Product and Quotient of Algebraic Structure, lag ranges theorem, Rings, Integral Domain, Field, Applications of Group theory.	15
IV	**Graphs:** Definition, examples and basic properties of graphs, Königsberg seven bridge problem; Subgraphs, Pseudographs, Complete graphs, Planarity Graph, Cyclic, Chromatic Number, Handshaking Theorem, Bipartite graphs, Isomorphism of graphs, Paths and circuits, Eulerian circuits, Hamiltonian cycles, Adjacency matrix, Weighted graph, Travelling salesman problem, shortest path and Dijkstra's algorithm.	15
Keywords	*Set, Lattices, Switching Circuit, Bipartite, Path, Circuit, Lattices, Boolean algebra, Graph.*	

Name and Signature of Convener & Members of CBoS:

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(Dr. K.B. Dubey)
(Suresh Thakur)
Dr SK Sahu
Dr S. Jain
R. Khawtey
ANJEETA KUJUR
(Sushil Kumar Sahu)

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- B. A. Davey & H. A. Priestley (2002). Introduction to Lattices and Order (2nd edition). Cambridge University Press.
- Edgar G. Goodaire & Michael M. Parmenter (2018). Discrete Mathematics with Graph Theory (3rd edition). Pearson Education.

Reference Books Recommended:

- Rudolf Lidl & Günter Pilz (1998). Applied Abstract Algebra (2nd edition). Springer.
- Kenneth H. Rosen (2012). Discrete Mathematics and its Applications: With Combinatorics and Graph Theory (7th edition). McGraw-Hill.
- C. L. Liu (1985). Elements of Discrete Mathematics (2nd edition). McGraw-Hill.

Online Resources:

- SWAYAM Portal: Online Lectures on Discrete Mathematics https://onlinecourses.swayam2.ac.in/cec20_ma02/preview
- NPTEL YouTube Channel: Online Lectures on Discrete Mathematics https://youtube.com/playlist?list=PL0862D1A947252D20&si=saIjtYdT4Z-__Js
- NPTEL YouTube Channel: Online Lectures on Discrete Mathematics https://youtube.com/playlist?list=PLEAYkSg4uSQ2Wfc_I4QEZUSRdx2ZcFziO&si=qf1UcKDC34RMWeCz

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 & 20 Assignment / Seminar - 10 Total Marks - 30	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts., 1out of 2 from each unit-4x10=40 Marks	

Name and Signature of Convener & Members of CBoS:

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R. Khandey
(Suresh Thakur)
(Sushil kumar Sahu)
(Dr Anamika Shukla Shyam)
(Shailendra Arya)
Jitendra Kumar
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(H. S. P. Tandel)

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Computer Application *(Certificate / Diploma / Degree/Honors)*		Semester - I	Session: 2024-2025
1	Course Code	CASC-02T	
2	Course Title	**Computer Fundamental and MS office**	
3	Course Type	**DSC (Discipline Specific Course)**	
4	Prerequisite	*As per program*	
5	Course Learning Outcomes (CLO)	After Completing this course, students will be able to: • Study and use of basic concepts and terminology of information technology. • Organize files and documents on storage devices. • Acquire knowledge of ICT and Internet applications. • Develop information technology solutions by evaluating user requirements in advance trends of IT. • Acquire knowledge of MS-Excel, MS-PowerPoint and MS-Access.	
6	Credit Value	3 Credits	*Credit = 15 Hours - Learning & Observation*
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Introduction to Computer**: History of computer, Generations and Classification, Basic Anatomy of Computer: Block Diagram, Central Processing Unit (CPU): Function of each Unit, Memory: Primary, Cache, Flash, Software and its needs, Types of S/W: System Software and Application Software, Types of Programming Language: Machine Language, Assembly Language, High Level Language their advantages and disadvantages, Language Processors/Translators: Assembler, Interpreter and Compiler, Fundamental of Information Technology: Data and Information, Concept of IT, Application of IT, What is ICT?, Components of ICT, Impact of ICT in Society. **Advanced Trends in IT:** Cloud Technology, Virtual LAN Technology, M-Commerce, Nanotechnology, Virtual Reality, 3-D Printing, Internet of Things (IoT), Artificial Intelligence (AI), Machine Learning (ML), Cloud Computing, Quantum Computing, G-Suite, GoI digital initiatives in higher education: SWAYAM, Swayam Prabha, National Academic Depository, National Digital Library of India, E-Sodh-Sindhu, Virtual labs, e-Yantra and NPTEL.	12
II	**MS-Word:** Introduction to word processing software and its features, Creating new document, Saving documents, Opening and Printing documents. Home Tab: Setting fonts, Paragraph settings, Various styles (Normal, No spacing, Heading1, Heading2, Title, Strong), Find & Replace, Format painter, Copy paste and paste special. Insert Tab: Pages, Tables, Pictures, Clipart, Shapes, Header & Footer, Word Art, Equation and Symbols. Page Layout Tab: Page setup, Page Background, Paragraph (indent and spacing). Mailing Tab: Create Envelops and Labels, Mail Merge. Review Tab: Spelling and Grammar check, New comment, Protect document, View Tab: Document views, Zoom, Window (New window, Split, Switch window).	11
III	**MS-Excel:** Introducing Excel, Use of Excel sheet, creating new sheet, Saving, Opening, and Printing workbook. Home Tab: Font, Alignment, Number, Styles and cells and editing, Conditional Formatting. Insert Tab: Table, Charts (column chart, Pie chart, Bar chart, Line chart) and Texts (header & footer, word art, signature line). Page Layout Tab:	11

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	Page setup options, Scale to fit (width, height, scale). Formulas Tab: Auto sum (sum, average, min, max), Logical (IF, and, or, not, true, false), Math & Trig (sin, cos, tan, ceiling, floor, fact, mod, log), Sort and Filter options, Data validation, Group and ungroup. Review Tab: Protect sheet, Protect workbook, and Share workbook. View Tab: Page breaks, Page layout, Freezing Panes, Split and hide.	
IV	**Working with PowerPoint and MS-Access** **PowerPoint:** Introducing PowerPoint, Use of PowerPoint presentation, Creating new slides saving, Opening and printing. Home Tab: New slide, Layout, Reset, Delete, Setting text direction, Align text, Convert to smart art, Drawing options. Insert Tab: Table, Picture, Clipart, Photo album, Smart art, Shapes and chart, Movie and sound, Hyperlink and action, Text box, Word art, Object. Design Tab: Page setup options, Slide orientation, Applying various themes, Selecting background style and formatting it. Animations Tab: Custom animation for entrance, Exit and emphasis, Applying slide transition, Setting transition speed and sound, Animation on rehearse timing. Slideshow & View Tab: Start slide, Show options, and Setup options. View tab: Presentation views, Colors and Window option. **MS-Access:** Introduction to DBMS, features of DBMS, creating blank databases, Saving it in accdb format, Defining data type in MS Access, Creating tables, creating reports, query wizard.	11
Keywords	*Information Technology (IT), Information and Communication Technology (ICT), G-Suite, MS Word, MS Excel, MS Power Point, MS-Access.*	

Name and Signature of Convener & Members of CBoS:

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Computer Fundamentals, P.K. Sinha, BPB Publication, Sixth Edition.
- Fundamentals of Information Technology, Chetan Shrivastava, Kalyan Publishers.
- Fundamentals of Computers, V. Rajaraman, PHI Sixth Edition.
- Computer Fundamentals and Office Automation, Dr. Santosh Kumar Miri, Iterative International Publisher IIP.
- Computer Fundamentals Architecture and Organization, B. Ram, New Age International Publishers, Fifth Edition.
- Fundamentals of Information Technology, Alexis Leon and Mathews Leon, Vikash Publication.

Reference Books Recommended:

- Introduction to Information Technology, V. Rajaraman, PHI publication.
- Fundamental of IT, Leon and Leon, Leon Tec world.
- Introduction to Information Technology, Aksoy and Denardis, Cengage learning.
- Computers Today, Suresh K. Basandra, Galgotia Publications.
- Information Technology – The breaking wave, Dennis P.Curtin, Kim Foley, Kunai Sen and Cathleen Morin, TMH.
- OFFICE 2013 in Simple Steps, Kogent Solution Inc., DremTech Press.
- Access 2010 in Simple Steps by Kogent Learning Solutions Inc.

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Online Resources:

- Introduction to Computer Fundamental from W3school: https://www.w3schools.blog/computer-fundamentals-tutorial
- Introduction to MS-Word from W3school: https://www.w3schools.blog/ms-word-tutorial
- Introduction to MS-Excel from W3school: https://www.w3schools.com/excel/excel_introduction.php
- Introduction to MS-PowerPoint from W3school: https://www.w3schools.blog/powerpoint-tutorial
- Introduction to MS-Access from W3school: https://www.w3schools.com/sql/sql_ref_msaccess.asp
- Fundamentals of Computers & Information Technology (in Hindi) : https://www.mcu.ac.in/wp-content/uploads/2020/04/1PGDCA1-Unit-I-Fundamentals-of-Computers-Information-Technology.pdf.
- Fundamentals of Computers & Information Technology (in Hindi): https://hte.rajasthan.gov.in/dept/dte/board_of_technical_education,_rajasthan/government_polytechnic_college_hanumangarh/uploads/doc/fundamental-_final-rkd.pdf.
- Information and Computers Technology: https://cbseacademic.nic.in/web_material/doc/2014/11_ICT-IX.pdf.pdf.
- Microsoft Office (in Hindi): https://www.scribd.com/document/534988849/9-Microsoft-office-in-hindi-www-GkNotesPDF-com.
- MS-OFFICE: https://www.rgycsm.org/uploads/books/MICROSOFT-OFFICE-BOOK.pdf.
- MS-OFFICE: Hindi Notes: https://www.copaguide.com/2020/04/ms-office-topics.html.
- Microsoft Office Full Crash Course:
- https://www.youtube.com/watch?v=SH4oyV5AJ6A

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 & 20 Assignment / Seminar - 10 Total Marks - 30	Better marks out of the two Test / Quiz obtained marks in Assignment shall be considered against 30 Marks
End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1 = 10 Mark; Q2. Short answer type- 5x4 = 20 Marks Section B: Descriptive answer type qts.,1 out of 2 from each unit-4x10 = 40 Marks	

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DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor of Computer Application *(Certificate / Diploma / Degree)*		Semester - I	Session: 2024-2025
1	Course Code	CASC-02P	
2	Course Title	Lab 1: MS-Office	
3	Course Type	Practical	
4	Prerequisite	*As per program*	
5	Course Learning Outcomes (CLO)	After Completing this course, students will be able to: • Gain Practical knowledge of MS-Office. • Organize files and documents on storage devices. • Acquire knowledge of ICT and Internet applications. • Develop information technology solutions by evaluating user requirements in advance trends of IT. • Acquire knowledge of MS-Excel, MS-PowerPoint and MS-Access.	
6	Credit Value	1 Credits	*Credit =30 Hours Laboratory or Field Learning/Training*
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

List of Experiments	No. of Period
Application of Information Technology 1. How to create mail in a Gmail account? Write the uses of Inbox, Sent, Outbox, Draft, Spam and Trash labels. 2. How to design Google form? Write the steps with appropriate windows. 3. How to create different student classes in Google classroom. 4. How do teachers create assignments and provide due dates, or grades in Google Classroom? 5. How do students find assignments, due dates, or grades in Google Classroom? 6. How to use social media platforms like twitter, Facebook and YouTube? 7. How to use social media platforms like Flickr, Skype, yahoo and WhatsApp? 8. How to use Google spreadsheets, Google Slides and Google forms? 9. How to share files between mobile phone and computer system/Laptop using Bluetooth. ** **MS-Word** 1. Prepare a grocery list having four columns (Serial number, the name of the product, quantity and price) for the month of April, 06. ➢ Font specific actions for Title (Grocery List):14-pointArialfontinboldanditalics. ➢ The headings of the columns should be in12-point and bold. ➢ The rest of the document should be in10-point Times New Roman.	30

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(Shailendra Dys)
ANJEETA KUJUR
(Dr. A.S. Sharma)

- Leave a gap of 12-points after the title.

2. Create a telephone directory.
   - The heading should be16-point Arial Font in bold.
   - The rest of the document should use10-point font size.
   - Other headings should use10-point Courier New Font.
   - The footer should show the page number as well as the date last updated.
3. Design a time-table form for your college.
   - The first line should mention the name of the collegein16-point Arial Font and should be bold.
   - The second line should give the course name/teacher's name and the department in14-pointArial.
   - Leave a gap of 12-points.
   - The rest of the document should use10-point Times New Roman font.
   - The footer should contain your specifications as the designer and date of creation.

4. XYZ Publications plan store lease an e-book design dapper your syllabus. Design the First page of the book as per the given specifications.
   - The title of the book should appearinboldusing20-pointArialfont.
   - The name of the author and his qualifications should be in the center of the page in16-point Arial font.
   - At the bottom of the document should be the name of the publisher and address in16-point Times New Roman.
   - The details of the offices of the publisher (only location) should appear in the footer.

5. Create the following one page documents.
   - Compose a note inviting friends together at your house, including a list of things to bring with them.
   - Design a certificate in landscape orientation with a border around the document.
   - Design a Garage Sale sign.
   - Make an assignment outlining your rules for your bedroom at home, using a numbered list.

6. Create the following documents:
   - A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.
   - Use a newsletter format to promote upcoming projects or events in your classroom or college.

7. Convert following text to a table, using comma as delimiter Type the following as shown (do not bold).

Color, Style, Item
Blue, A980, Van
Red, X023, Car
Green, YL724, Truck
Name, Age, Sex
Bob, 23, M
Linda, 46, F
Tom, 29, M

8. Enter the following data into a table given on the next page.

Salesperson	Dolls	Trucks	Puzzles
Kennedy, Sally	1327	1423	1193
White, Pete	1421	3863	2934
Pillar, James	5214	3247	5467
York, George	2190	1278	1928
Banks, Jennifer	1201	2528	1203
Atwater, Kelly	4098	3079	2067
Pillar, James	5214	3247	5467
York, George	2190	1278	1928
Banks, Jennifer	1201	2528	1203
Atwater, Kelly	4098	3079	2067

Add a column Region (values: S, N, N, S, S, S) between the Salesperson and Dolls columns to the given table Sort your table data by Region and within Region by Sales person in ascending order:
In this exercise, you will add a new row to your table, place the word Total at the bottom of the Sales person column, and sum the Dolls, Trucks, and Puzzles columns.

9. Wrapping of text around the image.
10. How to install MS-Office in Windows operating system.
11. How to convert word, excel and PowerPoint into pdf & pdf to word.
12. How to merge and split pdf files.

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MS-Excel

1. Enter the Following data in Excel Sheet

REGIONAL SALES PROJECTION						
State	Qtr1	Qtr2	Qtr3	Qtr4	Qtr Total	Rate Amount
Delhi	2020	2400	2100	3000	15	
Punjab	1100	1300	1500	1400	20	
U.P.	3000	3200	2600	2800	17	
Haryana	1800	2000	2200	2700	15	
Rajasthan	2100	2000	1800	2200	20	
TOTAL						
AVERAGE						

a. Apply Formatting as follow:
   Title in TIMES NEW ROMAN
   FontSize-14
   Remaining text-ARIAL, FontSize-10
   State name and Qtr. Heading Bold, Italic with Gray Fill Color.
   Numbers in two decimal places.
   Qtr. Heading in center Alignment.
   Apply Border to whole data.
b. Calculate State and Qtr. Total
c. Calculate Average for each quarter

d. Calculate Amount=Rate*Total.

2. Given the following worksheet

	A	B	C	D
1	Roll No.	Name	Marks	Grade
2	1001	Sachin	99	
3	1002	Sehwag	65	
4	1003	Rahul	41	
5	1004	Sourav	89	
6	1005	Harbhajan	56	

Calculate the grade of these students on the basis of following guidelines:

If Marks	Then Grade
>=80	A+
>= 60 and <80	A
>= 50 and <60	B
<50	F

3. Given the following worksheet

	A	B	C	D	E	F	G
1	Salesman	Sales in(Rs.)					
2	No.	Qtr1	Qtr2	Qtr3	Qtr4	Total	Commission
3	S001	5000	8500	12000	9000		
4	S002	7000	4000	7500	11000		
5	S003	4000	9000	6500	8200		
6	S004	5500	6900	4500	10500		
7	S005	7400	8500	9200	8300		
8	S006	5300	7600	9800	6100		

Calculate the commission earned by the salesman on the basis of following Candidates:

If Total Sales	Then Commission
<20000	0% of sales
> 20000 and< 25000	4% of sales
> 25000 and< 30000	5.5%of sales
> 30000 and< 35000	8%of sales
>=35000	11%of sales

The total sales are the sum of sales of all the four quarters.

4. Company XYZ Ltd. pays a monthly salary to its employees who consist of basic salary, allowances & deductions. The details of allowances and deductions are as follows:
   - HRA Dependent on Basic
     30% of Basic if Basic<=1000
     25% of Basic if Basic>1000 & Basic<=3000
     20% of Basic if Basic>3000
   - DA Fixed for all employees,30% of Basic
   - Conveyance Allowance(CA)

Rs.50/- if Basic is <=1000
Rs.75/- if Basic >1000 & Basic<=2000
Rs.100 if Basic>2000

- Entertainment Allowance (EA)
  NIL if Basic is<=1000
  Rs.100/-if Basic > 1000

Deductions

- Provident Fund
  6% of Basic
- Group Insurance Premium
  Rs.40/-if Basic is <=1500
  Rs.60/-if Basic > 1500 & Basic<=3000
  Rs.80/-if Basic>3000

Calculate the following:
Gross Salary=Basic +HRA+ DA+ CA+ EA
Total Deduction=Provident Fund + Group Insurance Premium
Net Salary=Gross Salary–Total Deduction

5. Create Payment Table for a fixed Principal amount, variable rate of interests and time in the form at below:

No. of Installments	5%	6%	7%	8%	9%
3	XX	XX	XX	XX	XX
4	XX	XX	XX	XX	XX
5	XX	XX	XX	XX	XX
6	XX	XX	XX	XX	XX

6. Use an array formula to calculate Simple Interest for given principal amounts given the rate of Interest and time

Rate of Interest	8%
Time	5Years
Principal	Simple Interest
1000	?
18000	?
5200	?

7. The following table gives a year wise sale figure of five salesmen in Rs.

Salesman	2019	2020	2021	2022
S1	10000	12000	20000	50000
S2	15000	18000	50000	60000
S3	20000	22000	70000	70000
S4	30000	30000	100000	80000
S5	40000	45000	125000	90000

a. Calculate total sale year wise.
b. Calculate the net sale made by each salesman
c. Calculate the maximum sale made by the salesman
d. Calculate the commission for each salesman under the condition.

>> If total sales > 4, 00,000 give 5% commission on total sale made by the salesman.

>> Otherwise give 2% commission.

e. Draw a bar graph representing the sale made by each salesman.

f. Draw a pie graph representing the sale made by a salesman in 2000.

8. Enter the following data in Excel Sheet

PERSONAL BUDGET FOR FIRST QUARTER

Monthly Income(Net): 1,475

EXPENSES	JAN	FEB	MARCH QUARTER TOTAL	QUARTER AVERAGE
Rent	600.00	600.00	600.00	
Telephone	48.25	43.50	60.00	
Utilities	67.27	110.00	70.00	
Credit Card	200.00	110.00	70.00	
Oil	100.00	150.00	90.00	
AV to Insurance	150.00			
Cable TV	40.75	40.75	40.75	
Monthly Total				

a. Calculate Quarter total and Quarter average.

b. Calculate Monthly total.

c. Surplus=Monthly income-Monthly total.

d. What would be the total surplus if monthly income is 1500.

e. How much does the telephone expense for March differ from quarter average?

f. Create a 3D column graph for telephone and utilities.

g. Create a pie chart for monthly expenses.

9. Enter the following data in Excel Sheet

TOTAL REVENUE EARNED FOR SAM'S BOOK STALL

Publisher Name	1997	1998	1999	2000	Total
A	Rs. 1,000.00	Rs. 1100.00	Rs. 1,300.00	Rs. 800.00	
B	Rs. 1,500.00	Rs. 700.00	Rs. 1,000.00	Rs. 2,000.00	
C	Rs. 700.00	Rs. 900.00	Rs. 1,500.00	Rs. 600.00	
D	Rs. 1,200.00	Rs. 500.00	Rs. 200.00	Rs. 1,100.00.	

a) Compute the total revenue earned.

b) Plot the line chart to compare the revenue of all publishers for 4 years.

c) Chart Title should be Total Revenue of Sam's Book stall(1997-2000)'

d) Give appropriate categories and value axis title.

10. Generate 25 random numbers between 0 & 100 and find their sum, average and count. How many no. are in the range 50-60.

****

MS-Power Point

1. Do the following task:
   - Start a new blank presentation
   - Your first Slide is going to be a Title Slide
   - Write the Text as in the preview below:

- Lighthouse Co Ltd
- Make the Font of "Lighthouse" Arial Black and size 88

- Insert a second slide this should be with a layout of Bulleted List
- Write the Text as in preview below
- [Title]: Lighthouse Co Ltd
- [Body]:
  i. Mission Statement
  ii. Company Objectives
  iii. Management Team
  iv. Employees
  v. Sales

Make the Font Color of the Points to Green
Insert a third slide that should be an Organization Chart.
Include the following people in the chart:

a. David Brent, General Manager
b. Tim Canterbury, Head of Sales
c. Gareth Keenan, Assistant to the General Manager
d. Dawn Tinsley , Human Resources Manager

Add a fourth slide and this should be a Table Chart.

The chart should look like the following:

New Products	Discontinued Products
Digital Cameras	8mm Cameras
Ultra Slim Video Camera	8x Zoom Video Camera
25" Plasma TVs21"	Black and White TVs
DVD Recorders	Video Players
7.1 Dolby Surround Systems	2 channel stereo systems

- Make the titles New Products and Discontinued Products with a shadow effect and centered in the cell. Widen columns to fit Text as above.
- The Fifth slide should be a Chart slide. The chart should be a bar chart, and include the following data must be used to form the chart:

	January	February	March	April
TVs	20	27	90	75
DVDs	30	38	34	31
Wifi equipment	45	46	45	43
Video Recorders	25	29	15	40

- Change the colours of the chart so that the series of bars are red, yellow, pink, and green.
- Add a light coloured background to all slides in the presentation.
- Add also Transition effects between each slide and also different effects for all text and pictures in the presentation.
- Reverse the order of the second and third slides
- Save the presentation as Light House Ltd.

2. Do the following:
   Load your Presentation Application and start a new presentation
   - The first slide is a Title Slide. Select the appropriate layout and enter the title: **Annual Food Fair**
   - Add the subtitle: **.A Celebration of Eating**
   - Insert a small, red circle at the bottom right of the title slide.

Dr. H.S. Hota
Chairman
(Dr. K.B. Dubey)
(Sunil Kumar Saha)
(Dr. Anil Sharma)
(Dr. A.S. Sharma)

- Change the font color for the whole title and subtitle to blue, and apply a text shadow effect just to the words **Food** and **Fair**
- Insert a second slide to the presentation, selecting a layout appropriate for a series of bullet points, and using the title: **The Menu**. Enter the following text:
  i. Chocolate Desserts
  ii. Cakes and Puddings
  iii. Roast Meals
  iv. Using Pasta Creatively
- Change the line spacing for these bullet points to 1.5 lines.
- Increase the font size for the words **The Menu** in the title.
- Add a footer with your name and the text: **Food Fair** so they both appear on every slide, and number all the slides. (Make sure the number is not obscured by the red circle on the title slide)
- Insert a third slide, which is to be an organization chart. Use the title **Meet The Team**. Enter: **Maggie Peet, Manager** at the top of the chart, and show the following three as reporting to Maggie Peet: **Brian Webb, Bookings; Janine Newton, Publicity; Gregg Brown, Accounts**
- Embolden the text in the title of the third slide, and change the font to Arial.
- Apply a light coloured background to all the slides in the presentation
- On the third slide, insert an image suitable for the topic of food from an image library. Reduce the size of the image and place it where it will not interfere with text.
- Save the presentation as **foodfair**.
- Print the presentation with three slides per page, and close the presentation.

3. Do the followings:
   - Load your Presentation Application and start a new presentation
   - The first slide is a Title Only Slide. Select the appropriate layout and enter the title: **Cook Family Cruises**.
   - Add a small blue rectangle at the top left of this slide.
   - Change the font color for the whole title to red, and apply a text shadow effect just to the word **Cruises**.
   - Insert a second slide to the presentation, selecting a layout appropriate for a series of bullet points, and using the title: **Our Itinerary**. Enter the following text:
     a. Canary Islands
     b. Mediterranean
     c. Greek Islands
   - Change the line spacing for these bullet points to 2 lines. Increase the font size of the word **Itinerary** in the title. Add a footer with your name and the text: **Cruise Information** so they both appear on every slide, and number all the slides.
   - Insert a third slide, which is to be a graph. Use the title **Our Market Share**. Use the following data to produce a pie chart: Cook 54%; Jackson 28%; Wilson 12%; Bennett 5%
     Embolden the text in the title of the third slide, and change the font to Arial.
   - Apply a different background to each slide in the presentation.
   - On the third slide, insert an image suitable for the topic of holidays from an image library. Reduce the size of the image and place it where it will not interfere with text.
   - Add a 4-slide containing nothing but the text: **Travel with us for less!!**
   - Save the presentation as a holiday.
   - Print the presentation with 4 slides per page, and close the presentation.

4. Creating an animation looks like the leaf is falling in a tree.

5. Creating an animation looks like demolishing a world trade center in America.

****

MS-Access

1. Create a database named "college" and perform the following tasks:
   A. Create a table named "student" having following fields:
      Class, Roll no and Name with these Information i.e., Field Name, Data type and Description
   B. Fill at least 5 records.
   C. Prepare a query to display all records and Name should be in ascending order.
2. Create the employee table in MS-Access with the referential integrity-foreign key.

Note: This is a tentative list; the teachers' concern can add more program as per requirement.

Keywords	*Information Technology (IT), Information and Communication Technology (ICT), G-Suite, MS Word, MS Excel, MS Power Point, MS-Access.*

Name and Signature of Convener & Members of CBoS:

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Computer Fundamentals, P.K. Sinha, BPB Publication, Sixth Edition.
- Fundamentals of Information Technology, Chetan Shrivastava, Kalyan Publishers.
- Fundamentals of Computers, V. Rajaraman, PHI Sixth Edition.
- Computer Fundamentals and Office Automation, Dr. Santosh Kumar Miri, Iterative International Publisher IIP.
- Computer Fundamentals Architecture and Organization, B. Ram, New Age International Publishers, Fifth Edition.
- Fundamentals of Information Technology, Alexis Leon and Mathews Leon, Vikash Publication.

Reference Books Recommended:

- Introduction to Information Technology, V. Rajaraman, PHI publication.
- Fundamental of IT, Leon and Leon, Leon Tec world.
- Introduction to Information Technology, Aksoy and Denardis, Cengage learning.
- Computers Today, Suresh K. Basandra, Galgotia Publications.
- Information Technology – The breaking wave, Dennis P.Curtin, Kim Foley, Kunai Sen and Cathleen Morin, TMH.
- OFFICE 2013 in Simple Steps, Kogent Solution Inc., DremTech Press.
- Access 2010 in Simple Steps by Kogent Learning Solutions Inc.

Online Resources:

- Introduction to Computer Fundamental from W3school:
  https://www.w3schools.blog/computer-fundamentals-tutorial
- Introduction to MS-Word from W3school:

https://www.w3schools.blog/ms-word-tutorial

- Introduction to MS-Excel from W3school: https://www.w3schools.com/excel/excel_introduction.php
- Introduction to MS-PowerPoint from W3school: https://www.w3schools.blog/powerpoint-tutorial
- Introduction to MS-Access from W3school: https://www.w3schools.com/sql/sql_ref_msaccess.asp
- Fundamentals of Computers & Information Technology (in Hindi) : https://www.mcu.ac.in/wp-content/uploads/2020/04/1PGDCA1-Unit-I-Fundamentals-of-Computers-Information-Technology.pdf.
- Fundamentals of Computers & Information Technology (in Hindi): https://htc.rajasthan.gov.in/dept/dte/board_of_technical_education,_rajasthan/government_polytechnic_college_hanumangarh/uploads/doc/fundamental-_final-rkd.pdf.
- Information and Computers Technology: https://cbseacademic.nic.in/web_material/doc/2014/11_ICT-IX.pdf.pdf.
- Microsoft Office (in Hindi): https://www.scribd.com/document/534988849/9-Microsoft-office-in-hindi-www-GkNotesPDF-com.
- MS-OFFICE: https://www.rgycsm.org/uploads/books/MICROSOFT-OFFICE-BOOK.pdf.
- MS-OFFICE: Hindi Notes: https://www.copaguide.com/2020/04/ms-office-topics.html.
- Microsoft Office Full Crash Course: https://www.youtube.com/watch?v=SH4oyV5AJ6A

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar +Attendance - 05 Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance:** On spot Assessment A. Performed the Task based on lab. work - 20 Marks B. Spotting based on tools & technology (written) – 10 Marks Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:

Dr. H. S. Hota Chairman (Dr K. B. Dubey) Dr SK Sahu (Dr. S. Jain) R. Khaunkar (Dr. Anil Sharma) (Suresh Thakur) (Sushil Kumar Sahu) Shailendra Arya (Dr. A.S. Sharma) ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF COMPUTER APPLICATION

COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Computer Application *(Certificate / Diploma / Degree/Honors)*		**Semester - I**	Session: 2024-2025
1	Course Code	CASC-03T	
2	Course Title	Operating System	
3	Course Type	DSC (Discipline Specific Course)	
4	Prerequisite	*As per program*	
5	**Course Learning. Outcomes (CLO)**	At the end of this course, the students will be able to: • Understand the concept of operating system. • Understand the Disk operating system (DOS). • Work with DOS using DOS commands. • Understand the Windows operating system. • Understand the Linux operating system.	
6	Credit Value	3 Credits	*Credit = 15 Hours - Learning & Observation*
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40

PART -B: Content of the Course

Unit	Total No. of Teaching–Learning Periods (01 Hr. per period) - 45 Periods (45 Hours) Topics (Course contents)	No. of Period
I	**Operating System Concepts:** Evolution of Operating Systems, Types of operating systems, Operating system structure. Generations of Operating System, Function and Services of Operating System, System Calls, System Boot, System Programs, Protection and Security of Operating System.	12
II	**Disk Operating System:** Introduction to DOS, History of DOS, Booting process of DOS, File & directory structure and naming rules, DOS system files. Internal commands of DOS – DIR, CLS, VER, VOL, DATE, TIME, COPY, TYPE, REN, DEL, CD, MD, RD, PATH etc. External Commands - CHKDSK, XCOPY, PRINT, DISKCOPY, DISKCOMP, DOSKEY, TREE, MOVE, LABEL, APPEND, FORMAT, SORT, FDISK, BACKUP, EDIT, MODE, ATTRIB, HELP, SYS.	11
III	**Windows:** Windows Operating System: History, Version and features of Windows, Basics of Windows, Windows concepts, Windows Structure, Desktop, Taskbar, Start Menu, working with files and folders, create, copy, delete, renaming and moving files and folders, working with recycle bin restoring deleted files, emptying the recycle bin, searching files and folders. Windows Explorer, Windows Accessories, Control Panel, Print Manager and Installing Printers. My computer, Media Player, Sound Recorder, Volume Control. Advanced features of Windows - Managing Hardware & Software Add or remove Hardware devices to/from computer, Add/remove programs, Backup, Clipboard Viewer, Disk Defragmenter, Drive Space, Scandisk, System Information windows update.	11
IV	**Linux:** Linux introduction, Advantages, Features of Linux, Basic Architecture of Unix/Linux system, Kernel, Shell, Linux File system, Linux standard directories. Partitioning the Hard drive for Linux, Installing the Linux system, System, startup and shut-down process, How Linux works, Linux GUI, Linux Desktop, Linux command cd, md, rm, mv, cp, ls, cat, find, grep, head, and tail.	11
keywords	*Operating System, DOS, Windows, Linux.*	

Name and Signature of Convener & Members of CBoS:

Chairman (Dr. K.B. Dubey) (BSK Sahu) (Dr. Anil Sharma) (Dr. S. Jain)

(Sushil Kumar Sahu) (Suresh Thakur) Shailendra Agr ANJEETA KUJUR

11-6-2024 Dr. Sanjay Kumar

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Peter Baer Galvin, Greg Gagne, Operating System Concepts – Abraham Silberschatz, 8th edition, Wiley-India, 2009.
- Andrew S. Tanenbaum, Modern Operating Systems, 3rd Edition, PHI
- Elmasri, Carrick, Levine, Operating Systems: A Spiral Approach – TMH Edition

Reference Books Recommended:

- Akshay Singh , Operating System, RGCSM Publications
- Rusell A Stultz, MS DOS 6.22, BPB Publications
- Brain Underdahl,Teach yourself Windows 2000, Wiley Publications.
- Peter Norton, Maximizing Windows, Teachmedia.
- Ray Duncan, Advances MS-DOS Programming, BPB
- Ray Yao, Shell Scripting in 8 Hours

Online Resources:

- Fundamentals of Computer , Windows Operating System: https://vikaspedia.in/education/digital-litercy/it-literacy-courses-in-associating-with-msup/computer-fundamentals
- Introduction to Operating System: https://www.w3schools.in/operating-system/tutorials/
- Introduction to Operating System: https://www.javatpoint.com/windows
- Windows : https://www.javatpoint.com/windows
- Linux: https://www.javatpoint.com/what-is-linux
- DOS: https://www.geeksforgeeks.org/ms-dos-operating-system/
- DOS : https://www.javatpoint.com/ms-dos-operating-system

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: 100 Marks
Continuous Internal Assessment (CIA): 30 Marks
End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20 & 20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts.,1 out of 2 from each unit-4x10=40 Marks	

Name and Signature of Convener & Members of CBoS:

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ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Computer Application *(Certificate / Diploma / Degree)*			Semester - I	Session: 2024-2025
1	Course Code	CASC-03P		
2	Course Title	Lab 2: Operating System		
3	Course Type	Practical		
4	Prerequisite	*As per program*		
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Understand the fundamental concepts of DOS, Windows and Linux Operating System. • Understand basics of DOS commands and its types. • Understand features of Windows Operating system. • Understand comparative features of DOS and Windows Operating systems. • Explore functionality of Linux.		
6	Credit Value	1 Credits	*Credit =30 Hours Laboratory or Field Learning/Training*	
7	Total Marks	Max. Marks: 50		Min Passing Marks: 20

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
List of Practical Experiment	1. Demonstrate different Directory naming listing structure with all options. 2. Create one file and rename file using DOS command 3. Demonstrate all Internal DOS Commands with Output. 4. Demonstrate all external DOS Commands with output. 5. Introduction to Windows and Familiarity with its controls. 6. Study and use of Desktop, my computer, recycle bin, Task bar. 7. Working with Files and Folder. 8. Use of various window applications: Calculator, notepad and MS-Paint. 9. Explaining control panel options. 10. Working with printers. 11. Create a file using Linux command. 12. Write a Linux command which lists all files and directories. 13. Demonstrate use of grep command. 14. Create Directory using Linux command and create 3 different files in this directory. 15. Delete above created files and directory using Linux command. 16. Explaining various flavors of Linux. **Note:** Concerned teacher can add additional experiment as per requirement.	30
Keywords	*DOS, Windows, Linux.*	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota (Chairman) · (Dr K.B. Dubey) · (Dr S.K. Sahu) · (Dr Suresh Thakur) · (Dr. Anil Sharma) · (Dr S. Jain) · K. Khamparia · (Dr A.S. Sahu) · (Sushil Kumar Sahu) · (Shailendra Arya) · ANJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Rusell A Stultz, MS DOS 6.22 BPB Publications
- Brain Underdahl,Teach yourself Windows 2000, Wiley Publications.

Reference Books Recommended:

- Peter Norton, Maximizing Windows, Teachmedia.
- Ray Duncan, Advances MS-DOS Programming, BPB
- Akshay Singh, Operating System, RGCSM Publications
- Ray Yao, Shell Scripting in 8 Hours

Online Resources:

- DOS: https://www.javatpoint.com/ms-dos-operating-system
- Windows: https://www.javatpoint.com/windows
- Linux: https://www.javatpoint.com/what-is-linux
- Fundamentals of Computer, Windows Operating System: https://vikaspedia.in/education/digital-litercy/it-literacy-courses-in-associating-with-msup/computer-fundamentals
- DOS: https://www.geeksforgeeks.org/ms-dos-operating-system/

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar +Attendance - 05 Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance: On spot Assessment** A. Performed the Task based on lab. work - 20 Marks B. Spotting based on tools & technology (written) – 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota Chairman

(Dr. K.B Dubey)

(Dr SKSahu)

(Dr. Anil Sharma)

(Dr. S. Jain)

R. Khuntey

(Sushil Kumar Sahu)

Durgesh Thakur

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Shailendra Arya

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FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Computer Application *(Certificate / Diploma / Degree/Honors)*		Semester -II	Session: 2024-2025
1	Course Code	CASC-04	
2	Course Title	Digital Electronics	
3	Course Type	DSC (Discipline Specific Course)	
4	Prerequisite	*As per program*	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able: • To understand the fundamental concepts and techniques used in digital electronics. • Understand how the computer system identifies the data inside. • To understand and examine the structure of various number systems and its application in digital design. • To Perform basic arithmetic calculations in binary, decimal and hexadecimal; • The ability to understand, analyze and design various combinational and sequential circuits. • To identify the basic requirements according to the specification for a newly customized digital circuit and design it in a cost effective manner.	
6	Credit Value	4 Credits	*Credit = 15 Hours - Learning & Observation*
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40

PART -B: Content of the Course

Total No. of Teaching–learning Periods (01 Hr. per period) – 60 Periods (60 Hours)

Unit	Topics (Course contents)	No. of Period
I	NUMBER SYSTEM AND DATA REPRESENTATION :Introduction of number system (binary, decimal, octal, hexadecimal etc.), inter-conversion between the number systems, arithmetic operations, complements in the number system, representation of numeric data(binary representation of integers, fixed point and floating point data representation),codes and its classification(weighted code and its types like NBCD etc. , non-weighted code like (Excess-3 code Gray code etc.) , alphanumeric code like (ASCII, UNICODE, EBCDIC etc.), Error detecting code like (parity bit coding technique, etc.),Error correcting codes like (hamming code etc.))	15
II	BOOLEAN ALGEBRA: Boolean algebra and basic operations, sum of product, product of sum, simplification of Boolean expression using simplification techniques: Boolean laws and K-Map. FUNDAMENTALS OF DIGITAL CIRCUIT DESIGN: Digital logic families and its properties, Logic gate and its types, Construction of basic digital circuits using fundamental gates as well as Universal gates, simplification of digital circuit. Types of digital circuits (combinational circuit, sequential circuits).	15
III	COMBINATIONAL CIRCUIT: Adder (half adder, full adder, N bit adder), Subtractor (half subtractor, full subtractor, N bit subtractor), Decoder, Encoder, Multiplexer, De-multiplexer, Comparator, Code Convertor SEQUENTIAL CIRCUIT: Multivibrators/Latch, Flip- flop and its types (S R flip flop, D Flip Flop, J K Flip Flop, T Flip Flop, Master Slave Flip Flop), Register and its types, Counters and its types.	15
IV	MICROPROCESSORS: Introduction of microprocessor, evolution of microprocessor, basic components in microprocessor, basic microprocessor instruction, addressing modes, designing of eight-bit microprocessor (8085 microprocessor), designing of 16-bit microprocessor (8086 microprocessor).	15

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Keywords	Number System, Logic gates, Combinational circuits, Sequential circuits, flip-flop, Registers, Counters, Microprocessor.

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota Chairman, (Dr. K.B. Dubey), (Dr. S.K. Sahu), (Dr. Anil Sharma), (Suresh Thakur), (Dr. A.S. Singh), Sushil Kumar Sahu, Shailendra Arya, Anjeeta Kujur

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- D. Nasib, S. Gill. J.B. Dixit, Digital Design and Computer Organization, Laxmi Publications Pvt Limited.
- K.K Neniwal, Digital Electronics (Hindi), Paperback Publication.

Reference Books Recommended:

- M. Morris Mano, Digital logic and Computer Design, Prentice-hall of India private ltd.
- A. K. Maini, Digital Electronics Principles, Devices and Applications, John Wiley & Sons, Ltd.

Online Resources:

- Digital Circuits by Prof. Santanu Chattopadhyay (NPTEL) https://youtube.com/playlist?list=PLbRMhDVUMngePP5JcezxImF-FzOC9wstz&si=6YjQgG1tFGtYmEZv
- Digital Electronics by Prof Gautam Saha (NPTEL) https://youtube.com/playlist?list=PLbRMhDVUMnge4gDT0vBWjCb3Lz0HnYKkX&si=L6PMoGGOG!3MM5jv
- Switching Circuits and Logic Design by Prof. Indranil Sengupta, IIT Kharagpur https://youtube.com/playlist?list=PLbRMhDVUMngfV8C6EINAUaQQz06wEhFM5&si=c8golfyf_VYBAzp0
- Online Simulator's for Digital Electronics Practices: CircuitVerse - Digital Circuit Simulator online
- Digital Electronics reference: Digital Electronics Tutorial - Javatpoint

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 & 20 Assignment / Seminar - 10 Total Marks - 30	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts.,1out of 2 from each unit-4x10=40 Marks	

Name and Signature of Convener & Members of CBoS:

H.S. Hota Chairman, (Dr. K.B. Dubey), (Dr. S.K. Sahu), (Dr. S. Jain), R. Khuntey, (Dr. Anil Sharma), (Suresh Thakur), (Dr. A.S. Singh), Sushil Kumar Sahu, Shailendra Arya, Anjeeta Kujur

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Computer Application (Certificate / Diploma / Degree/Honors)		Semester - II	Session: 2024-2025
1	Course Code	CASC-05T	
2	Course Title	Programming in C++	
3	Course Type	DSC (Discipline Specific Course)	
4	Prerequisite	*As per program*	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Understand the fundamentals of object oriented programming. • Write programs related to concept of object oriented program • Define functions, class and to create own Libraries. • Write programs for file handling. • Develop small programs to solve real world problems.	
6	Credit Value	3 Credits	*Credit = 15 Hours - Learning & Observation*
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Introduction and Programming Concepts :** Definition of Program, Source file, Object file, Executable file, Header file, Language Translator- Assembler, Interpreter, Compiler, Testing, Debugging, Linker and Loader, Algorithms, Flow Charts, History of C language, Structure of C program , C Tokens : Identifiers, Keywords, Constants, Variables, Operators, Data Types, Control structure: Conditional and looping statements, Operator Precedence and Associativity, Array and its types, Pointer, Functions : Standard Library and User defined functions, function prototype, Call by value and Call by reference, recursive functions, String functions.	12
II	**Introduction to Object Oriented Programming:** Concept of object oriented programming, Features of C++, Structure of C++ program, Data types, structure, class and objects, Access Specifiers: Private, Public, Protected, inline functions, static data and static functions. **Constructor:** Default constructor, Copy constructor, Parameterized constructor, Destructor.	11
III	**Inheritance and Polymorphism**: Definition, Concept of base and derived class, Types of Inheritance: Single, Multilevel, Multiple, Hierarchical and Hybrid Inheritance. Polymorphism: Definition, Compile time polymorphism: Function overloading, Operator overloading, constructor overloading, Runtime polymorphism: Virtual Function, pure virtual function. Inline function, friend function, friend class.	11
IV	**Input-Output and File Handling :** I/O classes, File and Stream classes, Char I/O, String I/O, Object I/O, File Pointer, Opening and Closing file. **Exception Handling and Standard Template Library:** Definition, Exception basics, try, catch and throws keywords, Template.	11
Keywords	*Token, Identifier, Keyword, Array, Function, Class, Object, Polymorphism, Inheritance, Constructor, Template.*	

Name and Signature of Convener & Members of CBoS:

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PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Peter Juliff, Program Design, PHI Publications.
- Yashwant Kanetkar, Let us C: BPB Publications.
- E. Balaguruswamy, Programming in ANSI C, Tata McGraw Hill

Reference Books Recommended:

- Y. Kanetkar, Let us C++, B.P.B Publication .
- E. Balaguruswamy, Programming in C++, Tata McGraw Hill.
- R. Kumar, Object Oriented Programming with C++, Prakhar Publication(Hindi)
- Dhupiya, Lakhyani , C++ Programming Alka Publications, Ajmer (Paperback, Dhupiya, Lakhyani)(Hindi)

Online Resources:

- Introduction to C and C++ from SWAYAM/NPTEL
  https://onlinecourses.nptel.ac.in/noc22_cs103/preview
  https://www.youtube.com/watch?v=KG4hjVDw-p8&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=2
- Constant and Inline Function through NPTEL:
  https://www.youtube.com/watch?v=pX6LufLso2M&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=10
- Pointer and Reference NPTEL
  https://www.youtube.com/watch?v=GtsBZ5e1-cE&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=12
- Function Overloading NPTEL
  https://www.youtube.com/watch?v=uJGmGAShHeU&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=13
- Operator Overloading NPTEL
  https://www.youtube.com/watch?v=0jpOwe4d-FE&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=17
- Dynamic Memory Management NPTEL
  https://www.youtube.com/watch?v=lkFK2X6qIc0&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=18
- Class and Object NPTEL
  https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=24
- Access Specifiers NPTEL
  https://www.youtube.com/watch?v=6ki_W7cXdM0&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=22
- Constructor and Destructor NPTEL
  https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=24
- C++ different topics from W3School
  https://www.w3schools.com/CPP/default.asp
- C++ different topics from Javatpoint
  https://www.javatpoint.com/cpp-tutorial

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 +20 Assignment / Seminar - 10 Total Marks - 30	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts.,**1 out of 2** from each unit-4x10=40 Marks	

Name and Signature of Convener & Members of CBoS:

Dr. H. S. Hota Chairman, (Dr. R.B. Dubey), (Dr. S.K. Sahu), Dayesh Kotangle, (Dr. Anil Sharma), Dr. S. r. Jain, R. Khunteey, (Sushil Kumar Sahu), (Saurav Thakur), Shailendra, ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Computer Application *(Certificate / Diploma / Degree)*	Semester - II	Session: 2021-2025

1	Course Code	CASC-05P
2	Course Title	Lab 3: Programming in C++
3	Course Type	Practical
4	Prerequisite	*As per program*
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Understand the fundamental programming concepts and methodologies which are essential to create good C++ programs. • Code, test, and implement a well-structured, robust computer program using the C++ programming language. • Write reusable modules (collections of functions). • Understand design/implementation issues involved with variable allocation and binding, control flow, types, subroutines, parameter passing. • Develop an in-depth understanding of functional, logic, and object-oriented programming paradigms.
6	Credit Value	1 Credits *Credit =30 Hours Laboratory or Field Learning/Training*
7	Total Marks	Max. Marks: 50 Min Passing Marks: 20

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
List of Practical Experiments.	1. Write a program in C++ for addition of two numbers using float data type. 2. Write a program in C++ to find the biggest number between two numbers. 3. Write a program in C++ to find the factorial value of any entered number using do – while loop. 4. Write a program in C++ for various arithmetic operations using switch case statements. 5. Write a program in C++ for Multiplication of two 3X3 matrices. 6. Write a program in C++ to store five books of information using structure. 7. Write a program in C++ to store six employee information using union. 8. Write a program in C++ to calculate simple interest using call by value and call by reference method. 9. Write a program in C++ to find the sum and average of five numbers using class and objects. 10. Write a program in C++ to multiply two numbers using private and public member functions. 11. Write a program in C++ to print structure like this using scope resolution operator 1 1 2 1 2 3 1 2 3 4 1 2 3 4 5 12. Write a program in C++ for constructor and Destructor.	30

13. Write a program in C++ for multiple inheritance.
14. Write a program in C++ for operator overloading.
15. Write a program in C++ for friend class and friend function.
16. Write a program in C++ for virtual function and virtual class.
17. Write a program in C++ for Exception Handling.
18. Write a program in C++ to open and close a file using file Handling.
19. Given two ordered arrays of integers, write a program to merge the two-arrays to get an ordered array.
20. WAP to display Fibonacci series (i) using recursion, (ii) using iteration
21. WAP to calculate Factorial of a number (i) using recursion, (ii) using iteration
22. WAP to calculate GCD of two numbers (i) with recursion (ii) without recursion.
23. Create a Matrix class using templates. Write a menu-driven program to perform following Matrix Operations (2-D array implementation): a) Sum b) Difference c) Product d) Transpose 22. Create the Person class. Create some objects of this class (by taking information from the user). Inherit the class Person to create two classes Teacher and Student class. Maintain the respective information in the classes and create, display and delete objects of these two classes (Use Runtime Polymorphism).
24. Create a class Triangle. Include overloaded functions for calculating area. Overload assignment operator and equality operator.
25. Create a class Box containing length, breadth and height. Include following methods in it: a) Calculate surface Area b) Calculate Volume c) Increment, Overload ++ operator (both prefix & postfix) d) Decrement, Overload -- operator (both prefix & postfix) e) Overload operator == (to check equality of two boxes), as a friend function f) Overload Assignment operator g) Check if it is a Cube or cuboid
26. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.
27. Write a program to retrieve the student information from the file created in the previous question and print it in the following format: Roll No. Name Marks
28. Copy the contents of one text file to another file, after removing all whitespaces.
29. Write a program for exception handling.
30. Write a program to insert data into file and to display it.

Note: Concerned teacher can add additional experiment as per requirement.

Keywords	*Array, Function, Structure, union, matrix, constructor, destructor, inheritance.*

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Peter Juliff, Program Design, PHI Publications.
- Yashwant Kanetkar, Let us C: BPB Publications.
- E. Balaguruswamy, Programming in ANSI C, Tata McGraw Hill

Reference Books Recommended:

- Y. Kanetkar, Let us C++, B.P.B Publication .
- E. Balaguruswamy, Programming in C++, Tata McGraw Hill.

- R. Kumar, Object Oriented Programming with C++, Prakhar Publication(Hindi)
- Dhupiya, Lakhyani , C++ Programming Alka Publications, Ajmer (Paperback, Dhupiya, Lakhyani)(Hindi)

Online Resources:

- Introduction to C and C++ from SWAYAM/NPTEL
  https://onlinecourses.nptel.ac.in/noc22_cs103/preview
  https://www.youtube.com/watch?v=KG4hjVDw-p8&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=2
- Constant and Inline Function through NPTEL:
  https://www.youtube.com/watch?v=pX6LufLso2M&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=10
- Pointer and Reference NPTEL
  https://www.youtube.com/watch?v=GtsBZ5c1-cE&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=12
- Function Overloading NPTEL
  https://www.youtube.com/watch?v=uJGmGAShHeU&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=13
- Operator Overloading NPTEL
  https://www.youtube.com/watch?v=0jpOwe4d-FE&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=17
- Dynamic Memory Management NPTEL
  https://www.youtube.com/watch?v=lkFK2X6qIc0&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=18
- Class and Object NPTEL
  https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=24
- Access Specifiers NPTEL
  https://www.youtube.com/watch?v=6ki_W7cXdM0&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=22
- Constructor and Destructor NPTEL
  https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=24
- C++ different topics from W3School
  https://www.w3schools.com/CPP/default.asp
- C++ different topics from Javatpoint
  https://www.javatpoint.com/cpp-tutorial

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar +Attendance - 05 Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment A. Performed the Task based on lab. work - 20 Marks B. Spotting based on tools & technology (written) – 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:

Dr. H. S. Hota (Chairman), (Dr. K. B. Dubey), (Dr. S. K. Saha), (Dr. S. Jain), (Dr. Anil Sharma), K. Khuntia, (Sushil Kumar Saha), (Suresh Thakur), (Shailendra Aggr), ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Computer Application *(Certificate / Diploma / Degree/Honors)*		Semester – II	Session: 2024-2025
1	Course Code	CASC -06T	
2	Course Title	Data Structure	
3	Course Type	DSC (Discipline Specific Course)	
4	Prerequisite (if, any)	*As per program*	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Understand the fundamentals and applications of data structure. • Utilize various algorithms for real world problem solving. • Understanding about data management in computer memory. • Apply stack, Queue, Lists, Trees and Graphs for real world application. • Understand how various data structures can be used to implement through any programming language.	
6	Credit Value	3 Credits	*Credit = 15 Hours - Learning & Observation*
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Introduction and Basic Concepts:** Introduction, Fundamentals of Algorithms, Data types: Primitive, Non-Primitive Absent Data Type (ADT), Classification of Data Structure: Linear and Nonlinear Data Structure. **Array:** Arrays and its types, Memory allocation and address calculations of Array, Sparse Array. **Linked List:** Types of Linked List and various Operations Like INSERT, DELETE, TRAVERSE. Introduction and Application of Stack and Queue.	12
II	**Stack:** Definition, Operations PUSH, POP, Implementations using Array and Linked list, Applications of Stack: Infix, Prefix, Postfix representation and conversion using Stack, Postfix expression evaluation using Stack, Recursion using Stack. **Queue:** Definition, Types of Queues: Priority Queue, Circular queue, Double Ended Queue, operations of Queue INSERT, DELETE, TRAVERSE, Implementation Queue using Array and Linked list, Applications of Queue.	11
III	**Tree:** Definition of Trees and their types, Binary trees, Properties of Binary trees and operations Insertion, deletion, searching and traversal algorithm: preorder, post order, in-order traversal, Binary Search Trees, Implementations, AVL Trees. **Graph:** Definition of Graph and their types, Adjacency and Incident (matrix & linked list) Representation of graphs, Graph Traversal – Breadth first Traversal, Depth first Traversal, Connectivity of Graphs; Weighted Graphs, Shortest Path Algorithm, Spanning Tree, Minimum Spanning Tree, Kruskal's and Prim's Algorithms.	11
IV	**Sorting Methods:** Types of Sorting Selection Sort, Insertion Sort, Bubble Sort, Quick Sort, Merge Sort, Radix Sort. **Searching**: Linear search, Binary search.	11
Keywords	*Data, ADT, Array, Linked List, Stack, Queue, Tree, Graph, Searching, Sorting.*	

Name and Signature of Convener & Members of CBoS:

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Michael T. Goodrich, Data Structures and Algorithms in C++, Wiley
- Horowitz and Sahani, Fundamentals of Data Structures, Computer Science Press

Reference Books ***Recommended:***

- Alfred V. Aho, Data structures and Algorithms, Jhon E. Hopcroft and J.E. Ullman.
- Jean Paul Trembley and Paul Sorenson, An Introduction to Data Structures with Applications, TMH, International Student Edition
- R. Kruse, Leung &Tondo, Data Structures and Program Design in C, PHI publication, 2nd Edition

Online Resources:

- NPTEL YouTube Channel: Data Structure Complete course
- https://youtube.com/playlist?list=PLc2MoXNv7E4mtsPlnn9BnTOENXsGyoDgR&si=aAYaVZ-vWfeuhFEO
- NPTEL YouTube Channel: Introduction to Data Structure
- https://www.youtube.com/watch?v=zWg7U0OEAoE&list=PLBF3763AF2E1C572F&index=1
- NPTEL YouTube Channel: Stacks
- https://www.youtube.com/watch?v=g1USSZVWDsY&list=PLBF3763AF2E1C572F&index=2
- NPTEL YouTube Channel: Queues and linked list
- https://www.youtube.com/watch?v=PGWZUgzDMY1&list=PLBF3763AF2E1C572F&index=3
- NPTEL YouTube Channel: Trees
- https://www.youtube.com/watch?v=tORLeIHHtazM&list=PLBF3763AF2E1C572F&index=6
- NPTEL YouTube Channel: Graphs
- https://www.youtube.com/watch?v=9zpSs845wf8&list=PLBF3763AF2E1C572F&index=24
- W3schools Data Structure Reference: DSA Tutorial (w3schools.com)

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 & 20 Assignment / Seminar - 10 Total Marks - 30	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts.,1out of 2 from each unit-4x10=40 Marks	

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(Sushil Kumar Sahu)

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Computer Application *(Certificate / Diploma / Degree)*	Semester – II	Session: 2024-2025

1	Course Code	CASC-06P
2	Course Title	Lab 4: Data Structure Using C++
3	Course Type	Practical
4	Prerequisite (if, any)	*As per program*
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Understand how the concept of data structure can be implemented programmatically. • Implement the fundamentals data structure through C and C++ • Understand the functioning of Array and linked list programmatically. • Understand the applications of array, linked list stack, queue, tree and graph programmatic. • Write programs for various data structures for real world application.
6	Credit Value	1 Credits *Credit =30 Hours Laboratory or Field Learning/Training*
7	Total Marks	Max. Marks: 50 Min Passing Marks: 20

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
Lab./Field Training/ Experiment	1. Write a program to create a square matrix, fill the data inside and print the diagonal elements. 2. Write a program to perform addition and subtraction on two matrices. 3. Write a program to perform multiplication on two matrices. 4. Write a program to perform insertion, deletion of nodes from the end in singly linked list. 5. Write a program to perform insertion and deletion of nodes from the end in singly linked list. 6. Write a program to perform insertion and deletion of nodes from the end in circular doubly linked list. 7. Write a program to perform push and pop operations in stack, where stack should be created using array. 8. Write a program to perform push and pop operation in stack, where stack should be created linked list. 9. Write a program to calculate factorial of given number using stack. 10. Write a program to perform insertion and deletion of data items in queue, queue should be implemented by using a linked list. 11. Write a program to perform insertion and deletion of data items in queue, queue should be implemented by using arrays. 12. Write a program to demonstrate functioning of a double ended queue. 13. Write a program to read the postfix arithmetic expression and evaluate its value using the stack. 14. Write a program to show how to handle the overflow and underflow situation in stack. 15. Write a program to convert infix notation-based expression into the postfix notation-based expression using the stack. 16. Write a program to implement the concept of priority-based element	30

traversing using priority queue.

17. Write a program to implement the concept of priority-based element traversing using priority queue.
18. Write a program to create binary search tree using the concept of linked list and array, suppose data set will be given at the run time.
19. Write a program to create a binary tree with any data set and traverse the data items in pre-order, in-order and post-order manner using recursion.
20. Write a program to perform deletion of any data item from the binary search tree.
21. Write a program to find the height of any tree.
22. Write a program to create any given undirected graph using the adjacency matrix, and print each node/element with list of its adjacent elements.
23. Write a program to find the height of any given tree.
24. Write a program to traverse the element of given graph according BFS and DFS.
25. Write a program to find the minimum spanning tree of any given graph.
26. Write a program to search any run time given element from the array of 10 elements in the array are unsorted.
27. Write a program to demonstrate the binary search.
28. Write a program to find the smallest and largest element in any array.
29. Write a program to arrange the data items of any array in ascending order.
30. Write a program to arrange the data items of any array in descending order using quick sort.

Note: Concerned teacher can add additional practical exercises as per requirement.

Keywords	*Array, Linked List, Stack, Queue, traversing, Tree, Graph, Searching, Sorting, Hashing.*

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PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

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- NPTEL YouTube Channel: Introduction to Data Structure https://www.youtube.com/watch?v=zWg7U0OEAoE&list=PLBF3763AF2E1C572F&index=1
- NPTEL YouTube Channel: Stacks https://www.youtube.com/watch?v=g1USSZVWDsY&list=PLBF3763AF2E1C572F&index=2

- NPTEL YouTube Channel: Queues and linked list https://www.youtube.com/watch?v=PGWZUgzDMYI&list=PLBF3763AF2E1C572F&index=3
- NPTEL YouTube Channel: Trees https://www.youtube.com/watch?v=tORLeHHtazM&list=PLBF3763AF2E1C572F&index=6
- NPTEL YouTube Channel: Graphs https://www.youtube.com/watch?v=9zpSs845wf8&list=PLBF3763AF2E1C572F&index=24
- W3schools Data Structure Reference: DSA Tutorial (w3schools.com)

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar +Attendance - 05 Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance:** On spot Assessment A. Performed the Task based on lab. work - 20 Marks B. Spotting based on tools & technology (written) – 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status

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