



School of Science and Computer Studies

BCA (Cloud Computing)

**Scheme of Teaching and Evaluation (STE)
Batch [2024-27]**

BCA (CC) Programme

Vision and Mission – CMRU

Vision and Mission – SSCS

Programme Educational Objectives

Programme Outcomes (POs)

Program Specific Outcomes (PSOs)

Category-wise and Semester-wise Credits Distribution

Credit Structure

Programme Structure

Legend

I Semester

II Semester

Interdisciplinary Courses

Skill Enhancement Courses

Graduate Requirement

First Semester Syllabus

Second Semester Syllabus

Glossary

BCA (CC) Programme

Vision and Mission – CMRU

Vision

- To nurture creative thinkers who will drive positive global change

Mission

- To offer multi, inter and cross-disciplinary modular programmes with technology-enabled teaching-learning processes.
- To focus on research-led teaching and learning in an innovative and interdisciplinary learning environment to create critical thinkers.
- To create leaders for a knowledge based economy, with ethical demands of a society base.
- To engage talented intellectual capital with strong faculty diversity in knowledge and experience.
- To ensure transformation of learning into positive behavior of students.

Vision and Mission – SSCS

Vision:

To provide high-quality education that cultivates globally recognized technocrats and entrepreneurs in Computer Science and Technology, equipped with ethical principles, cutting-edge knowledge, and innovative ideas, to meet industry demands and societal expectations.

Mission:

- To provide top-tier technical education in Computer Applications and Information Technology, guided by strong values and supported by cutting-edge infrastructure and innovative methods.
- To foster ethical, ambitious, and skilled engineers through a balanced approach of theoretical knowledge and practical experience.
- To develop the ability to solve both simple and complex challenges individually and in teams.
- To nurture globally competitive engineers with solid foundations, encouraging innovative thinking to navigate dynamic changes and advocate for environmentally conscious green computing solutions.

BCA (CC) Programme

Programme Educational Objectives (PEOs)

PEO1: Graduates will be equipped with the prequalification for professionals heading for a smart career in the IT field, which measures up to industry standards.

PEO2: Graduates will demonstrate the knowledge to analyze, design and code software applications.

PEO3: Graduates will be competent with the ability to understand the concepts of logic development, best software practices used in industry.

PEO4: Graduates will be proficient to gain an opportunity for Higher education in esteemed institutions/Academic Research centers.

Programme Outcomes (POs)

Graduates will be able to:

PO1: Knowledge: Apply the knowledge of mathematics and computer science specialization to analyze and solve problems.

PO2: Problem analysis: Identify, formulate and analyze complex problems and find simple solutions

PO3: Design and development of solutions: Design solutions for complex problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Modern tool usage: Create, select and apply appropriate techniques, resources and IT tools.

PO5: Environment and Sustainability: Understand the impact of the professional solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

PO6: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms in the field of technology.

PO7: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO8: Communication: Communicate effectively on activities with the society at large, such as, being able to make effective presentations, and give and receive clear instructions.

PO9:Project management and finance: Demonstrate knowledge and understanding of the computer science principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO10: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



BCA (CC) Programme

Program Specific Outcomes (PSOs)

Graduates will be able to:

PSO1: An ability to apply knowledge of Mathematics, Computer Science and Management in practice.

PSO2: An ability to enhance comprehensive understanding of the theory and its applications in diverse fields.

PSO3: The program prepares the young professionals for a range of Computer Applications, Computer Organization, Graphics and Multimedia, techniques of Computer Networking, Software Engineering, Web Technologies, Data Mining, IOT, Python and Mobile Application Development.

PSO4: An ability to apply the latest technologies in creating innovative solutions for real world problems in multidisciplinary streams.

BCA (CC) Programme
CURRICULUM AND CREDIT FRAMEWORK
BCA CLOUD COMPUTING

Sl. No	Category	I Sem	II Sem	III Sem	IV Sem	V Sem	VI Sem	Total
1	Core Course (Major)	13	13	15	13	11	5	70
2	Common Core	6	6	3	3	2		20
3	Interdisciplinary	-	3	3	3	-	-	9
4	Electives	-	-	-	-	5	5	10
5	Internships	-	-	-	-	-	6	6
6	Capstone Project / Dissertation						6	6
7	MOOC- Major	-	-	-	4	-	-	4
8	Community Service Programme	-	-	-	-	-	3	3
		19	22	21	23	18	25	128

BCA (CC) Programme

BCA (CC) Programme Structure

I Semester

Course Code	Course	CMRU Category	CMRU subcategory	UGC Category	School / Dept	Contact Hours/Week	Credit Distribution L-T-P-C
Program Core							
8CSPL1321	Problem Solving Techniques Using C and Lab	Foundation	Fundamental	Major Core	SSCS	7	3-0-2-5
8CSGC1461	Database Management Systems and Lab	Foundation	Fundamental	Major Core	SSCS	7	3-0-2-5
8MATH1031	Mathematical Foundation for Computer Science	Foundation	Fundamental	Major Core	SSCS	3	3-0-0-3
Common Core							
CPSSF1011 CPSSF1021 CPSSF1041 CPSSF1031 CPSAL1091 CPSAL1111 CPSAL1101	French German Spanish Koren Functional-Hindi Functional-English Functional- Kannada	PS	CC	AECC	DCCC	2	2-0-0-2
CPSAD1013	Design Thinking	PS	CC	AECC	DCCC	2	2-0-0-2
CKSAM1051	Indian Constitution	PS	CC	AECC	DCCC	2	2-0-0-2

BCA (CC) Programme

GCSCD1011	Community Service Programme -I (COS-I) *	CS	-	-	DCCC		0-0-1-1*
Total						23	19 + 1*

*The Community Service - I (COS-I) of 30 hours has to be carried out in the I Semester. The corresponding 1 credit and the CIE will be reflected in the VI Semester.

II Semester

Course Code	Course	CMRU Category	CMRU Subcategory	UGC Category	School/ Dept	Contact Hours/Week	Credit Distribution L-T-P-C
Program Core							
8CSGC2391	Data Structures using C and Lab	Foundation	Intermediate	Major core	SSCS	7	3-0-2-5
8CSPL1341	Operating System & Linux Foundation and Lab	Foundation	Intermediate	Major core	SSCS	7	3-0-2-5
8STAT2041	Statistics	Foundation	Fundamental	Major Core	SSCS	3	3-0-0-3
	IDE 1	Interdisciplinary	Fundamental	Minor	SOEC/SOM/SOSSH/SOET	3	3-0-0-3
Common Core							
CPSAL1061 / 71 / 81	Hindi / Kannada / English	PS	CC	AECC	DCCC	2	2-0-0-2

BCA (CC) Programme

CPSAL2032	Oral and Written Communication	PS	CC	AECC	DCCC	4	4-0-0-4
GCSCD1021	Community Service Programme -II (COS-II) *	CS	-	-	DCCC		0-0-1-1*
Total						26	22 + 1*
GPSDR1091 GPSBA1052	Career Preparedness Program-I (Personality development + Prepare for Aptitude Tests- 1/3)	PS	-	AECC	DCCC	3	GR

*The Community Service II (COS-II) of 30 hours has to be carried out in the II Semester. The corresponding 1 credit and the CIE will be reflected in the VI Semester.

Internship- I (CIP) of 2 credits to be carried out between II and III Semester break. The corresponding 2 credits will be reflected in the VI Semester.

BCA (CC) Programme

III Semester

Course Code	Course	CMRU Category	CMRU Subcategory	UGC Category	School/ Dept	Contact Hours/ Week	Credit Distribution L-T-P-C
Program Core							
8CSPL1331	Object Oriented Programming using JAVA and Lab	Foundation	Fundamental	Major core	SSCS	7	3-0-2-5
8CSPL1351	Web Technologies and Lab	Foundation	Fundamental	Major core	SSCS	7	3-0-2-5
8CSCC1031	Cloud Computing and Virtualisation Foundation	Foundation	Intermediate	Major Core	SSCS	3	3-0-0-3
	IDE2	Interdisciplinary	Fundamental	Minor		3	3-0-0-3
8CSDS1311	Excel for Data Analysis	Foundation	Fundamental	Major Core	SSCS	3	0-0-2-2
8INTS2010	Internship I [†] (CIP)	Internship	-	CC	SSCS		0-0-2-2 [†]
Common Core							
CKSAA1033	Introduction to Philosophical Thoughts	KSC	CC	AECC	DCCC	1	1-0-0-1
CCSAE1011	Disaster Management	CS	CC	AECC	DCCC	2	2-0-0-2
GCSCD1031	Community Service Programme III(COS-III) *	CS	-	-	DCCC	2	0-0-1-1*
Total						28	21+ 1*+ 2[†]
GPSBD1231	Career Preparedness Program-II (Career Development Tool Kit +	PS	-	AECC	DCCC	3	GR

**BCA (CC) Programme**

GPSBA1062	Prepare for Aptitude Tests-2/3)						
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† **Internship I - Community Internship Program (CIP) credits are reflected in the VI Semester**

*The Community Service - III (COS-III) of 30 hours has to be carried out in the III Semester. The corresponding 1 credit and the CIE will be reflected in the VI Semester.

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IV Semester

Course Code	Course	CMRU Category	CMRU Subcategory	UGC Category	School/ Dept	Contact Hours/Week	Credit Distribution L-T-P-C
Program Core							
8CSCC3161	Cloud Computing and Lab	Foundation	Advanced	Major core	SSCS	7	3-0-2-5
8CSGC1481 /	Data Communication and Networks Lab (Cisco Packet Tracer/NS2 Mini Project)	Foundation	Fundamental	Major core	SSCS	7	3-0-2-5
8CSGC2401	Cyber Security	Foundation	Intermediate	Major Core	SSCS	3	3-0-0-3
	MOOC			Major core		4	4-0-0-4
	IDE3	Interdisciplinary	Fundamental	Minor		3	3-0-0-3
Common Core							
CKSAM1021	Environment and Sustainability (EAS)	KSC	CC	AECC	DCCC	2	2-0-0-2
CKSAM1011	Critical Inquiry	KSC	CC	AECC	DCCC	1	1-0-0-1
Total						27	23
GPSBD1241 GPSBA1072	Career Preparedness Program-III (Workplace Effectiveness + Prepare for Aptitude Tests-3/3)	PS	-	AECC	DCCC	3	GR

Internship - II (SIP) of 4 credits to be carried out between IV and V Semester break. The corresponding 4 credits will be reflected in the VI Semester.

BCA (CC) Programme

V Semester

Course Code	Course	CMRU Category	CMRU Subcategory	UGC Category	School/ Dept	Contact Hours/ Week	Credit Distribution L-T-P-C
Program Core							
8CSGC1081	Software Engineering	Foundation	Advanced	Major core	SSCS	3	3-0-0-3
8CSCC4181	Cloud Security	Foundation	Advanced	Major core	SSCS	3	3-0-0-3
8CSAI3111	Internet of Things and Lab	Foundation	Advanced	Major	SSCS	7	3-0-2-5
8CSAI3101 / 8CSGC6731	Elective 1: Artificial Intelligence and Lab/ Full Stack Development and Lab	Elective	Advanced	Major	SSCS	7	3-0-2-5
8INTS3010	Internship II [†] (SIP)	Internship	-	CC	SSCS		
Common Core							
CKSAM1031	Ethics and values	KSC	CC	AECC	DCCC	2	2-0-0-2
Total						22	18 + 4 †
GPSDL1081	Professional Dynamics	PS	-	AECC	DCCC	1	GR

†† Internship II - Summer Internship Program (SIP) credits are reflected in the VI Semester

VI Semester

BCA (CC) Programme

Course Code	Course	CMRU Category	CMRU Subcategory	UGC Category	School/ Dept	Contact Hours/ Week	Credit Distribution L-T-P-C
Program Core							
8CSCC4171	Cloud Analytics and Lab	Foundation	Advanced	Major core	SSCS	7	3-0-2-5
8CSPL2371 / 8CSGC3501	Elective2: Enterprise Programming and Lab / Network Information Security and Lab	Elective	Advanced	Major core	SSCS	7	3-0-2-5
8INTS2010	Internship I [†] (CIP)	Internship	IC	CC	SSCS	-	0-0-2-2 [†]
8INTS3010	Internship II ^{††} (SIP)	Internship	IC	CC	SSCS	-	0-0-4-4 ^{††}
8CAPS40101	Capstone	Project	Project	DSE	SSCS	12	0-0-6-6
GCSCD1011	Community Service Programme -I (COS-I)*	CS	-	-	DCCC	-	0-0-1-1*
GCSCD1021	Community Service Programme - II (COS-II)*	CS	-	-	DCCC	-	0-0-1-1*
GCSCD1031	Community Service Programme - III (COS-III)*	CS	-	-	DCCC	-	0-0-1-1*

**BCA (CC) Programme**

Total	26	25
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† The credits of Internship I - Community Internship Program (CIP) taken up after the II Semester is reflected in the VI Semester

†† The credits of Internship II - Summer Internship Program (SIP) taken up after the IV Semester is reflected in the VI Semester

* The credit of Community Service - I (COS-I) / Community Service - II (COS-II) / Community Service - III (COS-III) of 30 hours each that was carried out in the I / II and III Semesters respectively is reflected in the Semester

FIRST SEMESTER

BCA (CC) Programme

8CSPL1321: Problem Solving Techniques Using C and Lab		
A. Course Framework		
Credits: L-T-P-C: 3-0-2-5		SyllabusVersion: 1
Contact Hours / Week: 7	Total Contact Hours:105	Level: 100
Prerequisite:(If applicable)	NIL	
Course Learning Objectives:		
CLO1: To develop logic for solving problems using C programming CLO2: To apply structured programming approach in solving problems CLO3: To develop modular reusable code for solving large complex problems		
Course Outcomes: On successful completion of the course, Students will be able to,		
CO1: Devise algorithms and draw flowcharts for solving problems problems (L3,L6) CO2: Apply C programming syntax and semantics for problem solution(L3) CO3: Design and develop programs using decision making and looping statements.(L6) CO4: Define and develop problem solution using functions, structures, union and pointers (L6) CO5: Develop programs using file concepts in simple data processing applications. (L6)		
PO: PO1 - PO4/PO6/PO10		PSO: PSO1-PSO3
B. Syllabus		
Module:1: INTRODUCTION TO COMPUTER PROGRAMMING		Hours: 9
Basic Programming concepts: Algorithms, Flowcharts, Overview of C: Introduction, Basic structure of ‘C’ program, Constants, Variables and Data Types: C Tokens, Keywords and Identifiers, Constants, Variables, Data types, Declaration of variables, Assigning values to variables, Defining symbolic constants.		
Module:2: OPERATORS AND EXPRESSIONS		Hours: 9



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Operators: Arithmetic operators, Relational operators. Logical operators, Assignment operators, Increment and decrement operators, Conditional operators, Bitwise operators, Special operators, Type conversion in expressions, Operator precedence and associativity.

Managing Input and Output Operations: Input and output statements, Reading a character, Writing characters, Formatted input, Formatted output statement

Module:3: DECISION MAKING, BRANCHING, LOOPING AND ARRAYS Hours: 9

Decision making: Simple IF statement, IF-ELSE statement, Nesting of IF-ELSE statements, ELSE-IF ladder, Switch statement, Conditional operator, GOTO statement.

Looping and branching: WHILE statement, DO WHILE statement, FOR statement, Jumps in loops.

Arrays: One dimensional array, Two-dimensional arrays.

Module:4:HANDLING OF CHARACTER STRINGS AND FUNCTIONS Hours: 9

Strings: Declaring and initializing string variables, Reading string from terminal, Writing string to screen, Arithmetic operators on characters, String handling functions - strlen, strcat, strcmp, strcpy and strev.

Functions: Built-in Functions, User defined functions: Need for user-defined functions, Function declaration, Function Prototype, Format of 'C' function, Return values and their types, Calling a function, Category of functions, Nesting of functions, Call by Value & Call by Reference, Recursion, Passing arrays to functions, Storage classes.

Module:5:STRUCTURES , UNIONS, POINTERS AND FILE HANDLING Hours:9

Structure: Definition, Structure initialization, Array of structures, Array within structure, Union.

Introduction to Pointers: Accessing the address of variables, Declaring and initializing pointers, Accessing a variable through its pointer, Pointers and arrays, Pointers and functions, Pointer to pointer, Pointers and character strings. Meaning of static and dynamic memory allocation, Memory allocation functions: malloc, calloc, free and realloc

File Handling: Defining and opening a file, Closing a file, I/O operations on files, Copy one file to another

Part -A

1. Write a C Program to find whether the given character is alphabet or number or special character.
2. Write a C Program to find the roots of the given quadratic equation using switch case.
3. Write a C Program to generate and print first 'n' Fibonacci numbers.
4. Write a C Program to find the GCD and LCM of two integer numbers.
5. Write a C Program to reverse the given number and check whether it is palindrome or not.
6. Write a C Program to find whether a given number is prime or not
7. Write a C Program to accept a sentence and convert all lowercase characters to uppercase and vice versa.
8. Write a C program to sum the following series $1 + 1/1! + 2/2! + 3/3! + \dots + n/n!$ using functions. Calculate the denominator using a recursive function.

Part - B



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9. Write a C Program to perform matrix multiplication
10. Write a C Program to input a string and find the number of occurrences of each vowel appearing in the string
11. Write a C Program to compute the sum of even numbers and the sum of odd numbers using a function.
12. Write a C Program to accept and display different Products with product number, price and date of purchase using structures.
13. Write a C Program to accept the string and reverse it using pointers.
14. Write a C program to count the number of characters, words and lines in a file and display the same.
15. Write a C Program to copy the contents of one file to another file.

C. References

1. Yashwanth Kanitkar, (2011). *Let us C*, BPB publication, 5th edition.
2. E. Balaguruswamy,(1998). *Programming in ANSI C*, Tata Mc Graw-Hill.
3. Kamthane, (2003). *Programming with ANSI and Turbo* , Pearson Education.
4. V. Rajaraman, (2000). *Programming in C*, PHI(EEE)
5. Venkateshmurthy,(2002). *Programming Techniques through C*, Pearson Education, 1st edition

D. Mode of Assessment

IAT / CCE / SEE

E. Scheme of Evaluation

Evaluation – 150 marks (Pass criteria 40% - 60 marks out of 150)

a. Continuous Internal Evaluation(CIE): 100 Marks

Components	Sum of 3 IATs	CCE	Practical Exam	Total Marks
Max. Marks	30 (Theory-2, Practical- 1)	20 (Theory-2, Practical – 1)	50	100
Theory	20	10		
Practical	10	10		

Semester End Examination (SEE) Scheme (Practical): 50 Marks

Section	Course with project	Course without project	Total Marks for the Section	Revised Bloom's Taxonomy

BCA (CC) Programme

Writing Program & Abstract	2 Programs & Project Abstract (10+5)	2 Programs	15	L3
Execution	1 Program & Project Demo (10+10)	2 Programs	20	L4
Viva-Voce	10	10	10	L5
Record/Report	5	5	5	

Semester End Examination (SEE) Scheme (Theory): 100 Marks (Scaled down to 50 marks)

Section	No of Questions	No of Questions to be attempted	Marks / Question	Total Marks for the Section	Revised Bloom's Taxonomy
A	12	10	3	30	L2
B	6	5	6	30	L3
C	5	4	10	40	L6

F. CO-PO-PSO Mapping (Theory)

CO	PO										PSO			
	1	2	3	4	5	6	7	8	9	10	1	2	3	4
1	*					*						*		
2		*	*								*			



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3			*	*		*						*	
4						*				*		*	
5			*										

BCA (CC) Programme

8CSGC1461: Database Management Systems and Lab		
A. Course Framework		
Credits: L-T-P-C: 3-0-2-5		SyllabusVersion: 1
Contact Hours / Week: 7	Total Contact Hours: 105	Level: 100
Prerequisite: (If applicable)	No	
Course Learning Objectives:		
CLO1: To learn about database management systems and relational database model		
CLO2: To design Relational Database Management Systems		
CLO3: To define the rules of relational data models and apply normalization techniques		
CLO4: To store, manipulate and retrieve data using SQL and perform critical operations using PL/SQL .		
CLO5: To apply transaction processing and concurrency control techniques for data access.(L3)		
Course Outcomes: On successful completion of the course, Students will be able to,		
CO1: Gain knowledge on fundamentals of a database system.(L2)		
CO2: Build relational model using Entity Relationship diagrams for real life systems(L3,L6)		
CO3: Organize data by eliminating redundancy and inconsistencies by applying normalization.(L3)		
CO4: Develop complex queries using SQL and PL/SQL to store,manipulate and data from database. (L3,L4,L6)		
CO5: Gain knowledge on transaction processing and concurrency control in database design. (L2)		
PO: PO1-PO5/PO9		PSO: PSO2
B. Syllabus		
Module – 1 : Introduction To Database Concepts		Hours: 9
Database and database Users, File Organization, Characteristics of the Database approach, different people behind DBMS, implications of Database Approach, Advantages of using DBMS, when not to use a DBMS.		
Database System Architecture: Data Models, schemas, and Instances, DBMS Architecture and Data independence, database languages and interfaces, The Database system environment, Classification of Database management Systems.		
Module – 2 : Data Modeling Using The Entity-relationship Model, Relational Data Model And Relational Algebra		Hours: 9

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Entity types, Entity sets, Attributes and Keys, ER Model Concepts, Notation for ER Diagrams, Proper naming of Schema constructs. Relational Data Model and Relational Algebra: Relational Data Model and Relational database Constraints: Relational model Concepts, Relational Model Constraints and Relational Database Schema, Defining Relations, Update Operations on Relations and dealing with constraints. Relational Algebra: Unary Relational Operations: SELECT and PROJECT, Relational Algebra operations from set theory, Basic Relational Algebra Operations, Additional Relational Operations, Examples of Queries in the Relational Algebra, Relational Database design Using ER – to-Relational Mapping.	
Module – 3: Functional Dependencies and Normalization for Relational Databases	Hours: 9
Informal Design Guidelines for Relational Schemas: Guideline1, Guideline2, Guideline3, Guideline4, Functional dependencies, Normal Forms Based on Primary Keys, General Definitions of second and Third Normal forms, Boyce-Codd normal form (Definition only).	
Module – 4: Relational database language : SQL and PL/SQL	Hours: 9
SQL: Data definition in SQL, Tables: Creation and modification, queries in SQL, Insert, Delete and Update Statements in SQL, views in SQL, Specifying indexes. PL/SQL: Introduction, Exceptions & cursor management, Database triggers, functions and procedures (Basic concepts).	
Module – 5: Basic concepts of Transaction Processing and Concurrency Control	Hours: 9
Introduction, Transaction and System Concepts, Desirable properties of transaction, Schedules and recoverability, Transaction Support in SQL, Locking Techniques for Concurrency Control, Optimistic Concurrency control.	
Part- A	
<ol style="list-style-type: none"> The STUDENT detail database has a table with the following attributes. The primary keys are underlined. STUDENT (Regno: Int, name: String, dob: date, marks : int) <ol style="list-style-type: none"> Create the above table Remove the existing attribute marks from the table Change the data type of regno from integer to string. Add a new attribute phoneno to the existing table Enter five tuples into the table. Display all the tuples in the student table. A LIBRARY database has a table with the following attributes: LIBRARY(bookid:int, title:string, author:string, publisher:string, yearpub:int, price:real) <ol style="list-style-type: none"> Create the above table 	



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- (ii) Enter the five tuples into the table
- (iii) Display all the tuples in library table
- (iv) Display the different publishers from the list
- (v) Arrange the tuples in alphabetical order of the book titles
- (vi) List the details of all the books whose price ranges between Rs. 100 and Rs. 300

3. BOOK DEALER DATABASE

AUTHOR(author_id:int,name:String,city:string,country:string)

PUBLISHER(publisher_id:int,name:string,city:string,country:string)

CATALOG(book_id:int,title:string,author_id:int,publisher_id:int,category:int,year:int,price:int)

CATEGORY(category_id:int,description:string)

ORDER_DETAILS(order_no:int,book_id:int,quantity:int)

- i. Create the above tables by properly specifying the primary keys and foreign keys.
- ii. Enter at least five tuples for each relation.
- iii. Give the details of the authors who have 2 or more books in the catalog and the price of books is greater than the average price of the books in the catalog and the year of publication is after 2010.
- iv. Find the author of the book which has maximum sales.
- v. Demonstrate how to increase the price of books published by specific publisher by 10%.

4. Write a PL/SQL stored procedure to calculate maximum and minimum of three numbers entered through users.

5. Write a PL/SQL stored procedure to find the sum of the first ten natural numbers.

6. Create an EMPLOYEE table with columns:

(EMP_ID,EMP_NAME,EMP_DOB,EMP_SAL,EMP_GRADE,EMP_DNO)

and an EMPLOYEE_LOG table with columns (EMP_ID,EMP_NAME,EMP_DOB,EMP_PRE_GRADE,EMP_PRE_SAL).

EMP_GRADE contains values like, "A", "B","C", "D".

Next solve the following:

- i) Write a PL/SQL code to insert some rows in Employee table
- ii) Create a PL/SQL trigger called EMPLOYEE_TRIGGER on the EMPLOYEE table. This trigger will be executed after every update of EMP_SAL or EMP_GRADE which will put the previous Employee value to EMPLOYEE_LOGtable.
- iii) Write a PL-SQL cursor that increments the salary of employees of Grade "D" by 20%.

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PART B
7. Mini project on Insurance Database. 8. Mini project on Order Processing Database. 9. Mini project on Customer Database. 10. Mini project on Hospital Database.
C. References
1. Elmasri & Navathe, 4 th Edition, <i>Fundamentals of Database Management</i> , Pearson Education. 2. Ramakrishnan & Gehrke, 3 rd Edition, <i>Database Management Systems</i> , McGraw – Hill. 3. Patrick Neill, 2 nd Edition, <i>DataBase Principles, Programme & Performance</i> , Harcourt. 4. Abrahamsi, Silberschatz, Henry.F.Korth, S.Sudarshan, 5 th Edition, 2006. <i>Database System Concepts</i> , McGraw hill. 5. Nilesh Shah, Prentice-Hall, <i>Database Systems in Oracle (A simplified Guide to SQL & PL/SQL)</i> .
D. Mode of Assessment
IAT / CCE / SEE
E. Scheme of Evaluation

Evaluation – 150 marks (Pass criteria 40% - 60 marks out of 150)

b. Continuous Internal Evaluation(CIE): 100 Marks

Components	Sum of 3 IATs	CCE	Practical Exam	Total Marks
Max. Marks	30 (Theory-2, Practical– 1)	20 (Theory-2, Practical – 1)	50	100
Theory	20	10		
Practical	10	10		

Semester End Examination (SEE) Scheme (Practical): 50 Marks

Section	Course with project	Course without project	Total Marks for the Section	Revised Bloom's Taxonomy
Writing Program & Abstract	2 Programs & Project Abstract	2 Programs	15	L3

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	(10+5)			
Execution	1 Program & Project Demo (10+10)	2 Programs	20	L4
Viva-Voce	10	10	10	L5
Record/Report	5	5	5	

Semester End Examination (SEE) Scheme (Theory): 100 Marks (Scaled down to 50 marks)

Section	No of Questions	No of Questions to be attempted	Marks / Question	Total Marks for the Section	Revised Bloom's Taxonomy
A	12	10	3	30	L2
B	6	5	6	30	L3
C	5	4	10	40	L6

F. CO-PO-PSO Mapping

CO-PO-PSO Mapping														
CO	PO										PSO			
	1	2	3	4	5	6	7	8	9	10	1	2	3	4
1	*	*							*			*		
2	*	*	*	*					*			*		
3	*	*	*	*					*			*		
4	*	*	*		*				*			*		



BCA (CC) Programme

5	*	*	*								*		
6	*	*	*					*			*		

BCA (CC) Programme

8MATH1031:Mathematical Foundation for Computer Science		
A. Course Framework		
Credits: L-T-P-C: 3-0-0-3		Syllabus Version: 1
Contact Hours / Week: 3	Total Contact Hours: 45	Level: 100
Prerequisite: (If applicable)	Basic knowledge of number systems, operations on numbers, linear and quadratic equations	
Course Learning Objectives:		
CLO1: : Students must be able to Enhance/Develop logical thinking/skills and its application to Computer Science.		
Course Outcomes: On successful completion of the course, Students will be able to,		
CO1: Solve problems in the language of sets and perform set operations, apply basic concepts and prove facts about ordinals and well ordered sets. (L3) CO2: Apply and interpret properties of linear systems and will be able to solve them by matrix techniques. (L3) CO3: Apply logical concepts in the field of Computer Science. (L3) CO4: Apply principles and concepts of Graph theory in practical situations and also will be able to formulate the concepts as a base for other related courses. (L3)		
PO: PO1		PSO: PSO1
B. Syllabus		
Module:1: SETS, RELATIONS AND FUNCTIONS		Hours: 10
Sets -Definition, Types of Sets, Subset and Power set ---- examples. Operations on Sets -Union, Intersection, Difference, Compliment and Symmetric difference ---- examples. Laws of Sets - Associative, Commutative, Distributive, De'Morgan, Absorption laws, etc. and their verifications using set examples. Principle of Inclusion-Exclusion --- Examples involving 2 and 3 sets. Cartesian product —Definition---Examples involving operations on sets. Relations ---Definition—Types of Relations—Equivalence relation---Examples. Functions – Definition-Examples—Types of functions- Constant, Identity, One-One, Onto functions, Bijective and Inverse functions—Examples. Composition of functions —Examples (no theorems).		
Module:2: MATRICES		Hours: 10
Introduction -Definition, Types of matrices. Algebra of matrices -Addition, Subtraction, Scalar Multiplication, Transpose and Multiplication of matrices-Illustrations. Rank by elementary row operation -Rank by reducing the matrix to Echelon form. Rank by reducing the matrix to Normal form. Inverse of a matrix -Inverse of a matrix by elementary row operation.		



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<p>Determinants-Examples. Homogeneous and Non- Homogeneous linear equations. Solving Homogeneous linear equations-Illustrations. Solving Non Homogeneous linear equations-Illustrations. Eigen Values and Eigen Vectors – Illustrations involving (2 x 2) matrices.</p>	
Module:3: MATHEMATICAL LOGIC	Hours: 10
<p>Statements and Notations-Propositions, Connectives-Illustrations. Fundamentals of forming Compound Propositions-Conjunction, Disjunction, Negation, Conditional and Biconditional statements and truth table. Negation of Compound propositions-Examples. Logical Equivalence-Illustrations of Commutative, Associative, Distributive, De Morgan's Identities and other compound propositions. Tautology and Contradiction-Examples. Tautological implication-Examples. Normal Forms-Definition of Normal forms, Disjunctive Normal form, Conjunctive normal form, Principal Disjunctive normal form, Principal Conjunctive normal form. Logical Inference-Validity using truth tables. Predicate Calculus-Predicates, Quantifiers, Negation of quantifiers.</p>	
Module:4: GRAPH THEORY	Hours: 15
<p>Introduction-What is a Graph? History of Graph theory and applications. Graph Concepts-Vertex, Edge, Incidence, Degree of a vertex, Finite and Infinite graphs, Null graph, Degree sequence of a graph, Regular graph, Complete graph, Subgraph, Spanning Subgraph, Bipartite and Complete Bipartite graphs. Isomorphism - Definition, Examples on Isomorphism. Walks, Paths and Circuits - Definition, Examples. Connected and Disconnected graphs, Euler's graph, Hamiltonian paths and circuits. Operations on graphs-Union, Intersection and Ringsum of two graphs. Shortest path by Dijkstra's algorithm-Weighted graphs, Examples to illustrate shortest path. Matrix representation of graphs-Incidence matrix, Circuit matrix, Adjacency matrix and Path matrix-Illustrations (No theorems). Trees and fundamental circuits-Cut sets and cut vertices, trees, properties of trees, distances and centers in a tree, rooted and binary trees, spanning trees, fundamental circuits, spanning trees in a weighted graph. Minimum spanning tree – Examples. Planar Graphs and Coloring: Only Definitions.</p>	
C. References	
<ol style="list-style-type: none"> Rosen Kenneth H, Discrete Mathematics and its Applications, Tata McGraw-Hill, 5th edition, 2007. Goudru N G , Discrete mathematical Structures, Himalaya, 2nd edition, 2004. T. Veerarajan, Discrete mathematics with graph Theory and Combinatorics, Tata McGraw-Hill, 2007. Kolman Bernald, Discrete mathematical Structures, Prentice hall of India, 5th edition, 2005. Lipschutz Lipson, Discrete Mathematics, Tata McGraw-Hill, 2006. Vatssa B.S., Discrete Mathematics, New age International. Tremblay J.P., Discrete Mathematical structures with Applications, Tata McGraw-Hill. Liu C L., Elements of Discrete Mathematics, Tata McGraw-Hill Akerkar, Discrete Mathematics, Pearson, 2004 Deon Neville ,The Essence of Discrete Mathematics, Tata McGraw-Hill, 2004. 	

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11. Shankar, Discrete Mathematical Structures, New Age International, 2002.
12. Johnson Baugh, Discrete Mathematics, Pearson, 5 th edition, 2002.
13. Lavarz, Discrete Mathematics, Springer, 2004.
14. Rudraiah, Discrete Mathematical Structures with Application to Comp. Sc., SBS, 2001
15. Narsingh Deo, Graph Theory.
D. Mode of Assessment
IAT / CCE / SEE
E. Scheme of Evaluation

Evaluation -100 marks**1. Continuous Internal Evaluation (CIE): 50 Marks**

Components	Average of 2 IATs	CCE	Total Marks
Max. Marks	20	30	50

2. Semester End Examination (SEE) Scheme: 100 Marks (Scaled down to 50 marks).

Section	No of Questions	No of Questions to be attempted	Marks / Question	Total Marks for the Section	Revised Bloom's Taxonomy
A	12	10	3	30	L2
B	6	5	6	30	L3
C	5	4	10	40	L6

F. CO-PO-PSO Mapping

CO-PO-PSO Mapping														
CO	PO										PSO			
	1	2	3	4	5	6	7	8	9	10	1	2	3	4
1	*										*			
2	*										*			
3	*										*			
4	*										*			
5	*										*			



BCA (CC) Programme

CPSSF1011: French –Level-1		
A. Course Framework		
Credits: L-T-P-C: 2-0-0-2		Syllabus Version: 1
Contact Hours / Week: 2	Total Contact Hours:30	Level: 50
Prerequisite:(If applicable)	NIL	
Course Learning Objectives:		
<p>CLO1: Recognize, understand and pronounce French Phonetics and Alphabets</p> <p>CLO2: Introduce Oneself and others in French</p> <p>CLO3: Identify and describe various professions in French</p> <p>CLO4: Use basic French verbs in simple sentences.</p>		
Course Outcomes: On successful completion of the course, Students will be able to,		
<p>CO1: Introduce themselves and others, and use common French salutations appropriately.(L1,L2)</p> <p>CO2: Use polite expressions in French appropriately in social interactions. (L2)</p> <p>CO3: Discuss daily activities with improved fluency and accuracy (L3)</p> <p>CO4: Identify and use parts of speech correctly in sentences.</p>		
B. Syllabus		
Module:1: Fundamentals of French		Hours: 6
<p>French alphabets, numbers, phonetics. Days in a week and months in a year Greeting and introduction – Introduce self and others in French Language.</p>		
Module:2: Description and identification		Hours: 6



BCA (CC) Programme

Different nationalities in French.

Name and describe objects using colours in French.

Describe various professions in French.

Module:3: Everyday Vocabulary and Grammar Hours: 6

Basic French phrases and correctly use common verbs.

Describe someone's personality using appropriate vocabulary and adjectives.

Verbs and Prepositions Used in Descriptions

Module: 4: Time, Activities, and Preferences Hours: 6

How to Tell Time in French

Sports and Activities in French

Expressing Preferences and Wishes

Module: 5: Daily Activities and Review Hours: 6

Listening and speaking skills through interactive audio exercises.

Quantifiers in various contexts to express quantities.

Use of articles in French

Verbs and prepositions to describe actions and locations accurately.

1. Rochester, Myrna Bell. *Easy French Step-by-Step*. McGraw-Hill, 2008.
2. Lanzer, Harriette. *French Vocabulary Builder*. Oxford University Press, 2001.
3. *Living Language: French, Complete Edition*. Living Language, 2010.
4. Heminway, Annie. *Complete French All-in-One*. McGraw-Hill Education, 2013.

D. Mode of Assessment



BCA (CC) Programme

IAT / CCE / SEE

E. Scheme of Evaluation

Evaluation -100 marks

1. Continuous Internal Evaluation (CIE): 50 Marks

Component	Average of 2 IATs	CCE	Total Marks
Max. Marks	20	30	50

2. Semester End Examination (SEE) Scheme: 100 Marks (Scaled down to 50 marks).

Section	No of Questions	No of Questions to be attempted	Marks / Question	Total Marks for the Section	Revised Bloom's Taxonomy
A	12	10	3	30	L2
B	6	5	6	30	L3
C	5	4	10	40	L6

F. CO-PO-PSO Mapping

CO-PO-PSO Mapping

	PO	PSO
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**BCA (CC) Programme**

CO	1	2	3	4	5	6	7	8	9	10	1	2	3	4
1														
2														
3														
4														

1 – Low. 2 – Medium and 3 – High

BCA (CC) Programme

CPSSF1021: German –Level-1		
A. Course Framework		
Credits: L-T-P-C: 2-0-0-2		Syllabus Version: 1
Contact Hours / Week: 2	Total Contact Hours:30	Level: 50
Prerequisite:(If applicable)	NIL	
Course Learning Objectives:		
<p>CLO1: Recognize, understand and pronounce German Phonetics and Alphabets</p> <p>CLO2: Introduce Oneself and others in German</p> <p>CLO3: Identify and describe various professions in German</p> <p>CLO4: Use basic German verbs in simple sentences.</p>		
Course Outcomes: On successful completion of the course, Students will be able to,		
<p>CO1: Introduce themselves and others, and use common German salutations appropriately.(L1,L2)</p> <p>CO2: Use polite expressions in German appropriately in social interactions. (L2)</p> <p>CO3: Discuss daily activities with improved fluency and accuracy (L3)</p> <p>CO4: Identify and use parts of speech correctly in sentences.</p>		
B. Syllabus		
Module:1: Fundamentals of German Hours: 6		
<p>German alphabets, numbers, phonetics. Days in a week and months in a year</p> <p>Greeting and introduction – Introduce self and others in German Language.</p>		
Module:2: Description and identification Hours: 6		



BCA (CC) Programme

<p>Different nationalities in German</p> <p>Name and describe objects using colours in German</p> <p>Describe various professions in German</p>
<p>Module:3: Everyday Vocabulary and Grammar Hours: 6</p>
<p>Basic German phrases and correctly use common verbs.</p> <p>Describe someone's personality using appropriate vocabulary and adjectives.</p> <p>Verbs and Prepositions Used in Descriptions</p>
<p>Module: 4: Time, Activities, and Preferences Hours: 6</p>
<p>How to Tell Time in German</p> <p>Sports and Activities in German</p>
<p>Expressing Preferences and Wishes</p>
<p>Module: 5: Daily Activities and Review Hours: 6</p> <p>Listening and speaking skills through interactive audio exercises.</p> <p>Quantifiers in various contexts to express quantities.</p> <p>Use of articles in German</p> <p>Verbs and prepositions to describe actions and locations accurately.</p>
<p>Text Books</p>
<p>Koithan, Ute, Helen Schmitz, and Tanja Sieber. Aspekte neu B1. Klett, 2014.</p> <p>Swick, Ed. Easy German Step-by-Step. McGraw-Hill, 2014.</p> <p>Durrell, Martin. Hammer's German Grammar and Usage. Routledge, 2016.</p> <p>Perlmann-Balme, Michaela, and Susanne Schwalb. EM Neu 2008 Brückenkurs B1+. Hueber Verlag, 2008.</p>
<p>D. Mode of Assessment</p>
<p>IAT / CCE / SEE</p>
<p>E. Scheme of Evaluation</p>

BCA (CC) Programme**Evaluation -100 marks****1. Continuous Internal Evaluation (CIE): 50 Marks**

Component	Average of 2 IATs	CC E	Total Marks
Max. Marks	20	30	50

2. Semester End Examination (SEE) Scheme: 100 Marks (Scaled down to 50 marks).

Section	No of Questions	No of Questions to be attempted	Marks / Question	Total Marks for the Section	Revised Bloom's Taxonomy
A	12	10	3	30	L2
B	6	5	6	30	L3
C	5	4	10	40	L6

F. CO-PO-PSO Mapping**CO-PO-PSO Mapping**

CO	PO										PSO				
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	
1															



BCA (CC) Programme

2														
3														
4														
5														

1 – Low. 2 – Medium and 3 – High

BCA (CC) Programme

CPSSF1041: Spanish –Level-1		
A. Course Framework		
Credits: L-T-P-C: 2-0-0-2		Syllabus Version: 1
Contact Hours / Week: 2	Total Contact Hours:30	Level: 50
Prerequisite:(If applicable)	NIL	
Course Learning Objectives:		
<p>CLO1: Recognize, understand and pronounce Spanish Phonetics and Alphabets</p> <p>CLO2: Introduce Oneself and others in Spanish</p> <p>CLO3: Identify and describe various professions in Spanish</p> <p>CLO4: Use basic Spanish verbs in simple sentences.</p>		
Course Outcomes: On successful completion of the course, Students will be able to,		
<p>CO1: Introduce themselves and others, and use common Spanish salutations appropriately.(L1,L2)</p> <p>CO2: Use polite expressions in Spanish appropriately in social interactions. (L2)</p> <p>CO3: Discuss daily activities with improved fluency and accuracy (L3)</p> <p>CO4: Identify and use parts of speech correctly in sentences.</p>		
B. Syllabus		
Module:1: Fundamentals of Spanish		Hours: 6
<p>Spanish alphabets, numbers, phonetics. Days in a week and months in a year Greeting and introduction – Introduce self and others in Spanish Language.</p>		
Module:2: Description and identification		Hours: 6



BCA (CC) Programme

Different nationalities in Spanish.

Name and describe objects using colours in Spanish.

Describe various professions in Spanish.

Module:3: Everyday Vocabulary and Grammar Hours: 6

Basic Spanish phrases and correctly use common verbs.

Describe someone's personality using appropriate vocabulary and adjectives.

Verbs and Prepositions Used in Descriptions

Module: 4: Time, Activities, and Preferences Hours: 6

How to Tell Time in Spanish Sports and Activities in Spanish

Expressing Preferences and Wishes

Module: 5: Daily Activities and Review Hours: 6

Listening and speaking skills through interactive audio exercises.

Quantifiers in various contexts to express quantities.

Use of articles in Spanish

Verbs and prepositions to describe actions and locations accurately.

Text Books

1. Kendris, Christopher. *501 Spanish Verbs*. Barron's Educational Series, 2018.
2. Howkins, Angela, and Juan Kattán-Ibarra.
3. DK. *Spanish-English Bilingual Visual Dictionary*. DK, 2017.
4. Richards, Olly. *Spanish Short Stories for Advanced Learners*. John Murray Learning, 2019.

D. Mode of Assessment



BCA (CC) Programme

IAT / CCE / SEE

E. Scheme of Evaluation

Evaluation -100 marks

1. Continuous Internal Evaluation (CIE): 50 Marks

Component	Average of 2 IATs	CCE	Total Marks
Max. Marks	20	30	50

0. Semester End Examination (SEE) Scheme: 100 Marks (Scaled down to 50 marks).

Section	No of Questions	No of Questions to be attempted	Marks / Question	Total Marks for the Section	Revised Bloom's Taxonomy
A	12	10	3	30	L2
B	6	5	6	30	L3
C	5	4	10	40	L6

F. CO-PO-PSO Mapping

CO-PO-PSO Mapping

	PO										PSO				
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	



BCA (CC) Programme

CO														
1														
2														
3														
4														
5														

1 – Low. 2 – Medium and 3 – High



BCA (CC) Programme

CPSSF1031:Korean		
A. Course Framework		
Credits: L-T-P-C: 2-0-0-2		Syllabus Version: 1
Contact Hours / Week: 2	Total Contact Hours: 30	Level: 100
Syllabus Link	STE-KOREAN Level 1.pdf	

CPSAL1091:Functional-Hindi		
A. Course Framework		
Credits: L-T-P-C: 2-0-0-2		Syllabus Version: 1
Contact Hours / Week: 2	Total Contact Hours: 30	Level: 100
Syllabus Link	2024-Functional Hindi- CPSAL1091-pdf.pdf	

BCA (CC) Programme

FUNCTIONAL ENGLISH Course Code: CPSAL1111 Batch:2024		
A. Course Framework		
Credits: L-T-P-C:2-0-0-2		Syllabus Version: 2.0
Contact Hours / Week-2	Total Contact Hours: 30	Level: 100
Prerequisite: (If applicable)	Knowledge on English Language	
Course Learning Objectives:		
CLO1: To develop language skills (LSRW) CLO2: To develop usage of Functional English. CLO3: To explore the history of ideas in developing vocabulary and paraphrasing. CLO4: To discover Narrative writing through analytical thinking.		
Course Outcomes: On successful completion of the course, Students will be able to:		
CO1: Define Social Values and Critical Thinking skills (L1) CO2: Compare the poetical terms and integrate creative ideas in the English Language. (L2) CO3: Develop vocabulary and interpret in one academic and professional life.(L2) CO4: Develop skills of comprehending and analytical to improve their language proficiency. (L3) CO5: Construct sentences to improve their Verbal Skills.(L3)		
B. Contents:		
Module:1:	Hours-06	
Vocabulary Development		
1. Concept of Word Formation 2. Identifying meanings using prefixes and suffixes to the root word 3. One word substitutes		

BCA (CC) Programme

Module: 2	Hours-06
Essentials of Grammar	
<ol style="list-style-type: none"> 1. Understand basic grammar-Parts of speech 2. Synonyms and Antonyms 	
Module: 3	Hours-04
Comprehending	
<ol style="list-style-type: none"> 1. Answering the given passage 2. Developing a story with the given hints. 	
Module: 4	Hours-06
Creative Thinking	
<ol style="list-style-type: none"> 1. Cloze Test 2. Verbal Analogy 3. Sentence structure: Jumbled words to form sentences; Jumbled sentences to form paragraph 	
Module: 5	Hours-08
Theme Extraction from short stories	
<ol style="list-style-type: none"> 1) Subha – by Rabindranath Tagore 2) The Only American from our village- by Arun Joshi 	
C. References:	
<ol style="list-style-type: none"> 1. https://englishpuff.blogspot.com/2014/05/text-of-only-american-from-our-village.html 2. https://www.englishliterature.info/2021/04/subha-story-by-rabindranath-tagore.html 3. https://www.poetryfoundation.org/poems/44266/mending-wall 4. https://www.poetryfoundation.org/poems/43671/the-little-black-boy 5.Essential Eng. Grammar Paperback – 12 January 2000- by Raymond Murphy 	
D. Mode of Assessment	

BCA (CC) Programme

IAT/CCE&SEE
E. Scheme of Evaluation

1. Continuous Internal Evaluation (CIE): 25 Marks

Components	Average of 2 IATs	CCE	Total Marks
Max Marks	10	15	25

2. Semester End Examination (SEE) Scheme: 50 Marks (Scaled down to 25 Marks)

Section	No. of Questions	No. of Questions to be attempted	Marks/Question	Total Marks for the Section	Revised Bloom's Taxonomy
A	5	4	3	12	L1, L2
B	4	3	6	18	L2, L3
C	3	2	10	20	L3



BCA (CC) Programme

CPSAL1101:Functional- Kannada		
A. Course Framework		
Credits: L-T-P-C: 2-0-0-2		Syllabus Version: 1
Contact Hours / Week: 2	Total Contact Hours: 30	Level: 100
Syllabus Link	2024-Kannada-Syllabus-CPSAL1071-.pdf	



BCA (CC) Programme

Course Code: CPSAD1013 Course Name: Design Thinking Process		
A. Course Framework		
Credits: L-T-P-C: 2-0-0-2		Syllabus Version: 3.0
Contact Hours / Week: 3	Total Contact Hours: 30	Level: 100
Prerequisite: (If applicable)	NA	
Course Learning Objectives:		
<p>CLO 1: Introduce students to the principles and processes of design thinking</p> <p>CLO 2: Introduce research methods and tools to effectively gather insights from stakeholders.</p> <p>CLO 3: Introduce problem reframing techniques to uncover root causes and identify opportunities for innovation.</p> <p>CLO 4: To equip students with techniques in innovative thinking and brainstorming.</p>		
Course Outcomes: On successful completion of the course, Students will be able to,		
<p>CO1: Implement design thinking methodologies to identify and address complex problems.(Level 3) CO2: Empathize with users and stakeholders to understand their needs effectively.(Level 2)</p> <p>CO3: Generate innovative ideas by engaging in ideation and prototyping processes(Level 5) CO4: Effectively communicate solutions using pitching techniques. (Level 4)</p>		
B. Syllabus		
MODULE 1: Introduction to Design Thinking Hours: 3		
Introduction to Design, Introduction to Design Thinking Process, Introduction to Design Thinking Mindsets ,Current ways of problem solving techniques, Design Thinking applied for a specific field.		
MODULE 2 : EMPATHIZE PHASE Hours: 9		
Introduction to Empathy, The use of empathy in problem solving, Importance of Understanding user needs in Designing Products, Services And Experiences.		
Design Research tools and techniques, Primary Research, Secondary Research, Field Observation, Understanding user needs through Interview, Stakeholder Mapping, Understanding Personas, Empathy Mapping, Journey Mapping, Research Presentation and Feedback.		
MODULE 3 : DEFINE PHASE Hours: 3		
Zooming into a Problem, Reframing the Problem statement, Root cause analysis, The 5 Whys, 'How Might we' statement, converting problems into opportunities.		

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BCA (CC) Programme

Mode of Assessment: CIE (IAT + CCE)
Assignments/ Deliverables: 50 Marks
Regular documentation and presentation of the Design Thinking Process (CCE 1,2) Weightage: 50 Marks (25 x 2)- reduced to 25
Students test the prototype, get external and internal feedback and present the final Project to an invited jury Weightage: 50 Marks - reduced to 25
Scheme of Evaluation : 50 Marks (CIE)
1.Continuous Internal Assessment (CIE) : 50 Marks
2. Sem End Exam - Presentation to external Jury : 50 Marks

Components	Marks	Total Marks
CCE 1	25	25 (reduced from 50)
CCE 2	25	
SEE	50	25 (reduced from 50)
TOTAL MARKS		50

F. CO-PO-PSO Mapping

CO-PO-PSO Mapping												
CO	PO										11	12
	1	2	3	4	5	6	7	8	9	10		
1	-	3	2	2	2	-	-	-	3	2	2	2
2	-	3	3	1	3	-	-	-	3	2	-	-
3	-	-	3	3	2	-	-	-	3	2	2	3
4	-	-	-	-	2	-	-	-	3	3	2	3

1-Low, 2-Medium, 3-High

BCA (CC) Programme

CKSAM1051: Indian Constitution		
A. Course Framework		
Credits: L-T-P-C: 2-0-0-2		Syllabus Version: 1.0
Contact Hours / Week: 2	Total Contact Hours: 30	Level: 100
Prerequisite: (If applicable)	NA	
Course Learning Objectives:		
<p>01: To establish a sense of responsibility to uphold the freedoms of this diverse, secular country 02: To create curiosity to explore India's rich history.</p> <p>03: To create a desire to contribute to the country in small and big ways.</p> <p>04: To gain an appreciation for the workings of the world's largest democracy. 05: To build the habit of researching and articulating their points of view.</p> <p>06: To imagine hypothetical and alternate histories and presents to enable deeper understanding of the impact of history and democracy.</p>		
Course Outcomes: On successful completion of the course, Students will be able to,		
<p>01: Study a particular event in Indian history and trace the impact that can be felt to the present day. 02: Understand the impact of the way a democracy is structured.</p> <p>03: Understand the freedoms that a citizen of India has, and what those mean in daily life. 04: Understand the duties of an Indian citizen and how they translate to daily life.</p> <p>05: Gain an understanding of the workings of the government in their residential locality. 06: Trace the impact of a single vote from their area of residence to the national scale. 07: Understand the Indian democratic process and their role in it.</p> <p>08: Identify ways in which they can contribute to the progress of the country.</p>		
B. Syllabus		
Module:1: From Princely States to One Country		Hours: 6
Gaining independence - The complexity of integration - Partition - Student discussion: Factors of Complexity - The continued impact		
Module:2: World's Largest Democracy		Hours: 5
History of the right to vote in India - 2019 national election - Two houses of parliament - Student discussion: Roots of Democracy		
Module:3: Global Systems of Democracy		Hours: 5
Direct and Representative Democracies - Structure of a democracy - Student discussion: Re-imagining India's Democracy		

BCA (CC) Programme

Module:4: Local Democracy	Hours: 5
State government - Your vote	
Module:5: Rights, Duties and Personal Responsibility	Hours: 4
Constitutional rights - Constitutional duties - Translating into action	
Final - Contributing to Social Change	Hours: 5
Social issue of choice: Research into context and opportunities for personal contribution	

C. References

1. The Story of the Integration of the Indian States - V.P. Menon (1956)
2. The Road to India's Partition - Haimanti Roy; The Conversation (2018)
3. Karnataka Information Election System
4. Mocomi - Indian Freedom Struggle
5. Mocomi - Indian Independence: 1947
6. Animated Lessons - The Princely States of India
7. TRT World: India-Pakistan partition explained
8. Garvita Sethi: From Lahore to New Delhi - Curfew, Gunshots and Run for Life - 1947 Partition Stories
9. Brut - Does everyone have a right to vote? Dhruv finds out
10. Indian Express Online: Facts about the First Election in Independent India
11. Rajya Sabha tv: History of elections in India
12. Vox: How India runs the world's biggest election
13. Global News: India Lok Sabha election 2019: How the world's largest democracy votes
14. Eclectic: Indian parliament explained in 5 minutes
15. Scroll.in: How is a Rajya Sabha MP elected?
16. MinuteVideos: Democracy
17. United 4 Social Change: Representative vs. Direct Democracy
18. SWI: Switzerland's direct democracy
19. The School of Life: Why Socrates Hated Democracy
20. ThinkNovus: Voting Systems - Best in the World
21. CGP Grey: The Problems with First Past the Post
22. CGP Grey: The Alternative Vote
23. CGP Grey: Mixed-Member Proportional Representation Explained
24. CNBC International: How do German elections work?
25. Amit Sengupta: How State Government Works
26. Exambin: Fundamental rights in the Indian Constitution
27. Exambin: Fundamental Duties of Indian Citizen

D. Mode of Assessment

CIE : IAT/CCE &SEE

E. Scheme of Evaluation

IC/DPS	IAT					CCE				CIE	SEE		Total
Evaluation	IAT-1	IAT-1 Scaled Down	IAT-2	IAT-2 Scaled Down	Average IAT [(B+D)/2]	CCE-1	CCE-2	CCE-3	Total CCE (F to H)	CIE (IAT + CCE) (E + I)	SEE	SEE Scaled Down	Grand Total (J + L)
Column Identifier >	A	B	C	D	E	F	G	H	I	J	K	L	M
Max. Marks	20	10	20	10	10	5	5	5	15	25	50	25	50

Semester End Examination (SEE) Scheme: 50 Marks (Scaled down to 25 Marks)

Section	No of Questions	No of Questions to be attempted	Marks / Question	Total Marks for the Section
A	5	4	3	12
B	5	3	6	18
C	3	2	10	20

SECOND SEMESTER

BCA (CC) Programme

8CSGC2391: Data Structures Using C and Lab		
A. Course Framework		
Credits: L-T-P-C: 3-0-2-5		Syllabus Version: 1
Contact Hours / Week: 7	Total Contact Hours: 105	Level: 200
Prerequisite: (If applicable)	Basic Programming Skills	
Course Learning Objectives:		
<p>CLO1:To learn how to use and manipulate several core data structures: Arrays, linked lists, stacks, queues, trees and graphs.</p> <p>CLO2: To explain the role of data structures in structuring and manipulating data.</p>		
Course Outcomes: On successful completion of the course, Students will be able to,		
<p>CO1: Select appropriate data structures as applied to specified problem definition.(L3)</p> <p>CO2: Implement Linear and Non-Linear data structures.(L3)</p> <p>CO3: Apply algorithms for sorting/searching technique for given problem.(L3)</p> <p>CO4: Implement operations like searching, insertion, deletion, traversing on various data structures.(L4)</p> <p>CO5: Implement the concept of Dynamic memory allocation.(L4)</p> <p>CO6: Design advance data structure using Non Linear data structure.(L4)</p>		
PO: PO1 -PO3/ PO7- PO7		PSO: PSO1- PSO3
B. Syllabus		
Module:1: INTRODUCTION TO DATA STRUCTURES		Hours:6
Definition, Classification of data structures: primitive and non-primitive. Operations on data structures. Recursion:Definition, Recursion in C, Writing Recursive programs – Fibonacci, Binomial coefficient ,GCD, Towers of Hanoi		
Module:2: SEARCHING AND SORTING		Hours:10
Sequential search, Binary search, Comparison - Sequential and Binary search. Sorting - Definition, Types: Bubble sort, Selection sort, Merge sort, Insertion sort, Quick sort		
Module:3: STACK & QUEUE		Hours:9
Stack – Definition, Array representation, Operations on stack, Infix, Prefix and Postfix notations. Conversion of an arithmetic expression from Infix to Postfix. Queue - Definition, Array representation, Simple queue & operations, Circular queue & operations, Introduction to Double-ended queue (Deque), and Priority queue.		
Module:4: LINKED LIST		Hours:11
Dynamic memory allocation and pointers: Introduction to pointers, Pointers and Structure. Linked list – Definition, Representation of linked list, Advantages and Disadvantages of linked list. Types: Singly, Doubly, Circular linked list. Operations on Singly Linked list: creation, insertion, deletion, search and display.		

BCA (CC) Programme

Module:5: GRAPHS and TREES	Hours:9
<p>Graph: Definition and terminology, Graph representation: Adjacency Matrix, Adjacency List</p> <p>Tree : Definition, Tree terminology: Root, Node, Degree of a node and tree, Terminal nodes, Non-terminal nodes, Siblings, Level, Edge, Path, depth, Parent node, ancestors of a node. Binary tree, Complete binary tree, Binary search tree, Binary tree - Array and Linked representation, Creation .</p>	
Part A	
<ol style="list-style-type: none"> 1) Write a C program to find the number of characters in a string using recursion 2) Write a C program to find the Binomial coefficient using Recursion 3) Write a C program to search for an element using Sequential search 4) Write a C program to search for an element in an array using Binary search 5) Write a C program to sort a list of N elements using Bubble sort Technique 6) Write a C program to sort a list of N elements of integer type using Quick sort Algorithm 7) Write a C program to sort a list of N elements using Merge sort Algorithm 8) Write a C program to find the length of a string and concatenate two strings using pointers. 	
Part B	
<ol style="list-style-type: none"> 9) Write a C program to demonstrate the working of STACK of size N using an array. The elements of the STACK may assume to be of type integer or real, the operations to be supported are 1. PUSH 2. POP 3. DISPLAY. The program should print appropriate messages for STACK overflow, Under flow and empty. Use separate functions to detect these cases 10) Write a C program to convert and print a given valid fully parenthesized infix arithmetic expression to postfix expression, the expression consists of single character (letter or digit) as operands and +, -, *, / as operators, assume that only binary operators are allowed in the expression 11) Write a C program to evaluate a postfix expression. 12) Write a C program to simulate the working of a Circular Queue using an array. Provide the operations CQINSERT, CQDELETE and CQDISPLAY. Check the Circular Queue status for empty and full. 13) Using dynamic variables and pointers Write a C program to construct a singly linked list consisting of the following information in each node; <ul style="list-style-type: none"> Roll – No (Integer), Name (Character string) <p style="text-align: center;">The operations to be supported are ;</p> <ol style="list-style-type: none"> 1. LINSERT Inserting a node in the front of the list 2. LDELETE Deleting the node based on Roll – No 3. LDISPLAY Displaying all the nodes in the list 	

BCA (CC) Programme

14. Using Dynamic variables and pointers construct Binary search tree of integers, Write C functions to do the following;

1. Given a KEY, Perform a search in Binary search tree. If it is found display Key found else insert the key in the Binary search tree.
2. While constructing the Binary search tree do not add any duplicate
3. Display the tree using any of the traversal method

C. References

1. Lipschutz, Schaum's outline series Data structures, Tata McGraw-Hill, 1986
2. Ashok M Kamthane, Introduction to Data Structures in C, Pearson Education 2005.
3. Langsam, Augenstein Maoshe & Aaron M. Tanenbaum Data Structures using C and C++ Pearson Education, 2nd Edition, 1996.
4. Trembley and Sorenson, An Introduction to Data Structures, Tata McGraw-Hill, 2nd Edition, 1991

D. Mode of Assessment

IAT / CCE / SEE

E. Scheme of Evaluation

Evaluation – 150 marks (Pass criteria 40% - 60 marks out of 150)

a. Continuous Internal Evaluation (CIE): 100 Marks

Components	Sum of 3 IATs	CCE	Practical Exam	Total Marks
Max. Marks	30 (Theory-2, Practical – 1)	20 (Theory-2, Practical – 1)	50	100
Theory	20	10		
Practical	10	10		

Semester End Examination (SEE) Scheme (Practical): 50 Marks

Section	Course with project	Course without project	Total Marks for the Section	Revised Bloom's Taxonomy



BCA (CC) Programme

Writing Program & Abstract	2 Programs & Project Abstract (10+5)	2 Programs	15	L3
Execution	1 Program & Project Demo (10+10)	2 Programs	20	L4
Viva-Voce	10	10	10	L5
Record/Report	5	5	5	

Semester End Examination (SEE) Scheme (Theory): 100 Marks (Scaled down to 50 marks)

Section	No of Questions	No of Questions to be attempted	Marks / Question	Total Marks for the Section	Revised Bloom's Taxonomy
A	12	10	3	30	L2
B	6	5	6	30	L3
C	5	4	10	40	L6

F. CO-PO-PSO Mapping

CO-PO-PSO Mapping														
CO	PO										PSO			
	1	2	3	4	5	6	7	8	9	10	1	2	3	4
1	*					*						*		
2		*	*								*			
3			*	*		*							*	
4						*				*			*	

BCA (CC) Programme

5			*																	
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BCA (CC) Programme

8CSPL1341: OPERATING SYSTEM AND LINUX FOUNDATION AND LAB		
Course Framework		
Credits: L-T-P-C: 3-0-2-5		Syllabus Version: 1
Contact Hours / Week: 7	Total Contact Hours: 105	Level: 200
Prerequisite : (If applicable)	NO	
Course Learning Objectives:		
<p>CLO1: To introduce the basic concepts and functions of operating systems.</p> <p>CLO2: To give a thorough understanding of process concepts, synchronization and deadlock.</p> <p>CLO3: To provide exposure for various memory and file management techniques of operating system.</p> <p>CLO4: To Study the basic Linux concepts and shell programming.</p>		
Course Outcomes: On successful completion of the course, Students will be able to,		
<p>CO1: Identify the structure of the operating system, CPU scheduling with different scheduling algorithms (Level 2)</p> <p>CO2: Identify the classic problems of Synchronization. (Level 2)</p> <p>CO3: Analyze different methods of handling deadlocks , the memory management and its allocation policies.(Level 4)</p> <p>CO4: Demonstrate file management, secondary storage structure and its various allocation methods.(Level 3)</p> <p>CO5: Apply the concepts of Linux programming. (Level 3)</p>		
PO: PO1-PO4	PSO:PSO1-PSO4	
B. Syllabus		
Module 1: INTRODUCTION TO OS, PROCESS, PROCESS SYNCHRONIZATION		Hours: 09
<p>Self Study: Introduction - Mainframe Systems, Multiprocessor Systems, Distributed Systems, Real-Time Systems, And Handheld Systems.</p> <p>Operating System Structures: System Components & OS Services, System calls.</p> <p>Processes: Process Concepts, Process Scheduling, Co-Operating process, Inter process communication.</p> <p>CPU Scheduling: Basic concepts, CPU - I/O burst cycle, CPU scheduler, Pre-emptive and non pre-emptive scheduling, Dispatcher. Scheduling Criteria, Scheduling Algorithms - First Cum First Served Scheduling, Shortest Job First Scheduling, Priority Scheduling, Round Robin Scheduling.</p> <p>Process Synchronization: The Critical-Section problem, Synchronization Hardware, Semaphores, Classic problems of Synchronization – The bounded buffer problem, The readers-writers problem, The Dining Philosophers problem.</p>		
Module 2: DEADLOCKS AND MEMORY MANAGEMENT		Hours: 09



BCA (CC) Programme

<p>Deadlocks - System Model, Characterization, Resource Allocation Graph, Methods of handling deadlocks - Deadlock prevention, Avoidance and Detection, Recovery from deadlocks.</p> <p>Memory: Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation.</p> <p>Virtual memory – Demand Paging and its Performance</p> <p>Page Replacement – Basic scheme, FIFO Page replacement, Optimal Page replacement, LRU page replacement.</p>	
<p>Module 3: FILE MANAGEMENT , SECONDARY STORAGE STRUCTURE Hours: 09</p>	
<p>File-System Interface – File Concepts, Access Methods, Directory Structure.</p> <p>File-System Implementation – File - System Structure, Directory Implementation, Allocation Methods, Free Space Management.</p> <p>Mass-Storage Structure - Disk Structure, Disk Scheduling – FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK, Disk Management, Swap- Space management, RAID Structure.</p>	
<p>Module 4: INTRODUCTION TO LINUX FILE SYSTEM Hours:09</p>	
<p>Introduction: History, salient features, Unix system architecture, Unix command format, Unix internal and external commands, Directory commands, File related commands, disk related commands ,general utilities.</p> <p>Unix File System: Boot, inode, super and data block, in-core structure, Directories, inode to a new file, Disk block allocation</p> <p>Filters : Simple Filters -cat, head, tail, uniq, cut, paste, wc, tr, more and sort commands, Filters using Regular expressions – rep, SED.</p>	
<p>Module – 5: SHELL PROGRAMMING Hours: 09</p>	
<p>Shell Script: Use of Vi editor, shell types, shell command line processing, shell script features, executing a shell script, System and user defined variables, expr command, read and echo statement, command substitution, escape sequence characters, shell script arguments, positional parameters, test command: file test, string test, numeric test.</p> <p>Conditional control structures if statement, case statement, Looping control structure – while, until, for statements. Jumping control structure –break, continue, exit.</p>	
<p>PART A</p>	
<ol style="list-style-type: none"> 1. Execute commands (mkdir, cat, cd, ls, rmdir) to create a tree of files and directories. 2. Write a shell program to count the number of characters and to count the number of vowels in the given string. 3. Write a shell program to check whether a given number is even or odd. 4. Write a shell program to find the factorial of a given number. 5. Write a shell program to print all prime numbers between m and n (m<n). 6. Write a shell program to check whether a given string is palindrome or not. 7. Write a shell program to display all the files & directory in the current directory. 	
<p>PART B</p>	



BCA (CC) Programme

8. Write a menu driven shell script to implement the following UNIX commands:
a) rm b) uniq c) tail d) cmp
9. Write a shell program to compress and decompress a file using gzip command.
10. Write a shell program to find a given pattern in a list of files of current directory using grep command.
11. Write a shell script to assign a file access permissions to given file using
a) Symbolic mode b) Absolute mode
12. Write a shell program to create a file containing the following fields: Student No, Student Name, age, gender, height and weight. Print all the details in a neat format.
13. Write a menu driven shell program with at least 3 options for a payroll system.
14. Write a shell program to accept a filename as input and display whether it exists or not. If it exists, then give the details of its attributes like access permission, its size etc.
15. Write a shell script for sending and handling MAIL using the write and mail command. Problem description: The SCRIPT should display whether your friend whose log name is "xxx" has currently logged in or not. If logged in then, the script should send a message to his terminal "Get me the definition of TCP/IP". If he has not logged in then such a message should be mailed to him.

C. References

1. Silberschatz, Galvin, Gagne, "*Operating System Concepts*", 9th Ed, Wiley-India.
2. Andrew Tanenbaum "*Introduction to Operating System*", 3rd edn . Pearson.
3. Williams Stallings "*Operating Systems: Internals and Design Principles*" 5th edn. Pearson.
4. Red Hat Linux Bible, Cristopher Negus, Wiley Dreamtech India
5. Muster J.C., *Introduction to UNIX and LINUX*, McGraw Hill.

D. Mode of Assessment

IAT / CCE / Mini Project / SEE

E. Scheme of Evaluation

Evaluation – 150 marks (Pass criteria 40% - 60 marks out of 150)

a. Continuous Internal Evaluation(CIE): 100 Marks

Components	Sum of 3 IATs	CCE	Practical Exam	Total Marks
Max. Marks	30 (Theory-2, Practical – 1)	20 (Theory-2, Practical – 1)	50	100
Theory	20	10		
Practical	10	10		

BCA (CC) Programme

Semester End Examination (SEE) Scheme (Practical): 50 Marks

Section	Course with project	Course without project	Total Marks for the Section	Revised Bloom's Taxonomy
Writing Program & Abstract	2 Programs & Project Abstract (10+5)	2 Programs	15	L3
Execution	1 Program & Project Demo (10+10)	2 Programs	20	L4
Viva-Voce	10	10	10	L5
Record/Report	5	5	5	

Semester End Examination (SEE) Scheme (Theory): 100 Marks (Scaled down to 50 marks)

Section	No of Questions	No of Questions to be attempted	Marks / Question	Total Marks for the Section	Revised Bloom's Taxonomy
A	12	10	3	30	L2
B	6	5	6	30	L3
C	5	4	10	40	L6

F. CO-PO-PSO Mapping

CO-PO-PSO Mapping														
CO	PO										PSO			
	1	2	3	4	5	6	7	8	9	10	1	2	3	4
1	*	*									*	*		
2		*	*								*	*		
3		*	*								*	*		
4	*	*										*		
5		*	*	*							*	*	*	*

BCA (CC) Programme

8STAT2041: Statistics		
A. Course Framework		
Credits: L-T-P-C: 3-0-0-3		Syllabus Version: 1
Contact Hours / Week: 3	Total Contact Hours: 45	Level: 200
Prerequisite: (If applicable)	Learners must be familiar with Basic Mathematics and Real Analysis.	
Course Learning Objectives:		
CLO1: To understand and apply Statistical techniques in the fields of Business analytics, Predictions and in various other fields.		
Course Outcomes: On successful completion of the course, Students will be able to,		
CO1: Organize data and present it in the form of diagrams and graphs.(L3: Apply)		
CO2: Solve the problems related to Measures of Central Tendency-Mean-Median-Mode. (L3)		
CO3: Solve the problems related to Measures of Dispersion-Range-Quartile Deviation-Mean Deviation and Standard Deviation. (L3)		
CO4: Solve the problems related to Correlation and Regression, interpret the direction and degree of association between two variables and also will be able to predict the value of one variable with the help of the known value of another variable. (L3)		
CO5: Formulate the trend values which enables in predicting the future values with the help of previous data's. (L3: Apply)		
PO: PO1		PSO: PSO1
B. Syllabus		
Module:1: Fundamentals of Statistics		Hours:9
Introduction- Definition, Characteristics of Statistics, Functions of Statistics, Scope of Statistics, Limitations of Statistics.		
Classification of data- Definition, Objectives of classification, Types of classification.		
Tabulation of data - Definition, objectives of tabulation, parts of statistical table- examples to draft blank tables.		
Formation of Frequency Distribution- Discrete frequency distribution, continuous frequency distribution, Types of class intervals, frequency density, relative frequency, rules for constructing continuous frequency distribution with few examples (univariate table only).		
Pictorial representation of data- Difference between diagrams and graphs, uses of diagrams and graphs, limitations of diagrams and graphs. Simple bar diagram, multiple bar diagram, subdivided bar diagram, percentage bar diagram. Histogram, frequency polygon, frequency curve and Ogives.		
Module:2: Measures of Central Tendency and location.		Hours:9
Central Tendency - Arithmetic Mean, Median and Mode.		
Quantiles or Partition values - Quartiles, Deciles and Percentiles.		
Module:3: Measures of Dispersion.		Hours:9

BCA (CC) Programme

Range, Quartile Deviation, Mean Deviation, Standard Deviation, Coefficient of Variation.	
Module:4: Correlation and Regression Analysis	Hours:9
Correlation: Definition-Types of Correlation-Methods of finding Correlation by 1. Karl Pearson's Correlation Coefficient. 2. Spearman's Rank Correlation Coefficient. Regression: Definition; Determination of Regression Coefficients and Regressions Equations, Regression Analysis – Examples.	
Module:5: Time Series	Hours:9
Definition-Components of time Series. Finding the trend values by 1. Method of Semi-Averages 2. Method of Moving averages 3. Method of least squares. (Inclusive of plotting the trend values using graphs).	
C. References	
1. Gupta S C, Fundamentals of Statistics, Himalaya, 6 th edition. 2. Spiegel, Murray R, Schaum's outlines Statistics, Tata Mcgraw Hill, 3 rd edition. 3. Sharma J K, Business Statistics, Pearson. 4. Levin, Statistics for Management, Pearson, 7 th edition. 5. Agarwal B. C, Basis Statistics, New age International.	
D. Mode of Assessment	
IAT / CCE / SEE	
E. Scheme of Evaluation	

F. CO-PO-PSO Mapping

CO-PO-PSO Mapping														
CO	PO										PSO			
	1	2	3	4	5	6	7	8	9	10	1	2	3	4
1	*										*			
2	*										*			
3	*										*			
4	*										*			
5	*										*			



BCA (CC) Programme

CPSAL1061: Hindi		
A. Course Framework		
Credits: L-T-P-C: 2-0-0-2		Syllabus Version: 1
Contact Hours / Week: 2	Total Contact Hours: 30	Level: 100
Syllabus Link	2024-Hindi-Syllabus-CPSAL1061-pdf.pdf	

CPSAL1071: Kannada		
A. Course Framework		
Credits: L-T-P-C: 2-0-0-2		Syllabus Version: 1
Contact Hours / Week: 2	Total Contact Hours: 30	Level: 100
Syllabus Link	2024-Kannada-Syllabus-CPSAL1071-.pdf	

STE 2024-27



School of Science and Computer Studies

BCA (CC) Programme

BCA (CC) Programme

CPSAL1081:English		
A. Course Framework		
Credits: L-T-P-C:2-0-0-2		Syllabus Version: 2.0
Contact Hours / Week-2	Total Contact Hours: 30	Level: 100
Prerequisite: (If applicable)	Knowledge on English Language and Literature	
Course Learning Objectives:		
<p>CLO1: To develop language skills (LSRW) CLO2: To develop Literary sensibilities CLO3: To explore the history of ideas and contemporize CLO4: To discover Narrative writing through analytical thinking.</p>		
Course Outcomes: On successful completion of the course, Students will be able to,		
<p>CO1: Define Critical Thinking skills (L1) CO2: Compare the poetical terms and integrate creative ideas in the English Language. (L2) CO3: Interpret meaningful connectivity on the basis of characters with the plot.(L2) CO4: Develop Narrative skills to improve their writing proficiency. (L3) CO5: Construct sentences to improve their Verbal Skills.(L3)</p>		
B. Syllabus		
Module:1: Prose		Hours: 06
<p>1) The Verger - Somerset Maugham 2) When Pirzada Came to Dine – Jhumpa Lahiri</p>		
Module:2: Poetry		Hours: 06



BCA (CC) Programme

1) A River– AK Ramanujan 2) Our Casuarina Tree– Toru Dutt	
Module:3 Novel (Extensive Reading)	Hours: 08
To Kill a Mockingbird- Harper Lee (Novel)*	
Module:4: Narrative Writing	Hours: 04
1) Narrative writing- Mini Sagas 2) Answering reading comprehension Passag	
Module:5 Grammar	Hours: 06
1. Articles 2. Prepositions 3. Subject-Verb agreement	
C. References	
1. Essential Eng. Grammar Paperback – 12 January 2000- by Raymond Murphy 2. To Kill a Mockingbird- movie 3. The Poetry of Pablo Neruda- Pablo Neruda 4. Somerset Maugham poems 5. Robert Browning poems https://poetryarchive.org/poet/robert-browning/ https://www.cambridge.org/download_file/stream_inline/1009762 • PDF file https://essaypro.com/blog/article-review www.skillshare.com/blog/5-examples-of-narrative-writing/ https://prezi.com/r1yeadfjme8x/paper-1-passages-for-comment/ https://blog.essaybasics.com/how-to-write-an-article-review	
D. Mode of Assessment	
CIE: IAT / Assignment / Participatory Learning and SEE	
E. Scheme of Evaluation	

BCA (CC) Programme**1. Continuous Internal Evaluation (CIE): 25 Marks**

Components	Average of 2 IATs	CCE	Total Marks
Max Marks	10	15	25

2. Semester End Examination (SEE) Scheme: 50 Marks (Scaled down to 25 Marks)

Section	No of Questions	No of Questions to be attempted	Marks / Question	Total Marks for the Section	Revised Bloom's Taxonomy
A	5	4	3	12	L1, L2
B	4	3	6	18	L2, L3
C	3	2	10	20	L3
Total SEE Marks				50	

BCA (CC) Programme**Oral and Written Communication (4 group Schools)****Course Code: CPSAL2032****Batch:2024****A. Course Framework****Credits: L-T-P-C:4-0-0-4****Syllabus Version: 3.0****Contact Hours / Week-4****Total Contact Hours: 60****Level: 100****Prerequisite: (If applicable)****Basic English Communication****Course Learning Objectives:**

CLO1: To develop the ability to speak clearly and concisely in formal and informal settings.

CLO2: To improve Listening skills for specific information, instructions, or details in spoken messages, such as academic lectures, workplace briefings, or public announcements.

CLO3: To enhance the ability to understand the main ideas, details, and implied meanings of texts.

CLO4: To foster structured and logically organized paragraphs to improve the effectiveness of written communication.

CLO5: To acquire a robust comprehension of grammar rules and principles, facilitating proficient communication in both spoken and written contexts.

Course Outcomes: On successful completion of the course, Students will be able to:

CO1: Apply different listening techniques to effectively engage with diverse speakers and situations. (L3)

CO2: Demonstrate proficiency in both oral and written communication, effectively expressing ideas, opinions, and information in a clear and coherent manner. (L3)

CO3: Use the different methods and strategies of reading. (L3)

CO4: Apply acquired knowledge in writing using appropriate tone and structure. (L3)

CO5: Analyze and interpret grammatical structure in texts to enhance communication skills in various contexts, including academic writing, professional correspondence, and interpersonal communication. (L2, L3)

B. Contents:**Module: 1****Hours-12****Focus on Speaking in formal and informal**

Greeting and Introducing self / Talking about self - (Formal and Informal in different contexts where students can introduce and describe themselves)-Introducing friends, colleagues, and peers. Sentence structure and word order, Framing questions with Be-verbs, Modal Auxiliaries, Wh. questions, and Auxiliary Questions.

BCA (CC) Programme

Module: 2	Hours-12
Listening and Elements of Grammar:	
Importance of Communication, Types of Communication, Barriers to Communication and strategies to overcome them. Listening -Types of Listening - Listening to Lectures/ Videos/Talks, Kinds of sentences, Prefixes and Suffixes (root words), Verbal Analogy	
Module: 3	Hours-12
Focus on Reading and Functional Grammar	
Methods in reading, (Scanning, skimming, and in-depth reading) Strategies in Reading Comprehension, Parajumbles, Verb forms and Tenses a Practical Approach.	
Module: 4	Hours-12
Refine Writing Skills	
Sentence correction, Drafting formal and informal correspondence / Emails for different academic situations and in the workplace -Different Tones, Vocabulary used in formal and informal Emails.	
Module: 5	Hours-12
Focus on Oral and Written concepts.	
Oral Presentation Skills - Plan Prepare and Present, Paragraph Writing, Types of Paragraphs (Narrative, Descriptive, Expository, Persuasive).	
C. References:	

BCA (CC) Programme

1. Dale Carnegie & Dorothy Carnegie. (1977). *The Quick and Easy Way to Effective Speaking*. Simon and Schuster.
2. Norman Lewis. (2009). *Word Power Made Easy*. Goyal Publishers.
3. Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
4. Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking*. Heinley ELT; 2nd Edition, 2018.
5. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
6. Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.
7. Robert W Bly Webster's New World Letter Writing Handbook. Wiley Publishing, Inc.
8. Chapman Rebecca. *English for Emails*. Oxford University Press.
9. Tracy, Brian. *Speak to Win: How to Present with Power in Any Situation*. HarperBusiness, 2008.
10. Murphy, Raymond. *English Grammar in Use*. Cambridge University Press, 2019.
11. Strunk Jr., William, and E.B. White. *The Elements of Style*. New York, Longman, 2000.
12. Wren, P.C., and H. Martin. *High School English Grammar and Composition*. S. Chand & Company, 2018.

Web References:www.esl-lab.comwww.englishmedialab.comwww.englishinteractive.net**D. Mode of Assessment**

IAT/CCE&SEE

E. Scheme of Evaluation

BCA (CC) Programme**1. Continuous Internal Evaluation (CIE): 50 Marks**

Components	Average of 2 IATs	CCE	Total Marks
Max Marks	20	30	50

2. Semester End Examination (SEE) Scheme: 100 Marks (Scaled down to 50 Marks)

Section	No. of Questions	No. of Questions to be attempted	Marks/Question	Total Marks for the Section	Revised Bloom's Taxonomy
A	7	5	3	15	L1, L2
B	7	5	8	40	L2, L3
C	4	3	15	45	L3, L4

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3							3	3		3
CO2	3	3						3	3	3		3
CO3	3	3			3			3	3	3		3
CO4	3	3			2			3	2	2		3
CO5	3	3			2			3	2	2		3

Level: Low-1, Medium-2, High-3

Graduate Attributes (GA)

BCA (CC) Programme

S No	Graduate Attributes
1	Engineering Knowledge
2	Problem Analysis
3	Design/Development of Solution
4	Conduct investigations of complex problems
5	Modern tool usages
6	The engineer and society
7	Environment and Sustainability
8	Ethics
9	Individual and team work
10	Communication
11	Project Management and finance
12	Lifelong learning

Graduate
Requirement Courses

GPSDR1091	Career Preparedness Program-I (Personality development + Prepare for Aptitude Tests-1/3)
GPSBA1052	

BCA (CC) Programme

GPSDR1091 : Personality Development		
A. Course Framework		
Credits: L-T-P-C: GR		Syllabus Version: 2.0
Contact Hours / Week: 2 hours per week	Total Contact Hours: 15 hours	Level: 100
Prerequisite:(If applicable)	NIL	
Course Learning Objectives:		
<p>CLO1: To develop self-awareness among students to help them maintain a positive mindset towards their professional and personal growth</p> <p>CLO2: To create an awareness on the process of goals and goal setting, for both personal and professional development.</p> <p>CLO3: To build confidence among students to acquire the skills for an easier transition from Campus to the Corporate world.</p> <p>CLO4: To relate how social and emotional intelligence helps in enhancing their professional success.</p>		
Course Outcomes: On successful completion of the course, Students will be able to:		
<p>CO1:Identify their personal strengths, weaknesses, and interests to develop a practical career plan. [Level 3]</p> <p>CO2: Develop a well defined career objective aligned with their chosen career trajectory [Level 3]</p> <p>CO3: Demonstrate their own understanding of 21st century skills critically, to identify their areas of strengths and weaknesses, and work on them consciously [Level-3].</p> <p>CO4:Compare and contrast different strategies for regulating and managing emotions and evaluate the impact of emotions on personal and professional relationships [Level-4].</p>		
B. Syllabus		
Module:1:	Personal Empowerment	Hours: 6 hours

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- Self Awareness: Knowing Self, Self Concept, Johari Window, SWOT Analysis and Self-reflection
- Positive Attitude + Growth Mindset: Fixed Mindset and Growth Mindset, Upskilling, Practicality and knowing your strength
- Clarity - Goal Setting, Learning styles: Career Pathways (Jobs, Higher Education, Research and Entrepreneurship), Career Planning, Skill Mapping, Use of SMARTER techniques to create goals, Goal Handbooks

Module:2 : Essential Skills

Hours: 7 hours

- Time Management, Importance of time management, Prioritising and scheduling, Various strategies to Manage Time for better productivity,
- Explore 21st century skills: Understand what are 21st century skills and competences, and how they can be applied across various spheres of professional life (3L model- Learning, Literacy-CRAAP Test and Life skills)
- Public Speaking : Understanding Public Speaking, Overcoming Public Speaking Fear, Requirements and Preparation for Public Speaking, Techniques for Engaging Speech Delivery

Module: 3 : Emotional Mastery

Hours: 2 hours

Emotional Intelligence, Domains of Emotional Intelligence Empathy; Social Emotional Intelligence; Application of Emotional Intelligence I at workplace and personal relationships.

C. References

1. James Bellanca & Ron Brandt (Editors). (2010). 21st Century Skills: Rethinking How Students Learn. Solution Tree.
2. Bernie Trilling & Charles Fadel. (2009). 21st Century Skills: Learning for life in our times. Jossey-Bass. A Wiley Imprint.
3. Daniel Goleman. (2009). Emotional Intelligence: Why it can matter more than IQ. HarperCollins
4. Travis Bradbury & Jean Greaves (2007). Emotional Intelligence 2.0. TalentSmart, CA USA
5. Duckworth, A. L., & Seligman, M. E. P. (2017). The science and practice of self-control. Perspectives on Psychological Science, 12(5), 715-718.
6. Hofmann, W., Schmeichel, B. J., & Baddeley, A. D. (2012). Executive functions and self-regulation. Trends in Cognitive Sciences, 16(3), 174-180.
7. Baumeister, R. F., & Heatherton, T. F. (1996). Self-regulation failure: An overview. Psychological Inquiry, 7(1), 1-15.
8. Adele B. Lynn & Janelle R. Lynn (2009). The Emotional Intelligence Activity Kit. Amacom, USA

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Mode of Assessment :			
D. Continuous Internal Evaluation (CIE)			
E. Scheme of Evaluation			
Components:			
CIE (CCE)			
	CCE (2 sets of MCQ's for 25 each)		Remarks
Evaluation	CCE-1	CCE-2	Grand Total (A+B)
Column Identifier >	A	B	C
Max. Marks	25	25	50

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Preparing for Aptitude Tests [UG-1/3]		
A. Course Framework		Course code: GPSBA1052
Credits: L-T-P-C: NA – Graduate Requirement (GR)		Syllabus Version: 2.0
Contact Hours / Week: 2	Total Contact Hours: 30	Level: 100
Prerequisite: (If applicable)	NA	
Course Learning Objectives:		
<p>O1: To build competence in aptitude skills (Quantitative, Logical Reasoning, and Verbal Ability). O2: To improve upon the aptitude skills of the students to ace such tests in the future.</p> <p>O3: To develop problem-solving abilities essential for employment.</p> <p>O4: To support students' transition from Campus to the Corporate environment.</p>		
Course Outcomes: On successful completion of the course, Students will be able to,		
<p>O1: Determine the calculation techniques for quick calculations and manipulation of numbers.</p> <p>O2: Apply the concepts of percentages, exponents, ratios, proportions, and averages for computing simple, compound interests and to calculate class /set relationships.</p> <p>O3: Solve problems of various arrangements (Circular and Linear).</p> <p>O4: Analyze the different graphs and interpret their specific components by solving problems. O5: Improve their grasp of English grammar to understand problems relating to verbal ability.</p>		
B. Syllabus		
Module:1:	Hours: 6	



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Calculation Techniques

- 1) Multiplication techniques- Base method, Vedic multiplication, and Complementary multiplication.
- 2) Subtraction from 100/1000/10000
- 3) Multiplication of a number with a series of 9s
- 3) Multiplication of a number from 11 to 19 and by 111
- 5) Computing squares, square roots, cube, and cube roots
- 6) Fraction comparison
- 7) Percentage calculation (Percentage-Fraction equivalence method)
- 8) Approximation

Module:2:

Hours: 6

Number System

- 1) Classification of numbers
- 2) Problems based on understanding of divisibility rules
- 3) Problems in LCM and HCF of natural numbers and fractions
- 4) Understanding Multiples and factors of numbers
- 5) Power Cycle concept
- 6) Remainder theorem and its application

Module:3:

Hours: 6

Percentage and its Applications, Ratio, Proportion, Variation & Partnership

- 1) Calculation of percentage and fraction equivalence
- 2) Percentage change or percentage increment and decrement'
- 3) Problems based on Profit, Loss and Discount
- 4) Problems based on Simple Interest and Compound Interest
- 5) Understanding ratios
- 6) Problems based on compounding of ratios
- 6) Comparison of ratios

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7) Applications based on equal ratios 8) Concepts & problems involving direct, inverse, and joint variation 9) 10) Problems based on the distribution of profits in a partnership	
Module:4:	Hours: 6
Logical Reasoning- Seating Arrangements, Direction Sense 1) Understanding the difference between Linear Arrangement and Circular Arrangement 2) Problems based on Linear Arrangement, Circular Arrangement, and Square Arrangement 3) To find the shortest distance between points using Pythagoras 4) To create a schematic diagram based on a description 5) Short puzzles based on direction sense Puzzles based on shadow concept	
Module:5:	Hours: 6
Data Interpretations Types of representation of data Interpreting various graphs like line, pie, bar, table, etc.	

C. References
1. Guha, A. (2016). <i>Quantitative Aptitude for Competitive Examination</i> . Tata McGraw-Hill. 2. Wren & Martin. (2017). <i>High School Grammar and Composition</i> . S-Chand Publishing. 3. Gupta, A.K. (2016). <i>Logical and Analytical Reasoning</i> . Ramesh Publishing House. 4. Aggarwal, R.S. (2017). <i>Quantitative Aptitude for Competitive Examination</i> . S-Chand Publishing. 5. Arun Sharma & Meenakshi Upadhyay. (2011). <i>How to Prepare for Verbal Ability and Reading Comprehension</i> . McGraw Hill
D. Mode of Assessment
CIE: IAT/CCE

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E.Scheme of Evaluation

GR Courses (PAT / PATL)	IAT	CCE						CIE	SEE	Total
Evaluation	IAT	CCE-1	CCE-2	CCE-3	CCE-4	CCE-5	Total CCE (B to F)	CIE (IAT + CCE) (A + G)	SEE	Grand Total (H + I)
Column Identifier >	A	B	C	D	E	F	G	H	I	J
Max. Marks	NA	10	10	10	10	10	50	50	NA	50

Interdisciplinary Courses

The IDE Syllabus is attached herewith.

https://docs.google.com/document/d/1108OrePiFu4svTh4A7jkv4ik4vU3p_tRTAZbonS60DI/edit



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PART B of the Lab courses:

Students shall carry out a mini project.

- A team of two students must develop the mini project. However during the examination, each student must demonstrate the project individually.
- The team must submit a brief project report (20-25 pages) that must include the following
 - a. Introduction
 - b. Requirement Analysis
 - c Software Requirement Specification
 - d. Analysis and Design,
 - e. Implementation
 - f. Testing
- Brief synopsis, not more than two pages to be submitted by the team as per the format given. It is recommended that students do prior art search as part of literature survey before submitting the synopsis for the Mini Projects.
- Rubrics may be used to evaluate the Mini-Project Each student has to execute one program picked from Part-A during the semester end examination.
- In SEE Part-A and Part-B shall be given 50% weightage each.

CURRICULUM GLOSSARY

Credit Distribution: Allocation of credits under lecture (L), tutorials (T), and practicals (P) viz. L-T-P-C. Eg. A 4 credit course has a credit distribution as 3-0-1-4 implying 3 credits for lecture and 1 credit for practicals and total of 4 credits

Program Core (Credit Courses):

Each academic programme is divided into mandatory and choice segments, with levels within them. Mandatory segments are those which lay a firm foundation of the knowledge required to complete a programme in the chosen domain, ending with a multifaceted assignment that serves as a culminating academic and intellectual experience for students, typically during their final year. Choice segments are those which a student could opt for to specialize further and / or to improve their interdisciplinary skills. All segments carry credits, and the students are expected to earn the minimum number of credits in their coursework towards program core during their academic programme.



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The Program Core courses are categorised as follows:

a. Foundation: A core course that must be satisfactorily completed in order to complete the requirements of the program. It lays the foundations for higher level courses. A foundation course assures that students are academically and personally ready to progress their degree. The foundation courses are further categorised as follows:

i. Fundamental: A required course you have to complete in order to enroll in a more advanced course. The prerequisite course usually teaches the basic information necessary to succeed in the more advanced course. It is the most basic or most important course on which other courses depend.

ii. Intermediate: Courses that are suitable for learners with some degree of skill or competence in that particular discipline area of study

iii. Advanced: Courses that involve higher and more complex levels of knowledge and understanding than introductory or foundational learning. It means the student has attained a level of knowledge and understanding of a particular area or topic that goes beyond basic terminology and definitions and is ready to be involved in Analysis, Synthesis and Evaluation of information related to a specific topic or area of learning.

b. Elective: A course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/subject of study or which provides an extended scope or which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill is called an Elective Course. Elective courses can fall either under specialization or general category.

i. General: Courses that are designed to develop learners' general knowledge, skills and attitudes, often to prepare students for more advanced education programmes. General courses complement the more specialised learning undertaken in a student's chosen field of study and contributes to the flexibility which graduates are increasingly required to demonstrate.

ii. Specialization: A set of related courses which are structures for students to achieve specific learning outcomes. Specialisations can be in a single discipline or multi-disciplinary. Specialization courses is a specified sequence of courses that equips one with specialised knowledge in one's discipline

c. Interdisciplinary: These are courses that are entirely outside of the program of study. One may take the course from other disciplines, as long as one meet the course requirements (prerequisites)



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d. Mini Project: A mini project is considered as a special course involving application of knowledge gained from studying a particular discipline or a particular area of the program of study in solving / analyzing /exploring a real life situation / difficult problem. A process that fosters learners' engagement in studying authentic problems or issues centred on a particular project, theme, or idea. This process is inquiry-based, outcome-oriented, and associated with conducting the curriculum in real-world contexts.

e. Internship: An internship is a full-time or part-time work experience during the program study for which one earns course credit and may be paid or considered as volunteer work. Internships allow students to gain real-world experience, determine if they have an interest in a particular career and create a network of professional contacts.

g. Dissertation: An elective course designed to acquire special / advanced knowledge, which a student studies on his own with an advisory support by a faculty member. Dissertation is an ordered and critical exposition of existing knowledge in any field or part of a field of study and is expected to provide a good training for the student in R&D work and technical leadership.

g. Capstone project: A final course in a sequence of courses that provides an opportunity for students to integrate the knowledge and skills they have acquired. The learning outcomes of the capstone will normally map into the learning outcomes for the program. It is a substantial, compulsory project that consolidates one's learning and demonstrates that one has acquired the necessary skills and knowledge during the program of study. One usually completes it during the final year of your course.

Common Core (Credit Courses):

Students are expected to earn a certain specified number of credits in their coursework towards Common Core, during their academic programme. While some courses are in workshop mode, which can be completed over a few days at a stretch, there are other courses which are offered for a few hours per week throughout a semester. Students take these courses planned for each academic programme, over multiple semesters. Credits range from 1 to 4, which are directly proportional to the number of hours required to complete a course. There are both 'mandatory' and 'choice' courses, with levels within them.

Common Core (Non – Credit): Graduate Requirement:



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Engagements under this category do not carry credits but are mandatory for the students to complete them during the academic programme, to be considered eligible to graduate / earn the degree.

These could be:

1. **Courses** embedded in the academic programme, where the students must ensure that they attend a minimum of 75% of the classroom hours and meet the assessment criteria, if any.
2. **Community Service activities** under which the students have to log a minimum number of hours in a semester by rendering certain prescribed services to the society and collect evidence from the concerned authority for having done so. A reflective presentation on the learning and experience gained, together with the impact on the society has to be submitted on completion of the required no. of hours as per the respective program.

Courses under various categories can be further classified as:

- **100 Level Courses:** These courses offer an introduction to a subject area and are designed for students in the first year of study. These courses have no prerequisites and are generally courses defining basic concepts or presenting the terminology of a discipline
- **200 Level Courses:** These courses are built on previous units and are normally taken in the second year or later; they may also be available to students with advanced prior knowledge. They are Courses of intermediate college-level difficulty; courses with 100-level course(s) as prerequisite(s)
- **300 Level Courses:** These courses are usually taken in third year or later, after 200-level study in the area. They may also be available to students with advanced prior knowledge. They are courses of advanced college-level difficulty offered for students clearly interested in the discipline or in any stream of the discipline
- **400 Level Courses:** These units of study are advanced courses and are normally taken in the third year or later as the final elements of a three year or four year degree or an integrated degree. The level indicates that the student will be demonstrating coherence and breadth or depth of knowledge and skills. The student may need to have completed a prerequisite course to study a 400 level course.
- **Prerequisite:** A prerequisite to ‘‘Course X’’ is a course that must be successfully completed before the student can undertake ‘‘Course X’’