FOUR YEAR UNDERGRADUATE PROGRAM (NEP–2020)

Program: Bachelor in Computer Application (2024 -28)

DISCIPLINE – COMPUTER APPLICATION

SESSION – 2024 -25

DSC -01 to 20		DSE -01 to 12	
Code	**Title**	**Code**	**Title**
CASC -01	Discrete Mathematics	CASE -01	Cyber Security and Cyber Law
CASC -02T	Computer Fundamental and MS-Office	CASE -02	Artificial Intelligence and Expert System
CASC -02P	**Lab 1:** MS-Office	CASE -03	Numerical Analysis
CASC -03T	Operating System	CASE -04	Computer System Architecture
CASC -03P	**Lab 2:** Operating System	CASE -05	Computer Graphics
CASC -04	Digital Electronics	CASE -06T	Cloud Computing
CASC -05T	Programming in C++	CASE -06P	**Lab 13:** Cloud Computing
CASC -05P	**Lab 3:** Programming in C++	CASE -07	Cryptography and Network Security
CASC -06T	Data Structure	CASE -08	Advanced Operating systems
CASC -06P	**Lab 4:** Data Structure Using C++	CASE -09	Soft Computing
CASC -07	Software Engineering	CASE -10	Digital Image Processing
CASC -08T	Relational Database Management System	CASE -11	Big Data Analytics
CASC -08P	**Lab 5:** Relational Database Management System (Oracle/MySQL)	CASE -12	Major Project-2
CASC -09T	Programming in Java		
CASC -09P	**Lab 6:** Programming in Java	**DGE -01 & 02**	
CASC -10	Theory of Computation	CAGE -01T	Computer Fundamental and MS-Office
CASC -11T	Web Technology	CAGE -01P	**Lab 1:** MS-Office
CASC -11P	**Lab 7:** Web Technology	CAGE -02T	Operating System
CASC -12T	Python Programming	CAGE -02P	**Lab 2:** Operating System
CASC -12P	**Lab 8:** Python Programming	**VAC**	
CASC -13	Data Mining and Data Warehousing	CAVAC-01	Artificial Intelligence
CASC -14T	Programming in .Net	**SEC**	
CASC -14P	**Lab 9:** Programming in .Net	CASEC-01	ICT Based Learning
CASC -15T	Machine Learning		
CASC -15P	**Lab 10:** Machine Learning		
CASC -16	Data Communication and Computer Networking		
CASC -17T	Advanced Java		
CASC -17P	**Lab 11:** Advanced Java		
CASC -18	Major Project-1		
CASC -19T	Mobile Application Development		

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CASC -19P	**Lab 12:** Mobile Application Development		
CASC -20T	Fundamentals of IoT and Applications		
CASC -20P	**Lab 14:** Fundamentals of IoT and Applications		

Program Outcomes (PO):

- Gain a complete exposure to the theories and practices of Computer Application.
- Get transformed into a skilled learner and active programmer, enabling the students to focus on their higher studies.
- Value computer professionals and programmers.
- Explore how the concepts and applications of Computer lead to innovative thinking with a problem-solving attitude.

Program Specific Outcomes (PSO):

- Understand the basic computer knowledge and concept of operating systems.
- Understanding the concept of programming and develop program in C++.
- Understanding the concept of data structure and implementation with C/C++.
- Understanding the concept of DBMS and implementation in MySQL /Oracle.
- Understanding the concept of OOPs and Java programming and develop program in Java.
- Understanding the concept of web technology and its implementation with HTML/CSS/DHTML/PHP.
- Understand the basic concept of data and computer networks.
- Understanding the basic concept of digital electronics.
- Understanding the basic concept of cyber security and cyber law.
- Understanding the basic concept of Artificial Intelligence.

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		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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(Surendra Thakur)
(H.S.P. Tandi)
(Dr. Aramita Shukla Sharma)
(Shailendra Arya)
ANJEETA KUJUR
Jeetendra Kumar
18-06-2024

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:

Dr. H.S. Hota (Chairman) (Dr. K.B. Dubey) (Sushil Kumar Sahu) (Surresh Thakur) Dr S K Sahu (Chailendra Arya) Dr. S. Jain R. Khawtey ANJEETA KUJUR

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=qf1UcKDC34RMWcCz

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:

Dr. H.S. Hota (Chairman) (Dr. K.B. Dubey) 11/06/24 Dr SK Sahu Dwyer Kottangle (Dr. Anil Sharma) (Dr. S. Jain) R. Khuddey

(Suresh Thakur) (Sushil Kumar Sahu) (Dr Aramita Shukla Sharma)

(Shailendra Arya) Jitendra Kumar ANJEETA KUJUR Tonde (H.S.P. Tonde)

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.

Chairman (Dr. K. B. Dubey)

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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FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
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.	30

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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.

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- 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.

****

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.

- 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.

Dr. H.S. Hota
Chairman

(Dr. K.G. Dubey)

(Dr. S.K. Saha)

(Dr. S. Jain)

(Dr. Anil Sharma)

Sushil Kumar Sahni

ANJEETA KUJUR

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://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:	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. S. K. Sahu Dr. S. Jain R. Khuntley Dr. Anil Sharma Sushil Kumar Sahu (Suresh Thakur) Dr. V. K. Gupta Sheikhundra 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

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

Unit	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:

Dr. H.S. Hota Chairman, (Dr. K.B. Dubey), (Dr. S.K. Sahu), Dugeet Kottangle, (Dr. Anil Sharma), (Dr. S. Jain), K. Khumchey, (Dr. A.S. Jain), (Sushil Kumar Sahu), (Suresh Thakur), Shailendra Arya, Anjeeta Kujur, 11-06-2024 (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-literacy/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:

Dr. H.S. Hota
Chairman

(Dr. K.B. Dubey)

(Suresh Thakur)

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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:

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(Suresh Thakur) (Dr. A.J. Sharma)

(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 SK Saha) (Dr. Anil Sharma) (Drvs. Jain) R. Khurtley

(Sushil Kumar Sahu) (Suresh Thakur) (Dr. A.S. Sharma)

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-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. Saha), (Dr. Amit Sharma), (Suresh Thakur), (Dr. A.S. Tomar), (Dr. V. Kamakshi Prasad), (Sushil Kumar Saha), (Shailendra Nath Jha), (Dr. 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=L6PMoGGOG13MM5jv
- Switching Circuits and Logic Design by Prof. Indranil Sengupta, IIT Kharagpur https://youtube.com/playlist?list=PLbRMhDVUMngfV8C6ElNAUaQQz06wEhFM5&si=e8goIfyf_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:

Dr. H.S. Hota (Chairman), (Dr. K.B. Dubey), (Dr. S.K. Saha), (Dr. Amit Sharma), (Dr. S.S. Jain), (Dr. R. Khanna), (Suresh Thakur), (Dr. A.S. Tomar), (Sushil Kumar Saha), (Shailendra Nath Jha), (Dr. 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.*	

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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. Dubay) (Dr. S.K. Sahu) Dr. S. Jain R. Khuntey (Dr. Anil Sharma) (Sushil Kumar Sahu) (Sewan Thakur) Shailendra Arya ANJEETA KUJUR (Dr. A.S. Sharma)

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-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.*

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:	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:

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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 -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.*	

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Dr. H.S. Hota Chairman, (Dr K.B. Dubey), (Dr S K Sah), (Dr. S. Jain), R. Khuntey, (Dr. Anil Sharma), (Dr A.S. Sharma), (Sushil Kumar Sahu), (Suresh Thakur), Shailendra Aga, ANJEETA KUJUR

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=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:	**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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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.*

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota Chairman, Kiran (Dr. K.B. Dubey), (Dr. S.K. Saha), (Dr. S. Jain), Dr. A.S.S., Dr. Anil Sharma, Kotangle, R. Khuntey, (Sushil Kumar Sahu), (Suresh Thakur), Shailendra Arya, ANJEETA KUJU

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=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

Name and Signature of Convener & Members of CBoS:

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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 -III	Session: 2024-2025

1	Course Code	CASC-07
2	Course Title	Software Engineering
3	Course Type	DSC (Discipline Specific Course)
4	Pre-requisite	*As per program*
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able: • Understand the fundamentals of software Engineering. • Identify and analyze the requirement of system. • Understand the design of existing System and Design the proposed System. • Understand the fundamentals of Software project management. • Create the test-cases and perform System testing. • Apply the concepts of software engineering for new system development.
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	**Software Engineering & Models:** The evolving role of software, changing nature of software, Evolution of Software Engineering, Characteristics of software. SDLC Introduction, Software Process Models: Waterfall Model, V-model, Prototype model, RAD model, Incremental development model, Spiral Model, Evolutionary Model, RAD Model, Agile model.	15
II	**2 Requirements engineering process**: Requirement Gathering and Analysis, Feasibility studies, requirements validation, requirements management. Functional and Non-Functional Requirements, User requirements, System Requirements, SRS documents. **Design Engineering:** Software design concepts, design process, design methodology, Function-oriented software design, Structured analysis, Structured Chart, DFD, Concept of Modularity, Cohesion and Coupling, OOAD (Object oriented analysis and design) Concept, UML diagram, different view of software using UML diagrams, Class diagram, Object diagram, Activity diagram, Interaction diagram, State chart diagram.	15
III	**Software Project Management:** Need of Software project management, Software project managements complexities, Types of management in SPM, Project Planning, Software project scheduling, Project size estimation: LOC, Function Point. Project estimation techniques: Empirical, Analytical and Heuristic technique, COCOMO models.	15
IV	**Testing Strategies and Quality Management:** Testing Strategies for software, black-box and white-box testing, Verification and Validation, Unit-testing, Integration and system testing, Debugging approach. **Software Reliability & Quality Management:** Software Reliability, Quality concepts, software quality assurance, software reviews, formal technical reviews, software configuration management, software reliability, the ISO 9000 quality standards, Capability Maturity Model. Risk Management.	15

Keywords *Software, software Engineering, Models, Requirement engineering, Software Designing Tools, Testing.*

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PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Rajib Mall, Fundamentals of Software Engineering, 5th ed, PHI publication.
- Roger S. Pressman, Software Engineering, A practitioner's Approach, 6th edition, McGraw Hill International Edition.

Reference Books Recommended:

- Sommerville, Software Engineering, 7th edition, Pearson Education.
- James Rumbaugh, Ivar Jacobson, The unified modelling language user guide Grady Booch, Pearson Education.

Online Resources:

- NPTEL YouTube Channel: Software Engineering Lectures by Prof Rajib Mall, IIT Kharagpur https://youtube.com/playlist?list=PLbRMhDVUMngf8oZR3DpKMvYhZKga90JVt&si=tTBITZUdivHpNz1H
- NPTEL YouTube Channel: Software Engineering Lecture Series https://youtube.com/playlist?list=PL8751DA481F0F0D17&si=07IfYV7GP8_oc1xZ

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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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 - III	Session: 2024-2025
1	Course Code	**CASC-08T**	
2	Course Title	**Relational Database Management System**	
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: • Learn about Database Concepts, Architecture, various Users, Data Models and Data Management. • Familiar with RDBMS Software like Oracle and MySql. • Create various Tables and Databases. • Explore various SQL commands. • Create Database on the basis of E-R diagrams for Minor and Major Project.	
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	**Overview of Database Management**: Introduction, Data Processing versus Data Management, Data Models: Network Model, Relational Model, Hierarchical Model, Instance and schema, View of Database system, File Oriented Approach vs Database Oriented Approach, Data Independence, DBMS Architecture, Database Administration Roles, Database languages: DDL, DML, DCL, TCL, Different kinds of DBMS users, Introduction to Data Dictionary.	12
II	**Database Design and E-R Model:** Introduction, Entity, Strong and weak entities, Relationship, Cardinality, Attributes, Concept of keys: Super key, Candidate key, Primary key, Alternate key, Foreign key, ER Diagram, Constraints in Database, Codd's Rules, Extended ER features: Generalization, Specialization and Aggregation, Participation, Converting an E-R model into relational Schema.	11
III	**Relational Database Design and Operations:** Introduction, Dependencies: Functional dependencies, Multivalued Dependencies, Join dependencies, Database anomalies, Decomposition, Normalization: Normal forms 1NF, 2NF, 3NF, BCNF, 4NF, 5NF, De-normalization. Relational Algebra: Select operation, Project operation, Union operation, Cartesian Product operation, Intersection operation, Join operation, Different types of joins (Inner join, Outer join, Self join).	11
IV	**Transaction:** Introduction, Desirable properties of transaction (ACID), Concurrency control techniques, Serializability.	11
Keywords	*Data Models, Data Dictionary, E-R Model, E-R Diagram, Keys, Functional Dependency, Anomalies, Normalization, Relational Algebra, Concurrency, Serializability.*	

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PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Database system concept, H. Korth and A. Silberschatz, TMH Publications.
- Data Base Management System, Alexies & Mathews,Vikash publication.
- Data Base Management System, C. J. Date ,Narosha Publication.
- Data Base Management System By James Matin.

Reference Books Recommended:

- Principles of Database System By Ullman.
- Program Design, Peter Juliff, PHI Publications.
- The Complete Reference, Kevin Loney, Oracle Press.
- SQL, PL/SQL The Programming Language of Oracle, Ivan Bayross , PustakKosh Publication.
- Microsoft SQL Server Management and Administration, Ross, STM Publications.

Online Resources:

- SWAYAM URL link for DBMS and RDBMS: https://youtu.be/f6LGtJutWyA
- SWAYAM URL link for DBMS and RDBMS: https://youtu.be/IoL9Ve2SRwQ
- SWAYAM URL link for DBMS and RDBMS: https://**swayam**.gov.in/courses/4434-data-base-management-system.
- Introduction of DBMS from SWAYAM: https://onlinecourses.swayam2.ac.in/cec19_cs05/preview
- Introduction of RDBMS from SWAYAM : https://onlinecourses.nptel.ac.in/noc19_cs46/preview
- Introduction to DMBS: https://www.w3schools.in/dbms/intro
- Data independence: https://www.w3schools.in/dbms/data-independence
- Generalization and Aggregation: https://www.w3schools.in/dbms/generalization-aggregation
- Introduction to DMBS: https://www.javatpoint.com/dbms-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	

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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)*	Semester - III	Session: 2024-2025

1	Course Code	CASC-08P		
2	Course Title	**Lab 5: Relational Database Management System (Oracle/MySQL)**		
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: • Learn about Database Concepts, Architecture, various Users, Data Models and Data Management which helps them to interact with various Databases. • Develop various Tables and Databases which helps them to develop new Software. • Practice various SQL commands which helps them to generate new relationships among various Tables and Databases which are useful for Software Development. • Familiar with RDBMS Software like Oracle and SQL Server which are used as Backend for Software Development. • Develop new Databases for their Minor and Major Project Development which enhances their Data Storage, Data Accessibility and Data Management.		
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. Design an employee table in Oracle/SQL Server having eid(primary key) ename, edesignation, edoj, edob, eaddress, salary, econtact as fields and answer the following questions : a) Insert five records in above created table. b) Display all five records. c) Delete the fourth record. d) Update the third record of the field ename as 'hari'. e) Add one new field in the table. 2. Design a salary table Oracle/SQL Server with one primary key and foreign key(employee table) having following fields : Month, working days, deptid, gross, incentive, deduction and net salary. a) Insert five records in the above created table. b) Display all five records. c) Use foreign key relations and display records. d) Update the second record of field deptid as 'Sales '. e) Add one new field in the table. 3. Create a new user in Oracle/SQL Server. 4. Create a view in Oracle/SQL Server. 5. Create a new table in Oracle/SQL Server and practice for join operation. 6. Create a new user in Oracle/SQL Server and practice for the commit and rollback command.	**30**

7. Create a new database in Oracle/SQL Server having at least five tables for the Hotel Management System.
8. Create a new database in Oracle/SQL Server having at least four tables for Covid Vaccination Management System.
9. Create a new database in Oracle/SQL Server having at least five tables for the Library Management System.
10. Create a new table in Oracle/SQL Server and practice for Group by and Order by Clause.
11. Create a new table in Oracle/SQL Server and practice for max(), min(), avg() and count() functions.
12. Create a new table in Oracle/SQL Server and practice for lower(), substr(),trim() and upper() functions.
13. Create a new table in Oracle/SQL Server and practice for unique and check constraints.
14. Create a new table in Oracle/SQL Server and practice for any two date formats.
15. Create a new table in Oracle/SQL Server and practice using clauses.
16. Create a new table in Oracle/SQL Server and practice for having clauses with sub queries.
17. Create a new table in Oracle/SQL Server and practice for aliases in any table.
18. Create a new table in Oracle/SQL Server and practice for inner and outer join.
19. Create a new table in Oracle/SQL Server and practice for Drop command.
20. Write a PL/SQL program for addition of two numbers.
21. Write a PL/SQL program to find the factorial value of any entered number.
22. Write a PL/SQL program for swapping of two numbers.
23. Write a PL/SQL program to print the first ten Natural Numbers.
24. Write a PL/SQL program to generate even series upto five digits starting from 2 and sum all the terms.
25. Write a PL/SQL program to practice for implicit and explicit cursors.

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

Keywords	*TABLE, SQL, PL/SQL.*

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:

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- Data Base Management System, C. J. Date ,Narosha Publication.
- Data Base Management System By James Matin.

Reference Books Recommended:

- Principles of Database System by Ullman.
- Program Design, Peter Juliff, PHI Publications.
- The Complete Reference, Kevin Loney, Oracle Press.
- SQL, PL/SQL The Programming Language of Oracle, Ivan Bayross, PustakKosh Publication.

- Microsoft SQL Server Management and Administration, Ross, STM Publications.

Online Resources:

- SWAYAM URL link for DBMS and RDBMS:
  https://youtu.be/f6LGtJutWyA
- SWAYAM URL link for DBMS and RDBMS:
  https://youtu.be/IoL9Ve2SRwQ
- SWAYAM URL link for DBMS and RDBMS :
  https://swayam.gov.in/courses/4434-data-base-management-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

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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 -III	Session: 2025-2026
1	Course Code	CASC-09T	
2	Course Title	Programming in Java	
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 fundamentals of java programming environment • Understand the importance of features of Java programming. • Create user defined Classes/interfaces and Packages which help them to develop new Application Software and Utility Software. • Develop new Online Software and Internet Games with the help of Applet and AWT Packages. • Familiar about Applet, Thread and Servlet Life Cycle which helps them to develop important applications for Internet Users.	
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	**Overview of JAVA:** The genesis of java, history of java, java virtual machine (JVM), java development kit (JDK), source files, jar files, compiling and running of files, byte code, platform independency, data types, literals, variables, constants, array and its types, operators, conditional and looping statements, various packages, introduction of class, objects and methods, nested and inner class, string handling, constructor and its types.	12
II	**Inheritance:** concept of super and sub class, types of inheritance, Polymorphism: method overloading, method overriding; abstract class, constructor in multilevel inheritance, using final with inheritance. **Interface:** defining and implementing interface, extending interface, nested interface, importance of interface in java. **Package:** defining package, rules for creating a new package, concept of class-path, access protection, importing package.	11
III	**Exception Handling and Multithreading:** using try and catch, multiple catch classes, nested try statements, throw, throws and finally, types of exception: built in exception, checked/unchecked exception, creating own exception class. **Java Thread Model:** main thread, creating own thread, life cycle of thread, thread priorities, synchronization, inter thread communication, suspending, resuming and stopping thread.	11
IV	**Java Packages: I/O classes:** Byte Stream and Character Stream, Predefined Stream, reading console input, writing console output. **Applet:** Applet Life Cycle, creating an applet, Using image and sound in applet. **Lang:** Various classes, Importance class Definition, **Util:** Framework, Event Model, Scanner Class **AWT:** Exploring AWT, Event handling – The delegation-event model, Event classes, Source of event, Event listener interfaces, handling mouse and keyboard event, Adapter class.	11

Keywords *Java Virtual Machine (JVM), Java Development Kit (JDK), Interface, Package, Threads, Applet, AWT.*

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(Sushil Kumar Sahu)
(Suresh Thakur)
ANJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Naughton P and Schildt H., Osborne, The complete reference, McGraw-Hill, Berkeley Publication.
- James R. Laverick, An Introduction to JAVA programming, Firewall Media publication.

Reference Books Recommended:

- E. Balgurusamy, Java Programming, McGraw-Hill Publication.
- Rashmi Kanta Das, Core JAVA for beginners, Vikas Publication.

Online Resources:

- SWAYAM URL Link for Java
  - https://onlinecourses.swayam2.ac.in/aic20_sp13/preview
  - https://onlinecourses.nptel.ac.in/noc19_cs84/preview
  - https://www.dqindia.com/iit-bombay-offers-free-online-course-java-swayam-platform/
  - https://www.classcentral.com/course/swayam-programming-in-java-12930
- W3schools Java Tutorial.
  Java Tutorial (w3schools.com)
- Online Platforms to Exercise and Execute the Java Programs
  - Online Java Compiler (programiz.com)
  - Solve Java | HackerRank
  - Online Java Compiler - Online Java Editor - Java Code Online (jdoodle.com)
- NPTEL Channel: Programming in Java
  Programming In Java - Course (nptel.ac.in)

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:

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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)*	Semester – III	Session: 2025-2026

1	Course Code	CASC-9P
2	Course Title	Lab 6: Programming in Java
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: • Execute the program in java • Implement the concept of multi-threading • Develop new Packages which help them to develop new application software and Utility Software. • Develop new Online Software and Internet Games with the help of Applet and AWT Packages. • Familiar about Applet, Thread and Servlet Life Cycle which helps them to develop value added services for Internet Users.
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 Contents of Course	1. Write a program to check palindrome number. 2. Write a program to check Armstrong number. 3. Write a program to check the prime number. 4. Write a program to calculate simple interest using the GUI Form. 5. Write a program to demonstrate the thread life cycle. 6. Write a program to show the use of applet. 7. Write a program to demonstrate the concept of arrays. 8. Write a program to find the second largest and second smallest number in array. 9. Write a program to perform multiplication of two matrices. 10. Write a program to demonstrate the concept of method overloading. 11. Write a program to demonstrate the concept of constructor overloading. 12. Write a program to demonstrate the concept of inner classes. 13. Write a program to demonstrate the concept of inheritance. 14. Write a program to demonstrate the concept of access specifiers in java. 15. Write a program to implement the concept of interface. 16. Write a program to show the creation of package in java. 17. Write a program to design the user registration form with basic registration details. 18. Write a program to show the exception handling process in java. 19. Write a program to show the significance of multithreading. 20. Write a program to read the data from the console device and store it in any file in secondary storage. 21. Write a program to copy the content of any file into another file. 22. Write a program to demonstrate the advantages of event delegation model. 23. Write a program in java for command line value passing. **Note:** Concerned teacher can add additional practical exercises as per requirement.	30

Keywords	Class, Object, interface, Inheritance, package, exception handling, threads, applet, AWT.

Name and Signature of Convener & Members:

Dr. H. S. Hota Chairman, (Dr. K. B. Dubey), (Dr SK Saha), (Dr. Anil Sharma), (Dr. S. Jain), R. Khunteley, (Sushil Kumar Saha), (Suresh Thakur), Shailendra Aya, ANJEETA KUJ

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Naughton P and Schildt H., Osborne, The complete reference, McGraw-Hill, Berkeley Publication.
- James R. Laverick, An Introduction to JAVA programming, Firewall Media publication.

Reference Books Recommended:

- E. Balgurusamy, Java Programming, McGraw-Hill Publication.
- Rashmi Kanta Das ,Core JAVA for beginners, Vikas Publication.

Online Resources:

- SWAYAM URL Link for Java
  - https://onlinecourses.swayam2.ac.in/aic20_sp13/preview
  - https://onlinecourses.nptel.ac.in/noc19_cs84/preview
  - https://www.dqindia.com/iit-bombay-offers-free-online-course-java-swayam-platform/
  - https://www.classcentral.com/course/swayam-programming-in-java-12930
- W3schools Java Tutorial.
  Java Tutorial (w3schools.com)
- Online Platforms to Exercise and Execute the Java Programs
  - Online Java Compiler (programiz.com)
  - Solve Java | HackerRank
  - Online Java Compiler - Online Java Editor - Java Code Online (jdoodle.com)
- NPTEL Channel: Programming in Java
  Programming In Java - Course (nptel.ac.in)

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:

Dr. H. S. Hota Chairman, (Dr. K. B. Dubey), (Dr SK Saha), Dwarek Kotangle, (Dr. Anil Sharma), (Dr. S. Jain), R. Khunteley, (Sushil Kumar Saha), (Suresh Thakur), Shailendra Aya, (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 -IV	Session: 2024-2025

1	Course Code	CASC-10	
2	Course Title	**Theory of Computation**	
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: • Understanding of the language compiler and their associated phases. • Understanding of the core concepts in automata theory and formal languages. • Understanding and analyzing the fundamentals of compiler designing. • Design grammars and automata (recognizers) for different language classes. • Design the pushdown automata and Turing machine.	
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	**Introduction to Language Compiler:** What is a compiler, phases of a compiler, the role of lexical analyzer, specification of tokens, recognition of tokens; different types of parsers; types of grammars, and their associated language in theory of computation. **Finite Automata:** Introduction to Finite State Automata (FSA): Formal definition, Representation notations (state transition diagram, transition table). Types of FSA: Deterministic Finite Automata (DFA), Nondeterministic Finite Automata (NFA), Finite Automata with Epsilon Transitions, Elimination of Epsilon transitions, Conversion of NFA to DFA, Equivalence of NFA and DFA. Applications of Finite Automata, Minimization of Deterministic Finite Automata. Mealy machine, Moore machine.	15
II	**Regular Expressions:** Introduction to RE, Identities of Regular Expressions, Finite Automata and Regular Expressions- Converting from DFA to Regular Expressions, Converting Regular Expressions to Automata, Applications of Regular Expressions. **Regular Grammars:** Definition, Regular grammar, and FA, FA for regular grammar, Regular grammar for FA. Proving languages to be non-regular -Pumping lemma, applications, Closure properties of regular languages.	15
III	**Context Free Grammar:** Introduction to CFGs, Properties of CFGs, Derivation Trees, Sentential Forms, Rightmost and Leftmost derivations of Strings. Ambiguity in CFG, Minimization of CFG, Chomsky Normal Form (CNF), Greibach Normal Form (GNF), Pumping Lemma for CFLs. **Pushdown Automata:** Introduction of PDA and its model, types of PDA, Languages accepted by the PDA, Acceptance by Final State and Acceptance by Empty stack and its Equivalence, Equivalence of CFG and PDA.	15
IV	**Turing Machines:** Formal definition and model of Turing Machine, Types of TMs, Languages of a TM, TM as acceptors, Properties of recursive and recursively enumerable languages, Universal Turing machine, The Halting problem, Undecidable problems about TMs. Context-sensitive language and linear bounded automata (LBA).	15
Keywords	*Language compiler, grammar, and their associated language, Finite Automata, Regular Expression, Regular Grammar, Context Grammar, and Turing Machine.*	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

AINJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman (2007), Introduction to Automata Theory Languages and Computation, 3rd edition, Pearson Education, India.
- K. L. P Mishra, N. Chandrasekaran (2003), Theory of Computer Science-Automata Languages and Computation, 2nd edition, Prentice Hall of India, India.
- Tools Alfred V. Aho, Ravi Sethi, D. Jeffrey Ullman and Monica S. Lam , Compilers Principles, Techniques and Tools, Addison Wesley.

Reference Books Recommended:

- A.M. Padma Reddy, Finite Automata and Formal languages, Pearson Education India
- Michael Sipser, Third Edition, Introduction to the Theory of Computation, Cengage Learning.

Online Resources:

- NPTEL YouTube Channel: Lectures on Theory of Computation https://youtube.com/playlist?list=PLbMVogVj5nJSd25WnSU144ZyGmsqjuKr3&si=EvuSjnO_TT1oTHjn
- NPTEL YouTube Channel: Lectures on Theory of Automata, Formal Languages and Computation https://youtube.com/playlist?list=PL85CF9F4A047C7BF7&si=SBm-gIkmkjOBDscB
- NPTEL YouTube Channel: Lectures on Theory of Computation and Automata https://youtube.com/playlist?list=PL3-wYxbt4yCgBHUpwXDTLos3JStccGIax&si=TbYH91hmlOrtUEnN.
- SWAYAM YouTube Channel: Introduction to Automata, Languages and Computations https://youtube.com/playlist?list=PLbRMhDVUMngcwWkzVTm_kFH6JW4JCtAUM&si=RbTG3WZ0Jf6Zx_pu.
- NPTEL YouTube Channel: https://www.youtube.com/watch?v=_ck1Lnm28hQ&list=PLbRMhDVUMngcseCW7wXDvtTDemCuH80fP

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. K.B. Dubey, (Dr SK Saini), Dwyer Kotangle, (Dr. Anil Sharma), (Dr. S. Jain), Dr. A.S., (Sushil Kumar Sahu), (Suresh Thakur), R. Khuntey, Dr. V.K. Gupta, Shailendra Arya, Jitendra Kumar, 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 - IV	Session: 2024-2025

1	Course Code	CASC-11T
2	Course Title	Web Technology
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: • Analyze a web page and identify its elements and attributes. • Create web pages using HTML, CSS, JAVASCRIPT, XHTML • Build dynamic web pages using JavaScript (Client-side programming). • Create XML documents and Schemas. • Build interactive web applications using PHP, AJAX. • Handling MySQL Database using PHP.
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:** Fundamentals of web technology: Webpages, website, browser, client, web servers, Basics of HTML CSS, Scripting Languages, MySQL, PHP etc., protocols governing the web, Web applications. Web Publishing: Introduction, Domain Name Registration, choosing a web host and signing up for an Account, web hosting. IDE for web development.	12
II	**HTML:** Introduction, Basic formatting tags: heading, paragraph, line break, bold, italic, underline, superscript, subscript, font and image. Different attributes like align, color, bgcolor, font face, border, size, Navigation Links using anchor tag: internal, external, mail and image links, Link to different web pages and sections. Lists: ordered, unordered and definition, Table tag, image tag, iframe tag. HTML Form controls: form, text, password, text area, button, checkbox, radio button, select box, hidden controls, Frameset and frames. Basics of DHTML, introduction of XML and its uses. Introduction of AJAX.	11
III	**CSS and Scripting Languages:** Introduction and features of CSS, CSS syntax, Creating Style sheets, CSS selectors (simple selector, combinator selectors, pseudo-class-selectors, pseudo-element-selectors, attribute selector), different ways to insert the CSS, different styling attributes and their settings like color, background, font, text, margin, position, border etc. **JavaScript:** introduction and features of java script, Syntax & Conventions, Variables, Expression, Branching & Looping, Function, Array, Objects, Events and Document Object model, Alerts, prompts and conforms.	11
IV	**PHP:** Introduction and features of PHP, data types, operators, control statements and looping, functions, array, string and string functions, object oriented, programming features of PHP: class-objects, abstraction, encapsulation, constructor, destructor, inheritance, polymorphism etc., Exception Handling. Handling HTML forms with PHP, Working with files and directories, session and cookies, PHP functions for Database Connectivity and basic operation with MySQL.	11

Keywords *Webpage, Website, HTML, AJAX, CSS, JavaScript, PHP, MySQL.*

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:

- Xavier, C, Web Technology and Design, New Age International.
- Ivan Bayross, HTML, DHTML, Java Script, Perl & CGI, BPB Publication.
- Ramesh Bangia, Internet and Web Design, New Age International.
- Ullman, PHP for the Web: Visual QuickStart Guide, Pearson Education.

Reference Books Recommended:

- Jim Converse & Joyce Park, PHP & MySQL Bible, Wiley India Publication
- Chuck Musiano & Bill Kenndy, O Reilly, HTML The Definitive Guide
- Joseph Schmuller, Dynamic HTML, BPB, 2000.
- Deitel, Deitel, Goldberg, Internet & World Wide Web How to Program,Pearson Education,
- Raj Kamal, Internet and Web Technologies, Tata McGraw-Hill.

Online Resources:

- Swayam Portal : Web technology: Web Technology - Course (swayam2.ac.in)
- W3schools: Web development Programming and Scripting Languages https://www.w3schools.com
- Fundamentals of PHP: PHP Tutorial (tutorialspoint.com)
- IIT Kharagpur YouTube Link: Database and SQL https://youtube.com/playlist?list=PLIwC9bZ0rmjSkm1VRJROX4vP2YMIf4Ebh&si=Z5JJIgtFMUWTfNtg
- NPTEL: SQL https://youtube.com/playlist?list=PLLQPIumE5cEgzU5hChH1V3H93x4UOlHR&si=2dxqvodFZcnQUudR

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

PART- A: Introduction

Program: Bachelor in Computer Application *(Certificate / Diploma / Degree)*		Semester – IV	Session: 2024-2025
1	Course Code	CASC-11P	
2	Course Title	Lab 7: Web Technology	
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: • Analyze a web page and identify its elements and attributes. • Create web pages using HTML, CSS, JAVASCRIPT, XHTML • Build dynamic web pages using JavaScript (Client-side programming). • Create XML documents and Schemas. • Build interactive web applications using PHP, AJAX. • Handling MySQL Database using PHP.	
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	**HTML** 1. Write HTML code to create the following table: 2. Write HTML code to create the following lists: 3. Write HTML code to create the following lists: 4. Write HTML code to demonstrate hyper linking between two web pages. 5. Create a marquee & also insert an image. 6. Write HTML code to create a frame in HTML with 3 columns (width= 30%, 30%, 40%) and put hyperlinked pictures inside each. 7. Write HTML code to create a webpage with a blue background and print the following text with white background. "Hello Word " 8. Write HTML code to create the following table:	30

Class	Subject 1	Subject 2	Subject 3
BCA-I	Visual Basic	PC Software	Electronics
BCA-II	C++	DBMS	English
BCA-III	Java	Multimedia	CSA

- C
- C++
- Fortran
- COBOL

1. Java
2. Visual Basic
3. Basic
4. COBOL

Course	OC	BC	MB	SC/ST	Total

Computer Science	**9**	**18**	**5**	**5**	**37**
Commerce	**14**	**25**	**6**	**5**	**50**
Grand Total					**87**

9. Write HTML code to create the following table:

Maruti		**Tata**		**Ford**	
Model	**Price**	**Model**	**Price**	**Model**	**Price**
Maruti 800	2 Lac	Sumo	2 Lac	Icon	5 Lac
Omni	3 Lac	Scorpio	3 Lac	Gen	2 Lac

10. Write HTML code to create the following table:

Pandit Ravishankar Shukla University		
Name	**Roll No.**	**Class**
Rahul	40	BCA-I
Preeti	85	BCA-I
Priya	74	BCA-I
Richa	95	BCA-I

11. Write HTML code to create the following table:

Students Record

Name	**Subject**	**Marks**
Arun	Java	70
	C	80
Ashish	Java	75
	C	69

12. Write HTML code to create the following table and also insert an image in the webpage.

Subject	**Max**	**Min**	**Obtain**
Java	100	33	75
Multimedia	100	33	70
Operating System	100	33	68
C++	100	33	73

13. Write HTML code to create the following table:

Name		Rahul	
Roll No.		101	
Subject	**Max**	**Min**	**Obtain**
Java	100	33	75
Multimedia	100	33	70

14. Write HTML code to create a form as the following:

Enter Name :

Enter Roll No. :

Enter Age :

Enter DOB :

15. Write HTML code to create the following form:

User Name :

Password :

When user types characters in a password field. The browser displays asterisks or bullets instead of character.

Submit

16. Write HTML code to create Student Registration Form
17. Write HTML code to create Contact Form
18. Write HTML code to insert Audio & Video in HTML
19. Write HTML code for the following equations:

$C_2H_5OH+PCL_5=C_2H_5CL+POCL_3+HCL$

$4H_3PO_3=3H_3PO_4+PH_3$

$PCL_3+CL_2=PCL_5$

20. Write the HTML code to display the following list:
    - Actors
        - Bruce Wills
        - Gerand Butler
        - Vin Diesel
        - Bradd Pitt
        - Paul Walker
        - Jason Statham
    - Actress
        - Julia Roberts
        - Angelina Jolie
        - Kate Wins let
        - Cameron Diaz
21. Write the HTML code to display the following list:
    1. Cricket Players
        A. Batsman
            i. Sachin Tendulkar
            ii. Rahul Dravid
            iii. Virendra Sehwag
        B. Bowlers
            i. Kumble
            ii. Zaheer Khan
            iii. Balaji
        C. Spinner
            i. Harbhajan
            ii. Ravindra Jadeja
            iii. Kartik

****

JavaScript

1. Write a java script, to print prime numbers from 1 and 50.
2. Write a script to get the largest value in an array.
3. Write a function to calculate the factorial of a number (a non-negative integer).
4. Write a script to demonstrate data validation.
5. Write a program to print dates using JavaScript.
6. Write a program to Sum and Multiply two numbers using JavaScript.

****

DHTML

1. Create a web page which shows the changes of header dynamically.

2. Create a webpage which explains the use of relative positioning.
3. Display an alert box to alert the x and y coordinates of the cursor.

****

PHP

1. write script using for loop to print all integer between -10 to 10
2. write script to construct the following pattern, using nested for loop

```
1
1 2
1 2 3
1 2 3 4 5
```

3. Write a PHP script to get the largest key in an array.
4. Write a function to calculate the factorial of a number (a non-negative integer).
5. Write a PHP script to check string for palindrome.
6. Write a PHP script to collect the data from the registration form designed in HTML, and submit it to the database.
7. Write a PHP script to read the data from the database and display it into the web page in tabular form.

****

MySQL

Task - I

Create the following table in MySQL:

College (cname, city, caddress, cphone)
Staffjoins (sid, cname, dept, doj, post, salary)
Staffs (sid, sname, saddress , scontacts)
Teaching (sid, class, paprid, fsession, tsession)
Subject (paperid, subject, paper, papername)

Write the queries to perform the following operations.

1. List the name and post of a teacher teaching a computer subject.
2. List the name and city of all staff working in your college.
3. List the name and city of all staff working in your college who earn more than 15000.
4. Find the staff whose date of joining is 2005.
5. Find the staff whose names start with 'M' or 'R' and 'A' and/or 7 characters long.
6. Modify the database so that staffN1 now works in C2 college.
7. List maximum, average, minimum salary of each college.
8. Acquire details of staff by name in a college or each college.
9. List names of staff in ascending order according to salary who are working in all colleges.
10. Find the staff that earn a higher salary who earn greater than the average salary of their college.

Task - II

Create the following table MySQL:
Enrollment (enrollno, name, gender, DOB, address, phone)
Admission (adno, enrollno, course, yearsem, date, cname)
Feestucture (course_yearsem, fee)
Payment (billno, admno, amount, pdate,purpose)

Write the queries to perform the following operations.

1. Get full detail of all students who took admission this year class wise.
2. Get details of students who took admission in sai colleges.
3. Calculate the total amount of fees collected in this session.
4. List the students who have not paid full fees in your colleges.
5. List the number of admission in your college every year.
6. List the students in colleges in your city and also live in your city.

Task - III

Create the following table MySQL:
Subject (paperid, subject, paper, papername)
test(paperid,tdate,max,min)
score(rollno,paperid,marks,attendance)
students(admno,rollno,class,yearsem)

Write the queries to perform the following operations.

1. List roll no of students who were present in a paper of a subject.
2. List all roll numbers who have passed in first division.
3. List all students in BCA-II who have scored higher than average in your college.

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

Keywords *HTML, Hyperlinks, Form, List, Table, CSS, JavaScript, MySQL, PHP.*

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Xavier, C, Web Technology and Design, New Age International.
- Ivan Bayross, HTML, DHTML, Java Script, Perl & CGI, BPB Publication.
- Ramesh Bangia, Internet and Web Design, New Age International.
- Ullman, PHP for the Web: Visual QuickStart Guide, Pearson Education.

Reference Books Recommended:

- Jim Converse & Joyce Park, PHP & MySQL Bible, Wiley India Publication
- Chuck Musiano & Bill Kenndy, O Reilly, HTML The Definitive Guide
- Joseph Schmuller, Dynamic HTML, BPB, 2000.
- Deitel, Deitel, Goldberg, Internet & World Wide Web How to Program,Pearson Education,
- Raj Kamal, Internet and Web Technologies, Tata McGraw-Hill.

Online Resources:

- Swayam Portal : Web technology: Web Technology - Course (swayam2.ac.in)
- W3schools: Web development Programming and Scripting Languages https://www.w3schools.com

- Fundamentals of PHP: PHP Tutorial (tutorialspoint.com)
- IIT Kharagpur YouTube Link: Database and SQL https://youtube.com/playlist?list=PLIwC9bZ0rmjSkm1VRJROX4vP2YMIf4Ebh&si=Z5JJIgtFMUWTfNtg
- NPTEL: SQL https://youtube.com/playlist?list=PLLQPIumE5cEgzU5hChH1V3H93x4UOlHR&si=2dxqvodFZcnQUudR

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. Dubay, (Dr S K Sahu), Dr. Kottayle, (Dr. Anil Sharma), (Dr. S. Jain), Cdr. A.S. Sa, R. Khuntey, (Sushil Kumar Sahu), (Naren Thakur), Shailendra Arya, Jeetendra Kumar, Dr. V.K. Gupta, ANJEETA KUJU

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 - IV	Session: 2024-2025

1	Course Code	CASC-12T		
2	Course Title	**Python Programming**		
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: • Define the structure and components of a Python program. • Demonstrate proficiency in handling of loops and creation of functions. Identify the methods to create and manipulate lists, tuples and dictionaries. • Discover the commonly used operations involving regular expressions and file system. • Determine the need for scraping websites and working with CSV, JSON and other file formats. • Interpret the concepts of Object-Oriented Programming as used in Python.		
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 Python Programming**: What is a Program, Formal and Natural Languages, Why use Python, Uses of python, Strengths & Drawbacks, The Python Interpreter, Running Python, The IDLE User Interface, The Interactive Prompt, Script Mode, Dynamic Typing , Debugging. **Types, Operators, Expressions & Statements**: Values and Types, Assignment Statement, Variable Names, Expressions & Statements, Order of Operations, String Operations, Comments.	10
II	**Conditionals**: Boolean Expressions, Logical operators, Conditional & Alternative Execution, Chained and Nested Conditions. **Iterations**: Reassignment, Updating Variables, The "for" and "while" statements, break. **Strings**: String is a sequence, len, Traversal with a for loop, String Slices, Searching, Looping and Counting, String Methods, the "in" operator, String Comparison.	10
III	**Lists, Tuples, and Dictionaries;** Basic list Operators, replacing, inserting, removing an element, searching and sorting lists, Accessing tuples, Operations, Working, Functions and Methods, dictionary literals, adding and removing keys, accessing and replacing values, Traversing Dictionaries.	10
IV	**Function, Files and Graphics:** Defining a function, calling a function, Types of functions, Function Arguments, Anonymous functions, Global and local variables, **Files**: Files & Persistence, Reading and Writing, Filenames and Paths.**Graphics programming**: Drawing with turtle graphics, using turtle module, moving the turtle with any direction, moving turtle to any location, the color, bgcolor, circle and speed method of turtle, drawing with colors, drawing basic shapes using iterations. **Python Libraries:** Exploring python libraries like Panda, Numpy, TensorFlow, Scikit-Learn, Keras, PyTorch, SciPy etc.	15
Keywords	*List, Tuple, Dictionary, Panda, Numpy, TensorFlow, Scikit-Learn, Keras, PyTorch, SciPy.*	

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. Sushil Kumar Saha), (Sushil Kumar Saha), (Suresh Thakur), (Dr. Shashi Kant Ayre), (Dr. Anjeeta Kumari)

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- T. Budd, Exploring Python, TMH, 1st Ed, 2011
- Allen Downey, Jeffrey Elkner, Chris Meyers, How to think like a computer scientist: Learning with Pyth,Freelyavailableonline.2012

Reference Books Recommended:

- Luca Massaron John Paul Mueller, Python for Data Science For Dummies, Wiley, 2ed, 2019
- Allen B. Downey, Think Python: How to Think Like a Computer Scientist, 2nd edition by O'Reilly, 2015
- Zed A. Shaw, Learn Python 3 the Hard Way (Addison-Wesley, 2016)

Online Resources:

- NPTEL URL link for Python Programming: https://www.youtube.com/watch?v=eoPsX7MKfe8&list=PLIdgECt554OVFKXRpo_kul0XpUQKk0ycO
- Complete NPTEL link for Basic Python Programming: https://www.youtube.com/watch?v=Y3Ri2GdYfYg&list=PLqftY2uRk7oXvERQEgATSr-KzAh8WLW_D
- File Handling: https://www.w3schools.com/python/python_file_handling.asp
- NumPy: https://www.w3schools.com/python/numpy/default.asp
- Pandas: https://www.w3schools.com/python/pandas/default.asp
- SciPy: https://www.w3schools.com/python/scipy/index.php
- Django: https://www.w3schools.com/django/index.php
- Matplotlib: https://www.w3schools.com/python/matplotlib_intro.asp
- Machine Learning: https://www.w3schools.com/python/python_ml_getting_started.asp
- Python MySQL: https://www.w3schools.com/python/python_mysql_getstarted.asp
- Topics related Python from SWAYAM/NPTEL
  https://www.youtube.com/channel/UCxu1cR5XRauYn37yg-Fh6rA
  https://www.youtube.com/channel/UCJAgw1niUkaShdmA5aAZdQw
- Topics related Python from Tutorials
  - https://www.javatpoint.com/python-tutorial
  - http://docs.python.org/3/tutorial/index.html
  - http://interactivepython.org/courselib/static/pythonds
  - http://www.ibiblio.org/g2swap/byteofpython/read/
- Python for Beginners:
  - https://www.w3schools.com/python/python_intro.asp
  - https://www.python.org/about/gettingstarted/
  - https://www.javatpoint.com/python-tutorial
  - https://www.geeksforgeeks.org/python-programming-language/

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. K.B. Dubey

(Dr S.K. Sahu)

(Dr. Amit Sharma)

Dr. S. Jain

(Dr A.S.S.

(Sushil Kumar Sahu)

Suresh Thakur)

R. Khuntey

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 - IV	Session: 2024-2025

1	Course Code	CASC-12P	
2	Course Title	**Lab 8: Python Programming**	
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: • Define the structure and components of a Python program. • Demonstrate proficiency in handling of loops and creation of functions. Identify the methods to create and manipulate lists, tuples and dictionaries. • Discover the commonly used operations involving regular expressions and file system. • Determine the need for scraping websites and working with CSV, JSON and other file formats. • Interpret the concepts of Object-Oriented Programming as used in Python.	
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	**Note:** This is tentative list; the teachers concern can add more program as per requirement. 1. Python program to find the union of two lists. 2. Python program to find the intersection of two lists. 3. Using for loop, print a table of Celsius/Fahrenheit equivalences. Let c be the Celsius temperatures ranging from 0 to 100, for each value of c, print the corresponding Fahrenheit temperature. 4. Using while loop, produce a table of sins, cosines and tangents. Make a variable x in range from 0 to 10 in steps of 0.2. For each value of x, print the value of sin(x), cos(x) and tan(x). 5. Write a program that reads an integer value and prints —leap yearǁ or —not a leap yearǁ. 6. Write a program that takes a positive integer n and then produces n lines of output shown as follows. For example, enter a size: 5 * ** *** **** ***** 7. Write a function that takes an integer _n'as input and calculates the value of 1 + 1/1! + 1/2! + 1/3! + … + 1/n	**30**

8. Write a function that takes an integer input and calculates the factorial of that number.
9. Write a function that takes a string input and checks if it's a palindrome or not.
10. Write a list function to convert a string into a list, as in list (_abc') gives [a, b, c].
11. Write a program to generate Fibonacci series.
12. Write a program to check whether the input number is even or odd.
13. Write a program to compare three numbers and print the largest one.
14. Write a program to print factors of a given number.
15. Write a method to calculate GCD of two numbers.
16. Write a program to create Stack Class and implement all its methods. (Use Lists).
17. Write a program to create Queue Class and implement all its methods. (Use Lists)
18. Write a program to implement linear and binary search on lists.
19. Write a program to sort a list using insertion sort and bubble sort.
20. Python program to remove the "i" th occurrence of the given word in a list where words repeat.
21. Python program to count the occurrences of each word in a given string sentence.
22. Python program to check if a substring is present in a given string.
23. Python program to map two lists into a dictionary.
24. Python program to count the frequency of words appearing in a string using a dictionary.
25. Python program to create a dictionary with key as first character and value as words starting with that character.
26. Python program to find the length of a list using recursion.
27. Python program to read a file and capitalize the first letter of every word in the file.
28. Python program to read the contents of a file in reverse order.
29. Python program to create a class in which one method accepts a string from the user and another prints it.
30. Study and Implementation of Database, Structured Query Language and database connectivity.

Keywords	*List, Tuple, Dictionary, Panda, Numpy, TensorFlow, Scikit-Learn, Keras, PyTorch, SciPy.*

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota (Chairman) · (Dr. S. Jain) · R. Khuntley · Dr. A.S. Sahoo · ANJEETA KUJUR

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- T. Budd, Exploring Python, TMH, 1st Ed, 2011
- Allen Downey, Jeffrey Elkner, Chris Meyers, How to think like a computer scientist: Learning with Pyth,Freelyavailableonline.2012

Reference Books Recommended:

- Luca Massaron John Paul Mueller, Python for Data Science For Dummies, Wiley, 2ed, 2019

- Allen B. Downey, Think Python: How to Think Like a Computer Scientist, 2nd edition by O'Reilly, 2015
- Zed A. Shaw, Learn Python 3 the Hard Way (Addison-Wesley, 2016)

Online Resources:

- NPTEL URL link for Python Programming: https://www.youtube.com/watch?v=eoPsX7MKfe8&list=PLIdgECt554OVFKXRpo_kul0XpUQKk0ycO
- Complete NPTEL link for Basic Python Programming: https://www.youtube.com/watch?v=Y3Ri2GdYfYg&list=PLqftY2uRk7oXvERQEgATSr-KzAh8WLW_D
- File Handling: https://www.w3schools.com/python/python_file_handling.asp
- NumPy: https://www.w3schools.com/python/numpy/default.asp
- Pandas: https://www.w3schools.com/python/pandas/default.asp
- SciPy: https://www.w3schools.com/python/scipy/index.php
- Django: https://www.w3schools.com/django/index.php
- Matplotlib: https://www.w3schools.com/python/matplotlib_intro.asp
- Machine Learning: https://www.w3schools.com/python/python_ml_getting_started.asp
- Python MySQL: https://www.w3schools.com/python/python_mysql_getstarted.asp
- Topics related Python from SWAYAM/NPTEL
  - https://www.youtube.com/channel/UCxu1cR5XRauYn37yg-Fh6rA
  - https://www.youtube.com/channel/UCJAgw1niUkaShdmA5aAZdQw
- Topics related Python from Tutorials
  - https://www.javatpoint.com/python-tutorial
  - http://docs.python.org/3/tutorial/index.html
  - http://interactivepython.org/courselib/static/pythonds
  - http://www.ibiblio.org/g2swap/byteofpython/read/

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

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 – V	Session: 2024-2025
1	Course Code	CASC-13		
2	Course Title	**Data Mining and Data Warehousing**		
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: • Store voluminous data for online processing. • Preprocess the data for mining applications. • Apply the association rules for mining the data. • Design and deploy appropriate classification techniques. • Cluster the high dimensional data for better organization of the data. • Evaluate various mining techniques on complex data objects.		
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	**Introduction:** What is data mining? Why it is important? Mining on what kind of data, Data mining Functionalities, steps of data mining, Knowledge discovery. **Data Warehouse:** Meaning, definition, OLTP vs. OLAP, Data warehouse architecture, Three Tier Architecture Data warehouse architecture, Data cube and OLAP technology.	15
II	**Association Rule:** Basic concept, Frequent item set mining: Apriori algorithm etc., mining various kind of association rules: Mining Multilevel association rules, mining multidimensional association rules.	15
III	**Classification and Prediction:** What is classification and prediction, Decision tree algorithms: CART, ID3 C4.5, CHAID, Bayesian classification, Rule based classification, Classification by backpropagation, Support vector machine, Association classification and other classification methods. Prediction using Regression and Neural Network methods, Accuracy measures, Ensemble methods.	15
IV	**Cluster Analysis:** What is cluster analysis?, Partitioning method, Hierarchical methods, Experiments with python data mining tools for model development, data preprocessing, feature selection for Financial data, health care data etc.	15
Keywords	*Data Mining, Data Warehouse, Knowledge discovery, OLTP, OLAP, Data cube, CART, CHAID, Regression.*	

Name and Signature of Convener & Members of CBoS:

Dr. H. S Hota
Chairman
(Suresh Thakur)
Dr. Vikas Kumar
Dr. Shailendra Aryan
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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Data Mining: Concepts and Techniques, Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishes (Elsevier, 2nd edition), 2006.
- Data Mining Methods for Knowledge Discovery, Cios, Pedrycz, Swiniarski,Kluwer Academic Publishers, London – 1998.

Reference Books Recommended:

- Data mining techniques, Arun K Pujari, Universities Press (India) private limited, 2007.
- Data Mining, Data Warehousing and OLAP, Gajendra Sharma, S.K. Kateria and Sons, 2010.

Online Resources:

- Tutorials:
  - https://docs.oracle.com/database/121/DWHSG/concept.htm#DWHSG-GUID-452FBA23-6976-4590-AA41-1369647AD14D
  - https://www.tutorialspoint.com/dwh/index.htm#:~:text=A%20data%20warehouse%20is%20constructed,necessary%20concepts%20of%20data%20warehousing.
  - https://intellipaat.com/blog/tutorial/data-warehouse-tutorial/
  - https://www.guru99.com/data-warehousing-tutorial.html
  - https://www.javatpoint.com/data-warehouse
  - https://www.softwaretestinghelp.com/data-warehousing-fundamentals/
  - https://www.tutorialspoint.com/data_mining/index.htm
  - https://www.javatpoint.com/data-mining
  - https://www.guru99.com/data-mining-tutorial.html
  - https://www.mygreatlearning.com/blog/data-mining-tutorial/
  - https://www.tutorialride.com/data-mining/data-mining-tutorial.htm
  - https://data-flair.training/blogs/data-mining-tutorial/
  - https://www.geeksforgeeks.org/data-mining/
- Lab Manuals:
  - https://siiet.ac.in/wp-content/uploads/2020/02/DM-LAB-MANUAL-IV-CSE-I-SEM.pdf
  - https://mrcet.com/pdf/Lab%20Manuals/CSE%20IV-I%20SEM.pdf
  - https://mrcet.com/pdf/Lab%20Manuals/IT%20III%20B.TECH%20%20SEM-II%20DWDM-R17A0590%20LAB%20MANUAL%202019-20.pdf
  - https://www.iare.ac.in/sites/default/files/lab1/IARE_DWDM_AND_WT_LAB_MANUAL.pdf
  - http://www.apgcm.edu.in/images/data-mining-lab-manual.pdf
  - https://www.jnec.org/labmanuals/cse/be/sem1/DWDM-BE-PART-I.pdf
  - https://www.jnec.org/labmanuals/it/be/sem1/DWDM-lab.pdf
  - https://www.bharathuniv.ac.in/downloads/csc/BCS6L1-DWDM%20lab.pdf
  - http://www.nrcmec.org/pdf/Manuals/CSE/student/4-1%20dwdm16-17.pdf

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):	Internal Test / Quiz-(2): **20 +20** Assignment / Seminar - **10**	Better marks out of the two Test / Quiz + obtained marks in Assignment

(By Course Teacher)	Total Marks - 30	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

(Suresh Thakur)

Shailendra Ajay

(Dr. S. Jain)

ANJEETA KUJU

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

PART- A: Introduction

Program: Bachelor of Computer Application *(Certificate / Diploma / Degree/Honors)*	Semester - V	Session: 2024-2025

1	Course Code	**CASC-14T**	
2	Course Title	**Programming in .Net**	
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 .NET framework and object-oriented programming. • Develop the console and GUI applications using .Net programming. • Evaluate the .NET framework namespace contents. • Understand the procedures, File I/O, Error handling and Message queues. • Understand and remember the components in VB.NET IDE, ADO.NET and also the window forms.	
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 .NET**: Overview of .net framework, Features and architecture, Managed Execution process, CLR, Common language specification, JIT Compilation, MSIL, Namespace, Assemblies, Metadata common type, System, Visual development and event driven programming , Cross language, Interoperability, Garbage collection.	12
II	**Programming with .NET Framework:** Windows form: working with Visual Studio IDE, Creating a .NET solution, MDI application, Components and controls, Data types, Variable, Type conversions, Operators, Methods and events, Scope and lifetime of variables, Creating Enumerations.	11
III	**Control Structures:** Control Structures: conditional statement, Loops, Arrays, Types of methods, Method data, Creating Sub Procedures and Function, Introduction to exception handling try catch statement, finally statement, throw, user defined Exception. **GUI Programming**: GUI Programming with window forms, Showing & hiding, Textbox, RichText box, Label, Button, Listbox, Combobox, Checkbox, Picturebox, Radio button, Toggle button, Panel, Groupbox, Scrollbar, Timer, Dialog boxes, OpenfileDialog, Save File dialog, Print dialog, Front dialog, Color dialog, Designing menus and sub menus, Msgbox and Inputbox.	11
IV	**Database Programming with ADO.net** – ADO .Net Architecture, .Net data provider, dataset components, creating database application using Window forms (Database connectivity through ADO.Net), Accessing data using server explorer, Data Adapters and Data sets, Command & Data reader, Data bind controls, displaying data in data grid.	11

Keywords *.NET, Window form, Graphical User Interface (GUI), MDI, ADO.Net*

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

(Suresh Thakur)

(Dr. S. Jain)

Shailendra Arya

ANJEETA KUJ

PART–C: Learning Resources

Text Books Recommended:

- Visual Basic .Net Complete- by BPB Publications , New Delhi
- The Complete Reference VB.Net –by Jeffery R. Shapiro , Tata Mcgraw Hill.
- Bill Evjen, Jason Beres, et.al, Visual Basic .Net programming, Wiley Dreamtech India (p) Ltd.

Reference Books Recommended:

- Professional VB.Net 2003 – by Bill Evjen & others , Wiley Dreamtech India(P) Ltd. New Delhi
- Fergal Grimes, Microsoft .NET for programmers, Shroff Publishers & Distributors (P) Ltd.
- Thuan Thai & Hoang Q.Lam, .NET Framework Essentials, Shroff Publishers & Distributors (P) Ltd.
- MSDN online – by Microsoft

Online Resources:

- VB.Net Basic Tutorial: https://www.tutorialspoint.com/vb.net/vb.net_loops.htm.
- VB.NET Tutorial: https://www.javatpoint.com/vb-net.
- VB.NET Tutorial for Beginners: Learn VB.Net Programming : https://www.guru99.com/vb-net-tutorial.html?gpp&gpp_sid.
- Home and Learn: VB Net Programming Course Contents: https://www.homeandlearn.co.uk/NET/vbNet.html.
- Programming with VB.NET : https://www.mcu.ac.in/wp-content/uploads/2020/04/1PGDCA4B-Part-I-Programming-with-VB-.Net_.pdf
- Programming with visual Basic.Net (Notes in Hindi): https://computerhindinotes.com/programming-with-visual-basic-net-notes-in-hindi/
- Programming with visual Basic.Net (Video Lectures in Hindi): https://computerhindinotes.com/visual-basic-net-video-tutorials-in-hindi.
- Visual Basic .NET The Complete Reference: https://ravithanki.files.wordpress.com/2010/10/complete-reference-vb_net.pdf
- Learning Visual Basic.NET Language: https://riptutorial.com/Download/visual-basic--net-language.pdf.
- VB.NET Programming: https://mkasoft.com/downloads/VB.NET%20programming.pdf.
- Visual Basic.Net: https://books-library.net/files/books-library.online_noo25328f31569407903f036b-8313.pdf
- Visual Basic.Net Black Book: https://bcaofficial.wordpress.com/wp-content/uploads/2017/05/vb-net-black-book.pdf.
- A Programmer's Introduction to Visual Basic.Net: https://www.interplat.com/vbnet.pdf.
- Visual Basic 2017 Made Easy : https://www.vbtutor.net/vb2017/vb2017mc_preview.pdf.

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. S. Jain

ANJEETA RUJU

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

PART- A: Introduction

Program: Bachelor of Computer Application *(Certificate / Diploma / Degree)*	Semester - V	Session: 2024-2025

1	Course Code	CASC-14P
2	Course Title	Lab 9: Programming in .Net
3	Course Type	Practical
4	Prerequisite	*As per program*
5	Course Learning Outcomes (CLO)	After Completing this course, students will be able to: • Study and use of .NET framework and object-oriented programming. • Develop the console and GUI applications using .Net programming. • Evaluate the .NET framework namespace contents. • Understand the procedures, File I/O, Error handling and Message queues. • Understand and remember the components in .NET IDE, ADO.NET and also the window forms. • Design, create, build, and debug dot net applications.
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	List of Experiments	No. of Period
List of practical experiments	1. Write a program to addition, subtraction, multiplication and division of any two numbers. 2. Write a program to find the maximum between three numbers. 3. Write a program to check whether a number is negative, positive or zero. 4. Write a program to check whether a year is a leap year or not. 5. Design an application to input marks of five subjects Physics, Chemistry, Biology, Mathematics and Computer. Calculate percentage and grade as following: a. Percentage > 90%: Grade A b. Percentage >= 80%: Grade B c. Percentage > 70%: Grade C d. Percentage >60%: Grade D e. Percentage >= 40%: Grade E f. Percentage < 40%: Grade F 6. Design an application to input basic salary of an employee and calculate its Gross salary following: a. Basic Salary <= 10000: HRA = 20%, DA = B0% b. Basic Salary <n20000: HRA = 30%, DA = 90% c. Basic Salary> 20000: HRA = 30%, DA = 95% 7. Design an application to input electricity unit charges and calculate the given condition: a. For first 50 units Rs. 0.50/unit b. For next 100 units Rs. 0.75/unit c. For next 100 units Rs. 1.20/unit d. For unit above 250 Rs. 1.50/unit e. An additional surcharge of 20% is added to the bill	30hrs.

8. Write a program to convert decimal to binary number system using bitwise operators.
9. Write a program to swap two numbers using the bitwise operator.
10. Write a program to create Simple Calculator using a select case.
11. Write a program to find the sum of all natural numbers between 1 to n.
12. Write a program to enter any number and print its reverse.
13. Write a program to enter any number and check whether the number is palindrome or not.
14. Write a program to check whether a number is Armstrong number or not
15. Write a program to print Fibonacci series up to n terms.
16. Write a program to print Pascal triangles up to n rows.
17. Write a program to print all negative elements in an array.
18. Design a digital clock using timer control
19. Create an application that offers various food items to select from check boxes and a mode of payment using a radio button. It then displays the total amount payable.
20. Create an application to implement the working of Context menu on textbox
21. Write a program to illustrate all functionalities of list box and combo box.
22. Write a program for temperature conversion using a radio button.
23. Write a program to launch a rocket using Picture Box and Timer control
24. Write a program to change the back color of any control using a scroll box.
25. Write a program to search an element for a one dimensional array.
26. Design a menu such that it contains submenu such as Addition, Subtraction, Scalar Multiplication, and Transpose of two metrics.
27. Write a program to find greatest among three given number using user define procedures
28. Write a program to check whether given number neon or not using user defined function
29. Write a program to check whether a given number is Niven or not using procedure.
30. Write a program to check whether a given number is duck number or not
31. Write a program to check whether a given number is a spy number or not.
32. Write a program to check whether a given number
33. Design the following application using radio button and checkbox:
34. Develop an application which is similar to notepad using menus.
35. Develop an application for facilitating purchasing order.
36. Develop an application for a billing system in a coffee shop.
37. Develop an application which is similar to login form.
38. Define structure student structure student has written member for storing name roll number name of three subjects and marks with member function to store and print data.
39. create a class circle with data member radius provide member function to calculate area driver class fare from class circle provide member function to calculate volume derived class cylinder from class is fair with additional data member for height and member function to calculate volume
40. Write a program that implements the concept of encapsulation.
41. Write a program to demonstrate the concept of function overloading.
42. Create a class student having a data member to store roll number name of the student name of three subject Max marks, Min marks, and obtained marks. Declare an object of class. Provide facilities to input data in data members and display result of students
43. Create a class array having an array of integer having five elements at data member provide following facilities: a) constructor to get number in array element b) sort the elements

	44. Create a table for employees and write a program using a data set to add, delete, edit and navigate records. 45. Write a program to access a database using ADO.NET and display key columns in the combo box or list box when an item is selected in it its corresponding records are shown in data grid control. 46. Write a program to calculate factorial of a number using user defined procedure. **Note:** This is a tentative list; the teachers' concern can add more experiment as per requirement.	
Keywords	*.NET, Window form, GUI, MDI, ADO.Net.*	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota Chairman

(Dr. S. Jain)

(Suresh Thakur)

Sheikh Arif

ANJEETA KUJUR

PART–C: Learning Resources

Text Books Recommended:

- Visual Basic .Net Complete- by BPB Publications , New Delhi
- The Complete Reference VB.Net –by Jeffery R. Shapiro , Tata Mcgraw Hill.
- Bill Evjen, Jason Beres, et.al, Visual Basic .Net programming, Wiley Dreamtech India (p) Ltd.

Reference Books Recommended:

- Professional VB.Net 2003 – by Bill Evjen & others , Wiley Dreamtech India(P) Ltd. New Delhi
- Fergal Grimes, Microsoft .NET for programmers, Shroff Publishers & Distributors (P) Ltd.
- Thuan Thai & Hoang Q.Lam, .NET Framework Essentials, Shroff Publishers & Distributors (P) Ltd.
- MSDN online – by Microsoft

Online Resources:

- VB.Net Basic Tutorial: https://www.tutorialspoint.com/vb.net/vb.net_loops.htm.
- VB.NET Tutorial: https://www.javatpoint.com/vb-net.
- VB.NET Tutorial for Beginners: Learn VB.Net Programming : https://www.guru99.com/vb-net-tutorial.html?gpp&gpp_sid.
- Home and Learn: VB Net Programming Course Contents: https://www.homeandlearn.co.uk/NET/vbNet.html.
- Programming with VB.NET : https://www.mcu.ac.in/wp-content/uploads/2020/04/1PGDCA4B-Part-I-Programming-with-VB-.Net_.pdf
- Programming with visual Basic.Net (Notes in Hindi): https://computerhindinotes.com/programming-with-visual-basic-net-notes-in-hindi/
- Programming with visual Basic.Net (Video Lectures in Hindi): https://computerhindinotes.com/visual-basic-net-video-tutorials-in-hindi.
- Visual Basic .NET The Complete Reference: https://ravithanki.files.wordpress.com/2010/10/complete-reference-vb_net.pdf

- Learning Visual Basic.NET Language: https://riptutorial.com/Download/visual-basic--net-language.pdf.
- VB.NET Programming: https://mkasoft.com/downloads/VB.NET%20programming.pdf.
- Visual Basic.Net: https://books-library.net/files/books-library.online_noo25328f31569407903f036b-8313.pdf
- Visual Basic.Net Black Book: https://bcaofficial.wordpress.com/wp-content/uploads/2017/05/vb-net-black-book.pdf.
- A Programmer's Introduction to Visual Basic.Net: https://www.interplat.com/vbnet.pdf.
- Visual Basic 2017 Made Easy: https://www.vbtutor.net/vb2017/vb2017me_preview.pdf.
- Introduction and Programming of dotNet: www.w3school.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

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

ANJEETA KUMAR

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

PART- A: Introduction

Program: Bachelor of Computer Application *(Certificate / Diploma / Degree/Honors)*		Semester - V	Session: 2024-2025
1	Course Code	CASC-15T	
2	Course Title	Machine Learning	
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: • Gain a deep understanding of advanced AI and machine learning principles. • Acquire skills for conducting a thorough literature review and formulating research problems. • Learn to design and implement advanced AI and machine learning algorithms. • Can understand and design generative AI techniques. • Can apply AI and machine learning techniques 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:** Concept of Machine Learning, Applications of Machine Learning, Key elements of Machine Learning, Supervised vs. Unsupervised Learning, Traditional programming Vs. Machine learning Statistical Learning: Bayesian Method, The Naïve Bayes Classifier.	13
II	**Linear Regression:** Prediction using Linear Regression, Gradient Descent, Linear Regression with one variable, Linear Regression with multiple variables, Polynomial Regression, Feature Selection and Feature Extraction. **Logistic Regression:** Classification using Logistic Regression, Logistic Regression vs. Linear Regression, Logistic Regression with one variable and with multiple variables.	11
III	**Regularization**: Regularization and its utility: The problem of Over fitting, Application of Regularization in Linear and Logistic Regression, Regularization and Bias/Variance. **Neural Networks:** Introduction, Model Representation, Gradient Descentvs. Perceptron Training, Stochastic Gradient Descent, Multilayer Perceptrons, Multiclass Representation, Back propagation Algorithms.	10
IV	**Deep Learning:** Introduction basics, various architectures of Deep learning: CNN, LSTM, Generative AI. **Machine learning tools:** Introduction of MATLAB, WEKA as machine learning tools, Using GUI of MATLAB and WEKA to develop Machine learning based models. Write programs to Implement machine learning models.	11
Keywords	*Artificial Intelligence (AI), Linear Regression, Logistic Regression, Artificial Neural Network (ANN).*	

Name and Signature of Convener & Members of CBoS:

Dr. H.S Hota
-Chairman

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Machine learning, Anuradha Srinivasaraghavan, Vincy Joseph, Wiley publication, India , 2019 edition.
- Introduction to Machine Learning with python A guide for data scientists, Andreas, C. Muller & Sarah Guido, O'Reilly.

Reference Books Recommended:

- Understanding machine learning: From theory to algorithms, shai shalev-shwartez, shai ben-david, Cambridge University press.
- Machine learning with python, Abhishek Vijayvargia, BPB publication.
- Machine learning using python, U Dinesh Kumar, Manaranjan Pradhan, Wiley publication.
- Deep learning, Ian Goodfellow , Yoshua Bengio, Aoran Courville, Adaptive computation and machine learning series.
- Machine learning, Tom M. Mitchell, McGraw Hill, Indian Edition.

Online Resources:

- Overview of Machine Learning: https://www.youtube.com/watch?v=whSKA8aO6xQ&list=PLyqSpQzTE6M-SISTunGRBRiZk7opYBf_K&index=3
- Introduction to Artificial Intelligence: https://www.youtube.com/watch?v=pKeVMlkFpRc&list=PLwdnzlV3ogoXaceHrrFVZCJKbm_laSHcH&index=2
- Deep Learning specialization: https://www.coursera.org/specializations/deep-learning
- Learning Material for Deep Learning https://onlinecourses.nptel.ac.in/noc24_cs114/preview
- Learning Material for Artificial Intelligence and Machine Learning https://onlinecourses.nptel.ac.in/noc24_ce107/preview
- Learning Material for Machine Learning https://onlinecourses.swayam2.ac.in/imb24_mg126/preview
- learning Material for Artificial Intelligence https://swayam-plus.swayam2.ac.in/course_detail?course_code=P_SMARTBRIDGE_01
- Learning Material for Machine Learning using Python https://www.coursera.org/specializations/machine-learning-introduction
- Learning Material for Artificial Intelligence https://www.coursera.org/learn/ai-for-everyone
- Learning Material for Machine Learning https://coursera.org/specializations/machine-learning-introduction
- Learning Material for deep Learning https://coursera.org/specializations/deep-learning

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 of Computer Application *(Certificate / Diploma / Degree)*	Semester - V	Session: 2024-2025

1	Course Code	CASC-15P	
2	Course Title	Lab 10: Machine Learning	
3	Course Type	Practical	
4	Prerequisite	*As per program*	
5	Course Learning Outcomes (CLO)	At the end of course, Students will be able to: • Understand complexity of Machine Learning algorithms and their limitations; • Applying common Machine Learning algorithms in practice and implementing their own. • Perform experiments in Machine Learning using real-world data. • Design and implement machine learning solutions to classification, regression, and clustering problems; and be able to evaluate and interpret the results of the algorithms. • Understand modern notions in data analysis oriented computing.	
6	Credit Value	1 Credits	*Credit =30 Hours Laboratory or Field Learning/Training*
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20

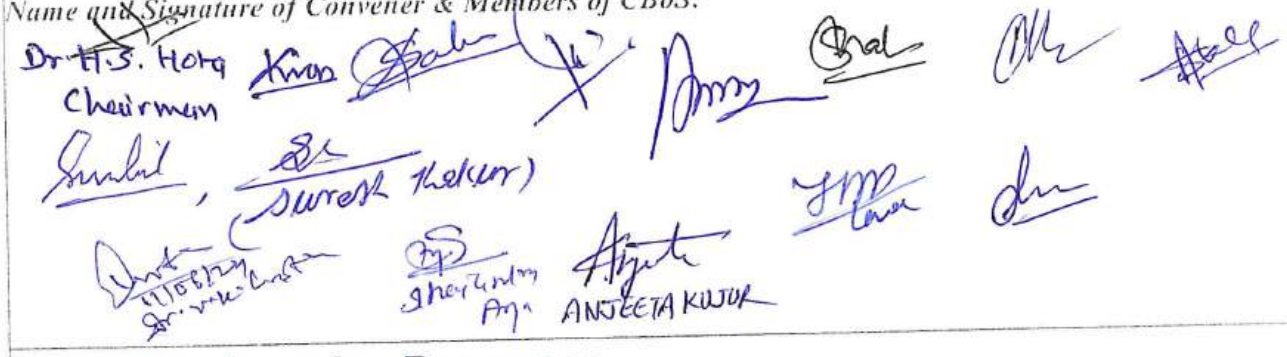
PART -B: Content of the Course

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

Module	Topics (Course contents)	No. of Period
List of Practical Experiments	1. Use command to compute the size of a matrix, size/length of a particular row/column, load data from a text file, store matrix data to a text file, finding out variables and their features in the current scope. 2. Perform basic operations on matrices (like addition, subtraction, multiplication) and 3. Display specific rows or columns of the matrix. 4. Perform other matrix operations like converting matrix data to absolute values, taking the negative of matrix values, adding/removing rows/columns from a matrix, finding the maximum or minimum values in a matrix or in a row/column, and finding the sum of some/all elements in a matrix. 5. Create various type of plots/charts like histograms, plot based on sine/cosine function based on data from a matrix. Further label different axes in a plot and data in a plot. 6. Generate different subplots from a given plot and color plot data. 7. Use conditional statements and different type of loops based on simple example/s. 8. Perform vectorized implementation of simple matrix operation like finding the transpose of a matrix, adding, subtracting or multiplying two matrices. 9. Implement Linear Regression problem. For example, based on a dataset comprising of existing set of prices and area/size of the houses, predict the estimated price of a given house. 10. Based on multiple features/variables perform Linear Regression. For example, based on a number of additional features like number of bedrooms, servant room,	30

	number of balconies, number of houses of years a house has been built – predict the price of a house. 11. Implement a classification/ logistic regression problem. For example based on different features of students data, classify, whether a student is suitable for a particular activity. Based on the available dataset, a student can also implement another classification problem like checking whether an email is spam or not. 12. Use some function for neural networks, like Stochastic Gradient Descent or back propagation - algorithm to predict the value of a variable based on the dataset of problem. **Note:** List of experiments may be changed by the concerned teacher.	
Keywords	*Artificial Intelligence (AI), Linear Regression, Logistic Regression, Artificial Neural Network (ANN).*	

Name and Signature of Convener & Members of CBoS:



PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Machine learning, Anuradha Srinivasaraghavan, Vincy Joseph, Wiley publication, India, 2019 edition.
- Introduction to Machine Learning with python A guide for data scientists, Andreas, C. Muller & Sarah Guido, O'Reilly.

Reference Books Recommended:

- Understanding machine learning: From theory to algorithms, shai shalev-shwartez, shai ben-david, Cambridge University press.
- Machine learning with python, Abhishek Vijayvargia, BPB publication.
- Machine learning using python, U Dinesh Kumar, Manaranjan Pradhan, Wiley publication.
- Deep learning, Ian Goodfellow , Yoshua Bengio, Aoran Courville, Adaptive computation and machine learning series.
- Machine learning, Tom M. Mitchell, McGraw Hill, Indian Edition.

Online Resources:

- Overview of Machine Learning:
  - https://www.youtube.com/watch?v=whSKA8aO6xQ&list=PLyqSpQzTE6M-SISTunGRBRiZk7opYBf_K&index=3
  - http://www.jnit.org/wp-content/uploads/2020/04/Machine-Learning-Lab-Manual.pdf
  - https://nthu-datalab.github.io/ml/
  - https://www.deeplearning.ai/courses/
  - https://www.jnec.org/labmanuals/cse/te/sem1/Machine%20Learning%20LAB%20MANUAL%20(1).pdf
  - https://deepakdvallur.weebly.com/machine-learning-laboratory.html

- https://copyassignment.com/machine-learning-a-gentle-introduction/

- Introduction to Artificial Intelligence:
  - https://www.youtube.com/watch?v=pKeVMlkFpRc&list=PLwdnzlV3ogoXaceHrrFVZCJKbm_laSHcH&index=2
  - http://www.hpc.iitkgp.ac.in/pdfs/AI_HPC.pdf
  - https://www.tensorflow.org/resources/learn-ml?gclid=CjwKCAjw_ISWBhBkEiwAdqxb9hljli5hnqF0Cq2Fgy_JEWiD_uZbxtetr_BFUF_QztAELk8d2q3P_BoCodMQAvD_BwE
  - https://www.edx.org/professional-certificate/deep-learning

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

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 - VI	Session: 2024-2025

1	Course Code	CASC-16
2	Course Title	**Data Communication and Computer Networking**
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 and functionalities of computer network technology. • Understand and explain the Data Communications System and its components. • Analyze the different types of network topologies and protocols. • Analyze various layers of OSI and TCP/IP models. • Explore wireless and wired LANs.
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	**Introduction to Computer Network and Physical Layer:** Fundamentals of Computer network, types of computer networks: LAN, MAN, WAN, Network topologies, Transmission modes, ISO-OSI reference model, TCP/IP model, Concept of Analog and Digital Signals, Bandwidth, Multiplexing: TDM, FDM, WDM, CDMA, Transmission Media -Guided, Unguided, switching techniques: Circuit Switching, Message Switching, Packet Switching. **Common Network Architecture:** Wireless LANs 802.11 standards, Overview of VSAT and VPN.	15
II	**Data Link Layer:** Functions of Data Link Layer, Framing, Error detection and correction codes: checksum, CRC, hamming code, Flow Control: Stop & Wait and Sliding Window Protocols, Error Control: Stop & wait ARQ, Go-back-n, Selective Repeat ARQ, Data link protocols: HDLC and PPP, Medium Access Sublayer: LLC Protocol, IEEE Project 802 series of network standard and CSMA/CD.	15
III	**Network Layer and Transport Layer:** Functions of Network Layer, Routing Protocols & Algorithms, IPv4, IPv6, X.25, Networking & Internetworking devices, Functions of Transport Layer, Flow Control & Buffering, Transport Layer Protocols: TCP, UDP & SCTP, Network and Principles of Congestion Control.	15
IV	**Session Layer:** Overview, functioning and protocols. **Presentation Layer:** functioning and protocols. **Application Layer:** BOOTP, DHCP, DNS, TELNET, World Wide Web (WWW), File Transfer Protocol (FTP), Hypertext Transfer Protocol (HTTP), Email Protocols: MIME & SMTP, POP, IMAP, Proxy Server.	15

Keywords *Protocol, Topology, Transmission Media, LAN, WAN, MAN, Wi-Fi.*

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Mohta
Chairman

Shailendra Arya

(Suresh Thakur)

ANJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Andrew S. Tanenbaum, Computer Networks, PHI / Pearson Education Inc.
- Behrouz A. Forouzan, Data Communication and Networking, Tata McGraw-Hill.

Reference Books Recommended:

- William Stallings, Data and Computer Communication, Pearson Education.
- Nader F. Mir, Computer and Communication Networks, Pearson Education, 2007.
- Black, Data & Computer Communication, PHI

Online Resources:

- NPTEL link for Data Communication: https://nptel.ac.in/courses/106105082
- Introduction to Data Communication from SWAYAM Portal https://www.youtube.com/watch?v=swtH_okidQc&list=PLUtfVcb-iqn8dG1-Cn7NTEdILR3hRVgcN&index=1
- Layered Architecture https://www.youtube.com/watch?v=xHO6LjSHco0&list=PLUtfVcb-iqn8dG1-Cn7NTEdILR3hRVgcN&index=2
- Data and Signal https://www.youtube.com/watch?v=6ZGVZ7gUccE&list=PLUtfVcb-iqn8dG1-Cn7NTEdILR3hRVgcN&index=3
- Guided Transmission Media https://www.youtube.com/watch?v=y7v3EAJsWXA&list=PLUtfVcb-iqn8dG1-Cn7NTEdILR3hRVgcN&index=5
- Unguided Transmission Media https://www.youtube.com/watch?v=hKq1tYlVxdQ&list=PLUtfVcb-iqn8dG1-Cn7NTEdILR3hRVgcN&index=6

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:

Dr. H.S. Hota
Chairman

(Suresh Thakur)

Dr. V. N. Gupta
11/06/24

Shailendra Ary

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 - VI	Session: 2024-2025

1	Course Code	**CASC-17T**
2	Course Title	**Advanced Java**
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 concepts underlying technologies in JAVA. • Work with Swings and multithreading. • Configuring Apache tomcat server. • Understand the concept of JSP. • Understand the concepts underlying client-server communication.
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) – 60 Periods (60 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Java Servlet:** Introduction to Java Servlet, Java Servlet Life Cycle, Java Servlet API, Java Servlet Interface, Introduction to JSP, Advantages of JSP overview Servlet, JSP Life Cycle, JSP API, JSP MVC Architecture, JSP Scripting Tag, JSP Implicit Object, JSP Directive Elements, JSP Action Elements, JSP Exception Handling. Simple JSP Web Application Development.	12
II	**Spring Framework:** Introduction to Spring MVC Framework, Spring Modules, Development IDE (Eclipse, NetBeans, Spring Tool Suite), Spring Dependency Injection, Spring ORM, Introduction to Spring boot, Spring JPA(Hibernate), Hibernate Log4j, Hibernate Mapping.	12
III	**Java Web Services:** Introduction to Web Services, Web Services Architecture, Web Services Components: (SOAP, RESTful), RESTful Webservices with Spring Boot, initializing a RESTful Web Services Project with Spring Boot, Connection RESTful Webservices with Hibernate.	12
IV	**Java Enterprise Application and Networking:** What is EJB, Need of EJB, EJB Architecture, EJB Session Bean, EJB Entity bean, Introduction to Socket Programming, Socket API, Socket Server, Socket Client, Messaging Passing between Socket Client and Socket Server.	14

Keywords *Socket, JDBC, Servlet, Java Server page (JSP), Hibe*

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

(Suresh Thakur)

Dr. V.K. Gupta

Shailendra Arya

ANJEETA KUJU

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Deitel&Deitel, "Java How to program", Prentice Hall, 4 th Edition, 2000.
- Gary Cornell and Cay S. Horstmann, "Core Java Vol 1 and Vol 2", Sun Microsystems Press, 1999.
- Stephen Asbury, Scott R. Weiner, Wiley, "Developing Java Enterprise Applications", 1998.

Reference Books Recommended:

- Steven Holzner, Java2, Swing, Servlets, JDBC and JAVA Beans Programming Black Book Dreamtech press
- Herbert Schildt, The Complete Reference JAVA, Tata McGraw Hill publication, 5th Edition.
- Gajendra Gupta, Advance JAVA, Firewall Media, 1st Edition, 2006.
- Elliotte Rusty Harold, JAVA network programming, O'Reilly Publication, 3rd Edition.
- Bruce W. Perry, Java Servlet and JSP Cookbook, O'Reilly Publication, 1st Edition.
- Andrew Lee Rubinger and Bill Burke, Enterprise JAVA beans 3.1, O'Reilly Publication, 6th Edition.
- Sue Spielman, The Struts Frameworks: Practical guide for Java Programmers, Murgan Kaufmann publisher.
- Chuck Cavaness, Programming Jakarta Struts, O'Reilly Publication, 1st Edition.
- K.Santosh Kumar, Spring and Hibernate, McGraw Hill Education (India) Pvt. Limited, 2nd edition.
- John Dean, Raymond Dean, Introduction to Programming with JAVA – A Problem Solving Approach, Tata Mc Graw Hill.
- Core and Advanced JAVA (Black Book), Dreamtech Press.
- Justin Edelson, Brett McLaughlin, JAVA and XML: Solutions to real world problem, O'Reilly Publication, 6th Edition.
- Rashmi Kanta Das, Core Java for Beginners, Vikas Publishing House Pvt. Ltd.
- David Flanagan, JAVA in a Nutshell, O'Reilly Publication, 5th Edition.
- Patrik Niemeyer and Jonathan Knudsen, Learning JAVA, O'Reilly Publication, 3rd edition.

Online Resources:

- https://www.edureka.co/blog/advanced-java-tutorial
- https://www.javatpoint.com/what-is-advance-java
- https://www.w3schools.in/java
- https://www.tutorialspoint.com/java/index.htm
- https://www.jigsawacademy.com/blogs/tutorial/advanced-java
- https://enos.itcollege.ee/~jpoial/allalaadimised/reading/Advanced-java.pdf

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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ANJECTA 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 - VI	Session: 2024-2025

1	Course Code	CASC-17P		
2	Course Title	Lab 11: Advanced Java		
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 concepts underlying technologies in JAVA. • Work with Swings and multithreading. • Configuring Apache tomcat server. • Understand the concept of JSP. • Understand the concepts underlying client-server communication.		
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. Program to demonstrate Swing components. 2. Program to implement Address Book using Swing components. 3. Program to demonstrate loading of file in an Swing Component. 4. Multithreading program, one of the threads print a….z and other thread print 1…26. 5. Example: 1a2b3c…. 26z. 6. Multithreading program to schedule two jobs. 7. Client Server Socket Programming. 8. Server Socket which receives data from a java client program using JSON 9. Program to fetch a particular Website tags when an URL is specified. 10. Implement stack, queue, hashmap, hashtable, enumeration, ArrayList. 11. Create a table from a java program. 12. Update a table from a java program. 13. Load a table data in Swing components. 14. Delete a record from a table, drop table from a java file. 15. Program which shows use of Statement, Prepared Statement and Callable Statement. 16. Configure Apache Tomcat and write a hello world jsp page. 17. Configure Apache Tomcat server to deploy Servlets. 18. Exceptional handling in a JSP page. 19. Create a login page and authenticate a user in a JSP page using database.	30

20. Write a program to implement a simple servlet which writes a Welcome HTML page in the web browser.
21. A servlet should receive a parameter from JSP page and process it.
22. Servlet program to implement parameter handling.
23. Servlet program to handle GET and POST request.
24. A website hit counter data which has to be saved in a cookie.
25. Implement a Java Beans to set and get values.
26. Program to illustrate the procedure of handling session and print a Hello world using Java Bean.
27. Enterprise Session Beans, deploy, and run a simple Java EE application which does add, subtract, multiply and division using stateless session bean.
28. An application named account using stateful session bean. The purpose of account is to perform transaction operations (deposit and withdraw) for the customer.
29. The account application consists of an enterprise bean, which performs the transactions, and two types of clients: an application client and a web client. Allow the user to properly close the frame.
30. Install and setup Eclipse IDE for Spring Boot application development in Advance Java.
31. Write a program in Java to demonstrate the connection of Spring boot application with Hibernate JPA.
32. Write a program in Java to enable message passing between Client and Server using Socket Programming.
33. Write a program in java to implement connection of RESTful Webservices with Hibernate.
34. Write a program in java to implement REST Webservices with spring boot application.
35. Write a program in java to implement SOAP Webservices with spring boot application.

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

Keywords *Socket, JDBC, Servlet, Java Server page (JSP), Hibernet.*

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Sheikh Ashraf Ali

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PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Deitel&Deitel, "Java How to program", Prentice Hall, 4 th Edition, 2000.
- Gary Cornell and Cay S. Horstmann, "Core Java Vol 1 and Vol 2", Sun Microsystems Press, 1999.
- Stephen Asbury, Scott R. Weiner, Wiley, "Developing Java Enterprise Applications", 1998.

Reference Books Recommended:

- Steven Holzner, Java2, Swing, Servlets, JDBC and JAVA Beans Programming Black Book Dreamtech press
- Herbert Schildt, The Complete Reference JAVA, Tata McGraw Hill publication, 5th Edition.
- Gajendra Gupta, Advance JAVA, Firewall Media, 1st Edition, 2006.
- Elliotte Rusty Harold, JAVA network programming, O'Reilly Publication, 3rd Edition.
- Bruce W. Perry, Java Servlet and JSP Cookbook, O'Reilly Publication, 1st Edition.
- Andrew Lee Rubinger and Bill Burke, Enterprise JAVA beans 3.1, O'Reilly Publication, 6th Edition.
- Sue Spielman, The Struts Frameworks: Practical guide for Java Programmers, Murgan Kaufmann publisher.
- Chuck Cavaness, Programming Jakarta Struts, O'Reilly Publication, 1st Edition.
- K.Santosh Kumar, Spring and Hibernate, McGraw Hill Education (India) Pvt. Limited, 2nd edition.
- John Dean, Raymond Dean, Introduction to Programming with JAVA – A Problem Solving Approach, Tata Mc Graw Hill.
- Core and Advanced JAVA (Black Book), Dreamtech Press.
- Justin Edelson, Brett McLaughlin, JAVA and XML: Solutions to real world problem, O'Reilly Publication, 6th Edition.
- Rashmi Kanta Das, Core Java for Beginners, Vikas Publishing House Pvt. Ltd.
- David Flanagan, JAVA in a Nutshell, O'Reilly Publication, 5th Edition.
- Patrik Niemeyer and Jonathan Knudsen, Learning JAVA, O'Reilly Publication, 3rd edition.

Online Resources:

- Tutorials:
  - https://www.edureka.co/blog/advanced-java-tutorial
  - https://www.javatpoint.com/what-is-advance-java
  - https://www.w3schools.in/java
  - https://www.tutorialspoint.com/java/index.htm
  - https://www.jigsawacademy.com/blogs/tutorial/advanced-java
  - https://enos.itcollege.ee/~jpoial/allalaadimised/reading/Advanced-java.pdf
- Lab manuals:
  - https://www.gacwrmd.in/learning/Computer/7MCE1P1-Advanced%20Java%20Programming%20Lab.pdf
  - http://ggnindia.dronacharya.info/ECS/Downloads/Labmanuals/V-Sem/LM_Ad_Java.pdf
  - https://ggnindia.dronacharya.info/CSE/Downloads/Labmanuals/Aug09-Dec09/CSE%20&%20IT/VII%20Sem/Adv_java_LAB_MANNUAL_VIISem.pdf
  - http://oseven.in/files/591337ebe6177.pdf
  - https://www.arsdcollege.ac.in/wp-content/uploads/2020/05/Programming_in_Java_-_week9.pdf

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:

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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/Honors)*	Semester - VI	Session: 2024-2025

1	Course Code	**CASC-18**		
2	Course Title	**Major Project-1**		
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: • Enhance knowledge on latest techniques. • Make ready for IT industry. • Upgrade skill set as per IT industry. • Handle real word applications. • Debug Problem to make DFD of proposed system.		
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 hours - 60 Hours

	Important Guidelines for Project	No. of Period
	A project report has to be submitted as per the rules described below: 1. **Number of Copies:** The student should submit One hard bound copy of the Project Report with one CD/DVD. 2. **No of students:** Every student has to submit separate project. 3. **Acceptance / Rejection of Project Report:** The student must submit a project report to the Head of Department/Project Guide for approval. The Head of Department/Project Guide holds the right to accept the project or suggest modifications for resubmission. 4. **Format of the Project Report :**The student must adhere strictly to the following format for the submission of the Project Report I. **Paper:** The report shall be typed on white paper, A4 size or continuous computer stationary bond, for the final submission. The report to be submitted to the University must be original and subsequent copies may be photocopied on any paper. II. **Typing:** The typing shall be of standard letter size, double-spaced and on one side of the paper only, using black ribbons and black carbons. III. **Margins:** The typing must be done in the following margins Left ----- 35mm, Right ----- 20mm Top ----- 35mm, Bottom ----- 20mm IV. **Binding:** The Report shall be Rexene bound in black. Plastic, spiral bound Project Reports not be accepted. V. **Front Cover:** The front cover should contain the following details: **TOP:** The title in block capitals of 6mm to 15mm letters. **CENTER:** Full name in block capitals of 6mm to 10mm letters. **BOTTOM:** Name of the University, year of submission- all in block capitals of 6mm to 10mm letters on separate lines with proper spacing and centring.	60

VI. **Blank Sheets:** At the beginning and end of the report, two white black bound papers should be provided, one for the purpose of binding and other to be left blank.

5. **Abstract:** Every report should have an abstract following the Institute's Certificate. The abstract shall guide the reader by highlighting the important material contained in the individual chapters, section, subsection etc.
6. **Certificates etc:** The report should contain the following:
   I. Institute Certificate: Successful completion of project by competent authority.
   II. Acknowledgment
   III. List of Figures
   IV. Tables
   V. Nomenclature and Abbreviations
7. **Contents of the Project Report:** The project report must contain following in form of chapter, however student may include any other relevant chapter(s):
   I. **Introduction to the project:** This chapter shall highlight the purpose of project work, it will also define the chapters to be followed in the Project Report.
   II. **Scope of work:** Brief scope of the project work done
   III. **Existing System and Need for proposed System:** If there is some system already in use, then give brief detail of it in order to help to understand the enhancements carried out by the student in the existing system.
   IV. **Operating Environment**: Hardware and Software required and used.
   V. **Proposed System:** Which may contain following:
      a. **Objectives to be fulfilled**: clearly define the objective(s) of the system.
      b. **User Requirements**: State the requirements of the use in an unambiguous manner.
      c. **Requirements Determination Techniques and Systems Analysis Methods Employed:** Use the formal methods to describe the requirements of the use like Fact Finding Methods, Decision Analysis, and Data Flow Analysis etc.
      d. **Prototyping:** If the prototypes has been developed prior to the detailed design, then give details of the prototype.
      e. **System Feature**: Which includes as follows:
      - Module specifications
        - D.F.D. and ER
        - System flow charts
        - Data Dictionary
        - Structure charts
        - Database /File layouts
        - Design of Input Design of Output screens and reports
        - User Interfaces
        - Design of Control Procedures
8. **Testing procedures and Implementation phase**
9. **Problems encountered, Drawbacks and Limitations**
10. **Proposed Enhancements/ Future enhancement**
11. **Conclusions**
12. **Bibliography**
13. **Annexure**

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PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Database system concept, H. Korth and A. Silberschatz, TMH Publications.
- Data Base Management System, Alexies & Mathews,Vikash publication.
- Roger S. Pressman, Software Engineering, A practitioner's Approach, 6th edition, McGraw Hill International Edition.

Reference Books Recommended:

- The Complete Reference, Kevin Loney, Oracle Press.
- SQL, PL/SQL the Programming Language of Oracle, Ivan Bayross, PustakKosh Publication.
- Microsoft SQL Server Management and Administration, Ross, STM Publications.
- James Rumbaugh, Ivar Jacobson, The unified modelling language user guide Grady Booch, Pearson Education.

Online Resources:

- SWAYAM URL link for DBMS and RDBMS: https://youtu.be/f6LGtJutWyA
- SWAYAM URL link for DBMS and RDBMS: https://**swayam**.gov.in/courses/4434-data-base-management-system
- Introduction of RDBMS from SWAYAM : https://onlinecourses.nptel.ac.in/noc19_cs46/preview
- Introduction to DMBS: https://www.w3schools.in/dbms/intro
- NPTEL YouTube Channel: Software Engineering Lectures by Prof Rajib Mall, IIT Kharagpur https://youtube.com/playlist?list=PLbRMhDVUMngf8oZR3DpKMvYhZKga90JVt&si=tTBITZUdivHpNz1H
- NPTEL YouTube Channel: Software Engineering Lecture Series https://youtube.com/playlist?list=PL8751DA481F0F0D17&si=07IfYV7GP8_oc1xZ

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
End Semester Exam (ESE):	100 Marks

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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 - VII	Session: 2024-2025

1	Course Code	**CASC-19T**
2	Course Title	**Mobile Application Development**
3	Course Type	**DSC (Discipline Specific Course)**
4	Pre-requisite	***As per program***
5	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to: • Apply general programming knowledge in the field of developing mobile applications. • Develop and deploy mobile applications into different hosting services. • Interact between user interface and underlying application. • Understand the full life cycle development of mobile apps. • Plan and carry out design work including developing a prototype that can be evaluated with a specified user group.
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 Mobile Applications:** History of Android, Android Features, Android Versions, Fundamentals: Basic Building blocks, Activities, Intents, Services, Broadcast Receivers, Intent Filters and Activity Stack. **Android Development:** Development IDE: Android Studio, Eclipse; Android Virtualization Framework, Creating Android Virtual Device (AVD), System Images in AVD, creating a Hardware Profile in AVD, Creating an Emulator Skin, Creating and Running a Simple Hello World Program.	12
II	**Basic UI Design:** Styles & Themes, Form widgets, Text Fields, Layouts: Relative Layout Table Layout, Frame Layout, Linear Layout, Nested layouts (dip, dp, sip, sp versus px), styles.xml, Drawable Resources for Shapes, gradients (selectors), Style attribute in the Layout File, Alert Dialogs & Toast, Time and Date, Images and media.	11
III	**Android Interface:** View and Notifications: creation and display; Menus: Options menu, Context menu, Pop-up Menu; Input Controls: Buttons, Text Fields, Checkboxes, Alert Dialogs, Spinners, Rating bar, Progress bar, Android Threads and Thread Handlers, Content Providers, Android File System, and Databases (SQLite, Firebase).	11
IV	**Messaging and Location-Based Services:** Sending SMS Messages Programmatically, Getting Feedback After Sending the Message, Receiving and Sending Email, Introduction to Location-based service, Configuring an Android Emulator for Location-Based Services, Geocoding and Map-Based Activities, Different Types of Permission in Android, Android Connectivity, Different types of Sensors, Android App Testing, Android App Deployment.	11
Keywords	*Android Studio, Eclipse, Virtualization, Debugging, Android Layout, Android UI Design, Android Menus, Toast, Spinners, Threads, Geocoding, Sensor, Android Connectivity, Android App Testing.*	

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PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Bill Phillips, Chris Stewart, Brian Hardy, and Kristin Marsicano, Android Programming: The Big Nerd Ranch Guide, Big Nerd Ranch LLC, 3rd edition, 2017.
- John Horton, Android Programming for Beginners - Second Edition, Packt Publishing
- Neil Smyth, Android Studio 3.0 Development Essentials: Android 8 Edition, Amazon Digital Services

Reference Books Recommended:

- Rajiv Ramnath, Roger Crawfis, and Paolo Sivilotti, Android SDK 3 for Dummies, Wiley.
- Michael Burton Android App Development for Dummies, 3ed, Wiley publication.

Online Resources:

- Android from SWAYAM/NPTEL- https://nptel.ac.in/courses/106106147
- Android from Tutorialspoint - https://www.tutorialspoint.com/android/android_overview.htm
- Android Studio from JavaTPoint - https://www.javatpoint.com/android-tutorial
- Android App Development - https://developer.android.com/guide
- Android Application Development – Udemy- https://www.udemy.com/course/learn-android-application-development-y//
- Android Application Development – Coursera – https://www.coursera.org/specializations/android-app-development

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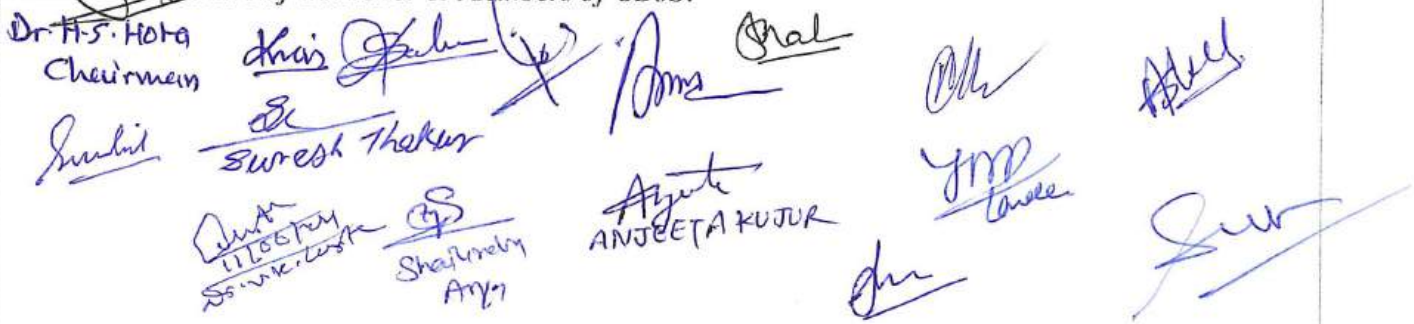
FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor in Computer Application *(Certificate / Diploma / Degree)*			Semester - VII	Session: 2024-2025
1	Course Code	**CASC-19P**		
2	Course Title	**LAB 12: Mobile Application Development**		
3	Course Type	**Practical**		
4	Pre-requisite	*As per program*		
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Apply general programming knowledge in the field of developing mobile applications. • Design and develop an Android app for different real-time activities and purposes. • Develop and deploy mobile applications into different hosting services. • Understand the specific requirements, possibilities, and challenges when developing for a mobile context. • Interact between user interface and underlying application. • Understand the full life cycle development of mobile apps. • Plan and carry out design work including developing a prototype that can be evaluated with a specified user group. • Reflect on possibilities and demands in collaborative software development.		
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 Contents of Course	1. Create "Hello World" application that will display "Hello World" in the middle of the screen in the red color with white background. 2. Create Custom Toast & Dialog Box. 3. Design an application that contains phone contacts in vertical linear manner. Selected contact appears at the top of the list with a large italicized font and a blue background. 4. Create an application that uses Layout Managers and Event Listeners. 5. Develop a standard calculator application to perform basic calculations like addition, subtraction, multiplication and division. 6. Design an application to draws basic graphical primitives (rectangle, circle) on the screen. 7. Design an android application Using Radio buttons. 8. Create a user registration application that stores the user details in a database table. 9. Build a mobile application that create, save, update and delete data in database. 10. Create an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user clicks the OK button. 11. Devise an application that implements Multithreading. 12. Develop a mobile application that uses GPS location information.	**30**

	13. Create an application that writes data to the SD card. 14. Implement an application that creates an alert upon receiving message. 15. Design a mobile application that creates alarm clock. 16. Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons for male and female), Age (numeric) and a Submit button. On clicking the submit button, print all the data below the Submit Button (use any layout). 17. Design an android application to create page using Intent and one Button and pass the Values from one Activity to second Activity. 18. Design an android application send SMS using Intent. 19. Create an android application using Fragments. 20. Design an android application for menu. **Note:** This is a tentative list; the teachers' concern can add more program as per requirement.	
Keywords	*Android, Eclipse, Virtualization, Debugging, Toast, Spinners, Threads, Geocoding, Doodlz.*	

Name and Signature of Convener & Members of CBoS:



PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Bill Phillips, Chris Stewart, Brian Hardy, and Kristin Marsicano, Android Programming: The Big Nerd Ranch Guide, Big Nerd Ranch LLC, 3rd edition, 2017.
- John Horton, Android Programming for Beginners - Second Edition, Packt Publishing
- Neil Smyth, Android Studio 3.0 Development Essentials: Android 8 Edition, Amazon Digital Services

Reference Books Recommended:

- Rajiv Ramnath, Roger Crawfis, and Paolo Sivilotti, Android SDK 3 for Dummies, Wiley.
- Michael Burton Android App Development for Dummies, 3ed, Wiley publication.

Online Resources:

- Android from SWAYAM/NPTEL: https://nptel.ac.in/courses/106106147
- Android from tutorialspoint: https://www.tutorialspoint.com/android/android_overview.htm
- Android Studio from Javatpoint: https://www.javatpoint.com/android-tutorial
- Android App Development: https://developer.android.com/guide
- Android Application Development – Udemy: https://www.udemy.com/course/learn-android-application-development-y//
- Android Application Development – Coursera: https://www.coursera.org/specializations/android-app-development
- Lab manuals:
  - https://pesitsouth.pes.edu/pdf/2019/July/MCA/android%20Lab%20manual.pdf
  - https://mrcet.com/pdf/Lab%20Manuals/MOBILE%20APPLICATION%20DEVELOPMENT%20LAB.pdf
  - https://www.vvitengineering.com/lab/CS6611-MOBILE-APPLICATION-DEVELOPMENT-LABORATORY.pdf
  - http://www.jnit.org/wp-content/uploads/2020/04/SDL-II-android.pdf

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:

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

PART- A: Introduction

Program: Bachelor of Computer Application *(Certificate / Diploma / Degree/Honors)*	Semester - VIII	Session: 2024-2025

1	Course Code	**CASC-20T**		
2	Course Title	**Fundamentals of IoT and Applications**		
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 IoT value chain structure (device, data cloud), application areas and technologies involved. • Understand working of sensors. • Understand about technological challenges faced by IoT devices, with a focus on wireless, energy, power, and sensing modules • Market forecast for IoT devices with a focus on sensors • Explore and learn about Internet of Things with the help of preparing projects designed for Raspberry Pi.		
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 Internet of Things**- Definition and Characteristics of IoT, Sensors, Actuators, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Embedded Systems, IoT Levels and Templates, Domain Specific IoTs – Home, City, Environment, Energy, Agriculture and Industry.	13
II	**IoT Physical Devices** - Introduction to Arduino and Raspberry Pi- Installation, Interfaces (serial, SPI, I2C). **Controlling Hardware**- Connecting LED, Buzzer, Switching High Power devices with transistors, Controlling AC Power devices with Relays, Controlling servo motor, speed control of DC Motor, unipolar and bipolar Stepper motors.	11
III	**Sensors**- Light sensor, temperature sensor with thermistor, voltage sensor, ADC and DAC, Temperature and Humidity Sensor DHT11, Motion Detection Sensors, Wireless Bluetooth Sensors, Level Sensors, USB Sensors, Embedded Sensors, Distance Measurement with ultrasound sensor.	10
IV	**Applications of IoT:** Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoT in Environmental Protection.	11
Keywords	*Internet of Things, IOT Sensors, IOT Actuators, Arduino, Raspberry Pi.*	

Name and Signature of Convener & Members of CBoS:

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ANJEETA RUSIA

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
- Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759
- Raspberry Pi Cookbook, Software and Hardware Problems and solutions, Simon Monk, O'Reilly (SPD), 2016, ISBN 7989352133895

Reference Books ***Recommended:***

- Peter Waher, 'Learning Internet of Things', Packt Publishing, 2015 3. Editors Ovidiu Vermesan
- Peter Friess,'Internet of Things – From Research and Innovation to Market Deployment', River Publishers, 2014
- N. Ida, Sensors, Actuators and Their Interfaces, SciTech Publishers, 2014.

Online Resources:

- Swayam/NPTEL: https://www.youtube.com/channel/UC6ZY_csXZc7YZZm2W8HcQ6A
- Javatpoint: https://www.javatpoint.com/iot-internet-of-things
- Tutorialspoint: https://www.tutorialspoint.com/internet_of_things/index.htm
- Topics Related to IOT from data-flair: https://data-flair.training/blogs/iot-tutorial/
- Topics Related to IOT from edureka: https://www.edureka.co/blog/iot-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:

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ANJEETA KUJUR

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

PART- A: Introduction				
Program: Bachelor of Computer Application *(Certificate / Diploma / Degree)*			Semester - VIII	Session: 2024-2025
1	Course Code	**CASC-20P**		
2	Course Title	**Lab 14: Fundamentals of IoT and Applications**		
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 IoT value chain structure (device, data cloud), application areas and technologies involved. • Understand working of IoT sensors. • Understand IoT sensors and technological challenges faced by IoT devices, with a focus on wireless, energy, power, and sensing modules • Market forecast for IoT devices with a focus on sensors • Explore and learn about Internet of Things with the help of preparing projects designed for Raspberry Pi.		
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. Data acquisition using Multimeter and oscillographic recorder 2. Connect an LED to GPIO pin 25 and control it through the command line. 3. Connect an LED to GPIO pin 24 and a Switch to GPIO 25 and control the LED with the switch. 4. The state of LED should toggle with every press of the switch Use DHT11 temperature sensor and print the temperature and humidity of the room with an interval of 15 seconds 5. Use joystick and display the direction on the screen 6. Use Light Dependent Resistor (LDR) and control an LED that should switch-on/off depending on the light. 7. Create a traffic light signal with three colored lights (Red, Orange and Green) with a duty cycle of 5-2-10 seconds. 8. Switch on and switch of a DC motor based on the position of a switch. 9. Convert an analog voltage to digital value and show it on the screen. 10. Create a door lock application using a reed switch and magnet and give a beep when the door is opened. 11. Control a 230V device (Bulb) with Raspberry Pi using a relay. 12. Control a 230V device using a threshold temperature, using a temperature sensor. 13. Create an application that has three LEDs (Red, Green and white). The LEDs should follow the cycle (All Off, Red On, Green On, and White On) for each clap (use sound sensor). 14. Create a web application for the above applications wherever possible with suitable modifications to get input and to send output. **Note:** Concerned teacher can add additional experiments as per requirement	**30**

Keywords	Internet of Things, IOT Sensors, IOT Actuators, Arduino, Raspberry Pi.

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PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
- Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759
- Raspberry Pi Cookbook, Software and Hardware Problems and solutions, Simon Monk, O'Reilly (SPD), 2016, ISBN 7989352133895

Reference Books ***Recommended:***

- Peter Waher, 'Learning Internet of Things', Packt Publishing, 2015 3. Editors Ovidiu Vermesan
- Peter Friess,'Internet of Things – From Research and Innovation to Market Deployment', River Publishers, 2014
- N. Ida, Sensors, Actuators and Their Interfaces, SciTech Publishers, 2014.

Online Resources:

- Swayam/NPTEL: https://www.youtube.com/channel/UC6ZY_csXZc7YZZm2W8HcQ6A
- Javatpoint: https://www.javatpoint.com/iot-internet-of-things
- Tutorialspoint: https://www.tutorialspoint.com/internet_of_things/index.htm
- Topics Related to IOT from data-flair: https://data-flair.training/blogs/iot-tutorial/
- Topics Related to IOT from edureka: https://www.edureka.co/blog/iot-tutorial/
- Lab Manuals:
  - https://www.lnmiit.ac.in/Department/ECE/uploaded_files/Internet_of_Things_Lab_manual.pdf
  - https://www.iare.ac.in/sites/default/files/lab1/IARE_IOT%20LAB%20_MANUAL.pdf
  - https://www.amirajcollege.in/wp-content/uploads/2020/06/2180709-iot_manual.pdf
  - https://peer.asee.org/internet-of-things-iot-laboratory.pdf
  - https://www.teachmint.com/tfile/studymaterial/class-7th/internetofthingsiot/iotlabmanualpdf/d85015cf-722b-4b50-86e4-0f456f91bfa0
  - https://www.slideshare.net/RadheyShyam18/iot-lab-manual-new
  - https://www.psgrkcw.ac.in/wp-content/uploads/2021/08/IoT-Applications-Lab-Manual-IT.pdf
  - https://www.coursehero.com/file/37028140/IoT-Lab-Manualpdf/
  - https://www.scribd.com/document/408744059/IoT-Lab-Manual
  - https://mrcet.com/CSE_downloads.html
  - http://iotmumbai.bharatividyapeeth.edu/index.php/lab-manuals#computer-technology

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:

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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/Honors)*		Semester – III	Session: 2024-2025
1	Course Code	**CASE-01**	
2	Course Title	**Cyber Security and Cyber Law**	
3	Course Type	**DSE (Discipline Specific Elective)**	
4	Prerequisite	***As per Program***	
5	Course Learning. Outcomes(CLO)	At the end of this course, students will be able to: • Understand the fundamental concepts in cyber security and distinguish among the attacks, threats and vulnerabilities. • Identify, differentiate and explain different cyber crimes and frauds. • Understand the concept of Cyber security issues and challenges associated with it. • Understand the cyber crimes, their nature, legal remedies and how to report the crimes through available platforms and procedures. • Understand the basic concepts related to E-Commerce and digital payments.	
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) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No .of Period
I	**Introduction:** Defining Cyberspace, Architecture of cyberspace, Internet, World wide web, Internet society, Regulation of cyberspace, Concept of cyber security, Issues and challenges of cyber security, Cyber Physical System Security, Classification of cyber crimes, Common cyber crimes- cyber crime targeting computers and mobiles, cyber crime against women and children, financial frauds, social engineering attacks, malware and ransomware attacks, zero day and zero click attacks, Cybercriminals modus-operandi, Reporting of cyber crimes, Remedial and mitigation measures.	15
II	**Authentication:** Vulnerability and vulnerability assessment, Intrusion Detection and Intrusion Prevention System, Introduction of Authentication, User Authentication Methods, Biometric Authentication Methods.	15
III	**Different Securities:** Window Security, Smartphone Security, Browser Security, Web Security, Email Security, Wi-Fi Security, and Social Media Security: Challenges, opportunities and pitfalls in online social network, Best practices for the use of Social media, Introduction to digital payments, Components of digital payment and stakeholders, Digital payments related common frauds and preventive measures. RBI guidelines on digital payments and customer protection in unauthorized banking transactions.	15
IV	**Cyber Law Basics:** Information Technology Act 2000-Amendments; Laws regarding posting of inappropriate content, Relevant provisions of Payment Settlement Act 2007, Cybercrimes and offenses dealt with IPC, RBI Act, IPR in India.	15
Keywords	*Cyberspace, Cybercrime, Cyber security, Physical System security, Ransomware, Modus-operandi, Authentication, Vulnerability, Intrusion Detection and Prevention, Cyber Law.*	

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Dr. Suresh Thakur

Shri Lindin Ayo

Dr. Vivek Sharma

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Cyber criminology: Exploring Internet Crimes and Criminal Behavior by K. Jaishankar, CRC press.
- Data communication and Networking by B. Forouzan, TMH.
- An unofficial guide to ethical hacking by Ankit Fadia, trinity publisher.
- An ethical guide to hacking mobile phones by Ankit Fadia, trinity publisher.
- Computer Network Security and Cyber Ethics by Siva Ram Murthy,B.S. Manoj , McFarland and Company , INC

Reference Books Recommended:

- Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010.
- Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
- Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)
- Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
- Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
- Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.
- Fundamentals of Network Security by E. Maiwald, McGraw Hill.

Online Resources:

- Cyber Security from SWAYAM: https://onlinecourses.swayam2.ac.in/cec21_cs09/preview
- Introduction to Cyber Security from SWAYAM: https://onlinecourses.swayam2.ac.in/nou20_cs01/preview
- Cyber Security for Beginners: https://heimdalsecurity.com/pdf/cyber_security_for_beginners_ebook.pdf
- Cyber Criminology by K. Jaishankar: https://larose.staff.ub.ac.id/files/2011/12/Cyber-Criminology-Exploring-Internet-Crimes-and-Criminal-Behavior.pdf
- Fundamental of Cyber Security by Dr. Jitendra Pandey: http://www.uou.ac.in/sites/default/files/slm/FCS.pdf
- Information Technology Act 2000: https://www.meity.gov.in/content/information-technology-act-2000
- Information Technology Act: https://www.meity.gov.in/content/information-technology-act
- Cyber Crime Law and Practice: https://www.icsi.edu/media/webmodules/publications/Cyber_Crime_Law_and_Practice.pdf

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/Honors)*		Semester – IV	Session: 2024-2025
1	Course Code	CASE-02	
2	Course Title	**Artificial Intelligence and Expert System**	
3	Course Type	**DSE (Discipline Specific Elective)**	
4	Prerequisite	*As per program*	
5	Course Learning Outcomes(CLO)	At the end of the course, students will be able to: • Understand the Basics about Artificial Intelligence and Expert Systems. • Understand the Programming Logics in Artificial Intelligence. • Understand various search methods in Artificial Intelligence. • Understand the Knowledge about the Expert Systems. • Understand the latest developments in Knowledge systems and Tools.	
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	**Introduction:** History, Definition of AI, Emulation of human cognitive process, knowledge search trade off, stored knowledge, semantic nets. An abstract view of modelling, elementary knowledge. Computational logic, analysis of compound statements using simple logic connectives, predicate logic, knowledge organization and manipulation, knowledge acquisition.	15
II	**AI Programming languages:** LISP and other programming languages- introduction to LISP, syntax and numerical function, LISP and PROLOG distinction, input output and local variables, Interaction and recursion, property list and arrays alternative languages, formalized symbolic logics- properties of WFRS, non-deductive inference methods. Inconsistencies and uncertainties- Truth maintenance systems, default reasoning and closed world assumption, Model and temporary logic.	15
III	**Problems and Heuristic Search Techniques:** Problem Characteristics, Production Systems, Control Strategies, Search techniques: Breadth First, Depth-first search, Hill-climbing, Heuristics Search Techniques: Best First Search, A* algorithm. **Knowledge Representation:** Approaches and Issues, Frame, Conceptual dependency, Semantic Net, Scripts etc., Propositional Logic, First order, Propositional Logic (FOPL), Conversion to clausal form, Inference rules, Resolution principal.	15
IV	**Expert System:** Introduction, Application, Existing Expert systems. Components of typical expert system, Rule based system architecture. **Pattern Recognition:** Pattern recognition system- understanding speech recognition, Image transformation, low level processing, medium and high level processing, vision system architecture.	15
Keywords	*Artificial Intelligence (AI), AI Agent, State Space, Production System, LISP, PROLOG, Knowledge Representation, Semantic Net, Propositional Logic, Expert System.*	

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:

- Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems, PHI Publication.
- Elaine Rich and Kevin Knight, Artificial Intelligence, TMH publication.
- George. F, William. A. Stubblefield, 'Artificial intelligence and the design of expert systems', The Benjamin Cummins Publishing Co., Inc 2nd Edition, 1992.
- V.S. Jankiraman, K. Sarukesi and P. Gopala krishnan, Foundations of Artificial Intelligence and Expert Systems , Macmillan Series in Computer Science.

Reference Books Recommended:

- Vinod Chandra S.S., Anand Hareendrn S., Artificial Intelligence and machine learning, PHI learning private Ltd.
- V.S. Jankiraman, K. Sarukesi and P. Gopala Krishnan, Foundations of Artificial Intelligence and Expert Systems, Macmillan Series in Computer Science
- Russel (Stuart), 'Artificial Intelligence- Modern approach, Pearson Education series in AI', 3rd Edition, 2009.
- Eugene Charniak, Drew Mc Dermot, 'Introduction to Artificial intelligence', Addison Wesley Longman Inc.,2009
- Robert J Schalkoff, 'Artificial intelligence An Engineering Approach', McGraw Hill International Edition, 1990

Online Resources:

- Introduction to Artificial Intelligence from SWAYAM: https://www.youtube.com/watch?v=pKeVMlkFpRc&list=PLwdnzlV3ogoXaceHrrFVZCJKbm_laSHcH&index=2
- Artificial Intelligence: Knowledge Representation And Reasoning from SWAYAM https://onlinecourses.nptel.ac.in/noc24_cs14/preview
- An introduction to Artificial Intelligence from SWAYAM: https://onlinecourses.nptel.ac.in/noc24_cs08/preview
- Introduction to Artificial Intelligence from Coursera: https://www.coursera.org/learn/introduction-to-ai
- Problem Solving as State Space Search from SWAYAM: https://www.youtube.com/watch?v=fLw8SfvaJWA&list=PLwdnzlV3ogoXaceHrrFVZCJKbm_laSHcH&index=3
- Heuristic Search from SWAYAM: https://www.youtube.com/watch?v=0awSpFyh2MY&list=PLwdnzlV3ogoXaceHrrFVZCJKbm_laSHcH&index=5
- Introduction to Artificial Intelligence: https://www.javatpoint.com/artificial-intelligence-ai
- How to Learn Artificial Intelligence from Coursera: https://www.coursera.org/articles/how-to-learn-artificial-intelligence
- What is knowledge representation: https://courses.csail.mit.edu/6.803/pdf/davis.pdf
- Informed Search https://www.youtube.com/watch?v=-Rf2hOyjZB8&list=PLwdnzlV3ogoXaceHrrFVZCJKbm_laSHcH&index=6
- Artificial; Intelligence and Expert System:
  - https://sist.sathyabama.ac.in/sist_coursematerial/
  - https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SMRA3003.pdf

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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ANJEETA KUJU

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 -V**	**Session: 2024-2025**
1	Course Code	**CASE-03**		
2	Course Title	**Numerical Analysis**		
3	Course Type	**DSE (Discipline Specific Elective)**		
4	Prerequisite	*As per Program*		
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Obtain numerical solutions of algebraic and transcendental equations. • Find out numerical solutions of system of linear equations and check the accuracy of the solutions. • Evaluating the solution of problem using various interpolating and extrapolating methods. • Solve initial and boundary value problems in differential equations using numerical methods. • Apply various numerical methods in real life problems.		
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	**Numerical Methods for Solving Algebraic and Transcendental Equations:** Round-off error, Cubic and Bi-quadratic Solution: Cardon's Method, Ferrari Method, Descartes Method, Graeffe's Root Squaring, Bisection method, False position method, Fixed point iteration method, Newton's method and secant method for solving equations.	15
II	**Numerical Methods for Solving Linear Systems:** Determinant Method, Matrix Inversion Method, Lower and upper triangular (LU) decomposition of a matrix and its applications, Thomas method for tridiagonal systems; Gauss-Jordan, Jacobi's, Gauss-Seidel and successive over-relaxation (SOR) methods.	15
III	**Interpolation:** Lagrange and Newton interpolations, Piecewise linear interpolation, Cubic spline interpolation, Hermite's Interpolation, Gregory-Newton forward and backward difference interpolations. **Numerical Differentiation and Integration:** First order and higher order approximation for first derivative, Approximation for second derivative; Numerical integration: Trapezoidal rule, Simpson's rules and error analysis, Bulirsch-Stoer extrapolation methods, Richardson extrapolation.	15
IV	**Initial and Boundary Value Problems of Differential Equations:** Euler's method, Taylor's Method, Runge-Kutta methods, Predictor-Corrector, Higher order one step method, multi-step methods: Adams–Bashforth methods, Adams–Moulton methods, Finite difference method, Shooting method.	15
Keywords	*Error, Decomposition, Interpolation, Differentiation, Integration, Higher order.*	

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:

- Brian Bradie (2006), A Friendly Introduction to Numerical Analysis. Pearson.
- C. F. Gerald & P. O. Wheatley (2008). Applied Numerical Analysis (7th edition), Pearson Education, India.
- F. B. Hildebrand (2013). Introduction to Numerical Analysis: (2nd edition). Dover Publications.

Reference Books Recommended:

- M. K. Jain, S. R. K. Iyengar & R. K. Jain (2012). Numerical Methods for Scientific and Engineering Computation (6th edition). New Age International Publishers.
- Robert J. Schilling & Sandra L. Harris (1999). Applied Numerical Methods for Engineers Using MATLAB and C. Thomson-Brooks/Cole.
- Dr B. S. Grewal, Numerical Methods, Khanna Publications.

Online Resources:

- SWAYAM/NPTEL : Online Lecture Series on Numerical Analysis
  https://onlinecourses.swayam2.ac.in/cec20_ma11/preview
  https://onlinecourses.nptel.ac.in/noc19_ma21/preview
- NPTEL : Online Lecture Series on Numerical Methods
  https://www.youtube.com/channel/UCqpVOOZS6-OFQaPKWBZLKJQ
  https://www.youtube.com/watch?v=TWAN_T66Cps&list=PLq-Gm0yRYwTguDcfylj1ZicXxzdZCAr5S

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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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 - VI	Session: 2024-2025
1	Course Code	**CASE-04**		
2	Course Title	**Computer System Architecture**		
3	Course Type	**DSE (Discipline Specific Elective)**		
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 architecture and functioning of computer systems at the hardware level. • Analyze the Instruction Set Architecture (ISA) • Understand the functioning of the CPU. • Understand the concept of parallel processing with their applications. • Understand the communication between the peripheral devices and CPU. • Explore the concepts of Memory Organization.		
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	**Fundamentals Of Basic Computer Organization And Design:** Introduction of digital components, register and its types(DR,AR,AC,IR,PC,TR,INPR,OUTR), register transfer and register transfer language, micro operations and its types, common bus system for register and memory organization, computer instruction, basic format of instruction, types of instruction according addressing field (zero, one, two, three addressing), types of instruction (MRI,NMRI), addressing modes, instruction cycle and its flowchart, types of control unit(hardwired and microprogrammed control unit), design of control unit in basic computer.	15
II	**Central Processing Unit and Parallel Processing Techniques:** Introduction to CPU, general register organization, stack organization (register stack, memory stack), application of stack organizations, CPU instructions (data transfer instruction, data manipulation instruction, program control instructions), RISC and CISC instructions, interrupts and its types, interrupt cycle. Flynn's classification of computers, Parallel processing techniques (pipeline processing, vector processing, array processing), pipeline processing concept, types of pipelines and its application, speedup ratio of a pipeline, vector processing concept and its applications, concept of array processing and its applications.	15
III	**Input – Output Organization:** Introduction to peripheral devices, input-output interface and its designing, Modes of data transfer (synchronous and asynchronous data transfer), controls in asynchronous data transfer (strobe control and handshaking control), modes of data transfer (programmed i/o, interrupt-initiated i/o and direct memory access), input-output processor.	15
IV	**Memory Organization and Multiprocessor Architecture:** Memory hierarchy, main memory and its organization (RAM and ROM Chips, memory address map, memory connections to CPU), auxiliary memory, associative memory, concept of cache memory, cache memory mapping techniques (associative mapping, direct mapping, set-associative mapping), cache coherence problem and its solution, introduction to multiprocessors, interconnection structures of multiprocessor-based systems, inter-processor communication and synchronization.	15
Keywords	*Registers, Micro operation, Instruction, Control Unit, Instruction Cycle, Interrupt Cycle, CPU, Stack,*	

	Parallel Processing, Pipeline Processing, Vector Processing, Array Processing, Asynchronous Data Transfer, DMA, RAM, ROM, Cache Memory, IOP, Multiprocessor.

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
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PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- M. Morris Mano, Computer System Architecture, 3e, Pearson Education
- B. Ram Sanjay Kumar, Computer Fundamentals Architecture and Organization , 5e, New Age International Publishers
- William Stalling, Computer Organization & Architecture, 11e, Pearson

Reference Books Recommended:

- Jyotsna Sengupta, Fundamentals of Computer Organization and Architecture, Deep & Deep Publications.
- Amit Kumar Mishra, A Textbook of Computer Architecture, Katson Books

Online Resources:

- NPTEL YouTube Channel: Online Lecture Series on Computer Architecture
  https://youtube.com/playlist?list=PL59E5B57A04EAE09C&si=WUP8O10Y6Zrleu-i
  https://youtube.com/playlist?list=PL1A5A6AE8AFC187B7&si=JmlOO3rT9NGiSMkmN
  https://youtube.com/playlist?list=PLgHucKw979AvcnTpPNZMZyORdL5HvTr9m&si=PqOMY-sh6tCuzPXA
- NPTEL Portal : Online Lecture Computer Architecture and Organization
  NPTEL :: Computer Science and Engineering – NOC :Computer architecture and organization

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:

Dr. H.S. Hota
Chairman

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 - VII	Session: 2024-2025

1	Course Code	**CASE-05**	
2	Course Title	**Computer Graphics**	
3	Course Type	**DSE (Discipline Specific Elective)**	
4	Pre-requisite	*As per program*	
5	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able: • Understand the basics of computer graphics, different graphics systems and applications of computer graphics. • Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis. • Use of geometric transformations on graphics objects and their application in composite form. • Extract scene with different clipping methods and its transformation to graphics display device. • Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.	
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	**Basics of Computer Graphics**: Applications of Computer Graphics, Input Devices: Keyboard, Mouse, Trackball & Space ball, Joystick, Data Glove, Digitizers, Image Scanners, Touch panels, Light Pens systems. Output display devices: Refresh CRT, Raster-Scan display and Random-scan display technique, Color display techniques-Beam penetration method and Shadow-mask method, Direct view storage tubes, Emissive & Non-emissive flat-panel, Displays-Plasma panels, LED and LCD monitor.	15
II	**Fundamental Techniques in Graphics**: Line-drawing algorithms, DDA algorithm and Bresenham's Line drawing Algorithm, Midpoint Algorithm for Circle and Ellipse Generation, Curve generation. Attributes for output primitives: Area-filling Algorithms - Scan-line Polygon-fill.	15
III	**Geometrical Transformation**: 2D Transformation (translation, rotation, scaling, reflection and shearing), Homogeneous Coordinates and Matrix Representation of 2D Transformations, Successive and composite 2D Transformations, the Window-to-Viewport Transformations, Introduction to 3D Transformations Matrix.	15
IV	**Curves and Surfaces**: Polygon Surfaces and polygon meshes, Quadratic and super quadrics surfaces, Spline curve and representationDefinition of Bezier curve and its properties, Algorithms for Bezier curves and surfaces, Hermite curve.	15
Keywords	*Computer Graphics, Raster Scan, Random-scan, Line Drawing Algorithm, Matrix Representation*	

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:

- Foley, Van Dam, Feiner, Hughes, Computer Graphics Principles& practice,2000.
- D.J. Gibbs & D.C. Tsichritzs: Multimedia programming Object Environment& Frame work, 2000.

Reference Books Recommended:

- Ralf Skinmeiz and Klana Naharstedt, Multimedia: computing, Communication and Applications, Pearson, 2001
- D. Haran & Baker. Computer Graphics Prentice Hall of India, 1986.

Online Resources:

- NPTEL: https://onlinecourses.nptel.ac.in/noc20_cs90
- https://mrcet.com/downloads/digital_notes/CSE/III%20Year/COMPUTER%20GRAPHICS%20NOTES.pdf
- http://www.aagasc.edu.in/cs/COMPUTER%20GRAPHICS%20NOTES.pdf
- https://archive.mu.ac.in/myweb_test/S.Y.B.Sc.(IT)%20(Sem%20%20III%20)%20Computer%20Graphics.pdf

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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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 - VII	Session: 2024-2025
1	Course Code	CASE-06T	
2	Course Title	Cloud Computing	
3	Course Type	DSE (Discipline Specific Elective)	
4	Pre-requisite	*As per program*	
5	Course Learning Outcomes (CLO)	After Completing this course, students will be able to: • Understand the concepts, characteristics and benefits of cloud computing. • Understand the key security and compliance challenges of cloud computing. • Understand the concept of Cloud Security and governance. • Learn the Concept of Cloud Infrastructure Model. • Understand the cloud storage, Cloud Virtualization & Micro services.	
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	**Fundamental Cloud Computing:** Concepts, Terminology, Technologies, Benefits, Challenges, SLAs and business cost metrics associated with cloud computing, SaaS, IaaS, PaaS delivery models, Common cloud deployment models and cloud characteristics, Various applications of cloud computing. **Cloud Architecture:** The technology architecture of cloud platforms and cloud-based solutions and services and their utilization via a set of cloud computing design patterns, Hybrid cloud deployment models, Compound design patterns and solution architectures that span cloud and on-premise environments.	12
II	**Cloud Security & Governance:** The cloud security mechanisms, cloud security architecture, A set of security design patterns, The definition of cloud governance precepts, Roles, Practices and processes, Common governance challenges and pitfalls specific to cloud computing.	11
III	**Cloud Storage:** The cloud storage devices, Structures and technologies, cloud storage mechanisms, Persistent storage, Redundant storage, Cloud-attached storage, Cloud-remote storage, Cloud storage gateways, Cloud storage brokers, Direct Attached Storage (DAS), Network Attached Storage (NAS), Storage Area Network (SAN), Various cloud storage-related design patterns.	11
IV	**Cloud Virtualization & Microservices:** Core topic areas pertaining to the fundamental virtualization mechanisms and types used within contemporary cloud computing platforms are explored along with various key performance indicators and related metrics, Microservices of Cloud Computing.	11

Keywords: *Cloud Computing, Security, Governance, Storage, Virtualization.*

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:

- Distributed Computing by Dollymore Cloud Computing (Wind) by Dr. Kumar Saurabh, 2nd Edison, Wiley India.

Reference Books ***Recommended:***

- Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wile, 2011 Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012.
- Handbook of Cloud Computing by Anand Nayyar, Publisher: BPB Publication.

Online Resources:

- Introduction to Cloud Computing from W3shool: https://www.w3schools.in/cloud-computing/tutorials/
- Introduction to Cloud Computing from Coursera: https://www.coursera.org/learn/introduction-to-cloud
- Cloud Computing Basics: https://www.coursera.org/learn/cloud-computing-basics
- Cloud Computing Concepts: https://www.coursera.org/learn/cloud-computing
- Cloud Computing Specialization from Coursera: https://www.coursera.org/specializations/cloud-computing
- Cloud Computing from SWAYAM/NPTEL: https://onlinecourses.nptel.ac.in/noc22_cs20/preview https://www.youtube.com/channel/UCK73enkjfQNDwdBqMyaMtRg
- Cloud Computing Basics: https://terrorgum.com/tfox/books/cloudcomputingbasics_aselfteachingintroduction.pdf
- CLOUD COMPUTING Principles and Paradigms : https://dhoto.lecturer.pens.ac.id/lecture_notes/internet_of_things/CLOUD%20COMPUTING%20Principles%20and%20Paradigms.pdf
- Cloud Computing Tutorial For Beginners: https://www.youtube.com/watch?v=fLV_t2qKYyU
- Introduction to Cloud Computing: https://www.youtube.com/watch?v=Dv0sjAYnVCY
- Cloud Computing Tutorials: https://www.youtube.com/watch?v=NyA9PB6j8bg

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

PART- A: Introduction				
Program: Bachelor of Computer Application *(Certificate / Diploma / Degree)*			Semester - VII	Session: 2024-2025
1	Course Code	**CASE-06P**		
2	Course Title	**Lab 14: Cloud Computing**		
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: • Identify the appropriate cloud services for a given application. • Assess the comparative advantages and disadvantages of Virtualization technology. • Analyze authentication, confidentiality and privacy issues in cloud computing. • Identify security implications in cloud computing. • Understand the importance of protocols and standards in management for cloud services.		
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	**Note:** This is tentative list; the teachers concern can add more experiments as per requirement. 1. Use gcc to compile c-programs. Split the programs to different modules and create an application using make command. 2. Use version control systems command to clone, commit, push, fetch, pull, checkout, reset, and delete repositories. 3. Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top of windows7 or 8. 4. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs 5. Install Google App Engine. Create hello world app and other simple web applications using python/java. 6. Use GAE launcher to launch the web applications. 7. Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim. 8. Find a procedure to transfer the files from one virtual machine to another virtual machine. 9. Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version) 10. Install Hadoop single node cluster and run simple applications like word count.	**30**
Keywords	*Cloud Computing, Security, Governance, Storage, Virtualization.*	

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:

- Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, Mastering Cloud Computing, McGraw Hill Education.
- Barrie Sosinsky, "Cloud Computing Bible", Wiley India Edition.
- Anthony Velte, toby Velte, Robert Elsenpeter, "Cloud Computing – A Practical Approach", Tata McGraw-Hill Edition.
- Kailash Jayaswal et al., Kogent Learning Solutions, Cloud Computing: Black Book, Dreamtech Press.

Reference Books Recommended:

- Rajkumar Buyya et al., Cloud Computing: Principals and Paradigms, Wiley India.
- Cloud Computing: Concepts, Technology & Architecture, Erl, Pearson Education India.
- Barrie Sosinsky, Cloud Computing Bible, O'Reilly Media.
- Toby Velte, Anthony Vote and Robert Elsenpeter, Cloud Computing: A Practical Approach, McGraw Hill.
- George Reese, Cloud Application Architectures: Building Applications and Infrastructures in the Cloud, O'Reilly Media.

Online Resources:

- Swayam/NPTEL: https://www.youtube.com/channel/UC6ZY_csXZc7YZZm2W8HcQ6A
- Javatpoint: https://www.javatpoint.com/iot-internet-of-things
- Tutorialspoint: https://www.tutorialspoint.com/internet_of_things/index.htm
- Topics Related to IOT from data-flair: https://data-flair.training/blogs/iot-tutorial/
- Topics Related to IOT from edureka: https://www.edureka.co/blog/iot-tutorial/
- Coursera: https://www.coursera.org/courses?query=computing
- Introduction to Cloud Computing from W3shool: https://www.w3schools.in/cloud-computing/tutorials/
- Introduction to Cloud Computing from Coursera: https://www.coursera.org/learn/introduction-to-cloud
- Cloud Computing Basics: https://www.coursera.org/learn/cloud-computing-basics
- Cloud Computing Concepts: https://www.coursera.org/learn/cloud-computing
- Cloud Computing Specialization from Coursera: https://www.coursera.org/specializations/cloud-computing
- Cloud Computing from SWAYAM/NPTEL https://onlinecourses.nptel.ac.in/noc22_cs20/preview https://www.youtube.com/channel/UCK73enkjfQNDwdBqMyaMtRg
- Lab Manuals:
- https://annauniversityedu.blogspot.com/2020/10/cs8711-cloud-computing-laboratory.html
- https://drive.google.com/file/d/1oiuQYwkgFXy4R45l8us4ynnXNFqx6OkW/view
- https://www.vidyarthiplus.com/vp/attachment.php?aid=53342
- https://www.iare.ac.in/sites/default/files/lab1/CAD%20LAB%20UPDATED%20BY%20ANJAIAH-%20FINAL_0.pdf
- https://jainakshay781.files.wordpress.com/2019/02/final-cc-lp-iv-manual-1.pdf
- http://www.gpcet.ac.in/wp-content/uploads/2018/08/GCC-LAB-MANUAL.pdf

- https://shanpnk.weebly.com/uploads/5/8/9/4/58948709/gcclab-courseware-labmanual.pdf
- https://www.bharathuniv.ac.in/downloads/csc/BCS7L1%20-Grid%20&%20Cloud%20Computing%20lab.pdf

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:

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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 - VII	Session: 2024-2025
1	Course Code	**CASE-07**	
2	Course Title	Cryptography and Network Security	
3	Course Type	**DSE (Discipline Specific Elective)**	
4	Pre-requisite	***As per program***	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Classify the symmetric encryption techniques. • Illustrate various Public key cryptographic techniques. • Evaluate the authentication and hash algorithms. • Summarize the intrusion detection and its solutions to overcome the attacks. • Basic concepts of system level security.	
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	**Classical Encryption Technique:** Basics of computer network, TCP/IP model, Foundations of Cryptography and security trends, Secret key vs public key cryptography, Symmetric cipher model, substitution techniques, Transportation techniques, Mathematical tools for cryptography: modular arithmetic, Euclidean algorithm, finite fields, polynomial arithmetic. **Symmetric cipher:** Symmetric cipher model, Traditional block cipher: Stream and block cipher, Feistel cipher network structure, Design Principles of Block Ciphers, Data Encryption Standard (DES), Strength of DES Triple DES, Block cipher design principal, Block cipher operation, Advance encryption Standard (AES), Evaluation criteria of AES,AES transformation function, key distribution.	15
II	**Public Key cryptography and Hash Function:** Principles of public key cryptosystem, requirement, RSA algorithm. Hash function, Key management: Diffie-Helman Key exchange, Man in the middle attack, elliptic curve arithmetic, elliptic curve cryptography, Application of cryptographic hash function, Hash and Message authentication Code (MAC), Hash and MAC algorithms, MAC based on hash function, Digital signature and Authentication protocol. Key management and distribution: Distribution of symmetric key and public key, Public key Infrastructure (PKI).	15
III	**IP and Web security protocols:** User authentication: principle, Remote user authentication using symmetric and asymmetric encryption, Kerberos, E-mail security: Pretty Good Privacy (PGP), S/MIME, IP security: IPsec, transport layer Security: Secure Socket layer (SSL), Secure Electronic Transaction (SET).	15
IV	**Network Security and Management:** Principles of cryptography, Authentication, integrity, key distribution and certification, Access control and Firewalls, attacks and counter measures, security in many layers. Infrastructure for network management, The internet standard management framework, SMI, MIB, SNMP, Security and administration.	15
Keywords	*Symmetric Cipher, Hash, Message Authentication Code (MAC), Public key, Private key, Secure Socket Layer (SSL), Secure Electronic Transaction (SET).*	

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:

- Cryptography and Network Security, William Stallings, 4th Edition Pearson Publication.
- Network security and cryptography, Bernard Menezes, Cenage Learning India Pvt. Ltd. First edition 2010.

Reference Books ***Recommended:***

- Applied cryptography - protocols and algorithm, Buce Schneier, Springer Verlag 2003.
- Cryptography and Network Security, Atul Kahate , TMH Publication.
- Cryptography and Network Security, Behrouz A. Forouzan, First Edition, TMH Publication.
- Network Security: Private Communication in Public World By Charlie Kaufman ,Radia Perlman and Mike Speciner, PHI Publication.

Online Resources:

- Swayam/NPTEL: https://onlinecourses.nptel.ac.in/noc20_cs21/preview
- Swayam/NPTEL: https://onlinecourses.nptel.ac.in/noc20_cs02/preview
- Coursera: https://www.coursera.org/search?query=Cryptography
- Coursera: https://www.coursera.org/search?query=network%20sequrity&
- https://www.gatevidyalay.com/tag/cryptography-and-network-security-tutorial/
- https://www.javatpoint.com/computer-network-security
- https://www.geeksforgeeks.org/cryptography-introduction/
- https://www.tutorialspoint.com/cryptography/index.htm
- https://www.vssut.ac.in/lecture_notes/lecture1428550736.pdf
- Lab Manuals:
  - http://www.anuraghyd.ac.in/cse/wp-content/uploads/sites/10/NS-CRYPTO-LAB-Final11.pdf
  - https://www.vvitengineering.com/lab/odd/CS6711-Security-Lab-Manual.pdf
  - https://www.vidyarthiplus.com/vp/attachment.php?aid=53300
  - https://kgr.ac.in/storage/2021/08/CNS-LAB-Manual.pdf

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/Honors)*	Semester – VII	Session: 2024-2025

1	Course Code	**CASE-08**
2	Course Title	**Advanced Operating Systems**
3	Course Type	**DSE (Discipline Specific Elective)**
4	Prerequisite	*As per program*
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Knowledge about advanced concepts in OS. • Ability to develop OS for distributed systems. • Understand process synchronisation and concurrency control. • Understand the architecture and functioning of mobile operating system. • Ability to develop modules for mobile devices.
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	**Multiprocessor Operating Systems:** System Architectures, Structures of OS, OS design issues, Process synchronization, Process Scheduling and Allocation, memory management.	15
II	**Distributed Operating Systems:** System Architectures, Design issues, Communication models, clock synchronization, mutual exclusion, election algorithms, Distributed Deadlock detection, Distributed scheduling, Distributed shared memory, Distributed File system, Multimedia file systems, File placement, Caching.	15
III	**Database Operating Systems:** Requirements of Database OS, Transaction process model, Synchronization primitives, Concurrency control algorithms.	15
IV	**Mobile Operating Systems:** ARM and Intel architectures, Power Management, Mobile OS Architectures, Underlying OS, Kernel structure and native level programming, Runtime issues, Approaches to power management.	15
Keywords	*Multiprocessor operating system, Distributed operating system, Database operating System, Mobile Operating system.*	

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:

- Mukesh Singhal, Niranjan Shivaratri, "Advanced Concepts in Operating Systems", TMH,2001
- William Stallings, "Operating Systems – Operating System: Internals and Design Principles", Prentice Hall, 2005.

Reference Books Recommended:

- Andrew S. Tanenbaum, "Distributed Operating Systems", Pearson Education, 1995.
- Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, "Operating System Principles", John Wiley & Sons Inc., 2006.

Online Resources:

- Advanced Concepts in Operating Systems: https://books.google.co.in/books/about/Advanced_Concepts_in_Operating_Systems.html?id=ajx9NAEACAAJ&redir_esc=y
- Distributed Operating System: *https://www.javatpoint.com/distributed-operating-system*
- Mobile Operating System
  - https://www.sciencedirect.com/topics/computer-science/mobile-operating-system
  - https://baou.edu.in/assets/pdf/PGDMAD_101_slm.pdf
- Database operating System:
  - https://www.redswitches.com/blog/database-operating-system/#:~:text=A%20Database%20Operating%20System%20(DBOS,storage%2C%20retrieval%2C%20and%20manipulation.
  - https://www.ibm.com/docs/en/psfa/7.2.1?topic=logs-database-operating-system
  - https://eecs.berkeley.edu/230426-2/

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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FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CURRICULUM

PART- A: Introduction

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

1	Course Code	**CASE-09**		
2	Course Title	**Soft Computing**		
3	Course Type	**DSE (Discipline Specific Elective)**		
4	Prerequisite	*As per program*		
5	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to: • Analyze and appreciate the applications which can use fuzzy logic. • Understand the difference between learning and programming and explore practical applications of Neural Networks (NN). • Students would understand the efficiency of a hybrid system and how Neural Network and fuzzy logic can be hybridized to form a Neuro-fuzzy network and its various applications • Ability to appreciate the importance of optimizations and its use in computer engineering fields and other domains. • To introduce the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience.		
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	**Introduction:** Soft computing, Different tools of soft computing: Fuzzy logic, Artificial Neural Network, Genetic Algorithm), Area of application. **Fuzzy Logic:** Introduction to Classical Sets and Fuzzy Sets, Membership Function, properties and operations of classical set and Fuzzy set, a-cuts, Properties of a-cuts, Linguistic Variables, Membership function, Classical relation and Fuzzy Relation and its properties and operations, Defuzzification and its methods, Fuzzy rule base.	15
II	**Artificial Neural Network(ANN):** Architecture, Introduction, Evolution of Neural Network, Biological Neural Network Vs ANN, Basic Model of ANN, Different types of ANN, Single layer Perceptron, Solving XOR problem, Activation function, Linear severability, Supervised and unsupervised learning, perceptron learning, delta learning, Feed-forward and Feedback networks, Error Back Propagation Network (EBPN), Associative memories and its types, Hopefield Network, Kohenenself-organizing Map.	15
III	**Genetic Algorithm:** What is Optimization?, Introduction, Application, GA operators: selection, crossover and mutation, different techniques of selection, crossover and mutation, different types of chromosomes, Application of GA.	15
IV	**Hybrid soft commuting:** Design of Neuro-Fuzzy model like ANFIS, Neuro-Genetic, Fuzzy-Genetic Neuro-Fuzzy-Genetic model.	15
Keywords	*Soft Computing, Fuzzy Logic, ANN, Genetic Algorithm.*	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

Sheikh Farook Thakur

ANJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Principles of soft computing, S.N. Shivanandan and S.N. Deepa , Wiley publication, Wiley India Edition.
- Neural network and Learning Machines, Simon Haykin, Pearson Education, 2011.
- Artificial Neural Networks, Robert J. Scholkoff, McGraw Hill Education (India) Pvt. Limited, 1997.
- Fuzzy Sets, Uncertainty and Information, G. J. Klir and T.A. Folger, PHI learning private limited. Publisher– Pearson 3Edition 1999

Reference Books Recommended:

- Neural Networks and Fuzzy Systems, A dynamical Systems Approach to Machine Learning, Bart Kosko, PHI learning private limited.
- Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis and Applications, S. Rakasekaran, G.A. VijayalakshmiPai, PHI learning private limited, 14th Edition. 2003.
- Neural Networks and Fuzzy Logic, K. Vinoth Kumar, R. Saravana Kumar, S. K. Kataraia and Sons publication.
- Artificial Neural Networks, B.Yegnanarayana Prentice Halll of India (P) Limited.
- Introduction to Artificial Neural Systems, Jacek M. Zurada, Jaico Publication House.

Online Resources:

- Introduction to Soft Computing from SWAYAM-NPTEL: https://www.classcentral.com/course/swayam-introduction-to-soft-computing-10053
- Introduction to Soft computing: What is soft computing - Javatpoint
- Need for Soft Computing: Need for Soft Computing - GeeksforGeeks
- Introduction To Soft Computing: Introduction To Soft Computing - Course (nptel.ac.in)

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

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 – VIII	Session: 2024-2025
1	Course Code	**CASE-10**		
2	Course Title	**Digital Image Processing**		
3	Course Type	**DSE (Discipline Specific Elective)**		
4	**Prerequisite** (if, any)	***As per program***		
5	**Course Learning Outcomes (CLO)**	At the end of this course, the students will be able to: • Learn and understand the digital image processing. • Learn and understand various image transform used in digital image processing. • Learn and understand various image enhancement techniques used in digital image processing. • Learn and understand various image restoration techniques and methods used in digital image processing. • Learn and understand various image compression and Segmentation used in digital image processing.		
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	**Introduction** - Digital image processing, Elements of Digital Image Processing system, Visual perception and properties of human eye, Image representation, A simple image model, Some basic relationship between pixels, Image geometry.	15
II	**Fourier and Image Transform** - Introduction to Fourier Transform, DFT & FFT, Properties of 2D Fourier Transform, Separable Image Transforms –Walsh, Hadamard Transform, Discrete Cosine Transform, Haar Transform	15
III	**Image Enhancement and Filtering** - Image Enhancement - Histogram Modeling, Equalization and modification, Image smoothing, Image sharpening, Spatial Filtering, Homomorphic filtering for image enhancement, Model of Image Degradation/Restoration process, Inverse filtering, Least Mean Square (Wiener) filtering, Constrained least mean square restoration, Singular value decomposition, Recursive filtering.	15
IV	**Image Compression and Segmentation** - Image compression models, Lossless compression: Variable length coding, LZW coding, Lossy Compression: Transform coding, Wavelet coding, Image Segmentation: Detection of discontinuities, Edge linking and boundary detection, Thresholding-Region oriented segmentation and Texture.	15
Keywords	*Digital Image, Image Transform, Image Enhancement, Image compression.*	
Name and Signature of Convener & Members of CBoS: Dr H.S. Hota Chairman (Suresh Thakur) ANJEETA KUJUR		

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Rafael C Gonzalez, Richard E Woods, "Digital Image Processing" - 2nd Edition, Pearson Education 2003
- Jain A.K., "Fundamentals of Digital Image Processing", Pearson education.

Reference Books Recommended:

- William K Pratt, "Digital Image Processing", John Willey 2001
- Millman Sonka, Vaclav Hlavac, Roger Boyle, Broos/Colic, "Image Processing Analysis and Machine Vision" - Thompson Learning, 1999.
- Chanda S., Dutta Majumdar - "Digital Image Processing and Applications", Prentice Hall of India, 2000.

Online Resources:

- Digital Image Processing Basics: https://www.geeksforgeeks.org/digital-image-processing-basics/
- Digital Image Processing: https://www.javatpoint.com/digital-image-processing-tutorial
- Digital Image Processing: https://www.tutorialspoint.com/dip/index.htm
- Digital Image Processing: https://in.mathworks.com/discovery/digital-image-processing.html
- NPTEL:
  - https://onlinecourses.nptel.ac.in/noc19_ee55/preview.
  - https://nptel.ac.in/courses/117105135
- Coursera : https://www.coursera.org/courses?query=image%20processing

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

(Suresh Thakur)

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 – VIII**	Session: 2024-2025
1	Course Code	**CASE-11**		
2	Course Title	**Big Data Analytics**		
3	Course Type	**DSE (Discipline Specific Elective)**		
4	Prerequisite	*As per program*		
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Understand fundamentals of Big Data analytics. • Investigate Hadoop framework and Hadoop Distributed File system. • Demonstrate the Map Reduce programming model to process the big data along with Hadoop tools. • Analyze web contents and Social Networks to provide analytics with relevant visualization tools. • Interpret business models and scientific computing paradigms, and apply software tools for big data analytics.		
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	**Understanding Big Data:** Datasets, Data Analysis, Data Analytics-Descriptive Analysis, Diagnostics Analytics, Predictive Analytics, Prescriptive Analytics, Big Data Characteristics – volume, velocity, variety, veracity, value, Different Types of Data – Structured Data, Unstructured Data, Semi-Structured Data.	15
II	**Introduction Hadoop:** Big Data – Apache Hadoop & Hadoop EcoSystem – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization.	15
III	**Hadoop Architecture:** Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands, Anatomy of File Write and Read, NameNode, Secondary NameNode, and DataNode, Hadoop MapReduce paradigm, Map and Reduce tasks.	15
IV	**Theory and Methods for Big Data Analytics:** Regression Modeling, Multivariate Analysis, Bayesian Modeling, Inference and Bayesian Networks, Support Vector and Kernel Methods, Analysis of Time Series: Linear Systems Analysis, Nonlinear Dynamics, Rule Induction, Decision Trees.	15
Keywords	*Big Data, Hadoop, Mapreduce, YARN, Spark, Hive, Hbase, Pig, Sqoop, Oozie.*	

Name and Signature of Convener & Members of CBoS:

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Sushil
Suresh Thakur
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PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Chris Eaton, Dirk deroos et al. , —Understanding Big data , McGraw Hill, 2012.
- Thomas Erl, Wajid Khattak, Paul Buhler,Big Data Fundamentals: Concepts, Drivers & Techniques, 1/e, 2016, Prentice Hall.
- Vignesh Prajapati, Big Data Analytics with R and Hadoop, 1e, 2013, Packt Publishing Ltd, UK.

Reference Books Recommended:

- Norman Matloff, The Art of R Programming: A Tour of Statistical Software Design, revised, 2011, No Starch Press
- Tom White, "Hadoop:The Definitive Guide," 3/e, 2012, O'REILLY Publications.
- Paul Zikopoulos, IBM, Chris Eaton, Paul Zikopoulos, "Understanding Big Data: Analytics for Enterprise Class Hadoop and streaming Data", 2012, The McGraw-Hill Companies.
- Bart Baesens, "Analytics in a Big Data World: The Essential Guide to Data Science and its Applications", 2014, Wiley Publications.
- Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasetsl, 2012, Cambridge University Press.

Online Resources:

- Swayam/NPTEL: https://onlinecourses.nptel.ac.in/noc20_cs92/preview
- Swayam/NPTEL: https://onlinecourses.swayam2.ac.in/arp19_ap60/preview
- Coursera: https://www.coursera.org/search?query=big%20data%20analytics
- What is Big Data?: https://www.javatpoint.com/what-is-big-data
- Big Data Tutorials:
- https://www.edureka.co/blog/big-data-tutorial
- https://www.guru99.com/bigdata-tutorials.html
- https://www.softwaretestinghelp.com/big-data-tutorial/
- https://data-flair.training/blogs/big-data-tutorials-home/
- https://www.simplilearn.com/tutorials/big-data-tutorial
- https://www.tutorialspoint.com/big_data_tutorials.htm
- Big Data Practical Approach:
- http://deccancollege.ac.in/MCALABMANUALS/BIGDATALABMANUAL.pdf
- https://www.iare.ac.in/sites/default/files/lab1/IARE_BIGDATA_LAB_MANUAL.pdf
- https://www.studocu.com/in/document/gujarat-technological-university/big-data-analytics/big-data-analytics-2180710-lab-manual/18844373
- https://usermanual.wiki/Document/CP5261202020DATA20ANALYTICS20LABORATORY20MANUAL20ME20CSE.1885205982/help
- https://sites.google.com/site/vsat2k/beit_bda

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. Thota
Chairman

(Suresh Thakur)

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 - VIII	Session: 2024-2025

1	Course Code	**CASE-12**	
2	Course Title	**Major Project-2**	
3	Course Type	**DSE (Discipline Specific Elective)**	
4	Prerequisite	*As per program*	
5	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to: • Enhance knowledge on latest techniques. • Make ready for IT industry. • Upgrade skill set as per IT industry. • Handle real word applications. • Debug Problem to make DFD of proposed system.	
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 hours - 60 Hours

	Important Guidelines for Project	No. of Period
	A project report has to be submitted as per the rules described below: 1. **Number of Copies:** The student should submit One hard bound copy of the Project Report with one CD/DVD. 2. **No of students:** Every student has to submit separate project. 3. **Acceptance / Rejection of Project Report:** The student must submit a project report to the Head of Department/Project Guide for approval. The Head of Department/Project Guide holds the right to accept the project or suggest modifications for resubmission. 4. **Format of the Project Report :**The student must adhere strictly to the following format for the submission of the Project Report I. **Paper:** The report shall be typed on white paper, A4 size or continuous computer stationary bond, for the final submission. The report to be submitted to the University must be original and subsequent copies may be photocopied on any paper. II. **Typing:** The typing shall be of standard letter size, double-spaced and on one side of the paper only, using black ribbons and black carbons. III. **Margins:** The typing must be done in the following margins Left ----- 35mm, Right ----- 20mm Top ----- 35mm, Bottom ----- 20mm IV. **Binding:** The Report shall be Rexene bound in black. Plastic, spiral bound Project Reports not be accepted. V. **Front Cover:** The front cover should contain the following details: **TOP:** The title in block capitals of 6mm to 15mm letters. **CENTER:** Full name in block capitals of 6mm to 10mm letters. **BOTTOM:** Name of the University, year of submission- all in block capitals of 6mm to 10mm letters on separate lines with proper spacing and centring.	60

VI. **Blank Sheets:** At the beginning and end of the report, two white black bound papers should be provided, one for the purpose of binding and other to be left blank.

5. **Abstract:** Every report should have an abstract following the Institute's Certificate. The abstract shall guide the reader by highlighting the important material contained in the individual chapters, section, subsection etc.
6. **Certificates etc:** The report should contain the following:
   I. Institute Certificate: Successful completion of project by competent authority.
   II. Acknowledgment
   III. List of Figures
   IV. Tables
   V. Nomenclature and Abbreviations
7. **Contents of the Project Report:** The project report must contain following in form of chapter, however student may include any other relevant chapter(s):
   I. **Introduction to the project:** This chapter shall highlight the purpose of project work, it will also define the chapters to be followed in the Project Report.
   II. **Scope of work:** Brief scope of the project work done
   III. **Existing System and Need for proposed System:** If there is some system already in use, then give brief detail of it in order to help to understand the enhancements carried out by the student in the existing system.
   IV. **Operating Environment**: Hardware and Software required and used.
   V. **Proposed System:** Which may contain following:
      a. **Objectives to be fulfilled**: clearly define the objective(s) of the system.
      b. **User Requirements**: State the requirements of the use in an unambiguous manner.
      c. **Requirements Determination Techniques and Systems Analysis Methods Employed:** Use the formal methods to describe the requirements of the use like Fact Finding Methods, Decision Analysis, and Data Flow Analysis etc.
      d. **Prototyping:** If the prototypes has been developed prior to the detailed design, then give details of the prototype.
      e. **System Feature**: Which includes as follows:
      - Module specifications
        - D.F.D. and ER
        - System flow charts
        - Data Dictionary
        - Structure charts
        - Database /File layouts
        - Design of Input Design of Output screens and reports
        - User Interfaces
        - Design of Control Procedures
8. **Testing procedures and Implementation phase**
9. **Problems encountered, Drawbacks and Limitations**
10. **Proposed Enhancements/ Future enhancement**
11. **Conclusions**
12. **Bibliography**
13. **Annexure**

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:

- Database system concept, H. Korth and A. Silberschatz, TMH Publications.
- Data Base Management System, Alexies & Mathews,Vikash publication.
- Roger S. Pressman, Software Engineering, A practitioner's Approach, 6th edition, McGraw Hill International Edition.

Reference Books Recommended:

- The Complete Reference, Kevin Loney, Oracle Press.
- SQL, PL/SQL the Programming Language of Oracle, Ivan Bayross, PustakKosh Publication.
- Microsoft SQL Server Management and Administration, Ross, STM Publications.
- James Rumbaugh, Ivar Jacobson, The unified modelling language user guide Grady Booch, Pearson Education.

Online Resources:

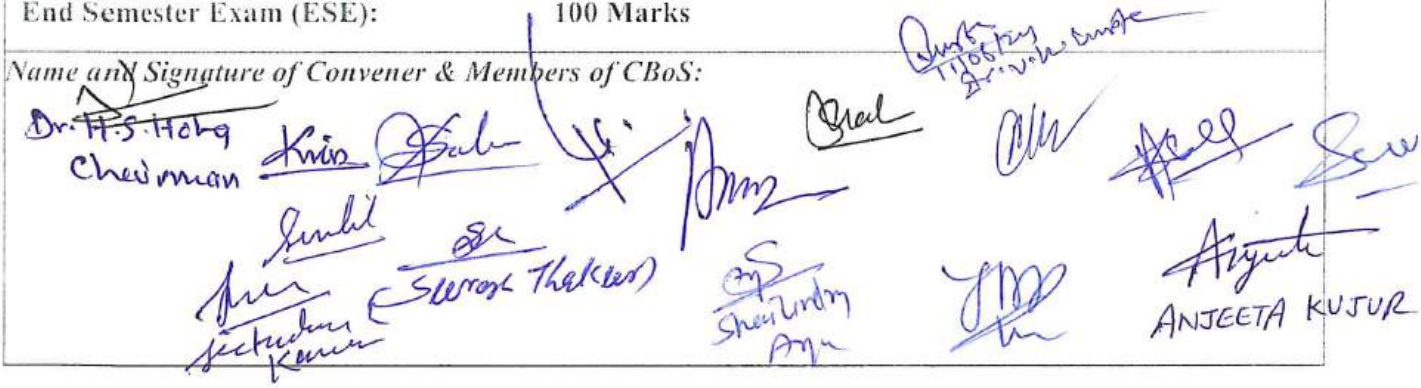
- SWAYAM URL link for DBMS and RDBMS: https://youtu.be/f6LGtJutWyA
- SWAYAM URL link for DBMS and RDBMS: https://**swayam**.gov.in/courses/4434-data-base-management-system
- Introduction of RDBMS from SWAYAM : https://onlinecourses.nptel.ac.in/noc19_cs46/preview
- Introduction to DMBS: https://www.w3schools.in/dbms/intro
- NPTEL YouTube Channel: Software Engineering Lectures by Prof Rajib Mall, IIT Kharagpur https://youtube.com/playlist?list=PLbRMhDVUMngf8oZR3DpKMvYhZKga90JVt&si=tTBITZUdivHpNz1H
- NPTEL YouTube Channel: Software Engineering Lecture Series https://youtube.com/playlist?list=PL8751DA481F0F0D17&si=07IfYV7GP8_oc1xZ

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
End Semester Exam (ESE):	100 Marks

Name and Signature of Convener & Members of CBoS:



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	**CAGE-01T**		
2	Course Title	**Computer Fundamental and MS office**		
3	Course Type	**DGE (Discipline Generic Elective)**		
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

	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:

Dr. H.S. Hota
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ANJEETA KUJU

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://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	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

Dr. V.K. Gupta (Suresh Thakur)

Shailendra Arya

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
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	**CAGE-01P**
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	**30**

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.

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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.

- 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.

- 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.

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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:

(Dr H. G. Hotal) (Chairman) (Dr S Jain) (Suresh Thakur) Shailendra Arya 11/06/24 Dr. V.K. Gupta ANJEETA KOJUK

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-1-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:	**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. S. Jain)

(Suresh Thakur)

ANJECTA 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	CAGE-02T
2	Course Title	Operating System
3	Course Type	DGE (Discipline Generic Elective)
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

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

Unit	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:

Dr. A.S. Hota Chairman

(Suresh Thakur)

(Dr. S. Jain)

Shailendra Arya

Dr. V.K. Gupta

ANJEETA KUJU

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:

Dr. H.S. Hota
Chairman

(D.V.S. Jain)

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**	**CAGE-02P**	
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.*

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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

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Shailendra Arya

Jeetendra Kumar

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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 – I/III/V	Session: 2024-2025

1	Course Code	**CAVAC–01**	
2	Course Title	**Artificial Intelligence**	
3	Course Type	**Value Addition Course (VAC)**	
4	Prerequisite	*As per program*	
5	Course Learning Outcomes(CLO)	At the end of this course, students will be able to: • Understand basics of AI. • Understand problem solving techniques of AI. • Aware about AI tools. • Explore application of AI in various domains. • Understand the current scenario of AI in India.	
6	Credit Value	**2 Credits**	***Credit = 15 Hours -Learning & Observation***
7	Total Marks	**Max. Marks: 50**	**Min Passing Marks: 20**

PART – B: Content of the Course

Total No. of Teaching– Learning Periods (01 Hr. per period) - 30 Periods (30 Hours)

Unit	Topics (Course contents)	No .of Period
I	**Introduction:** Overview of Artificial Intelligence (AI), Foundations of AI, Areas and Applications of AI in various domains, AI in India, Impact and examples of AI, Future of AI.	8
II	**Advanced AI:** Basic Concept of Machine Learning, Deep Learning, Computer vision, Natural Language Processing (NLP), Speech recognition, Generative AI Applications.	8
III	**AI Tools:** Conversational AI: ALEXA, CORTANA, SIRI etc., AI tools for content generation, Image creation, Presentation, Video editing etc.	8
IV	**Application of AI:** Agriculture, Healthcare, Environment, Teaching-Learning, E-Commerce, Industry, Research etc.	6
Keywords	*Artificial Intelligence (AI), Machine Learning (ML), Deep Learning, Computer Vision, Natural Language Processing (NLP), Conversational AI, Generative AI.*	

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Suresh Thakur

Shailendra Ajay

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PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Introduction to Artificial Intelligence and Expert Systems, Dan W. Patterson, PHI Publication.
- Artificial Intelligence, Elaine Rich and Kevin Knight TMH publication.

Reference Books Recommended:

- Artificial Intelligence and machine learning, Vinod Chandra S.S., Anand Hareendrn S., PHI learning private Ltd.
- Foundations of Artificial Intelligence and Expert Systems, Macmillan Series in Computer Science, V.S. Jankiraman, K. Sarukesi and P. Gopala Krishnan.

Online Resources:

- Ministry of Electronics and Information Technology Portal for INDIAai:
  https://indiaai.gov.in/
  Introduction to Artificial Intelligence from SWAYAM:
  https://www.youtube.com/watch?v=pKeVMlkFpRc&list=PLwdnzlV3ogoXaceHrrFVZCJKbm_laSHcH&index=2
  An introduction to Artificial Intelligence from SWAYAM:
  https://onlinecourses.nptel.ac.in/noc24_cs08/preview
- Introduction to Artificial Intelligence from Coursera:
  https://www.coursera.org/learn/introduction-to-ai
- Introduction to Artificial Intelligence:
  https://www.javatpoint.com/artificial-intelligence-ai
- How to Learn Artificial Intelligence from Coursera:
  https://www.coursera.org/articles/how-to-learn-artificial-intelligence

PART-D: Assessment and Evaluation

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End Semester Exam (ESE):	**Laboratory/Field Skill Performance: On spot Assessment** **A. Performed the task based on learned skill - 20 Marks** **B. Spotting based on tools (Written) - 10 Marks** **C. Viva-voce (based on principle/technology)- 05 Marks**	Managed by Coordinator as per skilling

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Chairman

Sunil

Sk Sharat Thakur

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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/IV/V/VI	Session: 2024-2025
1	Course Code	CASEC-01	
2	Course Title	ICT Based Learning	
3	Course Type	SEC (Skill Enhancement Course)	
4	Prerequisite	*As per program*	
5	Course Learning. Outcomes(CLO)	At the end of this course, students will be able to: • Understand the concept of ICT. • Understand the concept of Blended learning. • To provide knowledge about various OER resources • Create document using tools word, Google Docs • Learn about various Google tools.	
6	Credit Value	2 Credits (1C+1C)	*Credit =15 Hours Theoretical Learning and = 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 Teaching– Learning Periods (01 Hr. per period) - 30 Periods (30 Hours)

Unit	Topics (Course contents)	No .of Period
Theory Content	1. **ICT in Education:** Concept & Importance of ICT, Need of ICT in Education. 2. Blended Learning: Introduction, terminology, types of Blended Learning Models, Advantages and Disadvantages, Benefits of Blended Learning. 3. **E-Learning and Web Based Learning:** E-Learning, Web Based Learning, Virtual Classroom, EDUSAT. 4. **Open Educational Resources:** Introduction, Advantages & Disadvantages of OER, OER Tools Like Google Classroom, various OER.	15
Lab/Field Training Content	**Presentation Tools** – MS Word, MS Excel, MS PowerPoint, WPS Office. **Google Tools-** Google Forms, Google Classroom, Google Meet, Google Docs, Google Sheet, Google Slides. **Meeting Management Tools-** Different Types of Meeting Tools Like Google Meet, Zoom, Skype etc.	30
Keywords	*Blended Learning, Open Educational Resource, Google.*	

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PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Agarwal J.P. (2013): Modern Educational Technology. Black Prints, Delhi.
- Barton,R.(2004).Teaching Secondary Science with ICT. McGraw Hill International.

Reference Books ***Recommended:***

- Bhaskar Rao (2013): Samachara Prasara Sankethika vidya Shastramu, Masterminds, Guntur.
- Cambridge, D.(2010).E-Portfolios for Lifelong Learning and Assessment. John Wiley and Sons.

Online Resources:

- *https://www.unesco.org/en/communication-information/open-solutions/open-educational-resources*
- National Digital Library of India : https://www.ndl.gov.in/
- SWAYAM PORTAL: https://www.swayam.gov.in
- E-Gyankosh: https://egyankosh.ac.in/

PART-D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

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