



School of Science and Computer Studies

BCA (Game Development)

Scheme of Teaching and Evaluation (STE)

Batch [2024-27]

Vision and Mission – CMRU

Vision and Mission – SSSS

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

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 – SCS

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 (GD) 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 analyse 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.

Program Specific Outcomes (PSOs)

BCA (GD) Programme

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 (GD) Programme**CREDIT STRUCTURE**

Sl. No	Category	I Sem	II Sem	III Sem	IV Sem	V Sem	VI Sem	Total
1	Core Course (Major)	13	13	15	13	13	5	72
2	Interdisciplinary	-	3	3	3	-	-	9
3	Internships	-	-	-	-	-	6	6
4	Capstone Project / Dissertation	-	-	-	-	-	6	6
5	Common Core	6	6	3	3	2		20
6	Discipline Specific Elective					5	3	8
7	MOOC- Major	-	-	-	4	-	-	4
8	Community Service Programme				-	-	3	3
		19	22	21	23	20	23	128

STE 2024-27

School of Science and Computer Studies
BCA (GD) Programme



Programme Structure

BCA (GD) Programme

LEGEND	
UGC	
CC	Core Course
AECC	Ability Enhancement Compulsory Course
SEC	Skill Enhancement Course
GE	General Elective
DSE	Discipline Specific Elective
CMRU	
FC	Fundamental Course
IC	Intermediate Course
AC	Advanced Course
IDE	Interdisciplinary Elective
Common Core Courses	
PS	Preparing for Success
KSC	Knowing Self & Community
CS	Contributing to Society
AECC	Ability Enhancement Compulsory Course
SEC	Skill Enhancement Course

COURSE CODE DESCRIPTION:**aXXXXbccd:**

a - School Code Number

1 - School of Education (SOE)

2 - School of Architecture (SOA)

3 - School of Economics & Commerce (SOEC)

4 - School of Engineering & Technology (SOET)

5 - School of Legal Studies (SOLS)

6 - School of Management (SOM)

7 - School of Social Sciences & Humanities (SOSSH)

8 - School of Science and Computer Studies (SSCS)

9 - School of Design (SOD)

C - Department of Common Core Curriculum (DCCC)

XXXX - Discipline Code

b - Level Number

cc - Course Number

d - Syllabus Version Number

PROGRAM CORE DISCIPLINE CODE:

DISCIPLINE	CODE
General Computer Science	CSGC
Programming Languages	CSPL
Artificial Intelligence	CSAI
Data Science	CSDS
Cloud Computing	CSCC
Game Development	CSGA
Visual Effects & Animation	VEAA
Game Art & Design	GAAD
Art & Graphic Study	AAGS
Media Studies	MEST
Sound Engineering	SOEN

BCA (GD) Programme

Film Making	FIMA
Photography	PHGY
Statistics	STAT
Research	RESE
Mathematics	MATH
Internship	INTS
Capstone	CAPS
Massive Open Online Courses	MOOC
Interdisciplinary Courses	IDSS

COMMON CORE DISCIPLINE CODE:

DISCIPLINE	CODE
Contributing to Society - Ability Enhancement Compulsory Course	CSAE
Knowing Self & Community - Ability Enhancement Compulsory Course - Arts & Philosophy	KSAA
Knowing Self & Community - Ability Enhancement Compulsory Course - Me, My Country & My World	KSAM
Preparing for Success - Ability Enhancement Compulsory Course - Design Thinking	PSAD
Preparing for Success - Ability Enhancement Compulsory Course	PSAE
Preparing for Success - Ability Enhancement Compulsory Course - Language	PSAL
Preparing for Success - Skill Enhancement Course	PSSE
Preparing for Success - Skill Enhancement Course - Foreign Language	PSSF
Preparing for Success - Skill Enhancement Course -	PSSN

NCC	
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CREDIT DISTRIBUTION:

L-T-P-C :

- L** - Lecture credits
- T** - Tutorial credits
- P** - Practical credits
- C** - Credit (Total)

BCA (GD) Programme**BCA (GD) 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	FC	Major Core	SSCS	7	3-0-2-5
8CSGC1461	Database Management Systems and Lab	Foundation	FC	Major Core	SSCS	7	3-0-2-5
8MATH1041	Mathematics	Foundation	FC	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
GCSCD1011	Community Service	CS	-	-	DCCC		0-0-1-1*

BCA (GD) Programme

	Programme-I (COS-I) *						
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 Sub-category	UGC Category	School/ Dept.	Contact Hours/ Week	Credit Distribution L-T-P-C
Program Core							
8CSPL2411	C# Programming and Lab	Foundation	FC	Major Core	SSCS	7	3-0-2-5
8CSGC1581	Data Structures and Lab	Foundation	FC	Major Core	SSCS	7	3-0-2-5
8CSAI3121	Artificial Intelligence	Foundation	FC	CC	SSCS	3	3-0-0-3
	IDE 1	Interdisciplinary	FC	Minor	SOEC/ SOM/ SLS/ SOET	3	3-0-0-3
Common Core							
CPSAL1061 / 71 / 81	Hindi / Kannada / English	PS	CC	AECC	DCCC	2	2-0-0-2
CPSAL2032	Oral and Written	PS	CC	AECC	DCCC	4	4-0-0-4

BCA (GD) Programme

	Communication						
GCSCD1021	Community Service Programme -II (COS-II)*	CS	-	-	DCCC	2	0-0-1-1*
Total						28	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 (GD) 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							
8CSGD1011	Game Design-1(Introduction to Level Design)	Foundation	Fundamental	Major Core	SSCS	7	3-0-2-5
8CSGD1021	Game Development 1(Introduction to Unity and Construct engine)	Foundation	Fundamental	Major Core	SSCS	7	3-0-2-5
8CSGD1031	Human Computer Interaction in Game Design	Foundation	Fundamental	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	4	0-0-2-2
8INTS2010	Internship I [†] (CIP)	Internship	-	CC	SSCS		0-0-2-2 [†]
Common Core							
CKSAA1033	Introduction to Philosophical Thoughts(IPT)	KSC	CC	AECC	DCC C	1	1-0-0-1
CCSAE1011	Disaster Management	CS	CC	AECC	DCC C	2	2-0-0-2
GCSCD1031	Community Service	CS	-	-	DCC C	2	0-0-1-1*

BCA (GD) Programme

	Programme - III(COS-III) *						
Total						29	21 + 1*
GPSBD1171 / GPSBA1062	Career Preparedness Program-II (Career essentials + Prepare for Aptitude Test(2/3)	PS	-	AECC	DCC C	3	GR

† **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.

IDE Courses
5IDSS1011 Essentials of Human Rights and Public Interest Law
4IDSS1071 Fundamentals of Robotics
4IDSS1171 Waste Management
6IDSS1071 Marketing - For the Uninitiated
6IDSS1031 Basics of Entrepreneurship
6IDSS1051 Finance for Non-Finance Students
3IDSS1071 Financial Markets and Personal Investment
3IDSS1031 Introduction to Taxation

7IDSS1021 Personality & Development
7IDSS1071 Positive Psychology
NIDSS1021 NCC-2
NIDSS1041 NCC-4

BCA (GD) Programme
IV Semester

Course Code	Course	CMRU Category	CMRU Subcategory	UGC Category	School/ Dept	Contact Hours/ Week	Credit Distribution L-T-P-C
Program Core							
8CSPL3481	Java Programming for Game Development and Lab	Foundation	Intermediate	Major core	SSCS	7	3-0-2-5
8CSGD2041	Game Development -2 (Advanced Concepts in Unity)	Foundation	Intermediate	Major core	SSCS/ Industry	7	3-0-2-5
8CSGD2051	Game Design-2(Advanced concepts in Level Design)	Foundation	Intermediate	Major Core	SSCS	3	3-0-0-3
	MOOC			Major core			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
CKSAM1012	Critical Inquiry	KSC	CC	AECC	DCCC	1	1-0-0-1
Total						23	23
GPSBD1181/GPSBA1072	Career Preparedness Program-III (Career effectiveness + Prepare for Aptitude Tests-III)	PS	-	AECC	DCCC	3	GR

BCA (GD) Programme

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 (GD) Programme

V Semester

Course Code	Course	CMRU Category	CMRU Sub-category	UGC Category	School/ Dept	Contact Hours/ Week	Credit Distribution L-T-P-C
Program Core							
8CSGD2061	Virtual and Augmented Reality and Lab	Foundation	IC	CC	SSCS	7	3-0-2-5
8CSGD2071	Game Development -3 (Introduction to Unreal using Blueprints)	Foundation	IC	CC	SSCS	7	3-0-2-5
8CSGD3141	Project Management	Foundation	IC	CC	SSCS	3	3-0-0-3
8CSGD2081/8CSGD2091	Elective 1 : Integrating Online Services/Mobile Game Development	Foundation	FC	CC	SSCS	7	3-0-2-5
8INTS3010	Internship II ^{††} (SIP)	Internship	-	CC	SSCS		0-0-4-4 ^{††}
Common Core							
CKSAM1031	Ethics and Values	KSC	CC	AECC	DCCC	2	2-0-0-2
Total						26	20
GPSDL1081	Professional Dynamics		PS	-	AECC	DCCC	2

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

BCA (GD) Programme

VI Semester

Course Code	Course	CMRU Category	CMRU Subcategory	UGC Category	School/Dept	Contact Hours/Week	Credit Distribution on L-T-P-C
Program Core							
8CSGD3101	Game Development – 4 (Unreal Game Development using C++)	Advanced	IC	CC	SSCS	7	3-0-2-5
8CSCC3231 / 8CSCC3221	Elective2 : Game Testing / Blockchain and Gaming	Advanced	IC	CC	SSCS	3	3-0-0-3
8CAPS40101	Capstone :2D/3D (Genre Based)	Project	Project	DSE	SSCS	12	0-0-6-6
8INTS2010	Internship I [†] (CIP)	Internship	IC	CC	SSCS	-	0-0-2-2 [†]
8INTS3010	Internship II ^{††} (SIP)	Internship	IC	CC	SSCS	-	0-0-4-4 ^{††}
GCSCD1011	Community Service -I (COS-I)*	CS	-	-	DCCC	-	0-0-1-1*
GCSCD1021	Community Service - II (COS-II)*	CS	-	-	DCCC	-	0-0-1-1*
GCSCD1031	Community Service - III (COS-III)*	CS	-	-	DCCC	-	0-0-1-1*

BCA (GD) Programme

Total	22	23
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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 VI Semester.

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School of Science and Computer Studies
BCA (GD) Programme



FIRST SEMESTER

BCA (GD) 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.		

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Module:2: OPERATORS AND EXPRESSIONS	Hours: 9
<p>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.</p> <p>Managing Input and Output Operations: Input and output statements, Reading a character, Writing characters, Formatted input, Formatted output statement</p>	
Module:3: DECISION MAKING, BRANCHING, LOOPING AND ARRAYS	Hours: 9
<p>Decision making: Simple IF statement, IF-ELSE statement, Nesting of IF-ELSE statements, ELSE-IF ladder, Switch statement, Conditional operator, GOTO statement.</p> <p>Looping and branching: WHILE statement, DO WHILE statement, FOR statement, Jumps in loops.</p> <p>Arrays: One dimensional array, Two-dimensional arrays.</p>	
Module:4:HANDLING OF CHARACTER STRINGS AND FUNCTIONS	Hours: 9
<p>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.</p> <p>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.</p>	
Module:5:STRUCTURES , UNIONS, POINTERS AND FILE HANDLING	Hours:9
<p>Structure: Definition, Structure initialization, Array of structures, Array within structure, Union.</p> <p>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</p> <p>File Handling: Defining and opening a file, Closing a file, I/O operations on files, Copy one file to another</p>	
Part -A	

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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

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 the string.
11. Write a C Program to compute the sum of even numbers and the sum of odd numbers using function.
12. Write a C Program to accept and display different Products with product number, price and date 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

BCA (GD) Programme
IAT / CCE / SEE
E. Scheme of Evaluation
Evaluation – 150 marks (Pass criteria 40% - 60 marks out of 150)
1. 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 (10+5)	2 Programs	15	L3
Execution	1 Program & Project Demo (10+10)	2 Programs	20	L4
Viva-Voce	10	10	10	L5

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, Characteristics of the Database approach, different people behind DBMS, implications of Database Approach, Advantages of using 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, Functional dependencies, Relational Database design Using ER – to-Relational Mapping. Normal Forms Based on Primary Keys, General Definitions of second and Third Normal forms, Boyce-Codd normal form

Module 4: Relational Database Language : SQL and PL/SQL Hours: 9

SQL: Data definition in SQL, Tables: Creation and modification, Data 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

1. 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)

i) Create the above table

ii) Remove the existing attribute marks from the table

iii) Change the data type of regno from integer to string.

iv) Add a new attribute phoneno to the existing table

v) Enter five tuples into the table.

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vi) Display all the tuples in the student table.

2. A LIBRARY database has a table with the following attributes:

LIBRARY(bookid:int, title:string,author:string,publisher:string,yearpub:int,price:real)

(i) Create the above table

(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:

BCA (GD) Programme

- 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%.

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, 4thEdition,*Fundamentals of Database systems*”5th Edition, Pearson Education.
2. Ramakrishnan & Gehrke ,3rd Edition,. *Database Management Systems*, McGraw – Hill.
3. Patrick Neill, 2ndEdition.,. *DataBase Principles, Programme & Performance*,Harcourt.
4. Abrahamsi, Silberschatz, Henry.F.Korth, S.Sudarshan,5th Edition,2006. Database System Concepts, Mcgraw hill.
5. Nilesh Shah,Prentice-Hall,. Database Systems in Oracle (A simplified Guide to SQL & PL/SQL).

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
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BCA (GD) Programme

Max. Marks	30 <small>(Theory-2, Practical – 1)</small>	20 <small>(Theory-2, Practical –1)</small>	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 (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	

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

BCA (GD) Programme

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

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School of Science and Computer Studies
BCA (GD) Programme



BCA (GD) Programme

8MATH1041: Mathematics		
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)	NA	
Course Learning Objectives:		
CLO1 : Enable students to Enhance/Develop Mathematical skills and its application to Game Developing/Programming		
Course Outcomes: On successful completion of the course, Students will be able to		
<p>CO1: Apply Matrices and Vector concepts in Game programming (Level 3)</p> <p>CO2: Apply Trigonometry and Logic concepts in Game programming (level 3)</p> <p>CO3: Apply 2D Transformations, 3D Transformations and Quaternion's concepts in Game programming (Level 3)</p> <p>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. (Level 3)</p>		
PO: PO1	PSO: PSO1	
B. Syllabus		
Module:1: Matrices and Vectors		Hours: 10
<p>Matrices-Definition-Types of matrices-Algebra of matrices-Illustrations.</p> <p>Eigen value and Eigen vector-Illustrations involving 2x2 matrices, Diagonalization.</p> <p>Vectors-Definition-Vector Notation - Graphical Representation of Vectors - Magnitude of a Vector.</p> <p>Vector Manipulation - Multiplying a Vector by a Scalar - Vector Addition and Subtraction - Position Vectors - Unit Vectors.</p>		
Module:2:Trigonometry and Mathematical Logic		Hours: 10

BCA (GD) Programme

Meaning-Trigonometric Ratios , Inverse Trigonometric Ratios, Trigonometric Relationships, The Sine Rule , Cosine Rule, Compound Angles, Perimeter Relationships

Statements and Notations-Propositions, Connectives-Illustrations.

Fundamentals of forming Compound Propositions-Conjunction, Disjunction, Negation, Conditional and Biconditional statements and truth table.

Logical Equivalence-Illustrations of Commutative, Associative, Distributive, De' Morgan's Identities and other compound propositions.

Tautology and Contradiction-Examples.

Module:3:Transformation and Quaternion's

Hours: 10

2DTransformations - 2D Translation - 2D Scaling - 2D Rotation, 3DTransformation - 3DTranslation - 3D Scaling - 3DRotations - Gimbal Lock.

Adding and Subtracting Quaternion's, Multiplying Quaternion's, The Inverse Quaternion, Rotating Points around an Axis, Roll, Pitch and Yaw Quaternion's, Quaternion's in Matrix Form

Module-4 : Graph Theory

Hours:15

BCA (GD) Programme

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.

C. References

BCA (GD) Programme

1. Rosen Kenneth H, Discrete Mathematics and its Applications, Tata McGraw-Hill, 5th edition, 2007.
2. Goudru N G , Discrete mathematical Structures, Himalaya, 2nd edition, 2004.
3. T. Veerarajan, Discrete mathematics with graph Theory and Combinatorics, Tata McGraw-Hill, 2007.
4. Kolman Bernald, Discrete mathematical Structures, Prentice hall of India, 5th edition, 2005.
5. Lipschutz Lipson, Discrete Mathematics, Tata McGraw-Hill, 2006.
6. Vatssa B.S., Discrete Mathematics, New age International.
7. Tremblay J.P., Discrete Mathematical structures with Applications, Tata McGraw-Hill.
8. Liu C L., Elements of Discrete Mathematics, Tata McGraw-Hill
9. Akerkar, Discrete Mathematics, Pearson, 2004
10. Deon Neville ,Tehe Essence of Discrete Mathematics, Tata McGraw-Hill, 2004.
11. Shankar, Discrete Mathematical Structures, New Age International, 2002.
12. Johnson Baugh, Discrete Mathematics, Pearson, 5th 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.
16. Christopher Tremblay, 19th Aug 2003, Mathematics for Game Developers, Paperback
17. Vince, Mathematics for Computer Graphics

D. Mode of Assessment

IAT / CCE / SEE

E. Scheme of Evaluation**1. Continuous Internal Evaluation (CIE) : 50 Marks**

BCA (GD) Programme

Components	Average of 2 IAT's	CCE	Total Marks
Max. Marks	20	30	50

2. Semester End Examination (SEE) Scheme: 50 Marks

SEE is conducted for 100 marks and scaled to 50 marks.

Section	No of Questions	No of Questions to be attempted	Marks / Question	Total Marks for the Section	Revised Blooms Taxonomy
A	12	10	3	30	Understand
B	6	5	6	30	Apply
C	5	4	10	40	Apply

F. CO-PO-PSO Mapping

CO-PO-PSO Mapping								
CO	PO						PSO	
	1	2	3	4	5	6	1	2
1	*						*	
2	*						*	
3	*						*	
4	*						*	

BCA (GD) 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.</p> <p>Days in a week and months in a year</p> <p>Greeting and introduction – Introduce self and others in French Language.</p>		
Module:2: Description and identification		Hours: 6

BCA (GD) Programme

<p>Different nationalities in French.</p> <p>Name and describe objects using colours in French.</p> <p>Describe various professions in French.</p>	
Module:3: Everyday Vocabulary and Grammar	Hours: 6
<p>Basic French 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>	
Module: 4: Time, Activities, and Preferences	Hours: 6
<p>How to Tell Time in French</p> <p>Sports and Activities in French</p>	

Expressing Preferences and Wishes
<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 French</p> <p>Verbs and prepositions to describe actions and locations accurately.</p>
<ol style="list-style-type: none"> 1. Rochester, Myrna Bell. <i>Easy French Step-by-Step</i>. McGraw-Hill, 2008. 2. Lanzer, Harriette. <i>French Vocabulary Builder</i>. Oxford University Press, 2001. 3. <i>Living Language: French, Complete Edition</i>. Living Language, 2010. 4. Heminway, Annie. <i>Complete French All-in-One</i>. McGraw-Hill Education, 2013.
D. Mode of Assessment

BCA (GD) Programme

CO														
1														
2														
3														
4														

1 – Low. 2 – Medium and 3 – High

BCA (GD) 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 (GD) Programme

4														
5														

1 – Low, 2 – Medium and 3 – High

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		

BCA (GD) Programme

<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
<p>Different nationalities in Spanish. Name and describe objects using colours in Spanish. Describe various professions in Spanish.</p>	
Module:3: Everyday Vocabulary and Grammar	Hours: 6
<p>Basic Spanish phrases and correctly use common verbs. Describe someone's personality using appropriate vocabulary and adjectives. Verbs and Prepositions Used in Descriptions</p>	
Module: 4: Time, Activities, and Preferences	Hours: 6
<p>How to Tell Time in Spanish Sports and Activities in Spanish</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. Quantifiers in various contexts to express quantities. Use of articles in Spanish Verbs and prepositions to describe actions and locations accurately.</p>
<p>Text Books</p>

BCA (GD) Programme

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

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

BCA (GD) Programme

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														

1 – Low. 2 – Medium and 3 – High

BCA (GD) 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	

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:		
<p>CLO1: To develop language skills (LSRW) CLO2: To develop usage of Functional English.</p> <p>CLO3: To explore the history of ideas in developing vocabulary and paraphrasing. 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 Social Values and Critical Thinking skills (L1)</p> <p>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)</p> <p>CO4: Develop skills of comprehending and analytical to improve their language proficiency. (L3) CO5: Construct sentences to improve their Verbal Skills.(L3)</p>		
B. Contents:		
Module:1:	Hours-06	
Vocabulary Development		
<ol style="list-style-type: none"> 1. Concept of Word Formation 2. Identifying meanings using prefixes and suffixes to the root word 3. One word substitutes 		

BCA (GD) Programme

Module: 2	Hours-06
Essentials of Grammar	
1. Understand basic grammar-Parts of speech 2. Synonyms and Antonyms	
Module: 3	Hours-04
Comprehending	
1. Answering the given passage 2. Developing a story with the given hints.	
Module: 4	Hours-06
Creative Thinking	
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	
1) Subha – by Rabindranath Tagore 2) The Only American from our village- by Arun Joshi	
C. References:	
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 (GD) 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

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 (GD) 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)</p> <p>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)</p> <p>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.		
Mode of Assessment: CIE (IAT + CCE)		

BCA (GD) Programme**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 (GD) 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		

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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

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BCA (GD) Programme



SECOND SEMESTER

BCA (GD) Programme

8CSPL2411: C# Programming 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)	NA	
Course Learning Objectives: Introduce learner to Basic C# Programming concepts		
CLO1: To use arrays, list, function and methods in Object-Oriented Design Concepts CLO2: To use in Object-Oriented Design Concepts CLO3: To be able to manage errors CLO4: To be able to use different design patterns in Object oriented programming CLO5: To be able to apply OOPS concepts to Game characters		
Course Outcomes: On successful completion of the course, Students will be able to,		
CO1: Introduce the basics of Computer (L1) CO2: Demonstrate the understanding of C# programming language concepts (L 2) CO3: Design and develop programs using decision making, and looping statements(L 4) CO4: Define, develop and analyze the concepts like arrays, strings and user defined functions. (L 3) CO5: To be able to manage errors. (L 2) CO6: To use in Object-Orient Design Concepts. (L 3)		
PO: PO1/PO2/PO3/PO4		PSO: PSO1/PSO2
B. Syllabus		
Module:1: Introduction to C# programming		Hours: 10
Introduction to C# programming : Constants and variables, Data types- Integers, Floats and Strings, statements, Identifying keywords, Examining arithmetic operators, The Main method, Command line arguments, Program Structure, Common Type system, Value and Reference types, Flow Control: Decision making and Branching – if..else, Switch statement, ?: operator, Looping – do, while, for and foreach statement,		
Module:2: Working with Arrays and Lists, Functions/Methods in C#		Hours:10
Arrays and Lists: Arrays – one dimensional, Two dimensional and Variable-size arrays Functions/Methods: Parameters in functions, Returning values from functions, Creating method in C#, Parameters in methods, Returning data from methods, Passing named arguments, Passing optional parameters. Methods – Method parameters, Pass by value, Pass by reference, Output parameters, params arrays, Method overloading,		
Module:3: Classes and Objects		Hours:10

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Classes and Objects – Defining class, variables, methods and objects, Constructors and Destructors, Overload constructors, Static classes, Abstract classes, Abstract methods , Sealed class and Sealed methods, Polymorphism -overriding methods,Delegates Collection: Array List, Collection and Data Dictionaries	
Module:4: Interfaces, Exception Handling	Hours: 10
Interfaces: Defining and extending an interface, implement interfaces, Interfaces and inheritance, Operator Overloading – Unary, Binary and Comparison operators, Delegates – Declaration, methods, Instantiation, Invocation, Multicast delegates, Exception Handling: Defining Exception, Understanding try and catch keywords,Using “finally” block, “using” statement ,Throwing exceptions,Creating User defined/Custom Exception class	
Module:5 Introduction to C# in Unity	Hours: 5
Installing Unity and its configuration, C# console application, C# script in Unity.	
PART A	
<ol style="list-style-type: none"> 1. Write a C# program to accept the height of a person and categorize as tall, dwarf or average height 2. Write a C# program to check if a given year is a leap year or not. 3. Write a C# program to create a Stopwatch. 4. Write a C# program to search for a given element in an array. 5. Write a C# program to sort names in alphabetical order. 6. Write a C# program to generate Register Numbers automatically for 100 Students using static constructor 7. Write a C# program to print the sum of principal diagonal elements of the matrix. 8. Write a C# Program to implement delegates. 	
PART B	
<ol style="list-style-type: none"> 9. Write a C# program that will read a name from the keyboard and display it on the screen. The program should throw an exception when the length of the name is more than 15 characters. 10. Write a C# program to demonstrate Overriding. 11. Write a C# program to demonstrate Multilevel Inheritance 12. Write a C# Program to demonstrate Stack Overflow Exception 13. Write a C# Program to demonstrate IList interface. 14. Write a C# Program to perform a number guessing game. 15. Write a C# Program Creates a HangMan Game. 	
C. References	

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1. Dan Clark," Beginning C# Object-Oriented Programming",2011,Springer
2. Michael B White,"Mastering C#"
3. Mark Reed," C#: The Ultimate Beginner's Guide to Learn C# Programming Step by Step"
4. R. B. Whitaker, "The C# Player's Guide (3rd Edition)"

D. Mode of Assessment

CCE / SEE

E. Scheme of Evaluation**Evaluation – 150 marks (Pass criteria 40% - 60 marks out of 150)****a. Continuous Internal Evaluation(CIE): 50 Marks**

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

b. 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

c. Semester End Examination (SEE) Scheme (Practical with Mini Project): 50 Marks

Section	No of Questions	No of Questions to be attempted	Total Marks for the Section	Revised Bloom's Taxonomy
Writing	2	2	10	L3
Execution	1	1	15	L4
Viva-Voce			10	

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Mini project Demo & Report			15	L5
Record	MANDATORY TO APPEAR FOR SEE			

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	*	*	*									*		
6	*	*	*						*			*		

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8CSGC1581: Data Structures 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: 100
Prerequisite: (If applicable)	No	
Course Learning Objectives Learn notations of data structure.		
CLO1: To gain knowledge on various data structures :arrays, linked lists, stacks, queues, trees		
CLO2: To be able to apply efficient algorithms for searching and sorting operations		
CLO3: To be able to implement various data structure operations on linked lists		
CLO4: To use stacks and queues for game development problems		
CLO5: To create binary tree, binary search tree and perform data structure operations on them		
Course Outcomes: On successful completion of the course, Students will be able to,		
CO1: understand data structures used in Game Development (L2)		
CO2: Accomplish faster searching and sorting of data (L2,L3))		
CO3: implement various operations on linked lists (L3)		
CO4: Implement various operations on stack and Queues and solve application problems(L3)		
CO5: Implement the tree and Graphs in Data Structure (L3)		
PO: PO1-PO4	PSO: PSO1/PSO3/PSO4/PSO7	
B. Syllabus		
Module 1: Introduction to Data Structures		Hours: 9
Definition, Elementary data organization, Classification of Data Structures, Data Structures operations, Abstract Data Types, Algorithm complexity-Big Oh, Big Omega, Big Theta notation, Time-Space trade off. Arrays: Definition, Linear arrays, arrays as ADT, Representation of Linear Arrays in Memory, Traversing Linear arrays, Inserting and deleting, Multi-dimensional arrays		
Module 2: Searching and Sorting		Hours: 8
Searching :Linear Search, Binary Search Sorting: Bubble sort, Insertion sort, Selection sort,Quick sort, Merge sort		
Module 3: Linked Lists		Hours: 9
Linked lists and their representation in memory, Types of linked lists, Traversing a linked list, Searching a linked list. Insertion, and Deletion operations on linked lists		
Module 4 Stacks and Queues		Hours: 10
Stacks: Stacks and their array representation. Stack applications: Parenthesis matching, Polish notation, Recursion – Towers of Hanoi, Rearranging railroad cars Queues: Queues and their array representation, Types of queues, Queue applications: Railroad car rearrangement		
Module 5: Trees		Hours: 9

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Trees: Binary trees & and their representation in memory, Properties of Binary Trees, Traversing binary trees, Binary Search Trees- searching, inserting and deleting in binary search trees, Tree Traversals-preorder,inorder,postorder

PART A

1. Write a menu driven C++ program to insert and delete and element from an array.
2. Write a C++ program to search for a given element using Linear Search.
3. Write a program to search for a given element using Binary search
4. Write a program to sort elements using Bubble sort.
5. Write a program to implement Quick sort.
6. Write a program to implement Insertion sort.
7. Write a program to implement Selection sort.
8. Write a program to search for an element in Linked list.

PART B

9. Write a menu driven program to implement insertion and deletion operations in Linked list.
10. Write a program to implement Stack operations.
11. Write a program to rearrange railroad cars using stacks.
12. Write a program for Towers of Hanoi problem.
13. Write a program to implement Linear Queue
14. Write a program to implement Circular Queue
15. Write a program to create a Binary Search Tree and perform tree traversals.

C. References

1. Sartaj Sahni, "Data Structures, Algorithms and Applications in C++", McGraw Hill
2. Yeshwanth Kanetkar, "Data Structures through C++"
3. Michael T. Goodrich, Roberto Tamassia, David M. Mount, "Data Structures and Algorithms in C++", 2nd Edition, Wiley Publications

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): 50 Marks

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

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

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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

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

Section	No of Questions	No of Questions to be attempted	Total Marks for the Section	Revised Bloom's Taxonomy
Writing	2	2	10	L3
Execution	2	2	20	L4
Viva-Voce			20	L5
Record	MANDATORY TO APPEAR FOR SEE			

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

8CSAI3121: Artificial Intelligence		
F. A: Course Framework		
Credits: L-T-P-C: 3-0-0-3		SyllabusVersion: 1
Contact Hours / Week: 3	Total Contact Hours: 45	Level: 300
Prerequisite: (If applicable)	No	
Course Learning Objectives:		
<p>CLO1: To gain knowledge on foundations of Artificial Intelligence</p> <p>CLO2: To develop skill in solving problems through various types of search algorithms</p> <p>CLO3: To gain knowledge on probability and fuzzy logic for decision making under uncertainties</p> <p>CLO4: To understand the use of finite state machines in game development simulations</p> <p>CLO5: To apply human made rules to mimic human intelligence</p>		
Course Outcomes: On successful completion of the course, Students will be able to,		
<p>CO1: To be able to design agent programs for task environments</p> <p>CO2: To be able to use appropriate search technique for given problem</p> <p>CO3: To be able to use probability and fuzzy logic to design games</p> <p>CO4: To apply finite state machine concepts in simulation of games</p> <p>CO5: To develop games using Rule based AI</p>		
PO: PO1-PO5/PO9		PSO:
PSO2		
G. B: Syllabus		
Module 1 : Introduction to Artificial Intelligence		Hours: 9
<p>What is AI? Foundations of AI, Intelligent Agents- Agents and Environments, Task Environments, Structure of Agent,Types of Agents- simplex reflex based, model based reflex agents, goal based agents,utility based agents, learning agents,Working of Agent program</p>		
Module 2 : Problem solving by searching		Hours: 9

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Problem formulation, problem solving agents, 8 queens problem, route finding problem, problem solving by searching, Depth first search, Breadth first search, Bidirectional search, Informed search strategies- Greedy Best first search, A* search, Hill Climbing search	
Module 3:	Probability and Fuzzy logic Hours: 9
Probability, Conditional Probability, Bayes Theorem, Decisions under uncertainty, Bayesian Technique, Inference using Bayesian networks, Fuzzy logic basics, Fuzzification, fuzzy membership sets, hedges, fuzzy rules, fuzzy axiom, Defuzzification Use case: Kungu Fu fighting	
Module 4: Finite State Machine	Hours: 9
Finite State Machine Design, structure, classes, behavior, transition functions, Use case: simulation of AI ants example ,	
Module 5: Rule based AI	Hours: 9
Rule based system basics, Inference in Rule based systems, forward chaining, backward chaining, Use case: Fighting Game Strike Prediction	
H. References	
<ol style="list-style-type: none"> AI for Game developers, O'Reilly Russel and Norvig, "Artificial Intelligence- A modern Approach", 3rd Edition, Prentice Hall 	
I. Mode of Assessment	
IAT / CCE / SEE	
J. 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).

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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	*										*			

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	

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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

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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 (GD) 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 (GD) 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.

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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:	

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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 (GD) 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)

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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	

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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:

CLO1: To develop self-awareness among students to help them maintain a positive mindset towards their professional and personal growth

CLO2: To create an awareness on the process of goals and goal setting, for both personal and professional development.

CLO3: To build confidence among students to acquire the skills for an easier transition from Campus to the Corporate world.

CLO4: To relate how social and emotional intelligence helps in enhancing their professional success.

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

CO1:Identify their personal strengths, weaknesses, and interests to develop a practical career plan. [Level 3]

CO2: Develop a well defined career objective aligned with their chosen career trajectory [Level 3]

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].

CO4:Compare and contrast different strategies for regulating and managing emotions and evaluate the impact of emotions on personal and professional relationships [Level-4].

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

BCA (GD) Programme**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:

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.

O3: To develop problem-solving abilities essential for employment.

O4: To support students' transition from Campus to the Corporate environment.

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

O1: Determine the calculation techniques for quick calculations and manipulation of numbers.

O2: Apply the concepts of percentages, exponents, ratios, proportions, and averages for computing simple, compound interests and to calculate class /set relationships.

O3: Solve problems of various arrangements (Circular and Linear).

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.

B. Syllabus**Module:1:****Hours: 6****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

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- 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
- 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

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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). *Quantitative Aptitude for Competitive Examination*. Tata McGraw-Hill.
2. Wren & Martin. (2017). *High School Grammar and Composition*. S-Chand Publishing.
3. Gupta, A.K. (2016). *Logical and Analytical Reasoning*. Ramesh Publishing House.
4. Aggarwal, R.S. (2017). *Quantitative Aptitude for Competitive Examination*. S-Chand Publishing.
5. Arun Sharma & Meenakshi Upadhyay. (2011). *How to Prepare for Verbal Ability and Reading Comprehension*. McGraw Hill

D. Mode of Assessment

CIE: IAT/CCE

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 I C C E (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/1108OrePiFu4svTh4A7jkv4ik4vU3>

STE 2024-27

School of Science and Computer Studies



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BCA (GD) Programme**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. 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:

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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)

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

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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:

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

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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’’