SACRED HEART COLLEGE (AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE

BACHELOR OF COMPUTER APPLICATIONS

[MOBILE APPLICATIONS AND CLOUD TECHNOLOGY]

Course plan

Academic Year 2018-19

Semester 2

PROGRAMME OUTCOME

	PROGRAMME OUTCOME
PO 1	**Critical Thinking:** Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
PO 2	**Effective Communication:** Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the word by connecting people, ideas, books, media and technology.
PO 3	**Effective Citizenship:** Demonstrate empathetic social concern and equity centered national development, and the ability to act an informed awareness of issues and participate in civic life through volunteering.
PO 4	**Environment and Sustainability:** Understand the issues of environmental contexts and sustainable development.
PO5	**Ethics**: Recognise different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.
PO 6	**Global Perspective:** Understand the economic, social and ecological connections that link the world's nations and people.

BACHELOR OF COMPUTER APPLICATIONS [MOBILE APPLICATIONS AND CLOUD TECHNOLOGY]

PROGRAM SPECIFIC OUTCOMES	
PSO 1	Apply the theoretical foundations of computer science in modelling and developing solutions to the complex and real world problems.
PSO 2	Comprehend, explore and build up computer programs, applications in the allied areas like Algorithms, Multimedia, Web Design and android applications for efficient design of computer-based systems that meet the needs of industry and society.
PSO 3	Develop skills in android and cloud technology development so as to enable the graduates to take up employment/self-employment in global technical market.
PSO 4	Apply knowledge of layered network models, protocols, technologies, topologies and security policies for building network and internet based applications.

Course Structure

Course Code	Title Of The Course	No. Hrs./Week	Credits	Total Hrs./Sem
U2CCENG2	Critical Thinking, Academic Writing & Presentation	5	4	90
U2CPCMT2	Discrete Mathematics and Numerical Analysis	4	4	72
U2CRBCA4	Operating system	4	3	72
U2CRBCA5	OOPS with C++	4	3	72
U2CRBCA6	Data structures using ‘C’	4	3	72
U2ARESC1	Environmental Studies	5	4	75

U2PRBCA3	OOPS with C++ - Practical	2	1	36
U2PRBCA4	Data structures using 'C' - Practical	2	1	36

COURSE PLAN

PROGRAMME	**BACHELOR OF COMPUTER APPLICATIONS**	**SEMESTER**	**2**
COURSE CODE AND TITLE	**U2CCENG2: CRITICAL THINKING, ACADEMIC WRITING & PRESENTATION**	**CREDIT**	**4**
HOURS/WEEK	**4**	**HOURS/SEM**	**90**
FACULTY NAME			

	COURSE OUTCOMES	**PO/ PSO**	**CL**
CO 1	Comprehends fundamental concepts of critical reasoning and develops the capacity to read and respond critically, drawing conclusions, generalizing, differentiating fact from opinion and creating their own arguments.	PO2	U
CO 2	Develops appropriate and impressive writing styles for various contexts.	PO2	A
CO 3	Write and correct structural imperfections and edit what they have written	PO2	U
CO 4	Develops capacity for making academic presentations effectively and impressively.	PO2	An

Sessions		**Topic**	**Method**	**Course Outcome**	**Remarks/Reference**
1		Introduction to Critical Thinking	Lecture	CO 1	
2		Reasoning and Arguments	Discussion	CO1	
3		Deductive and Inductive Arguments	Lecture	CO1	
4		Fallacies	Lecture	CO1	
5		Inferential Comprehension	Reading Exercises	CO1	
6		Critical Thinking and Academic Writing	Lecture	CO1	
7		Critical Thinking and Academic Writing	Exercises	CO1	
8		Writing Models	Introductory Lecture	CO2	

9		Writing Letters	General Principles	CO2	
10		Writing a Letter to the Editor	Exercise - 1	CO2	
11		Letter to the Editor	Discussion on the Samples done	CO2	
12		Resume	General Guidelines	CO2	
13		Resume Writing	Writing Exercise	CO2	
14		Resume Writing	Discussion on the samples	CO2	
15		Covering Letter	General Introduction and Writing Exercise	CO2	
16		Covering Letter	Discussion on the samples	CO2	
17		Emails	General Instructions and Writing Exercise	CO2	
18		Emails	Discussion on the Samples	CO2	
19		Interview Skills	Discussion on the general principles	CO2	
20		Group Discussion	Practical sessions and Evaluation	CO2	
21		Accuracy in Academic writing	Lecture	CO3	
22		Articles and Determiners	Lecture and discussion	CO3	
23		Nouns and Pronouns	Lecture	CO3	
24		Subject-verb agreement	Lecture and discussion	CO3	
25		Phrasal verbs	Lecture	CO3	
26		Modals	Lecture	CO3	
27		Tenses	Lecture and demonstration	CO3	
28		Conditional clauses	General Instructions and Writing Exercise	CO3	
29		Relative Pronouns	Lecture and demonstration	CO3	
30		Passive Voices	Lecture and illustration	CO3	
31		Conjunctions	Lecture	CO3	
32		Embedded questions	Demonstration	CO3	
33		Punctuations and Abbreviations	General Instructions and	CO3	

			Writing Exercise		
34		Soft skills for academic presentations	Presentation and lecture	CO4	
35		Effective communication skills	Lecture	CO4	
36		How to structure presentation	Lecture and Demonstration	CO4	
37		Flip Charts, OHP, Power point presentation	Demonstration	CO4	
38		Clarity and brevity in presentation	Lecture	CO4	
39		Interaction and persuasion	Lecture	CO4	
40		Interview skills	Face to face interaction, demonstration	CO4	
41		Group Discussion	Demonstration and Lecture	CO4	
42		Group Discussion	Demonstration and Lecture	CO4	
43		Revision	Discussion and revising the topics	CO4	

ASSIGNMENT

	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)	Couse Outcome
1		Draft a Resume for applying for the career you wish to choose	CO 2

REFERENCE

- Marilyn Anderson, Pramod K Nayar and Madhucchandra Sen. Critical Thinking, Academic Writing and Presentation Skills. Pearson Education and Mahatma Gandhi University

COURSE PLAN

PROGRAMME	BACHELOR OF COMPUTER APPLICATIONS	SEMESTER	2
COURSE CODE AND TITLE	U2CPCMT2: DISCRETE MATHEMATICS AND NUMERICAL ANALYSIS	CREDIT	4
HOURS/WEEK	4	HOURS/SEM	72
FACULTY NAME	SIMI JASIL		

	COURSE OUTCOMES	PO/ PSO	CL
CO 1	Apply the basic concepts in combinatorial graph theory in science, business and industry	PSO1	A
CO 2	Apply graph theoretical algorithms to solve problems in daily life.	PO1, PSO2, PSO3	A
CO 3	Apply methods to solve system of equations.	PO1, PO2, PSO1	A
CO 4	Apply numerical methods for solving mathematical problems that arise in Science and Engineering	PO1, PO2, PSO1, PSO2,PSO4	An
CO 5	Appreciate the need of access control and protection in an operating system	PO1, PO2, PO3, PO4, PO5, PSO2, PSO3	U

- CL* Cognitive Level

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SESSION	TOPIC	LEARNING RESOURCES	VALUE ADDITIONS	COURSE OUTCOME
MODULE I				
1	The theory of counting	PPT	video	CO 1
2	The multiplication rule	PPT/Lecture		CO 1
3	Ordered sample and permutations	PPT/Lecture		CO 1
4	ordered sample and permutations problems	PPT/Lecture	e-resource	CO 1
5	unordered samples without repetition	PPT/Lecture		CO 1
6	unordered samples without repetition problems	PPT/Lecture		CO 1
7	permutations involving indistinguishable objects	Lecture		CO 1
8	permutations involving indistinguishable objects problems	Lecture		CO 1
9	multinomial co-efficient	Lecture		CO 1
10	unordered samples with repetition	Lecture		CO 1
11	unordered samples with repetition problems	PPT/Lecture		CO 1
12	permutation involving indistinguishable objects	PPT/Lecture		CO 1
13	permutation involving indistinguishable objects problems	PPT/Lecture		CO 1
14	Revision			
MODULE II				

15	Leonhard Euler and the seven bridges of Konigsberg	PPT/Lecture		CO 2
16	trees and spanning trees	Lecture		CO 2
17	minimal spanning trees	Lecture		CO 2
18	minimal spanning trees problems	Lecture		CO 2
19	binary trees	Lecture		CO 2
20	tree searching	PPT/Lecture		CO 2
21	Planar graphs	PPT/Lecture		CO 2
22	Euler‟s theorem	PPT/Lecture		CO 2
23	Euler‟s theorem problems	PPT/Lecture		CO 2
24	Problems on planar, euler graphs	Lecture		CO 2
25	Revision			
26	**CIA I**			
27	The shortest path problem	Lecture		CO 2
28	Dijkstras Algorithm	PPT/Lecture		CO 2
29	two “all-pairs” Algorithm	PPT/Lecture		CO 2
30	Floyd‟s Algorithm and	PPT/Lecture		CO 2
31	Marshal‟s Algorithm.	PPT/Lecture		CO 2
32	Revision			
MODULE III				
33	Fixed point iteration: x=g(x) method	PPT/Lecture		CO 3
34	Fixed point iteration: x=g(x) method problem	Lecture		CO 3
35	Fixed point iteration: x=g(x) method problem	Lecture		CO 3
36	Newton‟s method	Lecture		CO 3
37	Newton‟s method problem	Lecture		CO 3
38	Newton‟s method problem	PPT/Lecture		CO 3
39	Solution of linear system by Gaussian elimination	PPT/Lecture		CO 3
40	Solution of linear system by Gaussian elimination problem	Lecture		CO 3
41	Solution of linear system by Gaussian elimination problem	Lecture		CO 3
42	Gauss-Jordon method –Iterative method	Lecture		CO 3
43	Gauss-Jordon method problems	Lecture		CO 3
44	Gauss-Jordon method problems	Lecture		CO 3
45	Gauss-Seidel method	Lecture		CO 3
46	Gauss-Seidel method problems	Lecture		CO 3
47	Gauss-Seidel method problems	Lecture		CO 3
48	Inverse of a matrix by Gauss Jordon method.	Lecture		CO 3
49	Inverse of a matrix by Gauss Jordon method problems	Lecture		CO 3
50	Inverse of a matrix by Gauss Jordon method problems	Lecture		CO 3
51	Revision			

52	Revision			
MODULE IV				
53	Differentiation using interpolation formulae	Lecture		CO 4
54	Differentiation using interpolation formulae problems	Lecture		CO 4
55	Differentiation using interpolation formulae problems	Lecture		CO 4
56	Numerical integration by trapezoidal rule	Lecture		CO 4
57	Numerical integration by trapezoidal rule problems	Lecture		CO 4
58	Numerical integration by trapezoidal rule problems	Lecture		CO 4
59	Numerical integration by Simpson‟s 1/3 rule	Lecture		CO 4
60	Numerical integration by Simpson‟s 1/3 rule problems	Lecture		CO 4
61	Numerical integration by Simpson‟s 1/3 rule problems	Lecture		CO 4
62	Numerical integration by Simpson‟s 3/8 rule	Lecture		CO 4
63	Numerical integration by Simpson‟s 3/8 rule problems	Lecture		CO 4
64	Numerical integration by Simpson‟s 3/8 rule problems	Lecture		CO 4
65	Single step methods: Taylor series method	Lecture		CO 4
66	Taylor series method problems	Lecture		CO 4
67	Taylor series method problems	PPT/Lecture		CO 4
68	Euler method for first order equation	PPT/Lecture		CO 4
69	Fourth order Runge–Kutta method for solving first and second order equations.	PPT/Lecture		CO 4
70	Revision			
71	Revision			
72	Revision			

INDIVIDUAL ASSIGNMENTS/SEMINAR – Details & Guidelines

	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)	Couse Outcome
1	24/11/2018	Problems on the multiplication rule,unordered samples without repetition,permutations involving indistinguishable objects	CO 2
2	15/12/2018	Problems on Dijkstras Algorithm, two “all-	

		pairs" Algorithm, Floyd‟s Algorithm and Marshal‟s Algorithm	
3	15/1/2019	Problems on Gauss-Seidel method,Gauss Jordon method, Gaussian elimination method	CO 3
4	18/2/2019	Problems on trapezoidal, Simpson‟s 1/3 and 3/8 rule,Taylor series method,Fourth order Runge–Kutta method	

REFERENCES

- Engineering Mathematics, N.P. Bali, Manish Goyal
- Petergray – Logic, Algebra and databases (chapter 3), Affiliated East West press pvt Ltd.
- Robert J mcEliece, Robert B Ash and Carol Ash – Introduction to discrete mathematics (chapter 1,2 and 4) , Mc.Graw Hill

COURSE PLAN

PROGRAMME	**BACHELOR OF COMPUTER APPLICATIONS**	**SEMESTER**	**2**
COURSE CODE AND TITLE	**U2CRBCA4: OPERATING SYSTEM**	**CREDIT**	**4**
HOURS/WEEK	**4**	**HOURS/SEM**	**72**
FACULTY NAME	**SANTHOSH KUMAR K P**		

	COURSE OUTCOMES	**PO/ PSO**	**CL**
CO 1	Identify mechanism to handle processes, memory, I/O devices, and files and develop an appropriate algorithm for it.	PO1,PO2, PO6, PSO2, PSO3	U
CO 2	Discuss issues of Process Management including process structure, synchronization, scheduling and communication.	PO1, PSO2, PSO3	A
CO 3	Interpret the reasons for deadlock state, and the solution methods to handle it	PO1, PO2, PSO1	U
CO 4	Differentiate type of memory management techniques used by Operating Systems	PO1, PO2, PSO1, PSO2,PSO4	An
CO 5	Appreciate the need of access control and protection in an operating system	PO1, PO2, PO3, PO4, PO5, PSO2, PSO3	U

CL* Cognitive Level

SESSION	TOPIC	LEARNING RESOURCES	VALUE ADDITIONS	COURSE OUTCOME
MODULE I				
1	Introduction to Operating System	PPT	video	CO 1
2	Objectives and Functions of OS	PPT/Lecture		CO 1
3	Objectives and Functions of OS	PPT/Lecture		CO 1
4	Objectives and Functions of OS	PPT/Lecture	e-resource	CO 1
5	Evolution of OS	PPT/Lecture		CO 1
6	Evolution of OS	PPT/Lecture		CO 1
7	OS Structures	Lecture		CO 1
8	OS Components	Lecture		CO 1
9	OS Services	Lecture		CO 1
10	OS Services	Lecture		CO 1
11	System calls	PPT/Lecture		CO 1
12	System programs	PPT/Lecture		CO 1
13	Virtual Machines	PPT/Lecture		CO 1
14	Revision			
MODULE II				
15	Concept of Process	PPT/Lecture		CO 2
16	Process scheduling	Lecture		CO 2
17	Co-operating processes, Operations on processes	Lecture		CO 2
18	Inter process communication	Lecture		CO 2
19	Communication in client-server systems	Lecture		CO 2
20	Introduction to Threads	PPT/Lecture		CO 2
21	Single and Multi-threaded processes and its benefits	PPT/Lecture		CO 2
22	User and Kernel threads	PPT/Lecture		CO 2
23	Multithreading models, Threading issues	PPT/Lecture		CO 2
24	Scheduling criteria, Scheduling Algorithms	Lecture		CO 2
25	Scheduling criteria, Scheduling Algorithms	Lecture		CO 2
26	CIA-1			
27	Multiple Processor Scheduling, Real-time Scheduling	Lecture		CO 2
28	Algorithm Evaluation, Process Scheduling Models	Lecture		CO 2
29	Mutual Exclusion, Critical – section problem, Synchronization hardware	PPT/Lecture		CO 2
30	Semaphores, Classic problems of synchronization	PPT/Lecture		CO2
31	Critical Regions, Monitors, OS Synchronization, Atomic Transactions	PPT/Lecture		CO 2
32	Revision			

MODULE III				
33	**Deadlocks:** System Model, Deadlock characterization	PPT/Lecture		CO 3
34	Methods for handling Deadlocks	PPT/Lecture		CO 3
35	Deadlock prevention, Deadlock Avoidance	PPT/Lecture		CO 3
36	Deadlock Detection, Recovery from Deadlock	Lecture	Quiz	CO 3
37	**Memory Management**: Logical and physical Address Space	Lecture	Q & Ans Session	CO 4
38	Swapping	PPT/Lecture		CO 4
39	Contiguous Memory Allocation	PPT/Lecture		CO 4
40	Paging, Segmentation with Paging	PPT/Lecture		CO 4
41	**Virtual Management**: Demand paging, Process creation	PPT/Lecture		CO 4
42	Page Replacement Algorithms, Allocation of Frames	Lecture		CO 4
43	Thrashing	PPT/Lecture		CO 4
44	Operating System Examples, Page size and other considerations, Demand segmentation	PPT/Lecture		CO 4
45	**File-System Interface**: File concept, Access Methods, Directory structure	PPT/Lecture		CO 4
46	File- system Mounting, File sharing, Protection and consistency semantics	PPT/Lecture		CO 4
47	**File-System Implementation**: File-System structure	PPT/Lecture		CO 4
48	File-System Implementations	PPT/Lecture		CO 4
49	Directory Implementation,	PPT/Lecture		CO 4
50	Allocation Methods	PPT/Lecture		CO 4
51	Free-space Management, Efficiency and Performance, Recovery	PPT/Lecture		CO 4
52	**Disk Managemen**t: Disk Structure, Disk Scheduling	PPT/Lecture	Video	CO 4
53	Disk Management, Swap-Space Management	PPT/Lecture		CO 4
54	Disk Attachment, stable-storage Implementation	PPT/Lecture		CO 4
55	Revision			
56	**Protection**: Goals of Protection	Lecture	Debate	CO 5
57	Domain of Protection	PPT/Lecture		CO 5
58	Access Matrix	PPT/Lecture		CO 5
59	Implementation of Access Matrix	PPT/Lecture		CO 5
60	Revocation of Access Rights	PPT/Lecture		CO 5
61	Capability- Based Systems	PPT/Lecture		CO 5
62	Language – Based Protection	PPT/Lecture		CO 5
CIA – II				

63	**Security:** Security Problem	Lecture	Demo video	CO 5
64	User Authentication	Lecture		CO 5
65	One – Time Password	Lecture	Group discussion	CO 5
66	Program Threats	Lecture		CO 5
67	System Threats	PPT/Lecture		CO 5
68	Cryptography	PPT/Lecture		CO 5
69	Computer – Security Classifications	PPT/Lecture		CO 5
70	Revision			
71	Revision			
72	Revision			

INDIVIDUAL ASSIGNMENTS/SEMINAR – Details & Guidelines

	Date of completion	**Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)**	**Couse Outcome**
1	4/1/2019	Process synchronization problems	CO 2
2	28/1/2019	Memory management problems	CO 3

GROUP ASSIGNMENTS/ACTIVITES – Details & Guidelines

	Date of completion	**Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)**	**Couse Outcome**
1	2/2/2019	OTP: security (Group Discussion)	CO 5
2			

REFERENCES

- Milan Milonkovic, Operating System Concepts and design, II Edition, McGraw Hill 1992.
- Tanenbaum, Operation System Concepts, 2nd Edition, Pearson Education.
- Silberschatz / Galvin / Gagne, Operating System,6th Edition,WSE (WILEY Publication)

Web resource references:

- https://en.wikipedia.org/wiki/Operating_system

COURSE PLAN

PROGRAMME	BACHELOR OF COMPUTER APPLICATIONS	SEMESTER	2
COURSE CODE AND TITLE	U2CRBCA5: OOPS WITH C++	CREDIT	3
HOURS/WEEK	4	HOURS/SEM	72
FACULTY NAME	CHRISTY JACQUELINE		

	COURSE OUTCOMES	PO/ PSO	CL
CO 1	Understand the basic concepts of OOPS.	PO1,PO2, PO6, PSO2, PSO3	U
CO 2	Discuss real world problems and simulate using OOPS concepts.	PO1, PSO2, PSO3	A
CO 3	Apply the concepts of Object oriented programming	PO1, PO2, PSO1	A
CO 4	Illustrate the process of data file manipulations using c++	PO1, PO2, PSO1, PSO2,PSO4	A
CO 5	Apply concepts of templates and exception handling	PO1, PO2, PO3, PO4, PO5, PSO2, PSO3	A

CL* Cognitive Level

SESSION	TOPIC	LEARNING RESOURCES	VALUE ADDITIONS	COURSE OUTCOME
MODULE I				
1	Introduction to Programming concepts	PPT		CO 1
2	Comparison between Procedure versus Object oriented programming	PPT/Lecture		CO 1
3	Data types and its classification	PPT/Lecture		CO 1
4	Input and Output statements	PPT/Lecture		CO 1
5	Control statements	PPT/Lecture		CO 1
6	Decision and Looping statements	PPT/Lecture		CO 1
7	Introduction to Structures	Lecture		CO 1
8	Unions	Lecture		CO 1
9	Class	Lecture		CO 1
10	Access Specifier	Lecture		CO 1
11	Arrays, Class and Structures comparison	PPT/Lecture		CO 1
12	OOPS concepts	PPT/Lecture		CO 1
13	Class concept	PPT/Lecture	E-resource	CO 1
14	Enumerated data type and usage	PPT/Lecture		
MODULE II				

15	Class definition	PPT/Lecture		CO 2
16	Objects as function arguments	Lecture		CO 2
17	Returning objects from function	Lecture		CO 2
18	Scope resolution operator	Lecture		CO 2
19	Member function defined outside the class	Lecture		CO 2
20	Structure and class	PPT/Lecture		CO 2
21	Functions in c++	PPT/Lecture		CO 2
22	Built in functions	PPT/Lecture		CO 2
23	Call by value and call by reference	PPT/Lecture		CO 2
24	Overload function	Lecture		CO 2
25	Storage class	Lecture		CO 2
26	CIA-1			
27	Constructor	Lecture		CO 2
28	Types of constructor	Lecture		CO 2
29	Dynamic constructor	PPT/Lecture		CO 2
30	Constructor overloading	PPT/Lecture		CO2
31	Copy constructor	PPT/Lecture		CO 2
32	Destructor, Manipulating private data members			
MODULE III				
33	Defining operator overloading	PPT/Lecture		CO 3
34	Overloading unary operator and binary operator	PPT/Lecture		CO 3
35	Manipulation of string using overloaded operator	PPT/Lecture		CO 3
36	Data conversion	Lecture	Quiz	CO 3
37	Conversion between basic types	Lecture		CO 3
38	Conversion between objects and basic types	PPT/Lecture		CO 3
39	Conversion between objects of different classes	PPT/Lecture		CO 3
40	Base class and derived class	PPT/Lecture		CO 3
41	Defining derived class	PPT/Lecture		CO 3
42	Protected, public and private inheritance	Lecture		CO 3
43	Constructors and destructors in derived class	PPT/Lecture		CO 3
44	Levels of inheritance	PPT/Lecture		CO 3
45	Single Inheritance	PPT/Lecture		CO 3
46	Multiple and Multilevel	PPT/Lecture	E-resource	CO 3
47	Hierarchical inheritance	PPT/Lecture		CO 3
48	Hybrid Inheritance	PPT/Lecture		CO 3
MODULE IV				
49	Pointers	PPT/Lecture		CO 4
50	Pointer declaration and access	Lecture		CO 4
51	Pointer to void and arrays	PPT/Lecture		CO 4
52	Pointer constant and constant pointer	PPT/Lecture	Video	CO 4
53	Pointers and functions	PPT/Lecture		CO 4

54	Pointer arrays	PPT/Lecture		CO 4
55	Arrays of pointer to string	Lecture		CO 4
56	Memory Management	Lecture	Quiz	CO 4
57	New and delete, pointer to object	PPT/Lecture		CO 4
58	Referencing members using pointers	PPT/Lecture		CO 4
59	Self containing class	PPT/Lecture		CO 4
60	This pointer concepts	PPT/Lecture		CO 4
61	Virtual Function concepts	PPT/Lecture		CO 4
62	Friend function and static function	PPT/Lecture		CO 4
CIA – II MODULE V				
63	Templates concepts	Lecture	Demo video	CO 5
64	Types of templates	Lecture		CO 5
65	Member function templates	Lecture	Quiz	CO 5
66	Template arguments	Lecture		CO 5
67	Exception handling	PPT/Lecture		CO 5
68	C++ stream and C++ stream classes	PPT/Lecture		CO 5
69	Unformatted I/O operators	PPT/Lecture		CO 5
70	Manipulators	Lecture		CO 5
71	Revision			
72	Revision			

INDIVIDUAL ASSIGNMENTS/SEMINAR – Details & Guidelines

Sl.No	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)	Course Outcome
1	27/11/2018	Inheritance and types of inheritance	CO 2
2	15/1/2019	Pointer Concepts	CO 3

GROUP ASSIGNMENTS/ACTIVITES – Details & Guidelines

Sl.No	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)	Couse Outcome
1	5/2/2019	Templates and Exception Handling	CO 5
2			

REFERENCES

- E. Balaguruswamy: Object Oriented Programming with C++, Tata McGraw Hill. Publications
- Strousstrup: The C++ Programming Language, Pearson Edition, 3rd Edition
- Lafore Robert: Object Oriented Programming in Turbo C++, Galgotia Publications
- Lippman: C++ Primer, 3/e Pearson Education
- C++ completer reference by Herbert Schildt, Tata McGraw Hill Publications.

Web resource references:

- http://homepage.divms.uiowa.edu/~slonnegr/oosd/22Exceptions.pdf

COURSE PLAN

PROGRAMME	BACHELOR OF COMPUTER APPLICATIONS	SEMESTER	2
COURSE CODE AND TITLE	U2CRBCA6: DATA STRUCTURES USING C	CREDIT	3
HOURS/WEEK	4	HOURS/SEM	72
FACULTY NAME	SHAILESH S		

	COURSE OUTCOMES	PO/ PSO	CL
CO 1	The concept of elementary data organization, Dynamic memory allocation, Pointer, recursion and string operation	PO1,PO2	U
CO 2	Algorithm and its efficiency measure by means of asymptotic notation, analyze algorithms and its correctness.	PO1, PSO2, PSO3	An
CO 3	Ability to understand different sorting algorithm.	PO1, PO2, PSO1	A
CO 4	Ability to handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures- Stack, Queue, Linked List	PO1, PO2, PSO1, PSO2,PSO4	A
CO 5	Ability to have knowledge of tree and graphs concepts.	PO1, PO2, PO3, PO4, PO5, PSO2, PSO3	An

CL* Cognitive Level

SESSION	TOPIC	LEARNING RESOURCES	VALUE ADDITIONS	COURSE OUTCOME
MODULE I				
1	Syllabus Discussion	PPT	Discussion	CO 1

2	Introduction and classification of data structure & Elementry data organization	PPT/Lecture		CO 1
3	Introduction to Algorithm & complexity	PPT/Lecture		CO 1
4	Complexity analysis of algorithm	PPT/Lecture		CO 1
5	Character array & String processing	PPT/Lecture		CO 1
6	String processing functions	PPT/Lecture		CO 1
7	Pointer, Accessing variable and structure pointer.	Lecture		CO 1
8	Memory allocation	Lecture		CO 1
9	Dynamic Memory Allocation functions	Lecture		CO 1
10	Concept of Recursion	Lecture		CO 1
11	Examples of Recursion	PPT/Lecture		CO 1
12	Revision			
13	Revision			
14	Revision			
MODULE II				
15	Introduction to Searching	PPT/Lecture		CO 2, CO3
16	Linear Search and analysing complexity	Lecture		CO 2, CO3
17	Binary Search	Lecture		CO 2, CO3
18	Binary Search complexity analysis	Lecture		CO 2, CO3
19	Introduction to Sorting Algorithms	Lecture		CO 2, CO3
20	Insertion sort algorithm & analysis	PPT/Lecture		CO 2, CO3
21	Insertion sort complexity analysis	PPT/Lecture		CO 2, CO3
22	Bubble sort algorithm	PPT/Lecture		CO 2, CO3
23	Bubble sort complexity analysis	PPT/Lecture		CO 2, CO3
24	Quick sort algorithm	Lecture		CO 2, CO3
25	Quick sort complexity analysis	Lecture		CO 2
26	CIA-1			
27	Selection Sort algorithm & analysis	Lecture		CO 2
28	Selection Sort complexity analysis	Lecture		CO 2
29	Merge Sort algorithm	PPT/Lecture		CO 2
30	Merge Sort complexity analysis	PPT/Lecture		CO2
31	Summary of Module II	PPT/Lecture		CO 2
32	Revision			
MODULE III				
33	Introduction to Stack	PPT/Lecture		CO 3
34	Array representation of stack	PPT/Lecture		CO 3
35	Application of Stack	PPT/Lecture		CO 3
36	Infix to Post fix conversion & evaluation	Lecture		CO 3
37	Infix to Post fix conversion & evaluation (Implementation)	Lecture		CO 3
38	Queue definition and Application	PPT/Lecture		CO 3
39	Array representation	PPT/Lecture		CO 3
40	Types of queue	PPT/Lecture		CO 3

41	Operations on Queue	PPT/Lecture		CO 3
42	Operations on Queue	Lecture		CO 3
43	Summary of Module III	PPT/Lecture		CO 3
44	Revision	PPT/Lecture		CO 3
MODULE IV				
45	Link List	PPT/Lecture		CO 3
46	Types of Link List	PPT/Lecture	E-resource	CO 3
47	Application of Linked list	PPT/Lecture		CO 3
48	LL -advantage & disadvantage	PPT/Lecture		CO 3
49	Operation on singly link list	PPT/Lecture		CO 4
50	Operation on singly link list	Lecture		CO 4
51	Operation on doubly link list	PPT/Lecture		CO 4
52	Operation on doubly link list	PPT/Lecture	Video	CO 4
53	Operation on circular link list	PPT/Lecture		CO 4
54	Summary of Module IV	PPT/Lecture		CO 4
55	Revision	Lecture		CO 4
CIA **MODULE V**				
56	Tree definition and application	Lecture		CO 4
57	Different tree terminology	PPT/Lecture		CO 4
58	Binary tree & its type	PPT/Lecture		CO 4
59	Implementation of Binary tree	PPT/Lecture		CO 4
60	Binary Search Tree & its application	PPT/Lecture		CO 4
61	BST Travasal	PPT/Lecture		CO 4
62	Implementation of BST	PPT/Lecture		CO 4
63	Heap Tree	Lecture	Demo video	CO 5
64	Graph concept and application	Lecture		CO 5
65	Representation of graph	Lecture	Quiz	CO 5
66	Graph BFS Travasal	Lecture		CO 5
67	Implementation of BFS	PPT/Lecture		CO 5
68	Graph DFS Travasal	PPT/Lecture		CO 5
69	Implementation of DFS	PPT/Lecture		CO 5
70	Summary of Module V	Lecture		CO 5
71	Revision			
72	Revision			

INDIVIDUAL ASSIGNMENTS/SEMINAR – Details & Guidelines

Sl.No	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)	Course Outcome
1	27/11/2018	Infix to Postfix conversions Problems	CO 4
2	20/12/2018	Postfix evaluation problems	CO 4
3	2/1/2019	Inorder, Preorder, Post order traversal problems	CO 5
4	20/01/2019	DFS traversal problems	CO 5
4	14/02/2019	BFS traversal Problems	CO 5

GROUP ASSIGNMENTS/ACTIVITES – Details & Guidelines

Sl.No	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)	Couse Outcome
1	5/2/2019	Tree traversal problems	CO 5

REFERENCES

- Yashwant Kanetka Let us C , 6th Edition, PBP Publication.
- Richie and Kenninghan, (2004), The C programming Language , BPB Publication.
- Balaguruswamy (2005), Programming in ANSI C, 3rd Edition, Tata McGraw Hill.