

**Integral University, Lucknow**  
**Department of Computer Application**  
**STUDY & EVALUATION SCHEME**

**Choice Based Credit System**

**Bachelor of Computer Application (BCA)**

**Year I<sup>st</sup>, Semester II<sup>nd</sup>**

S. No.	Course Category	Subject Code	Name of the Subject	Periods				Evaluation Scheme				Subject Total
								Sessional (CA)			End Sem Exam	
				L	T	P	C	UE	TA	Total	ESE	
1.	Foundation	MT114	Mathematics II	3	1	0	4	40	20	60	40	100
2.	Core	CA105	System Analysis and Design	3	1	0	4	40	20	60	40	100
3.	Foundation	LN201	Advanced Professional Communication	3	1	0	4	40	20	60	40	100
4.	Core	CA106	Computer Organization	3	1	0	4	40	20	60	40	100
5.	Core	CA107	Data Structure using C	3	1	0	4	40	20	60	40	100
6.	Core	CA108	Data Structure Lab	0	0	3	2	40	20	60	40	100
7.	Core	CA109	Computer Organization Lab	0	0	3	2	40	20	60	40	100
8.	Foundation	LN153	Advanced Professional Communication Lab	0	0	2	1	40	20	60	40	100
<b>Total</b>				<b>15</b>	<b>5</b>	<b>8</b>	<b>25</b>					<b>800</b>

**L** - Lecture    **T** – Tutorial    **P** – Practical    **C** – Credit    **UE** – Unit Exam    **TA** – Teacher Assessment  
**Sessional Total (CA)** = Unit Exam + Teacher Assessment

**Subject Total** = Sessional Total (CA) + End Semester Examination (ESE)

## MT114 MATHEMATICS-II

w.e.f. Session 2015-2016

L T P

3 1 0

### UNIT –I

**Partial Differentiation and its Application:** Partial Derivatives, Euler's Theorem on Homogeneous function, Total differentiation, Errors, Jacobins, Curve tracing, Expansion of functions of one variable and two variables. [8]

### UNIT –II

**Ordinary Differential Equation:** Order and degree of differential equations, solution of differential equations of first order and first degree variables separable, Linear D.E., Homogenous D.E., Exact D.E., Linear differential equation with constant coefficients: Complementary function, Particular integral, Method of variation of parameters. [8]

### UNIT –III

**Partial Differential Equation and Geometry:** Introduction of partial Differential Equations, Linear partial differential equation of second order with constant coefficients, Classification of P.D.E. to parabolic, Elliptic and hyperbolic with examples, Straight lines, Circle, Parabola, Ellipse, Hyperbola in two dimensions. [8]

### UNIT –IV

**Probability and Distributions:** Definition of probability, Elementary properties, Conditional Probability, Baye's Theorems (without proof), Binomial Distribution, Poisson Distribution and Normal Distribution. [8]

### UNIT –V

**Statistics:** Measures of central Tendency – Mean, Median, Mode, Standard deviation and Variance, correlation – Karl Pearsons correlation coefficients, Rank correlation coefficients, Regression lines, Properties of regression coefficients. [8]

### REFERENCES:

1. Differential equation by Gupta, Malik and Mittal Pragati Prakashan.
2. Probability theory and random process by S.P. Eugene Xavier, S. Chand & company Pvt. Ltd.
3. Elements of partial Differential Equation by Sneddon McGraw Hill.
4. Mathematics and statistics by Ajay Goyal, Taxman Allied Service Pvt. Ltd.
5. Engineering Mathematics – II by H.K. Dass, S. Chand & company Pvt. Ltd.

# CA105 SYSTEM ANALYSIS AND DESIGN

w.e.f. Session 2015-2016

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## UNIT-I

**System Concepts and Information Systems Environment:** The System Concept: Definition, Characteristics of System, Elements of a System, Open and Closed System, Formal and Informal Information Systems, Computer based Information Systems, Management Information System, Decision Support System, General Business Knowledge, and Interpersonal Communicational System.

**The System Development Life Cycle:** Feasibility Study, Analysis, Design, Implementation, Post implementation & Maintenance [8]

## UNIT-II

**The Role of the System Analyst:** Introduction, Qualities of a System analyst, Roles of a System Analyst

**System Planning & Initial Investigation:** Strategies for Determining Information Requirement, Problem Definition & Project initiation, Analysis, Review, Observations.

**Information Gathering:** Types of Information, Information gathering tools, the art of Interviewing, Arranging the Interview, Guides to a Successful Interview, Types of Interviews and Questionnaires. [8]

## UNIT-III

**The Tools of Structured Analysis:** The Data Flow Diagram (DFD), Data Dictionary, Decision Trees and Structured English.

**Feasibility Study:** Feasibility Considerations, Steps in Feasibility Analysis, Feasibility Report.

**Cost/Benefit Analysis:** Cost/Benefit Categories, Procedure for Cost/Benefit Determination. [8]

## UNIT-IV

**The Process and Stages of System Design:** Logical & physical Design, Design Methodologies, Structured Design, Functional Decomposition, Structured Walkthrough, Processing Control & Data Validation, Audit Trail & Documentation Control.

**Input/output and Forms Design:** Input Design, CRT Screen Design, Output Design, Requirements of Form Design, Types of Form Design. [8]

## UNIT-V

**System Testing and Quality Assurance:** Introduction to System testing, Types of System Testing, Quality Assurance Goals in the System Life Cycle.

**Hardware & Software Selection and Maintenance:** The computer industry, Software industry, A procedure for hardware selection, Major phases in selection, Criteria for software selection. [8]

## REFERENCES:

1. Elis Awad, "System Analysis & Design", Galgotia Pub.
2. Jeffrey A. Hoffer; Joey F. George; Joseph S. Valacich," Modern Systems Analysis and Design", Prentice Hall, Sixth Edition 2011, ISBN-10: 0-13-608821-X

# LN 201      **ADVANCED PROFESSIONAL COMMUNICATION**

**w.e.f. Session 2015-2016**

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## **UNIT-I**

### **Reading & Listening Comprehension:**

Ways to improve the Speed & Efficiency of Reading, Importance of Skim Reading, Note Making, Linear Note- Making & Patterned Note- Taking, Listening Skills & Features of Effective Listening, Benefits of Effective Listening. [8]

## **UNIT-II**

### **Writing Skills:**

C V & Resume writing, Job Application letter/Covering letter.

**Précis making:** Principles of condensation, Rules for writing précis.

Paragraph writing, Development of paragraph [8]

## **UNIT-III**

### **Group Discussion and Interview Skills:**

**Group Discussion:** Meaning & Significance, How to prepare & practice for GD, Common Pitfalls in a GD.

**Seminars:** Definition & Conventions of a Seminar.

**Interview:** Definition, Skills & Techniques, Preparation, Negative Interview Factors & Interview Tips. [8]

## **UNIT- IV**

### **Presentation Skills:**

**Presentation strategies:** Purpose, Audience and locale, Organizing contents, Audio-Visual aids, Nuances of Delivery, Body language, Voice dynamics. [8]

## **UNIT-V**

### **Project Work:**

At the commencement of the semester, the student would be assigned a topic by the Teacher/Instructor. They will research it & submit a duly documented report of about 20-25 pages by the end of the semester. [8]

## **REFERENCES:-**

1. Raman, Meenakshi & Sharma, Sangeeta, "Technical Communication: Principles and Practice", Oxford University Press-2013
2. Konar, Nira, "Communication Skills For Professionals", PHI Learning Pvt. Ltd -2011
3. Board of Editors, "Written and Spoken Communication in English", University Press-2007
4. Lata , Pushp & Kumar, Sanjay, "Communicate or Collapse :A Handbook of Effective Public Speaking , Group Discussions and Interviews", PHI Learning Pvt. Ltd -2011
5. Duck, Steve & McMahan, David T., "The Basics of Communication : A Relational Perspective", Sage Publication-2012
6. Laws, Anne- Presentations, Orient Black Swan-2011

7. O'Connor, J. D., "Better English Pronunciation", Universal Books Stall-1991
8. Anderson, Marilyn, Nayar, Pramod K. & Sen, Madhuchhanda, "Critical Thinking, Academic Writing and Presentation Skills", Pearson-2009

# CA106 COMPUTER ORGANIZATION

w.e.f. Session 2015-2016

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## UNIT – I

### Digital Logic Circuit:

**Number System:** Binary, Octal, Hexadecimal, Character codes (BCD, ASCII, EBCDIC), Logic gates, Boolean Algebra, K-map simplification.

**Combinational logic design:** Half adder, Full adder, Subtractor, Carry look ahead adder, Decoder, Encoder, Multiplexer, De-multiplexer. [8]

## UNIT – II

### Sequential Circuits:

Flip-Flops, Excitation tables, Flip-Flop input equation, State table, State diagram, Registers, Counters (synchronous and asynchronous), Complements:  $(r-1)$ 's complement,  $r$ 's complement. Fixed point representation, Floating point representation, Gray codes. [8]

## UNIT – III

### BASIC Organization:

Von Neumann machine (IAS computer), Instruction formats, Instruction cycle, Organization of Central Processing Unit, General Register Organization, Stack Organization, Addressing Modes, Data transfer and manipulation, BUS Architecture, Hard-wired and micro programmed control unit. [8]

## UNIT – IV

### Memory Organization:

Memory hierarchy, Main Memory, Types of RAM & ROM, Auxiliary memory, Associative memory, Cache memory, Memory mapping (Direct, Associative, Set associative), Virtual memory, Memory management hardware. [8]

## UNIT – V

### I/O Organization:

Peripheral devices, I/O interface, Synchronous data transfer, Asynchronous data transfer, Strobe control, Handshaking, Mode of Data transfer: Program Driven I/O, Interrupt Driven I/O, Priority interrupt, Direct memory access, Input output processor, Serial communication, Parallel communication. [8]

## REFERENCES:-

9. M. Morris Mano, "Computer System Architecture" PHI.
10. B. Ram, "Computer Fundamental Architectures Organization", New Age.
11. Tannenbaum, "Structured Computer Organization", PHI.
12. Willam Stelling, "Computer Organizations Architecture" Pearson Education.

# CA107 DATA STRUCTURE USING C

w.e.f. Session 2015-2016

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## UNIT – I

**Introduction:** Introduction to Data Structure, Efficient use of memory, Elementary Data Organization, Structure operations, Time and space complexity of algorithms and asymptotic notations.

**Arrays:** Array Definition and Representation, Single and Multidimensional Arrays, Address calculation, Application of arrays, Character String in C, Character string operation, Array as Parameters. [8]

## UNIT - II

**Linked list:** Representation and Implementation of Singly Linked List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list and dynamic storage management, Circular Link List, Garbage Collection and Compaction. [7]

## UNIT - III

**Stacks:** Introduction to Stack, Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Linked Representation of Stack, Application of stack: Postfix and Prefix conversions, Evaluation of expressions using stack.

**Queues:** Introduction to Queue, Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues and De-queue, Priority Queues. [9]

## UNIT – IV

**Trees:** Basic terminology, Binary Trees, Binary tree representation and Traversal, Algebraic Expressions, Complete Binary Tree, Threaded Binary trees, Binary Search Tree (BST), Height balanced tree and various Rotations.

**Graph Theory:** Terminology & Representations, Traversal- BFS and DFS, Dijkstra’s algorithm for shortest path, Prim’s and kruskal’s Algorithm for Minimal Spanning tree. [9]

## UNIT – V

**Searching:** Sequential search, Binary search, and Hash search, Comparison and analysis.

**Sorting:** Insertion Sort, Selection Sort, Bubble Sort, Quick Sort, Two Way Merge Sort and Heap Sort. [7]

## REFERENCES:

1. Horowitz and Sahani, “Fundamentals of data Structures”, Galgotia Publication Pvt. Ltd., New Delhi.
2. M. Tenenbaum, “Data Structures using C & C++”, Prentice-Hall of India Pvt. Ltd., New Delhi.

## **CA108 DATA STRUCTURE LAB**

**w.e.f. Session 2015-2016**

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**0 0 3**

**Write the following program in C :**

- Find the Maximum and Minimum value in an array
- Concatenate two strings, without using library function
- Array implementation of Stack and perform Push and Pop operations
- Evaluation of a Postfix expression
- Array implementation of Linear Queue and perform Insertion and Deletion
- Array implementation of Circular Queue and perform Insertion and Deletion
- Implementation of Singly Link List and perform Insertion, Deletion and Traversal
- Implementation of Doubly Link List and perform Insertion, Deletion and Traversal operations
- Implementation of Binary Tree and perform Inorder, Preorder, and Postorder Traversals
- Searching of element in array using Linear Search
- Searching of element in array using Binary Search
- Sorting of elements in array using Bubble Sort



# CA109      COMPUTER ORGANIZATION LAB

**w.e.f. Session 2015-2016**

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- Study and Bread Realization of Logic Gates, K-Map, Flip-Flop equation, Realization of characteristic and excitation table of various Flip Flops
- Implementation of Half Adder, Full Adder and Subtractor.
- Implementation of Ripple Counters and Registers.
- Implementation of Decoder and Encoder circuits.
- Implementation of Multiplexer and De-Multiplexer circuits.
- Study of 8085 and 8086.
- Assembly language Programming for 8086.
  - (i)    Addition, Subtraction
  - (ii)   Find greatest numbers

# **LN 153      ADVANCED PROFESSIONAL COMMUNICATION LAB**

**w.e.f. Session 2015-2016**

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## **1. Framing Questions**

- Yes/ No questions
- Wh- questions
- Question tags
- Rhetorical questions

## **2. Group Discussion and Group Presentation**

(Theory and practice sessions, visual aids)

- When does the GD take place?
- What does the GD test?
- Difference between GD and conversation/ debate
- Some Do's and Don'ts of GD

## **3. Situational Conversation**

- Social language
- Emergency situation
- Seeking help
- Inquiries
- Communicating bad news

## **4. Negotiation**

- Common fears about negotiations
- Building Momentum
- Bargaining with more powerful opponents
- Opening Tactics
- Countering your opponents' moves

## **5. Mock Interview Exercises**