

**SACRED HEART COLLEGE (AUTONOMOUS)**

**DEPARTMENT OF COMPUTER SCIENCE**

**BSC COMPUTER APPLICATIONS (TRIPLE MAIN)**

**Course plan**

**Academic Year 2014 - 15**

**Semester 2**

### Course Structure

<b>Course Code</b>	<b>Title of The Course</b>	<b>No. Hrs./Week</b>	<b>Credits</b>	<b>Total Hrs./Sem</b>
U2CCENG2	Critical Thinking, Academic Writing & Presentation	5	4	90
U2CRCAP03	Micro Processors & Computer Organization	4	3	72
U2CRCAP04	Data Structures Using 'C'	4	3	72
U2PRCAP2	Data Structures Using C (Lab)	4	3	72
U2CRCMT2	Analytic Geometry, Trigonometry & Matrices	4	3	72
U2CRCST2	Probability and Statistics	4	3	72
U2ARENV1	Environmental Science	5	4	90

**COURSE PLAN (U2CCENG3: CRITICAL THINKING, ACADEMIC WRITING AND PRESENTATION)**

<b>PROGRAMME</b>	<b>BSc COMPUTER APPLICATIONS(TRIPLE MAIN)</b>	<b>SEMESTER</b>	<b>2</b>
<b>COURSE CODE AND TITLE</b>	<b>U2CCENG3: CRITICAL THINKING, ACADEMIC WRITING AND PRESENTATION</b>	<b>CREDIT</b>	<b>4</b>
<b>HOURS/WEEK</b>	<b>5</b>	<b>HOURS/SEM</b>	<b>90</b>

**COURSE OBJECTIVES**

To comprehend 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.

To develop appropriate and impressive writing styles for various contexts.

To write and correct structural imperfections and edit what they have written.

To develop capacity for making academic presentations effectively and impressively

<b>No. of Sessions</b>	<b>Topic</b>	<b>Method</b>	<b>Remarks</b>
2	Introduction to Critical Thinking	Lecture	
2	Reasoning and Arguments	Discussion	
2	Deductive and Inductive Arguments	Lecture	
2	Fallacies	Lecture	
2	Inferential Comprehension	Reading Exercises	
2	Critical Thinking and Academic Writing	Lecture	
2	Critical Thinking and Academic Writing	Exercises	
2	Writing Models	Introductory Lecture	
2	Writing Letters	General Principles	
2	Writing a Letter to the Editor	Exercise - 1	
2	Letter to the Editor	Discussion on the Samples done	
2	Resume	General Guidelines	
2	Resume Writing	Writing Exercise	
2	Resume Writing	Discussion on the samples	
2	Covering Letter	General Introduction and Writing Exercise	
2	Covering Letter	Discussion on the samples	
2	Emails	General Instructions and Writing Exercise	
2	Emails	Discussion on the Samples	
2	Interview Skills	Discussion on the general principles	
2	Group Discussion	Practical sessions and Evaluation	
2	Accuracy in Academic writing	Lecture	
2	Articles and Determiners	Lecture and discussion	
2	Nouns and Pronouns	Lecture	
2	Subject-verb agreement	Lecture and discussion	
2	Phrasal verbs	Lecture	

2	Modals	Lecture	
2	Tenses	Lecture and demonstration	
2	Conditional clauses	General Instructions and Writing Exercise	
2	Relative Pronouns	Lecture and demonstration	
2	Passive Voices	Lecture and illustration	
2	Conjunctions	Lecture	
2	Embedded questions	Demonstration	
2	Punctuations and Abbreviations	General Instructions and Writing Exercise	
2	Soft skills for academic presentations	Presentation and lecture	
2	Effective communication skills	Lecture	
2	How to structure presentation	Lecture and Demonstration	
2	Flip Charts, OHP, Power point presentation	Demonstration	
2	Clarity and brevity in presentation	Lecture	
2	Interaction and persuasion	Lecture	
2	Interview skills	Face to face interaction, demonstration	
2	Group Discussion	Demonstration and Lecture	
2	Group Discussion	Demonstration and Lecture	
6	Revision	Discussion and revising the topics	
Total = 90 Sessions			

#### ASSIGNMENT

	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)
1	14/2/16	Draft a Resume for applying for the career you wish to choose

#### REFERENCE

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

**COURSE PLAN (U2CRCAP3 :MICROPROCESSORS & COMPUTER ORGANIZATION)**

<b>PROGRAMME</b>	<b>BSc COMPUTER APPLICATIONS(TRIPLE MAIN)</b>	<b>SEMESTER</b>	<b>2</b>
<b>COURSE CODE AND TITLE</b>	<b>U2CRCAP3: MICROPROCESSORS &amp; COMPUTER ORGANIZATION</b>	<b>CREDIT</b>	<b>4</b>
<b>HOURS/WEEK</b>	<b>4</b>	<b>HOURS/SEM</b>	<b>72</b>

<b>COURSE OBJECTIVES</b>
To understand the organization of a computer system in terms of its main components
To understand addressing methods, instruction sequencing and execution.
To understand the detailed operation of a microprocessor
To understand different processor architectures
To understand the central processing unit, memory and memory mapping techniques

<b>SESSION</b>	<b>TOPIC</b>	<b>LEARNING RESOURCES</b>	<b>VALUE ADDITIONS</b>	<b>REMARKS</b>
<b>MODULE I</b>				
1	Functional units of a computer	Lecture		
2	Basic operational concepts	Lecture		
3	Basic operational concepts	Lecture		
4	Basic operational concepts	Lecture		
5	Bus structure	Lecture		
6	Addressing methods	PPT/Lecture		
7	Addressing methods	PPT/Lecture		
8	Memory locations and addresses,	Lecture		

9	Instructions and instruction sequencing	Lecture		
10	Instructions and instruction sequencing	Lecture		
11	Instruction execution	Lecture		
12	Instruction execution	Lecture		
13	Instruction execution	Lecture		
14	Revision			
<b>MODULE II</b>				
15	Introduction to 8086	Lecture		
16	Pin-out Diagram	Lecture		
17	Pin-out Diagram	Lecture		
18	Operating modes	Lecture		
19	Operating modes	Lecture		
20	Operation of 8086	Lecture		
21	Operation of 8086	Lecture		
22	Registers	Lecture		
23	Registers	Lecture		
24	Interrupts	Lecture		
25	Interrupts	Lecture		
26	<b>CIA-1</b>			
27	Bus Cycle	Lecture		
28	Bus Cycle	Lecture		
29	Addressing modes	PPT/Lecture		
30	Addressing modes	Lecture		
31	Addressing modes	Lecture		
32	Revision	Lecture		

<b>MODULE III</b>				
33	16 bit processors	Lecture		
34	32 bit processors	Lecture		
35	64 bit processors	Lecture		
36	Intel 80286	Lecture		
37	Intel 80286	Lecture		
38	Intel 80286	Lecture		
39	80386	Lecture		
40	80386	Lecture		
41	80386	Lecture		
42	80486	Lecture		
43	80486	Lecture		
44	80486	Lecture		
45	Pentium	Lecture		
46	Pentium	Lecture		
47	Pentium Pro	Lecture		
48	Pentium Pro	Lecture		
49	Pentium II	Lecture		
50	Pentium III	Lecture		
51	Pentium 4.	Lecture		
<b>MODULE IV</b>				
53	General Register Organization	Lecture		
54	Register stack	Lecture		
55	Register stack	Lecture		
56	Memory stack	Lecture		



57	Memory stack	Lecture		
58	Reverse Polish Notation	Lecture		
59	Evaluation of arithmetic expression	Lecture		
60	Instruction Formats	Lecture		
61	Instruction Classification & Program control instructions	Lecture		
62	Data transfer instructions	Lecture		
63	Data transfer instructions	Lecture		
<b>CIA II</b>				
<b>MODULE V</b>				
66	Organization of RAM	Lecture		
67	SRAM, DRAM	Lecture		
68	ROM,PROM,EROM,EEPROM	Lecture		
69	Auxiliary memory	Lecture		
70	Virtual Memory	Lecture		
71	Memory mapping Techniques	Lecture		
72	Revision			

#### **INDIVIDUAL ASSIGNMENTS/SEMINAR – Details & Guidelines**

	<b>Date of completion</b>	<b>Topic of Assignment &amp; Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)</b>
1	17/1/2015	Architecture of 8086
2	28/1/2015	Data manipulation Instructions

### GROUP ASSIGNMENTS/ACTIVITIES – Details & Guidelines

	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)
1	8/2/2015	Compare different microprocessors(Group Discussion)

#### REFERENCES

- B RAM -Fundamentals of microprocessors and micro computers
- M M Mano – Computer Architecture
- Advanced microprocessors & peripherals – Architecture Programming & interfacing by A K Ray & K M Bhurchand
- R S. Gaonkar- Micro processor Architecture, Programming and applications with 8085.
- Venugopal and Ravikanth- Introduction to assembly language programming in 8086
- Barry B. Brey- Intel Microprocessors 8086

**COURSE PLAN (U2CRCAP04: DATA STRUCTURES USING C)**

<b>PROGRAMME</b>	<b>BSc COMPUTER APPLICATIONS</b>	<b>SEMESTER</b>	<b>2</b>
<b>COURSE CODE AND TITLE</b>	<b>U2CRCAP04: DATA STRUCTURES USING C</b>	<b>CREDITS</b>	<b>3</b>
<b>HOURS/WEEK</b>	<b>4</b>	<b>HOURS/SEM</b>	<b>72</b>

<b>COURSE OBJECTIVES</b>
To understand a variety of techniques for designing algorithms.
To understand a wide variety of data structures and should be able to use them appropriately to solve problems
To understand some fundamental algorithms.
To understand the file organization concepts

<b>SESSION</b>	<b>TOPIC</b>	<b>LEARNING RESOURCES</b>	<b>VALUE ADDITIONS</b>	<b>REMARKS</b>
<b>MODULE 1</b>				
1.	Basics of C programs	Lecture		
2.	Syllabus discussion	Lecture		
3.	Concept of Structured data: Data structure definition	Lecture		
4.	Types and classification of data structures	Lecture		
5.	Types of Arrays	Lecture		
6.	Arrays – representation of array in the memory	PPT/Lecture		
7.	linear array operations	PPT/Lecture		

8.	Sorting Techniques	Lecture	Demo Video	
9.	Bubble sort algorithm			
10.	Selection sort algorithm			
11.	Searching Techniques	Lecture	Demo Video	
12.	Linear search algorithm			
13.	Binary search algorithm			
14.	Sparse Matrix	Lecture		
15.	Polynomial Addition	Lecture		
<b>MODULE 2</b>				
16.	Concepts of stack and queue	Lecture		
17.	Organization and operation on stacks	Lecture		
18.	Push and pop operation	PPT/Lecture		
19.	Traversing of stack	PPT/Lecture		
20.	Applications of stacks	PPT/Lecture		
21.	Polish Notations	PPT/Lecture		
22.	Conversion between infix to postfix & prefix representations	PPT/Lecture		
23.	Conversion of infix to prefix using parenthesis method	PPT/Lecture		
24.	Conversion of infix to postfix using parenthesis method	PPT/Lecture		
25.	Conversion of infix to prefix using stack	PPT/Lecture		

26.	Conversion of infix to postfix using stack	PPT/Lecture		
27.	Expression Evaluation	PPT/Lecture		
28.	Revision	Seminar		
29.	Revision	Seminar		
30.	Doubt Clearans	Discussion		
31.	<b>CIA – I</b>			
32.	Answer Discussion	Discussion		
33.	Organization and operations on queues	Lecture		
34.	Insert and delete Operations	Lecture	Demo video	
35.	Types of Queues	Lecture		
36.	Applications of Queues	Lecture		
37.	Linear and Circular Queue	Lecture		
38.	Circular queue insertion	Lecture		
39.	Circular queue deletion	Lecture		
<b>MODULE 3</b>				
40.	Concepts of Linked lists	Lecture		
41.	Static memory allocation	Lecture		
42.	Dynamic memory allocation	Lecture		
43.	Types of linked list	Lecture		
44.	Linked list using pointers	Lecture		
45.	Insertion and deletion operation on singly linked list	Lecture		
46.	Insertion and deletion operation on doubly linked list	Lecture		
47.	Circular linked list	Lecture		

48.	garbage collection	Lecture		
<b>MODULE 4</b>				
49.	Concept of recursion	Lecture		
50.	Definition of trees	Lecture		
51.	Binary trees	Lecture		
52.	Types of Trees	Lecture		
53.	Strictly binary trees, complete binary tree	Lecture		
54.	Binary search tree	Lecture		
55.	Creation of binary search tree	Lecture		
56.	Traversing methods	Lecture		
57.	AVL Tree	Lecture		
58.	Revision	Seminar		
59.	Revision	Seminar		
60.	Doubt Clearans	Discussion		
61.	<b>CIA – II</b>			
62.	Answer Discussion	Discussion		
<b>MODULE 5</b>				
63.	File Concepts	Lecture		
64.	<i>Concepts of file organizations</i>	Lecture		
65.	Types of file organizations	Lecture		
66.	Sequential file organization	PPT/Lecture		
67.	Random file organization	PPT/Lecture		
68.	Linked file organization	PPT/Lecture		

69.	Inverted files, Cellular partitioning	PPT/Lecture		
70.	Hashing function & Techniques	PPT/Lecture		
71.	Revision	Seminar		
72.	Revision	Seminar		

### INDIVIDUAL ASSIGNMENTS/SEMINAR – Details & Guidelines

	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)
1	15/12/15	Conversion of infix to postfix using stack
2	20/1/16	Construction of binary search tree
3	20/2/16	File organizations

### REFERENCES:

- Data Structures Through C (A Practical Approach), G.S Baluja Danapat Rai & Co.
- Fundamentals of Data Structures, Ellis Horowitz and Sartaj Sajni Galgotia Publications
- Introduction to data structures in C , Ashok N. Kamthane, Person Education
- Theory and Problems of Data Structures, Schaum's Outline Series, Seymour Lipschutz
- Data structures using c and C++ , Tanenbaum

**COURSE PLAN (U2CRCMT02: ANALYTIC GEOMETRY, TRIGONOMETRY AND MATRICES)**

<b>PROGRAMME</b>	<b>BSc COMPUTER APPLICATION(TRIPLE MAIN)</b>	<b>SEMESTER</b>	<b>2</b>
<b>COURSE CODE AND TITLE</b>	<b>U2CRCMT02: ANALYTIC GEOMETRY, TRIGONOMETRY AND MATRICES</b>	<b>CREDIT</b>	<b>3</b>
<b>HOURS/WEEK</b>	<b>4</b>	<b>HOURS/SEM</b>	<b>72</b>

<b>COURSE OBJECTIVES</b>
Identify more ideas of conics
Apply the equation of tangent, normal at a point on a conic
Describe the polar equation of a line, circle , tangent and normal to conics
Familiarize how to separate real and imaginary parts of hyperbolic functions of a complex variable.
Describe rank of a matrix,characteristic roots and characteristic vectors
Apply Cayley-Hamilton theorem to find inverse of a matrix

<b>SESSION</b>	<b>TOPIC</b>	<b>LEARNING RESOURCES</b>	<b>VALUE ADDITIONS</b>	<b>REMARKS</b>
<b>MODULE I</b>				
1 – 3	Tangents and Normals (parametric form only) of a conic	Lecture		
4 – 6	Orthoptic locus	Lecture		
7 – 9	Pole and Polar	Lecture		
10 – 12	Chord in terms of given points	Lecture		
13 – 15	Conjugate diameters of ellipse and hyperbola	Lecture		
16 – 18	Asymptotes of a hyperbola	Lecture		
19 – 21	conjugate hyperbola	Lecture		
22 – 24	rectangular hyperbola	Lecture		
<b>MODULE II</b>				
25 – 27	Polar co-ordinates	Lecture		
28 – 30	polar equation of a line	Lecture		
31 – 33	polar equation of a circle	Lecture		
34 – 36	polar equation of a conic	Lecture		
37- 39	Polar equations of tangent and normal to these curves	Lecture		
	CIA-1			
<b>MODULE III</b>				



40 – 42	Introductory Session	Lecture		
43 – 45	Circular and hyperbolic functions of a complex variable	Lecture		
46 – 48	Separation into real and imaginary parts	Lecture		
49 – 51	Factorisation of $x^n-1, x^n+1, x^{2n} - 2x^na^n\cos\theta + a^{2n}$	Lecture		
52 - 54	Summation of infinite series by C + i S method	Lecture		

#### MODULE IV

55 – 57	Rank of a Matrix	Lecture		
58 – 60	Non-Singular and Singular matrices	Lecture		
61 – 63	Inverse of a matrix by elementary Transformations	Lecture		
64 – 66	Equivalent matrices	Lecture		
67 – 69	Row Canonical form	Lecture		
70 – 72	Normal form	Lecture		
73 – 75	Elementary matrices only	Lecture		

#### CIA - II

76 – 78	Systems of Linear equations	Lecture		
79 - 81	System of non homogeneous solution using matrices	Lecture		
82 – 84	Cramer's rule	Lecture		
86 – 87	System of homogeneous equations	Lecture		
88	Characteristic equation of a matrix	Lecture		
89	Characteristic roots and characteristic vectors	Lecture		
90	Cayley-Hamilton theorem (statement only) and simple applications	Lecture		

#### INDIVIDUAL ASSIGNMENTS/SEMINAR – Details & Guidelines

	Date of completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)
1	16/12/2014	Problems of Conic section( Written )
2	20/1/2015	previous question paper( Written )

#### REFERENCES

- Manicavachagom Pillay , Natarajan – Analytic Geometry (Part I, Two Dimensions).
- S.L. Loney – Plane Trigonometry Part – II, S. Chand and Company Ltd.
- Frank Ayres Jr - Matrices , Schaum's Outline Series, TMH Edition

**COURSE PLAN (U2CRCST2 : PROBABILITY AND STATISTICS)**

<b>PROGRAMME</b>	<b>BACHELOR OF COMPUTER APPLICATIONS</b>	<b>SEMESTER</b>	<b>2</b>
<b>COURSE CODE AND TITLE</b>	<b>U2CRCST2 : PROBABILITY AND STATISTICS</b>	<b>CREDIT</b>	<b>3</b>
<b>HOURS/WEEK</b>	<b>4</b>	<b>HOURS/SEM</b>	<b>60</b>

<b>COURSE OBJECTIVES</b>
To understand different approaches to probability - their properties, Addition & Multiplication theorem, Theorem of total probability.
To understand random variables, probability distributions - their properties, distribution functions, Reliability functions, change of variables (univariate case only).
To understand joint distribution of a pair of random variables, marginal & conditional distributions, independence of random variables.
To understand the concepts of correlation - its properties, different measures of correlation.
To understand the regression equations - their identification, Probable error, Coefficient of determination, Linear regression (Three variable case), partial & multiple correlations - their expressional properties (no derivation).

<b>SESSION</b>	<b>TOPIC</b>	<b>LEARNING RESOURCES</b>	<b>VALUE ADDITIONS</b>	<b>REMARKS</b>
1	Random Experiments, sample space	PPT	video	
2	Events, Algebra of events	PPT/Lecture		
3	Borel field of events. Approaches to probability	PPT/Lecture		
4	Statistical definition of probability	PPT/Lecture	e-resource	
5	Classical definition of probability	PPT/Lecture		
6	Axiomatic definition of probability	PPT/Lecture		
7	Addition theorem on probability, conditional probability	Lecture		
8	Independence of events	Lecture		
9	problems	Lecture		
10	problems	Lecture		
11	Theorem of total probability	PPT/Lecture		
12	Properties, Problems	PPT/Lecture		
13	Bayes theorem	PPT/Lecture		
14	problems			
15	Random variables	PPT/Lecture		
16	Probability distribution of discrete random variables, properties	Lecture		

17	Probability distribution of continuous random variables, properties	Lecture		
18	Distribution function	Lecture		
19	problems	Lecture		
<b>CIA1</b>				
20	Joint distribution of a pair of random variables,	PPT/Lecture		
21	marginal and conditional distributions	PPT/Lecture		
22	problems			
23	Independence of random variables	PPT/Lecture		
24	problems	Lecture		
25	Correlation and its properties	Lecture		
26	Rank correlation			
27	Regression equations	Lecture		
28	Coefficient of determination	Lecture		
29	Partial and multiple correlation	PPT/Lecture		
30	properties	PPT/Lecture		
31	Reliability functions	PPT/Lecture		
32	Change of variables			
	Problems			
33	Joint distribution of a pair of random variables	PPT/Lecture		
34	Problems	PPT/Lecture		
35	Properties of joint p.d.f	PPT/Lecture		
36	Problems	Lecture	Quiz	
37	Distribution functions	Lecture	Q & Ans Session	
38	Marginal distribution	PPT/Lecture		
39	Problems	PPT/Lecture		
40	Conditional distribution	PPT/Lecture		
41	Problems	PPT/Lecture		
42	Independence of random variables	Lecture		
43	Problems			
44	Correlation	PPT/Lecture		
45	Types of correlations	PPT/Lecture		
46	Correlation coefficient	PPT/Lecture		
47	Properties of correlation coeff.	PPT/Lecture		
48	Problems	PPT/Lecture		
49	Rank correlation	PPT/Lecture		
50	Problems	PPT/Lecture		
<b>CIA II</b>				
51	Regression	PPT/Lecture		
52	Properties	PPT/Lecture	Video	
53	Multiple regression	PPT/Lecture		

54	Examination	PPT/Lecture		
55	Partial and multiple correlation			
56 – 60	Revision			

### INDIVIDUAL ASSIGNMENTS/SEMINAR – Details & Guidelines

	Date of Completion	Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)
1	15/12/14	Problems on Correlation coefficient(Written)
2	12/1/15	Problems using probability and bayes theorem (written)

### REFERENCES:

- S.P. Gupta (2011): Statistical Methods 43rd edition,.Sultan Chand and Sons Delhi.
- Gupta S. C. and Kapoor V. K.(2014): Fundamentals of Mathematical Statistics, 11th edition, Sultan Chand and Sons
- B.L. Agarwal (2013): Basic Statistics, 6th edition, New Age International (p) Ltd.
- Parimal Mukhopadhyaya (1996): Mathematical Statistics, New Central Book Agency (p) Ltd, Calcutta
- Murray R Spiegel, John Schiller, R. Alu Srinivassan (2008): Theory and problems of PROBABILITY AND STATISTICS, 3rd edition Schaum’s Outlines, Tata McGraw-Hill Publishing Company Ltd
- Rohatgi, V.K. and Saleh, A.K.MD.E.(2014).An Introduction to Probability and Statistics, (3rd ed.),John Wiley & Sons Inc