E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI – 625 014.

(*An Autonomous Institution – Affiliated to Madurai Kamaraj University*)

Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC

DEPARTMENT OF INFORMATION TECHNOLOGY

CBCS with OBE

MASTER OF SCIENCE

PROGRAMME CODE - OPI

COURSE STRUCTURE

(w.e.f. 2021 – 2022 Batch onwards)

Annexure - 2

E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI – 625 014.

(An Autonomous Institution – Affiliated to Madurai Kamaraj University)
(Re –accredited (3rd cycle) with Grade A+ and CGPA 3.51 by NAAC)
CBCS and OBE

DEPARTMENT OF INFORMATION TECHNOLOGY – PG

(w.e.f. 2021 – 2022 onwards)

VISION

- To create the most favorable environment for quality academic oriented undergraduate and postgraduate education in information technology.
- To develop the programming skills and to meet the current trends of information technology.
- Prepare the students for a technological society and orient them towards serving the society.

MISSION

- To impart high quality professional training at the postgraduate and undergraduate level with an emphasis on basic principles of information technology.
- To produce technologically competent and ethically responsible graduates through balanced and dynamic curriculum.
- To take up creative project work in collaboration with IT Industries and professional societies to make the nation as a knowledge-power.

Programme Educational Objectives (PEOs)
M.Sc. Information Technology

S. No.	On completion of the Programme, the student will
PEO1	Identify, design, and analyze complex computer systems and implement and interpret the results from those systems.
PEO2	Design, implement and evaluate a computer-based system, or process component, to meet the desired needs within the realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
PEO3	Review literature and indulge in research using research based knowledge and methods to design new experiments, analyze, and interpret data to draw valid conclusions.
PEO4	Select and apply current techniques, skills, and tools necessary for computing practice and integrate IT-based solutions into the user environment effectively.
PEO5	Apply contextual knowledge to assess professional, legal, health, social and cultural issues during profession practice.
PEO6	Analyze the local and global impact of computing on individuals, organizations, and society.

Annexure - 2

Program Outcomes (POs)

S.No.	Graduate Attribute	On Completion of the Programme, the student will
PO1	**Knowledge Base**	Provides technology-oriented students with the knowledge and ability to develop creative solutions.
PO2	**Problem Analysis & Investigation**	Get ability to apply knowledge of new technologies to the real-world issues.
PO3	**Design/development of solutions**	Design and develop computer programs/computer-based systems in the areas related to algorithms, networking, web design, cloud computing, Artificial Intelligence, Mobile applications.
PO4	**Conduct investigations of complex problems**	Get some development experience within a specific field of Information Technology through project work.
PO5	**Communication Skills & Design**	Be familiar with current research within various fields of Information Technology.
PO6	**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.

Programme Specific Outcomes (PSOs) with Graduate Attributes

S. No.	Graduate Attribute	On Completion of the Programme, the student will
PSO1	**Knowledge Base**	At the end of the programme, the student should be able to Understand the concepts and applications in the field of Information Technology like Web designing and development, Mobile application development, and Network and communication technologies.
PSO2	**Problem Analysis & Investigation**	Competent and complete software professional to meet the requirement of corporate world and Industry standard to provide solutions to industry, society and business.
PSO3	**Design/development of solutions**	Understand the technological developments in the usage of modern design and development tools to analyze and design for a variety of applications.
PSO4	**Conduct investigations of complex problems**	Apply the learning from the courses and develop applications for real world problems.
PSO5	**Communication Skills & Design**	Analyst who can apply latest technologies who can analyze and synthesize computing systems through quantitative and qualitative techniques to solve problems in the areas of Information Technology.
PSO6:	**Life-long learning**	Develop strong skills in systematic planning, developing, testing, implementing and providing IT solutions for different domains which helps in the betterment of life.

Eligibility for Admission

Candidates should have passed with minimum 55% in B.Sc. Computer Science / Information Technology / Computer Application of Madurai Kamaraj University or an Examination of any other University accepted by the Syndicate as equivalent there to shall be eligible for admission to M.Sc. Degree Course in Computer Science.

Duration of the Course

The students shall undergo prescribed course of study for the period of two academic years consists of four semesters under CBCS semester pattern with Outcome Based Education.

Medium of Instruction: English

System: Choice Based Credit System with Outcome Based Education Model.

Courses of Study with Credit Distribution

Category	No. of Courses	No. of Credits
Major Core Papers	12	48
Major Core Lab Papers	8	16
Elective	4	16
Non Major Elective	2	4
Project	1	6
Total	**27**	**90**

Nature of the Course

Courses are classified according to the following nature

1. Knowledge Oriented Skill
3. Employability Oriented
3. Entrepreneurship Oriented

Outcome Based Education (OBE) & Assessment

Students understanding must be built on and assessed for wide range of learning activities, which includes different approaches and are classified along several bases, such as

1. **Based on purpose:**
   - Formative (Internal tests, Assignment, Seminar, Quiz, Documentation, Case lets, ICT based Assignment, Mini Projects administered during the learning process)
   - Summative (Evaluation of students learning at the end of instructional unit)
2. **Based on Domain knowledge: (Post Graduate Up to K5 Levels)**
   - Assessment through K1, K2, K3, K4

Evaluation

Continuous Internal Assessment Test	: 25 marks
Summative (External)	: 75 marks
Total	**: 100 marks**

CIA-Continuous Internal Assessment: 25 Marks

Components	Marks
Test (Average of three tests - conduct for 150 marks and converted into 15 marks)	15
Assignment	5
Seminar	5
Total	**25**

- ✓ Centralized system of Internal Assessment Tests.
- ✓ There will be a three internal assessment tests.
- ✓ Duration of I Internal Exam $1^{1}/_{4}$ hrs for 30 Marks. Test I and 2 ½ hours for Test II and III for 60 Marks
- ✓ Students shall write retest on the genuine grounds if they are absent in either Test I or Test II and Test III with the approval of HOD.

Question Paper Pattern for Formative Test I

Section	Marks
A – Multiple Choice Questions (4x1 mark)	4
B– Short Answer (3x2 marks)	6
C – Either Or type (2/4 x 5 marks)	10
D – Open Choice type (1/2 x10 Marks)	10
Total	**30**

Question Paper Pattern for Formative Test II and Test III

Section	Marks
A – Multiple Choice Questions (8x1Mark)	8
B – Short Answer (6 x 2 marks)	12
C – Either Or type (4/8 x 5 marks)	20
D – Open Choice type (2/4 x 10 Marks)	20
Total	**60**

Conducted for 150 marks and converted into 15 marks

Question Paper Pattern for Summative Examination

Section	Marks
A – Multiple Choice Questions (10x1mark)	10
B – Short Answer Questions (5 x 2 Marks)	10
C – Either Or type (5 X 5marks)	25
D – Open Choice type(3out of 5 X 10Marks)	30
Total	**75**

In respect of Summative examinations passing minimum are 45% for Post Graduate.

Annexure - 2

Question Paper Pattern for Internal practical examination: 40 marks and External Practical Examination: 60 Marks

Internal	
Components	**Marks**
Major Question	20
Minor Question	10
Record Work	5
Program Explanation / VIVA	5
Total	40

External	
Components	**Marks**
Major Question	30
Minor Question	20
Record Work	5
Program Explanation / VIVA	5
Total	60

- In respect of external examinations passing minimum is **45%** for Post Graduate Courses and in total, aggregate of **50%.**

Latest amendments and revisions as per UGC and TANSCHE Norms are taken into consideration in curriculum preparation.

Annexure - 2

E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI – 625 014.

(An Autonomous Institution – Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS and OBE

DEPARTMENT OF INFORMATION TECHNOLOGY- PG

(w.e.f. 2021 – 2022 onwards)

COURSE STRUCTURE - SEMESTER WISE

Sem.	Category	Course Code	Course Title	Hours per Week	Exam Duration (hrs)	Maximum Marks			credits
						C.A	S.E	Total	
I	**Core**	21OPI11	Computer Architecture	5	3	25	75	100	4
	Core	21OPI12	Object Oriented Programming with C++	4	3	25	75	100	4
	Core	21OPI13	Data Structure and Algorithms	4	3	25	75	100	4
	Core		**Elective-I**	5	3	25	75	100	4
	Core Lab	21OPI11P	C++ and Data Structure Lab	5	3	40	60	100	2
	Core Lab	21OPI12P	PHP Programming Lab	5	3	40	60	100	2
	NME	21OPINM1	Photo Designing	2	3	25	75	100	2
II	**Core**	21OPI21	Operating System Concepts	5	3	25	75	100	4
	Core	21OPI22	Digital Image Processing	4	3	25	75	100	4
	Core	21OPI23	Data Communications and Networking	4	3	25	75	100	4
	Core		**Elective-II**	5	3	25	75	100	4
	Core Lab	21OPI21P	Unix and Linux Programming Lab	5	3	40	60	100	2
	Core Lab	21OPI22P	Digital Image Processing Lab	5	3	40	60	100	2
	NME	21OPINM2	Technologies of Internet	2	3	25	75	100	2

Annexure - 2

Sem.	Course Category	Course Code	Course Title	Hours per Week	Exam Duration (hrs)	Maximum Marks			credits
						CA	SE	Total	
III	**Core**	21OPI31	Relational Database Management System	5	3	25	75	100	4
	Core	21OPI32	Java and J2EE Programming	5	3	25	75	100	4
	Core	21OPI33	Data Mining and Warehousing	5	3	25	75	100	4
	Core		**Elective-III**	5	3	25	75	100	4
	Core Lab	21OPI31P	RDBMS Lab	5	3	40	60	100	2
	Core Lab	21OPI32P	Java and J2EE Programming Lab	5	3	40	60	100	2
IV	**Core**	21OPI41	Big Data Analytics	5	3	25	75	100	4
	Core	21OPI42	Advanced Software Engineering	5	3	25	75	100	4
	Core	21OPI43	Internet of Things (IOT)	5	3	25	75	100	4
	Core		**Elective-IV**	5	3	25	75	100	4
	Core Lab	21OPI41P	Python Programming Lab	5	3	40	60	100	2
	Core Lab	21OPI42P	Web Technology Lab	5	3	40	60	100	2
	Core	21OPIPR4	Project – Viva Voce	-	-	20	80	100	6
			Total Hours & Credits	**120**					**90**

ELECTIVE PAPERS

Semester - I

Elective I (Choose any one)

1. Discrete Mathematics - 21OPIE1A
2. System Analysis and Design - 21OPIE1B

Semester - II

Elective II (Choose any one)

1. Android Programming - 21OPIE2A
2. Theory of Computation - 21OPIE2B

Semester - III

Elective III (Choose any one)

1. Mobile Computing - 21OPIE3A
2. Block Chain Technologies - 21OPIE3B

Semester - IV

Elective IV (Choose any one)

1. Cloud Computing - 21OPIE4A
2. Cyber Security - 21OPIE4B

Annexure - 2

DEPARTMENT OF INFORMATION TECHNOLOGY				I M.Sc. Information Technology				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/Week**	**CIA**	**Ext**	**Total**
I	**Core**	**21OPI11**	**COMPUTER ARCHITECTURE**	**4**	**5**	**25**	**75**	**100**

Nature of the Course

Knowledge Oriented and Skill	√	Employability Oriented		Entrepreneurship oriented	

Course Objectives

1. To introduce the fundamental concepts underlying modern computer organization and architecture.
2. To comprehend the importance of the hardware-software interface.
3. To familiarize about hardware design of basic structure and behavior of the various functional modules of the computer.
4. To make the students know about the importance of multiprocessor and multi computers.
5. To give the students an elaborate idea about the different memory systems and buses.

Unit	Course Content	Hours	K Level	CLO
I	**Digital Logic Circuits**: Digital Computers- Logic Gates –Boolean Algebra- Map Simplification- Combinational Circuits- Flip-flops- Sequential Circuits. **Digital Components:** Integrated Circuits-Decoders – Multiplexer – Registers – Shift Registers – Binary Counters – Memory Unit. **Data Representation**: Data Types- Complements- Fixed Point Representation-Floating Point Representation – other Binary Codes-Error Detection Codes.	15	Up to K3	CLO1
II	**Register Transfer and Micro operation**: Register Transfer Language- Register Transfer – Bus and Memory Transfer – Arithmetic Micro Operation – Logic Micro Operation – Shift Micro operation- Arithmetic	15	Up to K3	CLO2

	Logic Shift Unit. **Basic Computer Organization and Design:** Instruction Codes- Computer Registers- Computer Instructions- Training – Timing And Control- Instruction Cycle-Memory Reference Instructions – Input And Output And Interrupt.			
III	**Micro programmed Control**: Control Memory – Addressing Sequencing – Micro Program Example – Design of Control Unit. **Central Processing Unit:** Introduction – General Register Organization – Stack Organization – Instruction Formats- Addressing Modes- Data Transfer And Manipulation – Programmed Control.	15	Up to K3	CLO3
IV	**Computer Arithmetic**: Introduction- Addition and Subtraction – Multiplication Algorithm – Division Algorithm.	15	Up to K4	CLO4
V	**Input Output Organization:** Peripheral Devices – Input Output Interfaces Asynchronous Data Transfer, Modes of Transfer, Direct Memory Access, Input Output Processor, Serial Communication. **Memory Organization:** Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory Virtual Memory.	15	Up to K4	CLO5

Book for Study

Morris Mano.M, *Computer System Architecture*, Prentice Hall India, New Delhi, 3rd Edition, 2006.

Chapters:

Unit I : Chapters 1, 2, 3
Unit II : Chapters 4, 5 (5.1 – 5.7)
Unit III : Chapters 7, 8 (8.1 – 8.7)
Unit IV : Chapters 10 (10.1 – 10.4)
Unit V : Chapters 11 (11.1 -11.4, 11.6 - 11.8), 12 (12.1 – 12.6)

Books for Reference

1. Alan Clements , *Computer Organization and Architecture* , Prentice Hall of India, New Delhi, 2nd Edition , 2007.
2. Carl Hamacher, Zvonko Vranesic, SafwatZaky, *Computer Organization*- Mc Graw Hill , America ,Newyork , Fifth Edition , 2002.
3. David,Patterson, John,Hennery , *Computer Organization and Design The Hardware and Software Interface*, Elsevier India, New Delhi , 3rd edition, 2007.
4. Rajaraman.V,Radhakrishnan.T , *Digital Logic and Computer Organization*, Prentice Hall Of India , New Delhi , 1st edition , 2006.
5. William Stallings , *Computer Organization & Architecture* , Prentice Hall of India, New Delhi , 7th edition , 2007.

Web Resources

1. https://www.mheducation.co.in/computer-organization-9781259005275-india
2. http://www.gpkhutri.in/BOOK/COMPUTER/Computer%20Organization%20 and %20Architecture%20Designing%20for%20Performance%20(8th%20Edition)%20-%20William%20Stallings.pdf
3. https://www.seas.upenn.edu/~leebcc/teachdir/ece590_fall14/kaxiras.pdf
4. http://csg.csail.mit.edu/6.375/6_375_2016_www/resources/archbook.pdf

E-Books

1.https://poojavaishnav.files.wordpress.com/2015/05/mano-m-m-computer-system-architecture.pdf

2.https://www.uotechnology.edu.iq/depeee/lectures/4th/Electronic/Microprocessor%20engineering%202/computer%20architecture.pdf

3.http://www.dhimangaurav.com/docs/morris.pdf

Pedagogy

Power point Presentations, Seminar, Quiz, Assignment, video material and Brain storming.

Rationale for Nature of the course

- Emphasizes the data flow, timing analysis, memory hierarchy, tradeoff between execution cycles, hardware requirements/cost and software that must be made in order to produce good system design.

- An overview of computer architecture, which stresses the underlying design principles and the impact of these principles on computer performance. General topics include design methodology, processor design, control design, memory organization, system organization, and parallel processing.

Activities to be given

- Group Discussion
- Quiz
- Seminar

Course Learning Outcomes (CLOs)

Upon successful completion of the Course, the students will be able to

No.	Course Outcome	Knowledge Level(According to Bloom's Taxonomy)
CLO 1	Understand the principles of number system, binary codes and Boolean algebra to minimize logic expressions.	Up to K3
CLO 2	Describe concepts of Hardwired control and micro programmed control.	Up to K3
CLO 3	Identify various design alternatives in processor organization.	Up to K3
CLO 4	Implement the principles of I/O in computer systems, including viable mechanisms for I/O and secondary storage organization.	Up to K4
CLO 5	Illustrate the I/O and memory organization.	Up to K4

K1- Remembering facts with specific answers
K2- Basic understanding of facts.
K3- Application oriented
K4- Analyzing, examining and making presentations with evidences

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO 1	3	1	1	1	-	1
CLO 2	3	2	-	-	1	2
CLO 3	3	1	3	-	1	1
CLO 4	3	2	2	2	1	-
CLO 5	3	1	1	-	2	1

1-Basic Level **2- Intermediate Level** **3- Advanced Level**

Annexure - 2

Continuous Internal Assessment (CIA) - Blue Print

Articulation Mapping – K Levels with Course Leaning Outcomes (CLOs)

CIA Test I (30 marks)										
CIA	**CLOs**	**K-Level**	**Section A MCQs**		**Section B Short Answer**		**Section C Either / or choice**		**Section D Open Choice**	
			No of Questions	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**
I	CLO1	Up to K3	4	2K1, K2 &K3	3	2K1 & K2	4	2K2 & 2K3	2	K2, K3
No of questions to be asked			4		3		4		2	
NO of questions to be answered			4		3		2		1	
Marks for each question			1		2		5		10	
Total marks for each section			**4**		**6**		**10**		**10**	
CIA Test II and III (60 marks)										
II	CLO2	Up to K3	4	2K1 & 2K2	3	K1, K2 & K3	4	K1,K2 & 2K3	2	K2, K3
	CLO3	Up to K3	4	2K1 & 2K3	3	2K2 & K3	4	K1,K2 & 2K3	2	K2, K3
III	CLO4	Up to K4	4	2K2, K3&K4	3	2 K2 & K3	4	2K3 & 2K4	2	K3, K4
	CLO5	Up to K4	4	2K2,K3 & K4	3	2K2 & K3	4	2K3 & 2K4	2	K2, K4
No of questions to be asked			8		6		8		4	
NO of questions to be answered			8		6		4		2	
Marks for each question			1		2		5		10	
Total marks for each section			**8**		**12**		**20**		**20**	

Annexure - 2

Distribution of Marks with K Levels CIA I, CIA II and CIA III

CIA	K Levels	Section A MCQ	Section B (Short Answer Questions)	Section C (Either/Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)
I	K1	2	4		-	6	12%
	K2	1	2	10	10	23	46%
	K3	1		10	10	21	42%
	Marks	**4**	**6**	**20**	**20**	**50**	**100%**
II	K1	4	2	10	-	16	16%
	K2	2	6	10	20	38	38%
	K3	2	4	20	20	46	46%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**
III	K2	4	8	-	10	22	22%
	K3	2	4	20	10	36	36%
	K4	2	-	20	20	42	42%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**

Summative Examination -Blue Print

Articulation Mapping – K Levels with Course Learning Outcomes (CLOs)

Units	CLOs	K- Level	Section A MCQs	Section B Short Answers	Section C (Either/or Choice)	SectionD (Open Choice)
1	CLO 1	Up to K3	2 (K1&K2)	1 (K1)	2 (K1&K1)	1(K2)
2	CLO 2	Up to K3	2 (K1&K2)	1 (K3)	2 (K2&K2)	1(K3)
3	CLO 3	Up to K3	2 (K2&K3)	1 (K2)	2 (K3&K3)	1(K3)
4	CLO 4	Up to K4	2 (K2&K3)	1 (K3)	2 (K3&K3)	1(K4)
5	CLO 5	Up to K4	2 (K1&K3)	1 (K4)	2 (K4&K4)	1(K4)
No. of Questions to be asked			10	5	10	5
No. of Questions to be answered			10	5	5	3
Marks for each question			1	2	5	10
Total Marks for each Section			**10**	**10**	**25**	**30**

(75 Marks)

K1- Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – solving problems

K4- Examining, analyzing, presentation and make inference with evidences.

Distribution of Marks with K Level for Summative Examination

K Levels	Section A (MultipleChoice Questions)	Section B (Short Answer Questions)	Section C (Either/OrChoice)	Section D(Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	3	2	10	-	**15**	**12.5%**	**12%**
K2	4	2	10	10	**26**	**21.6%**	**22%**
K3	3	4	20	20	**47**	**39.1%**	**39%**
K4	-	2	10	20	**32**	**26.6%**	**27%**
K5	-	-	-	-	-	-	-
Total	**10**	**10**	**50**	**50**	**120**	**100**	**100**

LESSON PLAN:

Unit	Course Content	Hrs	Mode of Teaching
I	**Digital Logic Circuits**: Digital Computers- Logic Gates –Boolean Algebra- Map Simplification- Combinational Circuits- Flip-flops- Sequential Circuits.	5	Chalk & Talk, PPT
	Digital Components: Integrated Circuits-Decoders – Multiplexer – Registers – Shift Registers – Binary Counters – Memory Unit.	5	
	Data Representation: Data Types- Complements- Fixed Point Representation-Floating Point Representation – other Binary Codes-Error Detection Codes.	5	
II	**Register Transfer and Micro operation**: Register Transfer Language- Register Transfer – Bus and Memory Transfer – Arithmetic Micro Operation – Logic Micro Operation – Shift Micro operation- Arithmetic Logic Shift Unit.	7	Chalk & Talk, Spot test, Exercise, Assignment, PPT, Video material.
	Basic Computer Organization and Design: Instruction Codes-Computer Registers- Computer Instructions- Training – Timing And Control- Instruction Cycle-Memory Reference Instructions – Input And Output And Interrupt.	8	

III	**Micro programmed Control**: Control Memory – Addressing Sequencing – Micro Program Example – Design of Control Unit.	7	Chalk & Talk, Exercise, PPT, video material
	Central Processing Unit: Introduction – General Register Organization – Stack Organization – Instruction Formats- Addressing Modes- Data Transfer And Manipulation – Programmed Control.	8	
IV	**Computer Arithmetic**: Introduction- Addition and Subtraction – Multiplication Algorithm – Division Algorithm.	15	Chalk & Talk, Exercise, Assignment, video material, Group Discussion
V	**Input Output Organization:** Peripheral Devices – Input Output Interfaces Asynchronous Data Transfer, Modes of Transfer, Direct Memory Access, Input Output Processor, Serial Communication.	7	Quiz, Chalk & Talk, Exercise , Spot test, Assignment, Seminar
	Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory Virtual Memory.	8	

Annexure - 2

DEPARTMENT OF INFORMATION TECHNOLOGY				I M.Sc. Information Technology				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/Week**	**CIA**	**Ext**	**Total**
I	**Core**	**21OPI12**	**OBJECT ORIENTED PROGRAMMING WITH C++**	**4**	**4**	**25**	**75**	**100**

Nature of the Course

Knowledge Oriented and Skill	√	Employability Oriented		Entrepreneurship oriented	

Course Objectives

1. Comprehend object oriented programming concepts using C++.
2. Understand Class, objects and Constructors.
3. Use the operator overloading and inheritance in program development.
4. Describe the concept of Pointer to objects and pure virtual functions.
5. Apply the concepts of files and its stream operations.

Unit	Course Content	Hours	K Level	CLO
I	Software Crisis – Software Evolution – Basic Concepts of Object-Oriented Programming – Benefits of OOP – Object-Oriented Languages - Applications of OOP – Application of C++ - Structure of a C++ Program – Tokens – Keywords – Identifiers – Basic Data Types – User-defined Data types – Derived data types – Symbolic constants – Type compatibility – Declaration of variables – Dynamic initialization of variables –Reference variables – Operators in C++ - Manipulators – Type cast operator – Expressions and their types-Implicit conversions – Control structures – The main function – Function prototyping – inline functions – Function overloading.	12	Up to K3	CLO1
II	Specifying a class – Defining member	12	Up to K3	CLO2

	functions – Making an outside function inline – Nesting of member functions – Private member functions – Array within a class – Memory allocation for objects – Static data members – Static member functions – Array of objects - Objects as function arguments – Friendly functions – Returning objects – Constant member functions – Constructors – Parameterized constructor – Multiple constructors in a class – Constructors with default arguments – Dynamic initialization of objects – Copy constructor – Destructors.			
III	Defining operator overloading – Overloading unary operators – Overloading binary operators– Overloading binary operators using friend function – Rules for overloading operators - Defining derived classes – Single inheritance – Making a private member inheritable – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance - Virtual base classes – Constructors in derived class – Member classes: Nesting of classes.	12	Up to K3	CLO3
IV	Pointer to objects – this pointer – Pointers to derived classes – Virtual functions – Pure virtual functions – C++ Stream classes – Unformatted I/O operations – Managing output with manipulators.	12	Up to K4	CLO4
V	Classes of file stream operations – Opening and Closing files – Detecting end of file – More about open() function – File modes, File pointers and their manipulation – Sequential input and output operations – Command-line arguments- Templates: class templates and function templates.	12	Up to K4	CLO5

Book for Study

Balagurusamy. E, *Object Oriented Programming with C++***,** McGraw Hill Education (India) Private Limited, New Delhi, Sixth Edition**,** 2013.

Unit I	–	Chapter 1 (Except 1.3, 1.4), Chapter 2 (Only 2.6), Chapter 3 (Except 3.20, 3.21, 3.22), Chapter 4
Unit II	–	Chapter 5 (Except 5.18, 5.19), Chapter 6 (Except 6.8, 6.9, 6.10)
Unit III	–	Chapter 7, Chapter 8
Unit IV	–	Chapter 9, Chapter 10
Unit V	–	Chapter 11 (Except 11.8), Chapter 12 (Only 12.2, 12.3 and 12.4)

Books for Reference

1. Alok Kumar Jagadev, Amiya Kumar Rath and Satchidananda Dehuri, *Object-Oriented Programming Using C++*, Prentice-Hall of India Private Limited, New Delhi, 2007.
2. Ashok N.Kamthane, *Object Oriented Programming with ANSI & Turbo C++*, Pearson Education, 2006.
3. John R.Hubbard , *Programming with C++* , Tata McGraw Hill Publishing Company Private Limited , New Delhi , Second Edition , 2007.
4. Paul Deitel, Harvey Deitel, *C++ How to Program*, PHI, U.S.A, Ninth edition, 2014.
5. Poornachandra Sarang, *Object-Oriented Programming With C++*, 2nd Edition, PHI Learning Private Limited, New Delhi, 2009.

Web Resources

1. https://www.tutorialspoint.com/cplusplus/cpp_tutorial.pdf
2. https://www.cplusplus.com/files/tutorial.pdf
3. http://www.lmpt.univ-tours.fr/~volkov/C++.pdf

E-Books

1.http://www.microlinkcolleges.net/elib/files/undergraduate/Information%20System/Object%20Oriented%20Programming%20with%20C++.pdf

2.https://www.google.co.in/books/edition/OBJECT_ORIENTED_PROGRAMMING_USING_C++/dZcq7OL4bhsC?hl=en&gbpv=1&printsec=frontcover

3.https://www.google.co.in/books/edition/Object_Oriented_Programming_with_ANSI_an/rA0SWk4dQ-0C?hl=en&gbpv=1

Pedagogy

Power point Presentations, Seminar, Quiz, Assignment, video material and Brain storming.

Activities to be given

- Group Discussion
- Quiz
- Seminar

Course Learning Outcomes (CLOs)

Upon successful completion of the Course, the students will be able to

S.**No.**	**Course Outcome**	**Knowledge Level(According to Bloom's Taxonomy)**
CLO 1	Understand the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.	Up to K3
CLO 2	Identify the dynamic memory management techniques using constructors, destructors, etc	Up to K3
CLO 3	Describe the concept of operator overloading and polymorphism.	Up to K3
CLO 4	Discuss on Pointers and virtual functions.	Up to K4
CLO 5	Implement the concept of Files and Templates.	Up to K4

K1- Remembering facts with specific answers
K2- Basic understanding of facts.
K3- Application oriented
K4- Analyzing, examining and making presentations with evidences

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
CLO 1	3	2	3	2	-	1
CLO 2	3	2	3	2	1	2
CLO 3	3	3	3	1	-	1
CLO 4	3	2	3	2	1	1
CLO 5	3	3	3	2	-	1

1-Basic Level **2- Intermediate Level** **3- Advanced Level**

Annexure - 2

Continuous Internal Assessment (CIA) - Blue Print

Articulation Mapping – K Levels with Course Leaning Outcomes (CLOs)

CIA Test I (30 marks)										
CIA	**CLOs**	**K-Level**	**Section A MCQs**		**Section B Short Answer**		**Section C Either / or choice**		**Section D Open Choice**	
			No of Questions	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**
I	CLO1	Up to K3	4	2K1, K2 &K3	3	2K1 & K2	4	2K2 & 2K3	2	K2, K3
No of questions to be asked			4		3		4		2	
NO of questions to be answered			4		3		2		1	
Marks for each question			1		2		5		10	
Total marks for each section			**4**		**6**		**10**		**10**	
CIA Test II and III (60 marks)										
II	CLO2	Up to K3	4	2K1 & 2K2	3	K1, K2 & K3	4	K1,K2 & 2K3	2	K2, K3
	CLO3	Up to K3	4	2K1 & 2K3	3	2K2 & K3	4	K1,K2 & 2K3	2	K2, K3
III	CLO4	Up to K4	4	2K2, K3&K4	3	2 K2 & K3	4	2K3 & 2K4	2	K3, K4
	CLO5	Up to K4	4	2K2,K3 & K4	3	2K2 & K3	4	2K3 & 2K4	2	K2, K4
No of questions to be asked			8		6		8		4	
NO of questions to be answered			8		6		4		2	
Marks for each question			1		2		5		10	
Total marks for each section			**8**		**12**		**20**		**20**	

Annexure - 2

Distribution of Marks with K Levels CIA I, CIA II and CIA III

CIA	K Levels	Section A MCQ	Section B (Short Answer Questions)	Section C (Either/Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)
I	K1	2	4	-	-	6	12%
	K2	1	2	10	10	23	46%
	K3	1		10	10	21	42%
	Marks	**4**	**6**	**20**	**20**	**50**	**100%**
II	K1	4	2	10	-	16	16%
	K2	2	6	10	20	38	38%
	K3	2	4	20	20	46	46%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**
III	K2	4	8	-	10	22	22%
	K3	2	4	20	10	36	36%
	K4	2	-	20	20	42	42%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**

Summative Examination -Blue Print

Articulation Mapping – K Levels with Course Learning Outcomes (CLOs)

Units	CLOs	K- Level	Section A MCQs	Section B Short Answers	Section C (Either/or Choice)	SectionD (Open Choice)
1	CLO 1	Up to K3	2 (K1&K2)	1 (K1)	2 (K1&K1)	1(K2)
2	CLO 2	Up to K3	2 (K1&K2)	1 (K3)	2 (K2&K2)	1(K3)
3	CLO 3	Up to K3	2 (K2&K3)	1 (K2)	2 (K3&K3)	1(K3)
4	CLO 4	Up to K4	2 (K2&K3)	1 (K3)	2 (K3&K3)	1(K4)
5	CLO 5	Up to K4	2 (K1&K3)	1 (K4)	2 (K4&K4)	1(K4)
No. of Questions to be asked			10	5	10	5
No. of Questions to be answered			10	5	5	3
Marks for each question			1	2	5	10
Total Marks for each Section			**10**	**10**	**25**	**30**

(75 Marks)

K1- Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – solving problems

K4- Examining, analyzing, presentation and make inference with evidences.

Annexure - 2

Distribution of Marks with K Level for Summative Examination

K Levels	Section A (MultipleChoice Questions)	Section B (Short Answer Questions)	Section C (Either/OrChoice)	Section D(Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	3	2	10	-	**15**	**12.5%**	**12%**
K2	4	2	10	10	**26**	**21.6%**	**22%**
K3	3	4	20	20	**47**	**39.1%**	**39%**
K4	-	2	10	20	**32**	**26.6%**	**27%**
K5	-	-	-	-	-	-	-
Total	**10**	**10**	**50**	**50**	**120**	**100**	**100**

LESSON PLAN:

Unit	Course Content	Hrs	Mode
I	Software Crisis – Software Evolution – Basic Concepts of Object-Oriented Programming – Benefits of OOP – Object-Oriented Languages - Applications of OOP – Application of C++	6	Chalk & Talk, PPT
	Structure of a C++ Program – Tokens – Keywords – Identifiers – Basic Data Types – User-defined Data types – Derived data types – Symbolic constants – Type compatibility – Declaration of variables – Dynamic initialization of variables –Reference variables – Operators		
	in C++ - Manipulators. Type cast operator Expressions and their types-Implicit conversions – Control structures – The main function – Function prototyping – inline functions – Function overloading.	6	
II	Specifying a class – Defining member functions – Making an outside function inline – Nesting of member functions – Private member functions – Array within a class – Memory allocation for objects – Static data members – Static member functions	6	Chalk & Talk, Spot test, Exercise, Assignment, PPT, Video material.

	Array of objects - Objects as function arguments – Friendly functions – Returning objects – Constant member functions – Constructors – Parameterized constructor – Multiple constructors in a class – Constructors with default arguments – Dynamic initialization of objects – Copy constructor – Destructors.	6	
III	Defining operator overloading – Overloading unary operators – Overloading binary operators– Overloading binary operators using friend function – Rules for overloading operators	6	Chalk & Talk, Exercise, PPT, video material
	Defining derived classes Single inheritance – Making a private member inheritable – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance - Virtual base classes – Constructors in derived class – Member classes: Nesting of classes.	6	
IV	Pointer to objects – this pointer – Pointers to derived classes – Virtual functions – Pure virtual functions	6	Chalk & Talk, Exercise, Assignment, video material, Group Discussion
	C++ Stream classes – Unformatted I/O operations – Managing output with manipulators.	6	
V	Classes of file stream operations – Opening and Closing files – Detecting end of file – More about open() function –	4	Quiz, Chalk & Talk, Exercise , Spot test, Assignment, Seminar
	File modes- File pointers and their manipulation – Sequential input and output operations	4	
	Command-line arguments- Templates: class templates and function templates.	4	

DEPARTMENT OF INFORMATION TECHNOLOGY				I M.Sc. Information Technology				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/Week**	**CIA**	**Ext**	**Total**
I	**Core**	**21OPI13**	**DATA STRUCTURES AND ALGORITHMS**	**4**	**4**	**25**	**75**	**100**

Nature of the Course

Knowledge Oriented and Skill	√	Employability Oriented		Entrepreneurship oriented	

Course Objectives

1. To study the systematic way of solving problems, various methods of organizing large amounts of data.
2. To solve problems using data structures such as linear lists, stacks, queues, hash tables, binary trees, binary search trees, and graphs and writing programs for these solutions.
3. To employ the different data structures to find the solutions for specific problems.
4. To apply the Graph Algorithms on related applications.
5. To design optimized algorithms with efficacy.

Unit	Course Content	Hours	K Level	CLO
I	**Basic Concepts:** Overview : System life cycle - Object Oriented Design – data abstraction and encapsulation - basics of C++ - algorithm specification performance analysis and measurements. **Arrays:** Abstract data types and the C++ class - the array as an abstract data type - representation of arrays - the string abstract data type. **Stacks & Queues:** Templates in C++ - the stack abstract data type - the queue abstract data type - subtyping and inheritance in C++.	12	Up to K3	CLO1
II	**Linked Lists:** Singly linked lists and Chains - representing chains in C++ - The Template Class chain - circular lists - linked stacks & queues- Polynomials - doubly linked lists - generalized lists.	12	Up to K3	CLO2

III	**Trees:** Introduction - binary trees - binary tree traversal and tree iterations - threaded binary trees - heaps - binary search trees- Selection Trees – Forests.	12	Up to K3	CLO3
IV	**Graphs:** The Graph Abstract Data Type – Elementary Graph Operation – Minimum Cost Spanning Tree – Shortest Paths and Transitive Clousure. **Hashing:** Introduction – Static Hashing – Dynamic Hashing – Bloom Filters.	12	Up to K4	CLO4
V	**Efficient Binary Search Trees:** Optimal Binary Search Trees - AVL trees - Red Black trees - Splay trees. **Multiway Search Trees:** m-way Search Trees – B Trees – B+ Trees.	12	Up to K4	CLO5

Book for Study

Elis Horowitz, Sartaj Sahni, Dinesh Mehta, *Fundamentals of Data structures in C++*, Universities Press (India) Private Limited, Hyderabad, Second Edition, 2013.

Unit I	-	Chapters 1 (1.1 - 1.5, 1.7), 2 (2.1, 2.2, 2.5, 2.6) and 3(3.1 – 3.4)
Unit II	-	Chapter 4 (4.1 -4.5), 4.7, 4.10, 4.11
Unit III	-	Chapter 5 (5.1, 5.3- 5.10)
Unit IV	-	Chapters 6 (6.1 – 6.5) and 8(8.1 -8.4)
Unit V	-	Chapters 10(10.1-10.4) , 11(11.1 -11.3)

Books for Reference

1. Aaron M. Tenenbaum, Moshe J. Augenstein & Yedidyah Langsam , *Data Structure using C & C++* , Prentice Hall of India Private Limited , New Delhi , Second Edition , 2005.
2. Ashok N.Kamthane , *Object Oriented Programming with Ansi & Turbo C++* , Pearson Education , New Delhi , First Edition , 2003.
3. Easwara Kumar K. S. , *Object Oriented Data Structure using C++* , Vikad Publishing House Private Limited , New Delhi , First Edition , 2000.
4. Ellis Horowitz, Sartaj sahni & Dinesh Metha , *Fundamentals of Data Structures in C++* , Universities Press (India) Private Limited , Hyderabad, Second Edition , 2007.
5. Mark Allen Weiss, *Data Structures and Algorithms Analysis in C*, Pearson Education Inc. and Dorling Kindersley Publishing Inc., New Delhi, Second Edition, 2010.

Web Resources

1. http://freecodecamp.org
2. https://www.dzone.com
3. https://lecturenotes.in

E-Books

1. file:///C:/Users/Administrator/Downloads/Fundamentals_of_Data_Structure_in_C.pdf

2.http://itlectures.ro/wpcontent/uploads/2016/04/AdamDrozdek_DataStructures_and_Algorithms_in_C_4Ed.pdf

3.http://www.musaliarcollege.com/eBooks/CSE/Data%20structures%20algorithms%20and%20applications%20in%20C.pdf

Pedagogy

Power point Presentations, Seminar, Quiz, Assignment, video material and Brain storming.

Rationale for Nature of the course

- The methods and techniques of data structure are widely used in system programming and application programming.
- Helps to develop logic and structured program by using organized data.

Activities to be given

- Practice to write Algorithms
- Seminar
- Data Organization

Course Learning Outcomes (CLOs)

Upon successful completion of the Course, the students will be able to

No.	Course Outcome	Knowledge Level(According to Bloom's Taxonomy)
CLO 1	Understand the uses of data abstraction and linear data structures.	Up to K3
CLO 2	Describe high level of abstraction of various linear and nonlinear data structures.	Up to K3
CLO 3	Sketch the significance of trees and binary search trees.	Up to K3
CLO 4	Illustrate various data structure of graphs and technique for hashing Level. (understand) Illustrate various data structure of graphs and technique for hashing Level.	Up to K4
CLO 5	Understand and implement various data structures along with their application of Binary Search Trees and AVL trees.	Up to K4

K1- Remembering facts with specific answers
K2- Basic understanding of facts.
K3- Application oriented
K4- Analyzing, examining and making presentations with evidences

Annexure - 2

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO 1	3	1	1	1	-	1
CLO 2	3	2	-	-	1	2
CLO 3	3	1	3	-	1	1
CLO 4	3	2	2	2	1	-
CLO 5	3	1	1	-	2	1

1-Basic Level 2- Intermediate Level 3- Advanced Level

Continuous Internal Assessment (CIA) - Blue Print
Articulation Mapping – K Levels with Course Leaning Outcomes (CLOs)

CIA Test I (30 marks)										
CIA	**CLOs**	**K-Level**	**Section A MCQs**		**Section B Short Answer**		**Section C Either / or choice**		**Section D Open Choice**	
			No of Questions	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**
I	CLO1	Up to K3	4	2K1, K2 &K3	3	2K1 & K2	4	2K2 & 2K3	2	K2, K3
No of questions to be asked			4		3		4		2	
NO of questions to be answered			4		3		2		1	
Marks for each question			1		2		5		10	
Total marks for each section			**4**		**6**		**10**		**10**	
CIA Test II and III (60 marks)										
II	CLO2	Up to K3	4	2K1 & 2K2	3	K1, K2 & K3	4	K1,K2 & 2K3	2	K2, K3
	CLO3	Up to K3	4	2K1 & 2K3	3	2K2 & K3	4	K1,K2 & 2K3	2	K2, K3
III	CLO4	Up to K4	4	2K2, K3&K4	3	2 K2 & K3	4	2K3 & 2K4	2	K3, K4
	CLO5	Up to K4	4	2K2,K3 & K4	3	2K2 & K3	4	2K3 & 2K4	2	K2, K4
No of questions to be asked			8		6		8		4	
NO of questions to be answered			8		6		4		2	
Marks for each question			1		2		5		10	
Total marks for each section			**8**		**12**		**20**		**20**	

Annexure - 2

Distribution of Marks with K Levels CIA I, CIA II and CIA III

CIA	K Levels	Section A MCQ	Section B (Short Answer Questions)	Section C (Either/Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)
I	K1	2	4	-	-	6	12%
	K2	1	2	10	10	23	46%
	K3	1		10	10	21	42%
	Marks	**4**	**6**	**20**	**20**	**50**	**100%**
II	K1	4	2	10	-	16	16%
	K2	2	6	10	20	38	38%
	K3	2	4	20	20	46	46%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**
III	K2	4	8	-	10	22	22%
	K3	2	4	20	10	36	36%
	K4	2	-	20	20	42	42%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**

Summative Examination -Blue Print

Articulation Mapping – K Levels with Course Learning Outcomes (CLOs)

Units	CLOs	K- Level	Section A MCQs	Section B Short Answers	Section C (Either/or Choice)	SectionD (Open Choice)
1	CLO 1	Up to K3	2 (K1&K2)	1 (K1)	2 (K1&K1)	1(K2)
2	CLO 2	Up to K3	2 (K1&K2)	1 (K3)	2 (K2&K2)	1(K3)
3	CLO 3	Up to K3	2 (K2&K3)	1 (K2)	2 (K3&K3)	1(K3)
4	CLO 4	Up to K4	2 (K2&K3)	1 (K3)	2 (K3&K3)	1(K4)
5	CLO 5	Up to K4	2 (K1&K3)	1 (K4)	2 (K4&K4)	1(K4)
No. of Questions to be asked			10	5	10	5
No. of Questions to be answered			10	5	5	3
Marks for each question			1	2	5	10
Total Marks for each Section			**10**	**10**	**25**	**30**

(75 Marks)

K1- Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – solving problems

K4- Examining, analyzing, presentation and make inference with evidences.

Distribution of Marks with K Level for Summative Examination

K Levels	Section A (MultipleChoice Questions)	Section B (Short Answer Questions)	Section C (Either/OrChoice)	Section D(Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	3	2	10	-	**15**	**12.5%**	**12%**
K2	4	2	10	10	**26**	**21.6%**	**22%**
K3	3	4	20	20	**47**	**39.1%**	**39%**
K4	-	2	10	20	**32**	**26.6%**	**27%**
K5	-	-	-	-	-	-	-
Total	**10**	**10**	**50**	**50**	**120**	**100**	**100**

LESSON PLAN:

Unit	Course Content	Hrs	Mode of Teaching
I	**Basic Concepts:** Overview : System life cycle - Object Oriented Design – data abstraction and encapsulation - basics of C++ - algorithm specification performance analysis and measurements.	4	Chalk & Talk, PPT
	Arrays: Abstract data types and the C++ class - the array as an abstract data type - representation of arrays - the string abstract data type.	4	
	Stacks & Queues: Templates in C++ - the stack abstract data type - the queue abstract data type - subtyping and inheritance in C++.	4	
II	**Linked Lists:** Singly linked lists and Chains - representing chains in C++	6	Chalk & Talk, Spot test, Exercise, Assignment, PPT, Video material.
	The Template Class chain - circular lists - linked stacks & queues-Polynomials - doubly linked lists - generalized lists.	6	
III	**Trees:** Introduction - binary trees - binary tree traversal and tree iterations - threaded binary trees	6	Chalk & Talk, Exercise, PPT, video material
	heaps - binary search trees- Selection Trees – Forests.	6	

IV	**Graphs:** The Graph Abstract Data Type – Elementary Graph Operation – Minimum Cost Spanning Tree – Shortest Paths and Transitive Clousure.	6	Chalk & Talk, Exercise, Assignment, video material, Group Discussion
	Hashing: Introduction – Static Hashing – Dynamic Hashing – Bloom Filters.	6	
V	**Efficient Binary Search Trees:** Optimal Binary Search Trees - AVL trees - Red Black trees - Splay trees.	6	Quiz, Chalk & Talk, Exercise , Spot test, Assignment, Seminar
	Multiway Search Trees: m-way Search Trees – B Trees – B+ Trees.	6	

DEPARTMENT OF INFORMATION TECHNOLOGY				I M.Sc. Information Technology				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/Week**	**CIA**	**Ext**	**Total**
I	**Elective-I**	**21OPIE1A**	**DISCRETE MATHEMATICS**	**4**	**5**	**25**	**75**	**100**

Nature of the Course

Knowledge Oriented and Skill	√	Employability Oriented		Entrepreneurship oriented	

Course Objectives

1. Simplify and evaluate basic logic statements including compound statements, implications, inverses, converses, and the properties of logic.
2. Identify and apply basic concepts of set theory, arithmetic, logic, proof techniques, binary relations, graphs and trees.
3. Demonstrate the ability to write and evaluate a proof or outline the basic structure of and give examples of each proof technique described.
4. Recognize the importance of Coding Theory.
5. Apply the knowledge and skills obtained to investigate and solve a variety of discrete mathematical problems.

Unit	Course Content	Hrs	K Level	CLO
I	**Set Theory**: Introduction – Sets – Notation and Description of sets – Subsets – Venn – Euler Diagrams – Operation on sets – Properties of set operations – Verification of basic laws and algebra by Venn diagram. **Relations**: Relations – Representation of a relation – Operations on relations – equivalence relation – Closures & Warshalls Algorithm – Partitions and Equivalence Classes.	15	Up to K3	CLO 1
II	**Recurrence relations and Generating functions:** Recurrence relation – an introduction– Polynomial and their evaluations – Recurrence relations – Solutions of finite order homogeneous (linear) relations – Solutions of non-	15	Up to K3	CLO2

	homogeneous(linear) relations – Solutions of non-homogeneous relations – Generating functions (For all the theorems consider the statements without proofs).			
III	**Coding Theory :** Introduction- Hamming Distances- Encoding a Message-Group Codes – Procedure for Generating Group Codes-Decoding and Error Correction.	15	Up to K3	CLO3
IV	**Logic**: Introduction – IF statements – Connectives – Truth table of a formula – Tautology - Tautological implications and Equivalence of formulae – Quantifiers.	15	Up to K4	CLO4
V	**Lattices :** Lattices-Some Properties of Lattices-New Lattices –Modular and Distributive Lattices . **Graph Theory:** Basic concepts – Matrix representations of graphs – Trees – Spanning tree – shortest path problem.	15	Up to K4	CLO5

Book for Study

Venkataraman.M.K, Sridharan.N and Chandrasekaran.Z , *Discrete Mathematics*, National Publishing company , Chennai , India , Third Edition , Jan 2011.

Chapters:

Unit I : Chapter 1.1 to 1.8 and 2(2.2 to 2.6)

Unit II : Chapter 5 (5.1 to 5.6)

Unit III : Chapter 8(8.1 to 8.8)

Unit IV : Chapter 9 (9.1 to 9.3, 9.6 to 9.8, 9.15)

Unit V : Chapter10 (10.1 to 10.4) and 11 (11.1 to 11.5)

Books for Reference

1. Edgar G. Goodaire, Michael,M.Parmenter , *Discrete Mathematics with Graph Theory* , PHI Learning Private Limited , New Delhi ,Third Edition , 2011.

2. Kolman ,Busby,Ross , *Discrete Mathematical Structures* , PHI Learning private Limited , New Delhi , Sixth Edition , 2009.

3. Liu . C L, D P Mohapatra , *Elements of Discrete Mathematics* , Tata Mcgraw Hill Education private Limited , New Delhi , Fifth Reprint , 2010.

4. Semyour Lipschutz / Marc Lipson – *Discrete Mathematics* - Tata Magraw Hill Education private Limited – New Delhi,India - II Edition - 2006.

5. M.K.Sen, B.C.Chakraborty – *Introduction to Discrete Mathematics* - Books And Allied (P) Ltd –Kolkata, India – III Edition - 2008 .

Web Resources

1.http://discrete.openmathbooks.org/pdfs/dmoi-tablet.pdf

2.https://web.stanford.edu/class/cs103x/cs103x-notes.pdf

3.https://home.iitk.ac.in/~arlal/book/mth202.pdf

E.-Books

1. http://cslabcms.nju.edu.cn/problem_solving/images/3/3e/Discrete_Mathematics_and_Its_Applications_%287th_Edition%29.pdf
2. https://alas.matf.bg.ac.rs/~mi10164/Materijali/DS.pdf
3. http://www2.cs.uh.edu/~arjun/courses/ds/DiscMaths4CompSc.pdf

Pedagogy:

Power point Presentations, Seminar, Quiz, Assignment, video material and Brain storming.

Activities to be given

- Group Discussion
- Quiz
- Seminar

Course Learning Outcomes (CLOs):

Upon successful completion of the Course, the students will be able to

No.	Course Outcomes	Knowledge Level(According to Bloom's Taxonomy)
CLO 1	Show appropriate set, function, or relation models for analysis of practical examples and interpretation of the associated operations and terminology in context.	Up to K3
CLO 2	Indicate the recurrence relations and generating functions.	Up to K3
CLO 3	Apply the concept of Coding Theory.	Up to K3
CLO 4	Solve the problems using Logic.	Up to K4
CLO 5	Apply formal proof techniques, and explain their reasoning clearly with Lattices and Graph Theory.	Up to K4

K1- Remembering facts with specific answers
K2- Basic understanding of facts.
K3- Application oriented
K4- Analyzing, examining and making presentations with evidences

Annexure - 2

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO 1	3	1	1	1	-	1
CLO 2	3	2	-	-	1	2
CLO 3	3	1	3	-	1	1
CLO 4	3	2	2	2	1	-
CLO 5	3	1	1	-	2	1

1-Basic Level 2- Intermediate Level 3- Advanced Level

Continuous Internal Assessment (CIA) - Blue Print

Articulation Mapping – K Levels with Course Leaning Outcomes (CLOs)

CIA Test I (30 marks)										
CIA	**CLOs**	**K-Level**	**Section A MCQs**		**Section B Short Answer**		**Section C Either / or choice**		**Section D Open Choice**	
			No of Questions	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**
I	CLO1	Up to K3	4	2K1, K2 &K3	3	2K1 & K2	4	2K2 & 2K3	2	K2, K3
No of questions to be asked			4		3		4		2	
NO of questions to be answered			4		3		2		1	
Marks for each question			1		2		5		10	
Total marks for each section			**4**		**6**		**10**		**10**	
CIA Test II and III (60 marks)										
II	CLO2	Up to K3	4	2K1 & 2K2	3	K1, K2 & K3	4	K1,K2 & 2K3	2	K2, K3
	CLO3	Up to K3	4	2K1 & 2K3	3	2K2 & K3	4	K1,K2 & 2K3	2	K2, K3
III	CLO4	Up to K4	4	2K2, K3&K4	3	2 K2 & K3	4	2K3 & 2K4	2	K3, K4
	CLO5	Up to K4	4	2K2,K3 & K4	3	2K2 & K3	4	2K3 & 2K4	2	K2, K4
No of questions to be asked			8		6		8		4	
NO of questions to be answered			8		6		4		2	
Marks for each question			1		2		5		10	
Total marks for each section			**8**		**12**		**20**		**20**	

Annexure - 2

Distribution of Marks with K Levels CIA I, CIA II and CIA III

CIA	K Levels	Section A MCQ	Section B (Short Answer Questions)	Section C (Either/Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)
I	K1	2	4		-	6	12%
	K2	1	2	10	10	23	46%
	K3	1		10	10	21	42%
	Marks	**4**	**6**	**20**	**20**	**50**	**100%**
II	K1	4	2	10	-	16	16%
	K2	2	6	10	20	38	38%
	K3	2	4	20	20	46	46%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**
III	K2	4	8	-	10	22	22%
	K3	2	4	20	10	36	36%
	K4	2	-	20	20	42	42%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**

Summative Examination -Blue Print

Articulation Mapping – K Levels with Course Learning Outcomes (CLOs)

Units	CLOs	K- Level	Section A MCQs	Section B Short Answers	Section C (Either/or Choice)	SectionD (Open Choice)
1	CLO 1	Up to K3	2 (K1&K2)	1 (K1)	2 (K1&K1)	1(K2)
2	CLO 2	Up to K3	2 (K1&K2)	1 (K3)	2 (K2&K2)	1(K3)
3	CLO 3	Up to K3	2 (K2&K3)	1 (K2)	2 (K3&K3)	1(K3)
4	CLO 4	Up to K4	2 (K2&K3)	1 (K3)	2 (K3&K3)	1(K4)
5	CLO 5	Up to K4	2 (K1&K3)	1 (K4)	2 (K4&K4)	1(K4)
No. of Questions to be asked			10	5	10	5
No. of Questions to be answered			10	5	5	3
Marks for each question			1	2	5	10
Total Marks for each Section			**10**	**10**	**25**	**30**

(75 Marks)

K1- Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – solving problems

K4- Examining, analyzing, presentation and make inference with evidences.

Distribution of Marks with K Level for Summative Examination

K Levels	Section A (MultipleChoice Questions)	Section B (Short Answer Questions)	Section C (Either/OrChoice)	Section D(Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	3	2	10	-	**15**	**12.5%**	**12%**
K2	4	2	10	10	**26**	**21.6%**	**22%**
K3	3	4	20	20	**47**	**39.1%**	**39%**
K4	-	2	10	20	**32**	**26.6%**	**27%**
K5	-	-	-	-	-	-	-
Total	**10**	**10**	**50**	**50**	**120**	**100**	**100**

LESSON PLAN:

Unit	Course Content	Hrs	Mode of Teaching
I	**Set Theory**: Introduction – Sets – Notation and Description of sets – Subsets – Venn – Euler Diagrams – Operation on sets – Properties of set operations – Verification of basic laws and algebra by Venn diagram	6	Chalk & Talk, PPT
	. **Relations**: Relations – Representation of a relation – Operations on relations – equivalence relation – Closures & Warshalls Algorithm – Partitions and Equivalence Classes.	6	
II	**Recurrence relations and Generating functions:** Recurrence relation – an introduction– Polynomial and their evaluations – Recurrence relations – Solutions of finite order homogeneous (linear) relations .	6	Chalk & Talk, Spot test, Exercise, Assignment, PPT, Video material.
	Solutions of non-homogeneous(linear) relations – Solutions of non-homogeneous relations – Generating functions (For all the theorems consider the statements without proofs).	6	
III	**Coding Theory :** Introduction- Hamming Distances- Encoding a Message.	6	Chalk & Talk, Exercise, PPT, video material
	Group Codes –Procedure for Generating Group Codes- Decoding and Error Correction.	6	

IV	**Logic**: Introduction – IF statements – Connectives – Truth table of a formula**.**	6	Chalk & Talk, Exercise, Assignment, video material, Group Discussion
	Tautology - Tautological implications and Equivalence of formulae – Quantifiers.	6	
V	**Lattices :** Lattices-Some Properties of Lattices- New Lattices –Modular and Distributive Lattices .	6	Quiz, Chalk & Talk, Exercise , Spot test, Assignment, Seminar
	Graph Theory: Basic concepts – Matrix representations of graphs – Trees – Spanning tree – shortest path problem.	6	

DEPARTMENT OF INFORMATION TECHNOLOGY				I M.Sc. Information Technology				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/Week**	**CIA**	**Ext**	**Total**
I	**Elective- I**	**21OPIE1B**	**SYSTEM ANALYSIS AND DESIGN**	**4**	**5**	**25**	**75**	**100**

Nature of the Course

Knowledge Oriented and Skill	√	Employability Oriented		Entrepreneurship oriented	

Course Objectives

1. This course introduces established and evolving methodologies for the analysis, design, and development of an information system.
2. Emphasis is placed on system characteristics, managing projects, prototyping and systems development life cycle phases.
3. Upon completion, students should be able to analyze a problem and design an appropriate solution using a combination of tools and techniques.
4. Implement the Forms Design – File Organization and Data Base Design.
5. Illustrate the Role of the Data Processing Auditor

Unit	Course Content	Hours	K Level	CLO
I	The Systems Concept – Characteristics of System– Elements of a System–Types of Systems –System Models– System Development Life Cycle (SDLC).	15	Up to K3	CLO1
II	The System Analyst Definition – Role of the Analyst – Analyst/User Interface – Analyst in the MIS Organization – The Bases for Planning in Systems Analysis – Initial Investigation.	15	Up to K3	CLO2
III	Information Gathering Introduction –Information Gathering Tools – The Tools of Structured Analysis – System Performance Definition – Feasibility Study – Data Analysis – Cost/Benefit Analysis.	15	Up to K3	CLO3
IV	The Process of Design–Design Methodologies – Major Development Activities – Audit considerations – Input/output and Forms Design –	15	Up to K4	CLO4

	File Organization and Data Base Design.			
V	System Testing – The Test Plan –Quality Assurance – Role of the Data Processing Auditor – Post Implementation Review – Software Maintenance – The Computer Industry –The Software Industry – Hardware/Software Selection – Financial considerations in selection.	15	Up to K4	CLO5

Book for Study:

1. Elias M.Awad, *Systems Analysis and Design*, Tata McGraw Hill , New Delhi , Second Edition , 2007.

Chapters:

Unit I :Chapter 1, 2

Unit II :Chapter 3, 4

Unit III :Chapter 5,6,7,8

Unit IV :Chapter 9,10,11

Unit V :Chapter 12 to 14

Books for Reference

1. Awad.M, *System Analysis and Design* , Galgotia Publishers, New Delhi, First Edition, 2006.
2. Gary B.Shelly,ThomasJ.Cashman,HarryJ.Rosenblatt, *Systems Analysis And Design*, Thomas Course Technology , 6th Edition , NewDelhi , 2006.
3. ISRD Group , *Structured System Analysis and Design*, Tata McGrawHill , NewDelhi, First Edition , 2007.
4. Kock, *Systems Analysis & Design Fundamentals*, Saga Publications India Pvt.Ltd, NewDelhi ,1st Edition , 2005.
5. Rajesh Nalk & Swapna Kishor, *System Analysis & Business Applications*, Wheeler Publishing, 1st Edition , 1994.

Web Reference

1. http://union.ncsa.uiuc.edu/HyperNews/get/hypernews

2.https://www.tutorialspoint.com/system_analysis_and_design/system_analysis_and_design_overview.htm

3. http://www.w3.org/pub/www/library/Activity.html

E-Books

1.https://www.google.co.in/books/edition/Structured_System_Anal_And_Design_Isrd/koyquCMIoSUC?hl=en&gbpv=1&dq=Structured+System+Analysis+by+ISRD+group+first+edition&pg=PA299&printsec=frontcover

2.https://www.google.co.in/books/edition/Systems_Analysis_Design_Fundamentals/Sb9yAwAAQBAJ?hl=en&gbpv=1&dq=system+analysis+and+design+fundamentals+by+kock&printsec=frontcover

3.https://www.saigontech.edu.vn/faculty/huynq/SAD/Systems_Analysis_Design_UML_5th%20ed.pdf

Pedagogy

Power point Presentations, Seminar, Quiz, Assignment, video material and Brain storming.

Activities on be given

- Group Discussion
- Quiz
- Seminar

Course Learning Outcomes (CLOs)

Upon successful completion of the Course, the students will be able to

No.	Course Outcome	Knowledge Level(According to Bloom's Taxonomy)
CLO 1	Understand the system design & element System life cycle	Up to K3
CLO 2	Describe about Analyst & MIS Organization The Bases for Planning in	Up to K3
CLO 3	Identify the Feasibility Study – Data Analysis – Cost/Benefit Analysis	Up to K3
CLO 4	Implement the Forms Design – File Organization and Data Base Design.	Up to K4
CLO 5	Illustrate the Hardware/Software Selection – Financial considerations in selection.	Up to K4

K1- Remembering facts with specific answers
K2- Basic understanding of facts.
K3- Application oriented
K4- Analyzing, examining and making presentations with evidences

Annexure - 2

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO 1	3	1	1	1	-	1
CLO 2	3	2	-	-	1	2
CLO 3	3	1	3	-	1	1
CLO 4	3	2	2	2	1	-
CLO 5	3	1	1	-	2	1

1-Basic Level 2- Intermediate Level 3- Advanced Level

Continuous Internal Assessment (CIA) - Blue Print
Articulation Mapping – K Levels with Course Leaning Outcomes (CLOs)

CIA Test I (30 marks)										
CIA	**CLOs**	**K-Level**	**Section A MCQs**		**Section B Short Answer**		**Section C Either / or choice**		**Section D Open Choice**	
			No of Questions	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**
I	CLO1	Up to K3	4	2K1, K2 &K3	3	2K1 & K2	4	2K2 & 2K3	2	K2, K3
No of questions to be asked			4		3		4		2	
NO of questions to be answered			4		3		2		1	
Marks for each question			1		2		5		10	
Total marks for each section			**4**		**6**		**10**		**10**	
CIA Test II and III (60 marks)										
II	CLO2	Up to K3	4	2K1 & 2K2	3	K1, K2 & K3	4	K1,K2 & 2K3	2	K2, K3
	CLO3	Up to K3	4	2K1 & 2K3	3	2K2 & K3	4	K1,K2 & 2K3	2	K2, K3
III	CLO4	Up to K4	4	2K2, K3&K4	3	2 K2 & K3	4	2K3 & 2K4	2	K3, K4
	CLO5	Up to K4	4	2K2,K3 & K4	3	2K2 & K3	4	2K3 & 2K4	2	K2, K4
No of questions to be asked			8		6		8		4	
NO of questions to be answered			8		6		4		2	
Marks for each question			1		2		5		10	
Total marks for each section			**8**		**12**		**20**		**20**	

Annexure - 2

Distribution of Marks with K Levels CIA I, CIA II and CIA III

CIA	K Levels	Section A MCQ	Section B (Short Answer Questions)	Section C (Either/Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)
I	K1	2	4		-	6	12%
	K2	1	2	10	10	23	46%
	K3	1		10	10	21	42%
	Marks	**4**	**6**	**20**	**20**	**50**	**100%**
II	K1	4	2	10	-	16	16%
	K2	2	6	10	20	38	38%
	K3	2	4	20	20	46	46%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**
III	K2	4	8	-	10	22	22%
	K3	2	4	20	10	36	36%
	K4	2	-	20	20	42	42%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**

Summative Examination -Blue Print

Articulation Mapping – K Levels with Course Learning Outcomes (CLOs)

Units	CLOs	K- Level	Section A MCQs	Section B Short Answers	Section C (Either/or Choice)	SectionD (Open Choice)
1	CLO 1	Up to K3	2 (K1&K2)	1 (K1)	2 (K1&K1)	1(K2)
2	CLO 2	Up to K3	2 (K1&K2)	1 (K3)	2 (K2&K2)	1(K3)
3	CLO 3	Up to K3	2 (K2&K3)	1 (K2)	2 (K3&K3)	1(K3)
4	CLO 4	Up to K4	2 (K2&K3)	1 (K3)	2 (K3&K3)	1(K4)
5	CLO 5	Up to K4	2 (K1&K3)	1 (K4)	2 (K4&K4)	1(K4)
No. of Questions to be asked			10	5	10	5
No. of Questions to be answered			10	5	5	3
Marks for each question			1	2	5	10
Total Marks for each Section			**10**	**10**	**25**	**30**

(75 Marks)

K1- Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – solving problems

K4- Examining, analyzing, presentation and make inference with evidences.

Annexure - 2

Distribution of Marks with K Level for Summative Examination

K Levels	Section A (MultipleChoice Questions)	Section B (Short Answer Questions)	Section C (Either/OrChoice)	Section D(Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	3	2	10	-	**15**	**12.5%**	**12%**
K2	4	2	10	10	**26**	**21.6%**	**22%**
K3	3	4	20	20	**47**	**39.1%**	**39%**
K4	-	2	10	20	**32**	**26.6%**	**27%**
K5	-	-	-	-	-	-	-
Total	**10**	**10**	**50**	**50**	**120**	**100**	**100**

LESSON PLAN:

Unit	Course Content	Hrs	Mode of Teaching
I	The Systems Concept – Characteristics of System– Elements of System–Types of Systems	8	Chalk & Talk, PPT
	System Models– System Development Life Cycle(SDLC).	7	
II	The System Analyst Definition – Role of the Analyst – Analyst/User Interface	8	Chalk & Talk, Spot test, Exercise, Assignment, PPT, Video material.
	Analyst in the MIS Organization – The Bases forPlanning in Systems Analysis – Initial Investigation.	7	
III	Information Gathering Introduction –Information Gathering Tools – The Tools of Structured Analysis	8	Chalk & Talk, Exercise, PPT, video material
	System Performance Definition – Feasibility Study –Data Analysis – Cost/Benefit Analysis.	7	
IV	The Process of Design –Design Methodologies – Major Development Activities – Audit considerations	8	Chalk & Talk, Exercise,

	Input/Output and Forms Design – File Organization and Data Base Design.	7	Assignment, video material, Group Discussion
V	System Testing – The Test Plan –Quality Assurance – Role of the Data Processing Auditor – Post Implementation Review	8	Quiz, Chalk & Talk, Exercise , Spot test, Assignment, Seminar
	Software Maintenance – The Computer Industry –The Software Industry – Hardware/Software Selection – Financial considerations in selection.	7	

DEPARTMENT OF INFORMATION TECHNOLOGY				I M.Sc. Information Technology				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/Week**	**CIA**	**Ext**	**Total**
I	**Core Lab**	**21OPI11P**	**C++ and Data Structure Lab**	**2**	**5**	**40**	**60**	**100**

Nature of the Course

Knowledge Oriented and Skill	√	Employability Oriented	√	Entrepreneurship oriented	

Course Objectives

1. Impart the knowledge Default arguments and constructor.
2. Learn the organized structures of inheritance type and operator overloading.
3. Design a string manipulation and virtual function.
4. To learn the organized structures of Stack, Queues, Linked list and Tree.
5. To design algorithms for Sorting with efficacy.

Unit	Content	Hours	K Level	CLO
I	1. Write a program in C++ to implement the default arguments. 2. Write a program in C++ to implement the Friend Function. 3. Write a Program in C++ to Find the Square value of given two integer in Inline Function. 4. Write a Program in C++ to implement the Copy Constructor.	15	Up to K3	CLO1
II	5. Write a Program in C++ to implement the Single inheritance. 6. Write a Program in C++ to Create Multiple inheritance. 7. Write a Program in C++ to Create Multilevel Inheritance. 8. Write a Program in C++ to implement the Hybrid Inheritance.	15	Up to K3	CLO2
III	9. Write a Program in C++ to implement the operator overloading. 10. Write a Program in C++ to perform the basic	15	Up to K3	CLO3

	operation of string manipulation. 11. Write a program in C++ to perform the basic operation using virtual function. 12. Write a Program in C++ to implement the Formatting output using manipulators.			
IV	13. Write a program in C++ to implement Stack using Array. 14. Write a program in C++ to implement Queue using Array. 15. Write a program in C++ to perform the basic operations of Single Linked List. 16. Write a program in C++ to implement Stack using Linked List.	15	Up to K3	CLO4
V	17. Write a program in C++ to implement Queue using Linked List. 18. Write a program in C++ to perform the operations of Tree Traversal. 19. Write a program in C++ to read N elements and arrange them in order using Insertion sort technique. 20. Write a program in C++ to read N elements and arrange them in order using Selection sort technique.	15	Up to K4	CLO5

Book for study

1. Balagurusamy. E, *Object Oriented Programming with C++***,** McGraw Hill Education (India) Private Limited, New Delhi, Sixth Edition**,** 2013.

2. Data Structures and Algorithm Analysis in C++ by Mark Allen Weiss, Fourth Edition, Pearson Publications.

Books for Reference

1. Alok Kumar Jagadev, Amiya Kumar Rath and Satchidananda Dehuri, *Object-Oriented Programming Using C++*, Prentice-Hall of India Private Limited, New Delhi, 2007.
2. Ashok N.Kamthane, *Object Oriented Programming with ANSI & Turbo C++*, Pearson Education, 2006.

3. John R.Hubbard , *Programming with C++* , Tata McGraw Hill Publishing Company Private Limited , New Delhi , Second Edition , 2007.
4. "Data Structures with C" by Seymour Lipschutz, Mc Grow Hill Publications.
5. "Data Structures and Algorithm Analysis in C" by Mark Allen Weiss, Second Edition, Pearson Publications.
6. "An Introduction to Data Structure with Application" – THM, II Edition – 1991.

Web Resources

1. https://www.tutorialspoint.com/cplusplus/cpp_tutorial.pdf
2. https://www.cplusplus.com/files/tutorial.pdf
3. http://www.lmpt.univ-tours.fr/~volkov/C++.pdf
4. http://freecodecamp.org
5. https://www.dzone.com

Nature of the course

- Developing logic and structured program, organizing data in software development.

Activities to be given

- Implement Programming
- Mini Projects

Activities on Employability Oriented

- Software Development
- Data Analysis

Pedagogy

Record Book writing, Program development and Demonstration, Practical sessions.

Course Learning Outcomes (CLOs)

Upon successful completion of the Course, the students will be able to

.No.	Course Outcome	Knowledge Level(According to Bloom's Taxonomy)
CLO 1	Understand the procedural and object oriented paradigm with concepts of class & objects, functions and constructors.	Up to K3
CLO 2	Identify the method to implement the various Inheritance types.	Up to K3
CLO 3	Describe the concept of operator overloading, polymorphism and virtual functions.	Up to K3
CLO 4	Gain knowledge of data structure like Stack and Queue which can be applied to solve problems.	Up to K3
CLO 5	Describe the non linear data structure like List, trees and sorting techniques.	Up to K4

K1- Remembering facts with specific answers

K2- Basic understanding of facts.

K3- Application oriented

K4- Analyzing, examining and making presentations with evidences

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CLOs / POs	PO1	PO2	PO3	PO4	PO5	PO6
CLO 1	2	2	3	1	-	1
CLO 2	2	2	2	1	1	2
CLO 3	3	3	2	2	1	1
CLO 4	2	3	2	3	-	-
CLO 5	2	2	3	3	-	-

1-Basic Level 2- Intermediate Level 3- Advanced Level

LESSON PLAN

Unit	Course Content	Hrs	Mode of Teaching
I	1. Write a program in C++ to implement the default arguments. 2. Write a program in C++ to implement the Friend Function. 3. Write a Program in C++ to Find the Square value of given two integer in Inline Function. 4. Write a Program in C++ to implement the Copy Constructor.	15	Demo & Practical Session
II	5. Write a Program in C++ to implement the Single inheritance. 6. Write a Program in C++ to Create Multiple inheritance. 7. Write a Program in C++ to Create Multilevel Inheritance. 8. Write a Program in C++ to implement the Hybrid Inheritance.	15	Demo & Practical Session
III	9. Write a Program in C++ to implement the operator overloading. 10. Write a Program in C++ to perform the basic operation of string manipulation.	15	Demo & Practical Session

	11. Write a program in C++ to perform the basic operation using virtual function. 12. Write a Program in C++ to implement the Formatting output using manipulators.		
IV	13. Write a program in C++ to implement Stack using Array. 14. Write a program in C++ to implement Queue using Array. 15. Write a program in C++ to perform the basic operations of Single Linked List. 16. Write a program in C++ to implement Stack using Linked List.	15	Demo & Practical Session
V	17. Write a program in C++ to implement Queue using Linked List. 18. Write a program in C++ to perform the operations of Tree Traversal. 19. Write a program in C++ to read N elements and arrange them in order using Insertion sort technique. 20. Write a program in C++ to read N elements and arrange them in order using Selection sort technique.	15	Demo & Practical Session

Annexure - 2

DEPARTMENT OF INFORMATION TECHNOLOGY				I M.Sc. Information Technology				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/Week**	**CIA**	**Ext**	**Total**
I	**Core Lab**	**21OPI12P**	**PHP Programming Lab**	**2**	**5**	**40**	**60**	**100**

Nature of the Course

Knowledge Oriented and Skill	√	Employability Oriented	√	Entrepreneurship oriented	

Course Objectives

1. Develop program using control statement
2. Perform operation based on arrays and functions
3. Develop programs by applying various object oriented concepts
4. Use form controls with validation to collect user's input.
5. Perform database operations in PHP.

Unit	Content	Hrs	K-Level	CLO
I	1. Write a simple PHP program using expressions and operators 2. Write a PHP program to demonstrate the use of Decision making control structures using If statement, If-else statement and . Switch statement. 3. Write a PHP program to demonstrate the use of Looping structures using- While statement, Do-while statement, For statement and For each statement 4. Write a PHP program to display a digital clock which displays the current time of the server.	15	K3	1
II	5.Write a PHP program for creating and manipulating- Indexed array, Associative array, and Multidimensional array. 6. Write a PHP program to Calculate length of string. 7. Write a simple PHP program to demonstrate use of various built-in string functions. 8. Write a simple PHP program to demonstrate use of simple function and parameterized function.	15	K3	2
III	9. Write a PHP Form Handling using GET Form and POST Form 10. Write a PHP program for File Handling 11. Write a PHP program to Inherit members of super class in	15	K3	3

	subclass. 12.Design a web page using following form controls: a. Text box b. Radio button, c. Check box, d. Buttons			
IV	13. Design a web page using following form controls: a. List box, b. Combo box, c. Hidden field box 14. Develop web page with data validation. 15. Write simple PHP program to – a. Set cookies and read it b. Demonstrate session management 16. Write a PHP program for sending and receiving plain text message (e-mail).	15	K3	4
V	17. Develop a simple application to enter data into database 18. Develop a simple application to retrieve and present data from database. 19. Develop a simple application to Update table data fromdatabase 20. Develop a simple application to Delete table data from database.	15	K4	5

Books for Study

Robin Nixon **,** *Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5 (Learning Php, Mysql, Javascript, Css & Html5)* **,** O'Reilly Media, Inc**.** 4th Edition, May 2018

Books for Reference

1. Dave W Mercer, Allan Kent, Steven D Nowicki, David Mercer, Dan Squier, Wankyu Choi – *" Beginning PHP",* Wiley Publishing, Inc

2. Ivan Bayross -"*HTML, DHTML, JavaScript, Pearl & CGI*", Fourth Revised Edition, BPB Publication

3.RasmusLerdorf and Kevin Tatore, Shroff "*Programming PHP"*, Publishers & Distributors Pvt.Ltd

4. Lynn Beighley & Michael Morrison, "*Head First PHP &MySQL"* , O'Reilly, First Edition, 2009

5. **"***Learning PHP, MySQL & JavaScript: A Step-by-Step Guide to Creating Dynamic Websites"* O'Reilly Media, Inc ,6th Edition, June 2014

Web Resources

1. https://www.guru99.com/what-is-php-program.html
2. https://www.tutorialspoint.com/php/
3. https://tutorialehtml.com/en/php-tutorial- introduction/
4. https://books.goalkicker.com/PHPBook/
5. https://codecourse.com/watch/php-basics

Nature of the course

- Developing logic and structured program, organizing data in software development.

Activities to be given

- Implement Programming
- Mini Projects
- Web page Designing
- Software development

Pedagogy

Record Book Writing, Projector Demonstration and Practical sessions.

COURSE LEARNING OUTCOMES

On the completion of the course, the students will be able to

CLOs	**COURSE LEARNING OUTCOMES**	**K – Level**
CLO 1	Write PHP scripts using control statements.	Up to K3
CLO 2	Create PHP programs that perform operation on arrays and use various PHP library functions.	Up to K3
CLO 3	Develop PHP programs by applying various object oriented concepts.	Up to K3
CLO 4	Analyze and solve common web application tasks use form controls with validation.	Up to K3
CLO 5	Analyze and solve various database tasks using the PHP.	Up to K4

K1- Remembering facts with specific answers
K2- Basic understanding of facts.
K3- Application oriented
K4- Analyzing, examining and making presentations with evidences

Annexure - 2

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CLOs / POs	PO1	PO2	PO3	PO4	PO5	PO6
CLO 1	2	2	3	1	-	1
CLO 2	2	2	2	1	1	2
CLO 3	3	3	2	2	1	1
CLO 4	2	3	2	3	-	-
CLO 5	2	2	3	3	-	-

1-Basic Level 2- Intermediate Level 3- Advanced Level

LESSON PLAN

Unit	Course Content	Hrs	Mode of Teaching
I	1. Write a simple PHP program using expressions and operators 2. Write a PHP program to demonstrate the use of Decision making control structures using If statement, If-else statement and . Switch statement. 3. Write a PHP program to demonstrate the use of Looping structures using- While statement, Do-while statement, For statement and For each statement 4. Write a PHP program to display a digital clock which displays the current time of the server.	15	Demo & Practical Session
II	5. Write a PHP program for creating and manipulating- Indexed array, Associative array, and Multidimensional array. 6. Write a PHP program to Calculate length of string. 7. Write a simple PHP program to demonstrate use of various built-instring functions. 8. Write a simple PHP program to demonstrate use of simple functionand parameterized function.	15	Demo & Practical Session

III	9. Write a PHP Form Handling using GET Form and POST Form 10 Write a PHP program for File Handling 11. Write a PHP program to Inherit members of super class in subclass. 12.Design a web page using following form controls: a. Text box b. Radio button, c. Check box, d. Buttons	15	Demo & Practical Session
IV	13. Design a web page using following form controls: a. List box, b. Combo box, c. Hidden field box 14. Develop web page with data validation. 15. Write simple PHP program to – a. Set cookies and read it b. Demonstrate session management 16. Write a PHP program for sending and receiving plain text message (e-mail).	15	Demo & Practical Session
V	17. Develop a simple application to enter data into database 18. Develop a simple application to retrieve and present data from database. 19. Develop a simple application to Update table data from database 20. Develop a simple application to Delete table data fromdatabase.	15	Demo & Practical Session

DEPARTMENT OF INFORMATION TECHNOLOGY				I M.Sc. Information Technology				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/Week**	**CIA**	**Ext**	**Total**
I	**NME**	**21OPINM1**	**PHOTO DESIGNING**	**2**	**2**	**25**	**75**	**100**

Nature of the Course

Knowledge Oriented and Skill	√	Employability Oriented	√	Entrepreneurship oriented	

Course Objectives

1. Identify the major regions of the Photoshop workspace.
2. Explain the function of each: Menu bar and context menus, Options bar, Toolbox, palettes, and document window(s).
3. Demonstrate knowledge of design principles, elements, and image composition.
4. Explore Photoshop Help, and use it to find out more about the tools in the Toolbox shapes and adjust layers.
5. To transforming Images with Filters.

Unit	Course Content	Hrs	K-Level	CLO
I	**Getting into Photoshop:** Introduction - Best in Photoshop 7.0 - Photoshop Interface-Saving the File-Importing Existing File.	6	Up to K2	CLO1
II	**Editing and Retouching:** Working with Selections-Getting started with the Selection tool-Selection with Rectangle Marquee Tool-Selection with Elliptical Marquee Tool-Moving a Selection-Moving with Keyboard Shortcut-Selection with the Magic Wand-Selection with Lasso Tool-Adding and Subtraction Selection-Selection with the Magnetic Lasso-Transforming a Selection-Combining Selection Tools-Cropping the Completed Image-Quick Mask tool to make Selection-Enabling the Quick Mask Mode- Adjusting Quick Mask Setting-Patch Tool-Paint Tools-Image Color Adjustments	6	Up to K2	CLO2
III	**Making Artistic use of Photoshop:** Painting Tools-Working with Brushes-Drawing-Eraser Tool-Brushes Palette-Pen Tool-Selecting an Image with Pen Tool-Editing and Cleaning Tools-Clone Stamp Tool-Healing Brush-Image Resizing.	6	Up to K2	CLO3

IV	**Building Original Art work:** Layers-Creating A Layer -Layer Mask-Transform-Custom shapes -CreateYour own Custom shapes.	6	Up to K2	CLO4
V	**Transforming Images with Filters:** Filters-Text Tool-Text Wrap-Try it.	6	Up to K3	CLO5

Book for Study

J. Jenitha, A. Diana, "Adobe Photoshop 7.0 - A Novice Guide" ACCA Publication, 2012.

Chapters:

Unit I: 6

Unit II: 7, 8

Unit III: 9

Unit IV: 10

Unit V: 12, 13

Books for Reference

1. Deke McClelland, Laurie Ulrich Fuller Robert C. Fuller, "Photoshop CS2 Bible", Photoshop®CS2 Bible, Professional Edition, 2005.
2. Photoshop CS6 in Simple Steps", Kogent Learning Solutions Inc, Dreamtech Press, 2013.
3. Tay Vaughan-1999,Multimedia:Making it work-Fourth Edition, Tata McGraw, Hill Edition.
4. Walterworth join A-1991, Multinedia Technologies and Applications, Ellis Horwood Ltd,London.
5. John F Koegel Buford, Multimedia Systems, addition Wesley, First Indian Report.

Web Resources

1. https://freepdf-books.com/photoshop-cs3-restoration-and-retouching-bible/
2. https://freepdf-books.com/photoshop-cs5-the-missing-manual/
3. https://www.computer-pdf.com/graphics/772-tutorial-photoshop-cc-2018-essential-skills.html
4. https://www.computer-pdf.com/graphics/235-tutorial-introduction-to-digital-imaging-using- photoshop.html

E-Books

1. http://hogback.atmos.colostate.edu/rr/old/tidbits/pdf/pShopGuide.pdf

2 https://www.adobe.com/au/print/tips/phslecib/pdfs/pslecib.pdf

3. https://www.sjsu.edu/ajeep/docs/Photoshop%20Module%20v7c-PC%20for%20WEB-2.pdf

Pedagogy

Chalk and talk, Materials, PPT, Assignment, Seminar, Problem solving, Group discussion, Interaction and Demonstration.

Course Learning Outcomes

Number	Course outcome	Knowledge Level
CLO1	Understand the Principles of Photoshop.	Up to K2
CLO2	Describe the concept of Editing and Retouching	Up to K2
CLO3	Analyze the Painting Tools,Brushes,Drawing-Eraser Tool and Pen Tool.	Up to K2
CLO4	: Implement the concept of create layer and r own Custom shapes.	Up to K2
CLO5	Applying the text tool and wrap text.	Up to K3

K1- Remembering facts with specific answers

K2- Basic understanding of facts.

K3- Application oriented

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CLOs / POs	PO1	PO2	PO3	PO4	PO5	PO6
CLO 1	**2**	**2**	**2**	**2**	**2**	**1**
CLO 2	**2**	**2**	**3**	**2**	**3**	**2**
CLO 3	**2**	**2**	**3**	**2**	**3**	**2**
CLO 4	**2**	**2**	**3**	**2**	**3**	**3**
CLO 5	**2**	**2**	**3**	**2**	**2**	**2**

1-Basic Level 2- Intermediate Level 3- Advanced Level

Continuous Internal Assessment (CIA) - Blue Print
Articulation Mapping – K Levels with Course Leaning Outcomes (CLOs)

units	CLOs	K-level	Section A		Section B		Section C	Section D
			MCQs		Short Answers			
			No. of Questions	K-Level	No. of Questions	K-Level	(Either/or Choice)	(Open Choice)
I	CLO 1	Up to K2	1	K1	-			
II	CLO 2	Up to K2	1	K1	1	K1		
III	CLO 3	Up to K2	1	K2	1	K2		
IV	CLO 4	Up to K2	1	K2	1	K2	2 (K2 & K2)	1 (K2)
V	CLO 5	Up to K3	-					1 (K3)
No. of Questions to be asked			4		3		2	2

No. of Questions to be answered	4		3		1	1
Marks for each question	1		2		5	10
Total Marks for each Section	**4**		**6**		**5**	**10**

Distribution of Marks with K Level for Formative Examination

CIA	K Levels	Section A MCQ	Section B (Short Answer Questions)	Section C (Either/Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
I	K1	2	2	10	-	14	28%	28%
	K2	2	4	10	10	26	52%	52%
	K3				10	10	20%	20%
	Marks	**4**	**6**	**20**	**20**	**50**	**100 %**	**100%**

Summative Examination -Blue Print

Articulation Mapping – K Levels with Course Learning Outcomes (CLOs)

Units	CLOs	K- Level	Section A MCQs	Section B Short Answers	Section C (Either/or Choice)	Section D (Open Choice)
1	CLO 1	Up to K2	2 (K1&K2)	1 (K1)	2 (K1&K1)	1(K2)
2	CLO 2	Up to K2	2 (K1&K2)	1 (K2)	2 (K2&K2)	1(K2)
3	CLO 3	Up to K2	2 (K1&K2)	1 (K2)	2 (K2&K2)	1(K2)
4	CLO 4	Up to K2	2 (K1&K2)	1 (K2)	2 (K2&K2)	1(K2)
5	CLO 5	Up to K3	2 (K1&K2)	1 (K2)	2 (K2&K2)	1(K3)
No. of Questions to be asked			10	5	10	5
No. of Questions to be answered			10	5	5	3
Marks for each question			1	2	5	10
Total Marks for each Section			**10**	**10**	**25**	**30**

K1- Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – solving problems

Annexure - 2

Distribution of Marks with K Level for Summative Examination

K Levels	Section A (No choice)	Section B (No choice)	Section C (Either/ or)	Section D (Open choice)	Total marks	% of marks without choice	Consolidated
K1	4	4	20	20	48	40.00	40%
K2	4	4	20	20	48	40.00	40%
K3	2	2	10	10	24	20.00	20%
Total marks	10	10	50	50	120	100	100%

LESSON PLAN

Unit	Course Content	Hours	Mode of Teaching
I	**Getting into Photoshop:** Introduction - Best in Photoshop 7.0 - Photoshop Interface Saving the File-Importing Existing File.	**6**	Lecture, GD
II	**Editing and Retouching:** Working with Selections-Getting started with the Selection tool-Selection with Rectangle Marquee Tool-Selection with Elliptical Marquee Tool-Moving a Selection-Moving with Keyboard Shortcut-Selection with the Magic Wand-Selection with Lasso Tool-Adding and Subtraction Selection-Selection with the Magnetic Lasso-Transforming a Selection-Combining Selection Tools- Cropping the Completed Image-Quick Mask tool to make Selection-Enabling the Quick Mask Mode- Adjusting Quick Mask Setting-Patch Tool-Paint Tools-Image Color Adjustments	**6**	Lecture
III	**Making Artistic use of Photoshop:** Painting Tools-Working with Brushes-Drawing-Eraser Tool-Brushes Palette-Pen Tool-Selecting an Image with Pen Tool-Editing and Cleaning Tools-Clone Stamp Tool- Healing Brush-Image Resizing.	**6**	Lecture, PPT
IV	**Building Original Art work:** Layers-Creating A Layer -Layer Mask-Transform-Custom shapes -Create Your own Custom shapes.	**6**	Lecture, PPT
V	**Transforming Images with Filters:** Filters-Text Tool-Text Wrap-Try it.	**6**	Lecture, GD, Assignment

Annexure - 2

DEPARTMENT OF INFORMATION TECHNOLOGY				I M.Sc. Information Technology				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/Week**	**CIA**	**Ext**	**Total**
II	**Core**	**21OPI21**	**OPERATING SYSTEM CONCEPTS**	**4**	**5**	**25**	**75**	**100**

Nature of the Course

Knowledge Oriented and Skill	√	Employability Oriented		Entrepreneurship oriented	

Course Objectives

1. To give an overview of the many types of computing environments.
2. To introduce CPU scheduling and basis of multi programmed operating system.
3. To develop a description of deadlocks, which prevent sets of concurrent processes from completing their tasks.
4. To have an understanding of the main memory and secondary memory Management techniques.
5. To discuss file system design tradeoffs, including access methods, file sharing, file locking, and directory structures.

Unit	Course Content	Hours	K Level	CLO
I	**Introduction:** What is an Operating System – Mainframe Systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Real Time Systems.	15	Up to K3	CLO1
II	**Process Management:** Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes – Inter process Communication - Scheduling Algorithms - Threads: Overview – Multithreading models.	15	Up to K3	CLO2
III	**Deadlocks:** System model – Deadlock Characterization – Methods for handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock.	15	Up to K3	CLO3

IV	**Memory Management:** Background – Swapping – Contiguous Memory Allocation – Paging Segmentation - Segmentation with Paging. Virtual Memory: Background – Demand Paging – Process Creation – Page Replacement.	15	Up to K4	CLO4
V	**File-System Interface:** File Concept – Access Methods – Directory structure – File-System Mounting – File Sharing – Protection.	15	Up to K4	CLO5

Book for Study

Silberschatz, Galvin, Gagne, *Operating System Concepts*, John Wiley & Sons, Inc., VI th ed.,

Chapters:

Unit I - Chapter 1

Unit II - Chapter 4, 5

Unit III - Chapter 8

Unit IV - Chapter 9, 10

Unit V - Chapter 11

Books for Reference

1. Charles Crowley, Operating system – A Design Oriented Approach, McGraw-Hill Education, 2009.
2. Deital.H.M, *Operating System*, Pearson Education, 11th Edition 2003.
3. Milon MilenKovic, Operating Systems Concepts And Design, Tata Mc Graw-Hill, New Delhi, 2nd Edition, 1997.
4. Pramod Chandra, P.Bhatt, *An Introduction to Operating Systems*, PHI, 2007.
5. William Stallings, *Operating Systems* Internals and Design Principles, PHI, 2008.

Web Resources

1. https://www.crectirypati.com/sites/default/files/lectur_notes/OpertingSystemsLectureNotes.pdf
2. http://www2.cs.uic.edu/~jbell/CourseNotes/OperatingSystems
3. http://www.smartzworld.com/notes/linux-programming-pdf-lp-pdf-notes/

E-Books

1. http://www.cs.put.poznan.pl/akobusinska/downloads/Operating_Systems_Concepts.pdf

2. http://web.cse.ohio-state.edu/~soundarajan.1/courses/3430/silberschatz8thedition.pdf

3.http://edclap.com/pluginfile.php/13305/mod_resource/content/1/OS%20Book%20Galvin.pdf

Pedagogy

Chalk and talk Materials, PPT, Assignment, Seminar, Problem solving, Group discussion,

Interaction and Demonstration.

Rationale for Nature of the course

- Help accomplish include managing inputs from users, sending output to the output devices, management of storage spaces and control of peripheral devices.

Activities to be given

- Case Studies
- Quiz
- Seminar

Course Learning Outcomes(CLOs):

Upon successful completion of the Course, the students will be able to

No.	Course Outcomes	Knowledge Level(According to Bloom's Taxonomy)
CO 1	Identify the role of Operating System and understand the design of control unit.	Up to K3
CO 2	Understanding CPU Scheduling, Synchronization	Up to K3
CO 3	Identify Deadlock Handling and Solve Deadlock Detection Problems.	Up to K3
CO 4	Describe the role of paging, segmentation and virtual memory in operating systems.	Up to K4
CO 5	Illustrate the file system interface	Up to K4

K1- Remembering facts with specific answers

K2- Basic understanding of facts.

K3- Application oriented

K4- Analyzing, examining and making presentations with evidences

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO 1	3	1	1	1	-	1
CLO 2	3	2	-	-	1	2
CLO 3	3	1	3	-	1	1
CLO 4	3	2	2	2	1	-
CLO 5	3	1	1	-	2	1

1-Basic Level 2- Intermediate Level 3- Advanced Level

Annexure - 2

Continuous Internal Assessment (CIA) - Blue Print

Articulation Mapping – K Levels with Course Leaning Outcomes (CLOs)

CIA Test I (30 marks)										
CIA	**CLOs**	**K-Level**	**Section A MCQs**		**Section B Short Answer**		**Section C Either / or choice**		**Section D Open Choice**	
			No of Questions	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**
I	CLO1	Up to K3	4	2K1, K2 &K3	3	2K1 & K2	4	2K2 & 2K3	2	K2, K3
No of questions to be asked			4		3		4		2	
NO of questions to be answered			4		3		2		1	
Marks for each question			1		2		5		10	
Total marks for each section			**4**		**6**		**10**		**10**	
CIA Test II and III (60 marks)										
II	CLO2	Up to K3	4	2K1 & 2K2	3	K1, K2 & K3	4	K1,K2 & 2K3	2	K2, K3
	CLO3	Up to K3	4	2K1 & 2K3	3	2K2 & K3	4	K1,K2 & 2K3	2	K2, K3
III	CLO4	Up to K4	4	2K2, K3&K4	3	2 K2 & K3	4	2K3 & 2K4	2	K3, K4
	CLO5	Up to K4	4	2K2,K3 & K4	3	2K2 & K3	4	2K3 & 2K4	2	K2, K4
No of questions to be asked			8		6		8		4	
NO of questions to be answered			8		6		4		2	
Marks for each question			1		2		5		10	
Total marks for each section			**8**		**12**		**20**		**20**	

Annexure - 2

Distribution of Marks with K Levels CIA I, CIA II and CIA III

CIA	K Levels	Section A MCQ	Section B (Short Answer Questions)	Section C (Either/Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)
I	K1	2	4		-	6	12%
	K2	1	2	10	10	23	46%
	K3	1		10	10	21	42%
	Marks	**4**	**6**	**20**	**20**	**50**	**100%**
II	K1	4	2	10	-	16	16%
	K2	2	6	10	20	38	38%
	K3	2	4	20	20	46	46%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**
III	K2	4	8	-	10	22	22%
	K3	2	4	20	10	36	36%
	K4	2	-	20	20	42	42%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**

Summative Examination -Blue Print

Articulation Mapping – K Levels with Course Learning Outcomes (CLOs)

Units	CLOs	K- Level	Section A MCQs	Section B Short Answers	Section C (Either/or Choice)	SectionD (Open Choice)
1	CLO 1	Up to K3	2 (K1&K2)	1 (K1)	2 (K1&K1)	1(K2)
2	CLO 2	Up to K3	2 (K1&K2)	1 (K3)	2 (K2&K2)	1(K3)
3	CLO 3	Up to K3	2 (K2&K3)	1 (K2)	2 (K3&K3)	1(K3)
4	CLO 4	Up to K4	2 (K2&K3)	1 (K3)	2 (K3&K3)	1(K4)
5	CLO 5	Up to K4	2 (K1&K3)	1 (K4)	2 (K4&K4)	1(K4)
No. of Questions to be asked			10	5	10	5
No. of Questions to be answered			10	5	5	3
Marks for each question			1	2	5	10
Total Marks for each Section			**10**	**10**	**25**	**30**

(75 Marks)

K1- Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – solving problems

K4- Examining, analyzing, presentation and make inference with evidences.

Annexure - 2

Distribution of Marks with K Level for Summative Examination

K Levels	Section A (MultipleChoice Questions)	Section B (Short Answer Questions)	Section C (Either/OrChoice)	Section D(Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	3	2	10	-	**15**	**12.5%**	**12%**
K2	4	2	10	10	**26**	**21.6%**	**22%**
K3	3	4	20	20	**47**	**39.1%**	**39%**
K4	-	2	10	20	**32**	**26.6%**	**27%**
K5	-	-	-	-	-	-	-
Total	**10**	**10**	**50**	**50**	**120**	**100**	**100**

LESSON PLAN:

Unit	Course Content	Hours	Mode of Teaching
I	**Introduction:** What is an Operating System – Mainframe Systems .	8	Chalk & Talk, PPT
	Desktop Systems – Multiprocessor Systems – Distributed Systems – Real Time Systems.	7	
II	**Process Management:** Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes.	8	Chalk & Talk, Spot test, Exercise, Assignment, PPT, Video material.
	Inter process Communication - Scheduling Algorithms - Threads: Overview – Multithreading models.	7	
III	**Deadlocks:** System model – Deadlock Characterization – Methods for handling.	8	Chalk & Talk, Exercise, PPT, video material
	Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock.	7	
IV	**Memory Management:** Background – Swapping – Contiguous Memory Allocation – Paging Segmentation - Segmentation with Paging.	8	Chalk & Talk, Exercise, Assignment, video material, Group Discussion
	Virtual Memory: Background – Demand Paging – Process Creation – Page Replacement.	7	
V	**File-System Interface:** File Concept – Access Methods – Directory structure.	8	Quiz, Chalk & Talk, Exercise , Spot test, Assignment, Seminar
	File-System Mounting – File Sharing – Protection.	7	

Annexure - 2

DEPARTMENT OF INFORMATION TECHNOLOGY				I M.Sc. Information Technology				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/Week**	**CIA**	**Ext**	**Total**
II	**Core**	**21OPI22**	**DIGITAL IMAGE PROCESSING**	**4**	**4**	**25**	**75**	**100**

Nature of the Course

Knowledge Oriented and Skill		Employability Oriented	√	Entrepreneurship oriented	√

Course Objectives

1. Identify the image fundamentals and mathematical transforms necessary for image processing
2. Learn the functionalities of spatial and frequency filters for image enhancement.
3. To identify the requirements of various image segmentation methods and object recognition models for various real-time applications.
4. Get broad exposure to and understanding of color image processing models.
5. To analyze the functionalities of Morphological Image processing method.

Unit	Content	Hours	K Level	CLO
I	**Digital Image Processing:** Origins of Digital Image Processing, Steps in Digital Image Processing, Digital Image Fundamentals: Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Basic Relationships between Pixels, Mathematical Tools used in Digital Image Processing..	**15**	Up to K3	CLO1
II	**Image Transformation & Filters**: Basic Intensity Transformation Functions, Histogram Processing, Fundamentals of Spatial Filtering, Smoothing Spatial Filter, Sharpening Spatial Filters, Combining Spatial Enhancement methods, Fuzzy techniques for Intensity Transformation and Spatial Filtering. Filtering in the Frequency Domain: Preliminary Concepts, Sampling and the Fourier	**15**	Up to K3	CLO2

	Transforms of Sampled Functions, The Discrete Fourier Transform (DFT), Properties of the 2-D DFT, Filtering in the Frequency Domain, Image Smoothing and Sharpening using Frequency Domain Filters, Selective Filtering..			
III	**Image Restoration, Reconstruction and Image Segmentation:** Image Degradation/Restoration process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Functions, Inverse Filtering, Wiener Square Error Filtering, Constrained Least Square Filtering, Geometric Mean Filter, Image Reconstruction from Projections. Image Segmentation: Point, Line and Edge Detection, Thresholding, Region-Based Segmentation, Segmentation Using Morphological Watersheds, Use of Motion in Segmentation	**15**	Up to K3	CLO3
IV	**Color Image Processing:** Color Fundamentals, Color Models, Pseudo color Image Processing, Full Color Image Processing, Color Transformation, Smoothing and Sharpening, Image Segmentation Based on Color, Noise in Color Images. Wavelets and Multi resolution Processing: Multi resolution Expansion, Wavelet Transforms in One Dimension, The Fast Wavelet Transforms, Wavelet Transforms in Two Dimensions, Wavelet Packets. Image Compression: Fundamentals, Basic Compression Methods, Digital Image Watermarking	**15**	Up to K4	CLO4

V	**Morphological Image Processing:** Erosion and Dilation, Opening and Closing, The Hit-Or-Miss Transformation, Basic Morphological Algorithms, Gray-Scale Morphology. Object Recognition: Patterns and Pattern Classes, Recognition Based on Decision-Theoretic Methods, Structural Methods.	**15**	Up to K4	CLO5

Book for Study

Rafael C. Gonzalez, Richard E. Woods, *"Digital Image Processing"*, 3rd Edition, Pearson Education, 2008.

Chapters:

Unit I	:	chapter 1 and 2
Unit II	:	chapter 3 and 4
Unit III	:	chapter 5 and 10
Unit 1V	:	chapter 6 and 7
Unit V	:	chapter 9 and 12

Books for Reference::

1. Chanda B., Dutta Majumdar .D, *Digital Image Processing and Applications*, Prentice Hall of India, New Delhi, Second Edition, 2007.

2. Jain A.K., *Fundamentals of Digital Image Processing*, Pearson education References, New Delhi, Second Edition, 2004.

3. Millman Sonka, Vaclav Hlavac, Roger Boyle, Broos Colic, *Image Processing Analysis and Machine Vision* , Thompson Learning, USA, Low Price Edition, 2002.

4. Rafael C Gonzalez, Richard E Woods, *Digital Image Processing*, 2nd Edition, Pearson Education , New Delhi, Second Edition, 2003.

5. William K Pratt, *Digital Image Processing*, John Willey & Sons Inc – New Delhi - Third Edition -2002.

Web Resources

1.https://en.wikipedia.org/wiki/Digital_image_processing

2.https://www.sciencedirect.com/topics/engineering/image-processing

3.https://www.intechopen.com/chapters/71817

E-Books

1. http://sdeuoc.ac.in/sites/default/files/sde_videos/Digital%20Image%20Processing%203rd%20ed.%20-%20R.%20Gonzalez%2C%20R.%20Woods-ilovepdf-compressed.pdf
2. https://content.kopykitab.com/ebooks/2016/03/6189/sample/sample_6189.pdf
3. https://preetikale.files.wordpress.com/2018/07/fundmentals-of-digital-image-processing-ak-jain.pdf

Pedagogy

Power point Presentations, Seminar, Quiz, Assignment, video material and Brain storming.

Activities to be given

- Group Discussion
- Quiz
- Seminar

Course Outcomes

Upon successful completion of the Course, the students will be able to

No.	Course Outcomes	Knowledge Level(According to Bloom's Taxonomy)
CLO 1	Understand the basic concepts of digital image fundamentals.	Up to K3
CLO 2	Describe concepts of Image Transformation & Filters.	Up to K3
CLO 3	Identify various design alternatives in image restoration and Segmentation techniques.	Up to K3
CLO 4	Implement the principles of Color Image Processing.	Up to K4
CLO 5	Illustrate the Morphological Image Processing Techniques.	Up to K4

K1- Remembering facts with specific answers
K2- Basic understanding of facts.
K3- Application oriented
K4- Analyzing, examining and making presentations with evidences

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO 1	3	1	1	1	-	1
CLO 2	3	2	-	-	1	2
CLO 3	3	1	3	-	1	1
CLO 4	3	2	2	2	1	-
CLO 5	3	1	1	-	2	1

1-Basic Level 2- Intermediate Level 3- Advanced Level

Annexure - 2

Continuous Internal Assessment (CIA) - Blue Print
Articulation Mapping – K Levels with Course Leaning Outcomes (CLOs)

CIA Test I (30 marks)										
CIA	**CLOs**	**K-Level**	**Section A MCQs**		**Section B Short Answer**		**Section C Either / or choice**		**Section D Open Choice**	
			No of Questions	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**
I	CLO1	Up to K3	4	2K1, K2 &K3	3	2K1 & K2	4	2K2 & 2K3	2	K2, K3
No of questions to be asked			4		3		4		2	
NO of questions to be answered			4		3		2		1	
Marks for each question			1		2		5		10	
Total marks for each section			**4**		**6**		**10**		**10**	
CIA Test II and III (60 marks)										
II	CLO2	Up to K3	4	2K1 & 2K2	3	K1, K2 & K3	4	K1,K2 & 2K3	2	K2, K3
	CLO3	Up to K3	4	2K1 & 2K3	3	2K2 & K3	4	K1,K2 & 2K3	2	K2, K3
III	CLO4	Up to K4	4	2K2, K3&K4	3	2 K2 & K3	4	2K3 & 2K4	2	K3, K4
	CLO5	Up to K4	4	2K2,K3 & K4	3	2K2 & K3	4	2K3 & 2K4	2	K2, K4
No of questions to be asked			8		6		8		4	
NO of questions to be answered			8		6		4		2	
Marks for each question			1		2		5		10	
Total marks for each section			**8**		**12**		**20**		**20**	

Distribution of Marks with K Levels CIA I, CIA II and CIA III

CIA	**K Levels**	**Section A MCQ**	**Section B (Short Answer Questions)**	**Section C (Either/Or Choice)**	**Section D (Open Choice)**	**Total Marks**	**% of (Marks without choice)**
I	K1	2	4		-	6	12%
	K2	1	2	10	10	23	46%
	K3	1		10	10	21	42%
	Marks	**4**	**6**	**20**	**20**	**50**	**100%**
	K1	4	2	10	-	16	16%

II	K2	2	6	10	20	38	38%
	K3	2	4	20	20	46	46%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**
III	K2	4	8	-	10	22	22%
	K3	2	4	20	10	36	36%
	K4	2	-	20	20	42	42%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**

Summative Examination -Blue Print

Articulation Mapping – K Levels with Course Learning Outcomes (CLOs)

Units	**CLOs**	**K- Level**	**Section A MCQs**	**Section B Short Answers**	**Section C (Either/or Choice)**	**SectionD (Open Choice)**
1	CLO 1	Up to K3	2 (K1&K2)	1 (K1)	2 (K1&K1)	1(K2)
2	CLO 2	Up to K3	2 (K1&K2)	1 (K3)	2 (K2&K2)	1(K3)
3	CLO 3	Up to K3	2 (K2&K3)	1 (K2)	2 (K3&K3)	1(K3)
4	CLO 4	Up to K4	2 (K2&K3)	1 (K3)	2 (K3&K3)	1(K4)
5	CLO 5	Up to K4	2 (K1&K3)	1 (K4)	2 (K4&K4)	1(K4)
No. of Questions to be asked			10	5	10	5
No. of Questions to be answered			10	5	5	3
Marks for each question			1	2	5	10
Total Marks for each Section			**10**	**10**	**25**	**30**

(75 Marks)

K1- Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – solving problems

K4- Examining, analyzing, presentation and make inference with evidences.

Distribution of Marks with K Level for Summative Examination

K Levels	**Section A (Multiple Choice Questions)**	**Section B (Short Answer Questions)**	**Section C (Either/Or Choice)**	**Section D (Open Choice)**	**Total Marks**	**% of (Marks without choice)**	**Consolidated %**
K1	3	2	10	-	**15**	**12.5%**	**12%**
K2	4	2	10	10	**26**	**21.6%**	**22%**
K3	3	4	20	20	**47**	**39.1%**	**39%**
K4	-	2	10	20	**32**	**26.6%**	**27%**
K5	-	-	-	-	-	-	-
Total	**10**	**10**	**50**	**50**	**120**	**100**	**100**

LESSON PLAN:

Unit	Course Contents	Hours	Mode of Teaching
I	**Digital Image Processing:** Origins of Digital Image Processing, Steps in Digital Image Processing, Digital Image Fundamentals: Elements of Visual Perception, Light and the Electromagnetic Spectrum	**8**	Chalk & Talk, PPT
	Image Sensing and Acquisition, Image Sampling and Quantization, Basic Relationships between Pixels, Mathematical Tools used in Digital Image Processing..	**7**	
II	**Image Transformation & Filters**: Basic Intensity Transformation Functions, Histogram Processing, Fundamentals of Spatial Filtering, Smoothing Spatial Filter, Sharpening Spatial Filters, Combining Spatial Enhancement methods.	**5**	Chalk & Talk, Spot test, Exercise, Assignment, PPT, Video material.
	Fuzzy techniques for Intensity Transformation and Spatial Filtering. Filtering in the Frequency Domain: Preliminary Concepts, Sampling and the Fourier Transforms of Sampled Functions.	**5**	
	The Discrete Fourier Transform (DFT), Properties of the 2-D DFT, Filtering in the Frequency Domain, Image Smoothing and Sharpening using Frequency Domain Filters, Selective Filtering..	**5**	
III	**Image Restoration, Reconstruction and Image Segmentation:** Image Degradation/Restoration process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering	**8**	Chalk & Talk, Exercise, PPT, video material

	Linear, Position-Invariant Degradations, Estimating the Degradation Functions, Inverse Filtering, Wiener Square Error Filtering, Constrained Least Square Filtering, Geometric Mean Filter, Image Reconstruction from Projections. Image Segmentation: Point, Line and Edge Detection, Thresholding, Region-Based Segmentation, Segmentation Using Morphological Watersheds, Use of Motion in Segmentation	**7**	
IV	**Color Image Processing:** Color Fundamentals, Color Models, Pseudo color Image Processing, Full Color Image Processing, Color Transformation, Smoothing and Sharpening, Image Segmentation Based on Color, Noise in Color Images.	**5**	Chalk & Talk, Exercise, Assignment, video material, Group Discussion
	Wavelets and Multi resolution Processing: Multi resolution Expansion, Wavelet Transforms in One Dimension, The Fast Wavelet Transforms, Wavelet Transforms in Two Dimensions, Wavelet Packets.	**5**	
	Image Compression: Fundamentals, Basic Compression Methods, Digital Image Watermarking	**5**	
V	**Morphological Image Processing:** Erosion and Dilation, Opening and Closing, The Hit-Or-Miss Transformation, Basic Morphological Algorithms, Gray-Scale Morphology.	8	Quiz, Chalk & Talk, Exercise , Spot test, Assignment, Seminar
	Object Recognition: Patterns and Pattern Classes, Recognition Based on Decision-Theoretic Methods, Structural Methods.	**7**	

DEPARTMENT OF INFORMATION TECHNOLOGY				I M.Sc. Information Technology				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/Week**	**CIA**	**Ext**	**Total**
II	**Core**	**21OPI23**	**DATA COMMUNICATIONS AND NETWORKING**	**4**	**4**	**25**	**75**	**100**

Nature of the Course

Knowledge Oriented and Skill	√	Employability Oriented	√	Entrepreneurship oriented	

Course Objectives

1. To understand the general principles of data communication.
2. To familiarize the transmission media, flow control and error detection and correction.
3. To acquire the knowledge of the basic protocols involved in wired and wireless communication process.
4. To gain core knowledge of network layer routing protocols and IP addressing.
5. To motivate the need for network security practices in organizational units.

Unit	Course Content	Hours	K Level	CLO
I	**Introduction:** Data Communication - Networks - Network Types - Internet History - Standards and Administration. **Network Models:** Protocol Layering - TCP/IP Protocol Suite - The OSI Model. **Physical Layer:** Data Signals - Periodic Analog Signals - Digital Signals - Transmission Impairment - Data Rate Limits – Performance.	15	Up to K3	CLO1

II	Multiplexing - Spread Spectrum. **Switching:** Introduction - Circuit - Switched Networks - Packet Switching - Structure of a Switch. **Data - Link Layer:** Introduction - Link Layer Addressing. **Error Detection & Correction:** Introduction - Block Coding - Cyclic Codes - CheckSum - Forward Error Correction.	15	Up to K3	CLO2
III	**Wired LANs: Ethernet:** Ethernet Protocol - Standard Ethernet **Wireless LANs:** Introduction - IEEE 80.11 Projects - Bluetooth Other **Wireless Networks:** WiMAX - Cellular Telephony - Satellite Networks. Connecting Devices. **Network Layer: Introduction to Network Layer:** Network - Layer Services - Packet Switching - Network - Layer Performance - IPV4 Addresses - Forwarding of IP Packets.	15	Up to K3	CLO3
IV	**Network - Layer Protocol:** Internet Protocol (IP) - ICMPv4 - Mobile IP. **Next Generation IP:** IPv6 Addressing - The IPv6 Protocol - The ICMPv6 Protocol - Transition from IPv4 to Ipv6. **Transport Layer:** Introduction - Transport - Layer Protocols. **Transport - Layer Protocols:** Introduction - User Datagram Protocol - Transmission Control Protocol.	15	Up to K4	CLO4
V	**Cryptography and Network Security:** Introduction – Confidentiality – Other Aspects of Security.**Internet Security:** Network Layer Security – Transport Layer Security – Application Layer Security - Firewalls	15	Up to K4	CLO5

Book for Study

Data Communications and Networking by Behrouz A.Forouzan, 5th edition, Tata McGraw Hill Education (India) Private Limited.

Chapters

UNIT – I 1: 1.1- 1.5., 2: 2.1- 2.3., 3: 3.1- 3.6.

UNIT – II 6: 6.1, 6.2 , 8: 8.1- 8.4., 9: 9.1, 9.2., 10: 10.1- 10.5.

UNIT – III 13: 13.1, 13.2., 15: 15.1, 15.2., 16: 16.1- 16.3, 17: 17.1, 18: 18.1- 18.5.

UNIT – IV 19: 19.1- 19.3., 22: 22.1- 22.4., 24: 24.1- 24.3

UNIT – V 31: 31.1- 31.3. 32: 32.1- 33.4.

Books for Reference

1.Brijendra Singh, *Data communications and Computer Networks*, PHI Learning Private Limited, New Delhi, 2nd Edition, 2009.

2. Barry Dumas.M, Morris Schwartz, *Principles of Computer Networks and Communications,* Pearson Education, New Delhi, IV edition, 2006.

3. Fred Halsall, *Data Communications, Computer Networks and Open Systems,* Pearson Education, New Delhi, IV edition, 2003.

4. Tanenbaum.A.S, *Computer Networks*, Pearson Education. Inc, New Delhi, V edition, 2011.

5. William Stallings, *Data and Computer Communications,* Pearson Education, New Delhi, 7th Edition, 2004.

Web Resources

1. http://www.geeksforgeeks.org
2. http://www.en.m.wikipedia.org
3. http://www.tutorialspoint.com

Nature of the course

- To allow multiple processes to send and receive the data over the network without interfering with other processes.

Activities to be given

- Creating Models
- Quiz
- Seminar

Pedagogy

Chalk and talk Materials, PPT, Assignment, Seminar, Group discussion, Interaction and Projectors.

Course Learning Outcomes(CLOs)

Upon successful completion of the Course, the students will be able to

No.	Course Outcomes	Knowledge Level(According to Bloom's Taxonomy)
CLO1	Describe the functions of each layer in OSI and TCP/IP model.	Up to K3
CLO 2	Differentiate various Switching techniques and Apply the concept of different Error Detection and Correction methods.	Up to K3
CLO3	Discuss the design principles of wired and wireless communication media.	Up to K3
CLO 4	Understand the various Transport layer protocols and also differentiate IPV4 and IPV6 Protocols.	Up to K4
CLO5	Discuss and Explain current network authentication applications, network security and their vulnerabilities that are exploited by intentional and unintentional attacks.	Up to K4

K1- Remembering facts with specific answers

K2- Basic understanding of facts.

K3- Application oriented

K4- Analyzing, examining and making presentations with evidences

Mapping of CO with **PO**

	PO1	PO2	PO3	PO4	PO5	PO6
CLO 1	2	2	1	3	2	1
CLO2	3	2	2	2	1	1
CLO 3	1	2	3	1	2	2
CLO 4	2	2	2	-	1	-
CLO 5	2	3	2	2	-	-
Total	10	12	10	8	6	4

11- Basic Level **2- Intermediate Level** **3- Advanced Level**

Annexure - 2

Continuous Internal Assessment (CIA) - Blue Print

Articulation Mapping – K Levels with Course Leaning Outcomes (CLOs)

CIA Test I (30 marks)										
CIA	**CLOs**	**K-Level**	**Section A MCQs**		**Section B Short Answer**		**Section C Either / or choice**		**Section D Open Choice**	
			No of Questions	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**
I	CLO1	Up to K3	4	2K1, K2 &K3	3	2K1 & K2	4	2K2 & 2K3	2	K2, K3
No of questions to be asked			4		3		4		2	
NO of questions to be answered			4		3		2		1	
Marks for each question			1		2		5		10	
Total marks for each section			**4**		**6**		**10**		**10**	
CIA Test II and III (60 marks)										
II	CLO2	Up to K3	4	2K1 & 2K2	3	K1, K2 & K3	4	K1,K2 & 2K3	2	K2, K3
	CLO3	Up to K3	4	2K1 & 2K3	3	2K2 & K3	4	K1,K2 & 2K3	2	K2, K3
III	CLO4	Up to K4	4	2K2, K3&K4	3	2 K2 & K3	4	2K3 & 2K4	2	K3, K4
	CLO5	Up to K4	4	2K2,K3 & K4	3	2K2 & K3	4	2K3 & 2K4	2	K2, K4
No of questions to be asked			8		6		8		4	
NO of questions to be answered			8		6		4		2	
Marks for each question			1		2		5		10	
Total marks for each section			**8**		**12**		**20**		**20**	

Distribution of Marks with K Levels CIA I, CIA II and CIA III

CIA	**K Levels**	**Section A MCQ**	**Section B (Short Answer Questions)**	**Section C (Either/Or Choice)**	**Section D (Open Choice)**	**Total Marks**	**% of (Marks without choice)**
I	K1	2	4		-	6	12%
	K2	1	2	10	10	23	46%
	K3	1		10	10	21	42%
	Marks	**4**	**6**	**20**	**20**	**50**	**100%**
	K1	4	2	10	-	16	16%

II	K2	2	6	10	20	38	38%
	K3	2	4	20	20	46	46%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**
III	K2	4	8	-	10	22	22%
	K3	2	4	20	10	36	36%
	K4	2	-	20	20	42	42%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**

Summative Examination -Blue Print

Articulation Mapping – K Levels with Course Learning Outcomes (CLOs)

Units	**CLOs**	**K- Level**	**Section A MCQs**	**Section B Short Answers**	**Section C (Either/or Choice)**	**SectionD (Open Choice)**
1	CLO 1	Up to K3	2 (K1&K2)	1 (K1)	2 (K1&K1)	1(K2)
2	CLO 2	Up to K3	2 (K1&K2)	1 (K3)	2 (K2&K2)	1(K3)
3	CLO 3	Up to K3	2 (K2&K3)	1 (K2)	2 (K3&K3)	1(K3)
4	CLO 4	Up to K4	2 (K2&K3)	1 (K3)	2 (K3&K3)	1(K4)
5	CLO 5	Up to K4	2 (K1&K3)	1 (K4)	2 (K4&K4)	1(K4)
No. of Questions to be asked			10	5	10	5
No. of Questions to be answered			10	5	5	3
Marks for each question			1	2	5	10
Total Marks for each Section			**10**	**10**	**25**	**30**

(75 Marks)

K1- Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – solving problems

K4- Examining, analyzing, presentation and make inference with evidences.

Distribution of Marks with K Level for Summative Examination

K Levels	**Section A (MultipleChoice Questions)**	**Section B (Short Answer Questions)**	**Section C (Either/OrChoice)**	**Section D(Open Choice)**	**Total Marks**	**% of (Marks without choice)**	**Consolidated %**
K1	3	2	10	-	**15**	**12.5%**	**12%**
K2	4	2	10	10	**26**	**21.6%**	**22%**
K3	3	4	20	20	**47**	**39.1%**	**39%**
K4	-	2	10	20	**32**	**26.6%**	**27%**
K5	-	-	-	-	-	-	-
Total	**10**	**10**	**50**	**50**	**120**	**100**	**100**

LESSON PLAN:

Unit	Course Content	Hrs	Mode of Teaching
I	**Introduction:** Data Communication -Networks - Network Types - Internet History - Standards and Administration.	5	Chalk & Talk, PPT
	Network Models: Protocol Layering - TCP/IP Protocol Suite - The OSI Model.	5	
	Physical Layer: Data Signals - Periodic Analog Signals - Digital Signals - Transmission Impairment - Data Rate Limits – Performance.	5	
II	Multiplexing - Spread Spectrum. **Switching:** Introduction - Circuit - Switched Networks - Packet Switching - Structure of a Switch.	5	Chalk & Talk, Spot test, Exercise, Assignment, PPT, Video material.
	Data - Link Layer: Introduction - Link Layer Addressing.	5	
	Error Detection & Correction: Introduction - Block Coding - Cyclic Codes - CheckSum - Forward Error Correction.	5	
III	**Wired LANs: Ethernet:** Ethernet Protocol - Standard Ethernet **Wireless LANs:** Introduction - IEEE 80.11 Projects - Bluetooth Other	5	Chalk & Talk, Exercise, PPT, video material
	Wireless Networks: WiMAX - Cellular Telephony - Satellite Networks. Connecting Devices.	5	
	Network Layer: Introduction to Network Layer: Network - Layer Services - Packet Switching - Network - Layer Performance - IPV4 Addresses - Forwarding of IP Packets.	5	
IV	**Network - Layer Protocol:** Internet Protocol (IP) - ICMPv4 - Mobile IP.	5	Chalk & Talk, Exercise, Assignment, video material,
	Next Generation IP: IPv6 Addressing - The IPv6 Protocol - The ICMPv6 Protocol - Transition from IPv4 to Ipv6.	5	

	Transport Layer: Introduction - Transport - Layer Protocols. **Transport - Layer Protocols:** Introduction - User Datagram Protocol - Transmission Control Protocol.	5	Group Discussion
V	**Cryptography and Network Security:** Introduction – Confidentiality – Other Aspects of Security.	8	Quiz, Chalk & Talk, Exercise , Spot test, Assignment, Seminar
	Internet Security: Network Layer Security – Transport Layer Security – Application Layer Security – Firewalls.	7	

DEPARTMENT OF INFORMATION TECHNOLOGY				I M.Sc. Information Technology				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/Week**	**CIA**	**Ext**	**Total**
II	**Elective 1I**	**21OPIE2A**	**ANDROID PROGRAMMING**	**4**	**5**	**25**	**75**	**100**

Nature of the Course

Knowledge Oriented and Skill	√	Employability Oriented		Entrepreneurship oriented	

Course Objectives

1. To understand the basics of activities and multiple layouts.
2. To understand the usage of menus in designing widgets.
3. To explore the App architecture with fragments.
4. To acquire knowledge in handling database, files and notifications.
5. To impart graphics and animation process.

Unit	Course Content	Hrs	K-Level	CLO
I	**Activities and Layout:** Introduction-Declaring an Activity- Starting a new activity with an intent object-Switching between activities-Passing data to another activity-Returning a result from an activity-Saving an activity's state-Storing persistent activity data-Understanding the activity life cycle. **Layouts:** Introduction –Defining and inflating a layout- Using Relative layout- Using linear layout-Creating tables- Table Layout and Grid Layout-Recycler View replaces List View – Changing layout properties during runtime.	15	K3	1
II	**Views, Widgets and Styles:** Introduction- Inserting a widget into a layout-Using Graphics to show button state-Creating a widget at runtime-Creating a custom component-Applying a style to a view-Turning a style into a theme-Selecting a theme based on the Android version. **Menus and Action Mode:** Introduction-Creating an options menu-Modifying menus and menu items during runtime-Enabling Contextual Action Mode for a view-Creating a pop-up menu.	15	K3	2
III	**Fragments and System UI:** Introduction-Creating and Using a Fragment-Adding and Removing Fragments during runtime-Passing data between Fragments. **Home Screen Widgets, Search and the**	15	K3	3

	System UI: Introduction- Creating a shortcut on the Home Screen- Creating a Home Screen widget- Adding Search to the Action Bar- Showing your App full-screen			
IV	**Data Storage:** Introduction-Storing simple data-Read and Write a text file to internal storage-Read and Write a text file to external storage-Including resource files in your project-Creating and Using an SQLite database-Accessing data in the background using a Loader-Accessing external storage with scoped directories in Android N. **Alerts and Notifications:** Displaying a message box with AlertDialog- Displaying a progress dialog-Making a Flashlight with a Heads-up Notification.	15	K4	4
V	**Graphics and Animation: Using the Touchscreen and Sensors:** Listening for click and long-press events- Pinch-to-zoom with multi-touch gestures- Reading sensor data-using Android Sensor Framework events- Reading device orientation. **Graphics and Animation**: Introduction-Scaling down large images to avoid Out of Memory exceptions-A transition animation-defining scenes and applying a transition- Creating a Compass using sensor data and RotateAnimation- Creating a slideshow with ViewPager-Creating a Card Flip Animation with Fragments-Creating a ZoomAnimation with a Custom Transition-Displaying Animated image (GIF/WebP) with the new ImageDecoder library- Creating a Circle image with the new ImageDecoder.	15	K4	5

Book for Study

"Android 9 Development" by Rick Boyer, Cookbook, 3rd Edition, Packet Publishing ltd 2018.

Chapters:

Unit I **:** Chapter 1, 2
Unit II **:** Chapter 3, 4
Unit III **:** Chapter 5, 6
Unit IV **:** Chapter 7, 8
Unit V **:** Chapter 9, 10

Books for Reference

1. "Android Programming for Beginners" by John Horton- 1st Edition, Packt Publishing.
2. "Android Programming Unleashed" by B.M.Harwani – Pearson Education 2013.
3. Android Programming by Bill Phillips and Chris Stewart – O'Reilly Media Publishers, Third Edition.

Web Resources

1. https://www.tutorialspoint.com/android/index.htm
2. https://www.w3adda.com/android-tutorial
3. https://www.w3points.com/android-tutorial/
4. https://sites.google.com/site/cse4707/file-cabinet

Nature of the course

- Build native interfaces, open source, expressive and flexible UI and native performance.

Activities to be given

- Practice to write Application coding
- Group Discussion
- Seminar

Pedagogy

Chalk and talk, Materials, PPT, Assignment, Seminar, Problem solving, Group discussion, Interaction and Demonstration.

COURSE LEARNING OUTCOMES

On the completion of the course, the students will be able to

CLOs	COURSE LEARNING OUTCOMES	K –Level
CLO 1	Develop various Android applications related to layouts and pass information between multiple activities.	Up to K3
CLO 2	Describe how to design simple GUI applications, use built-in widgets and components.	Up to K3
CLO 3	Discuss the usage of fragments in android platform. Design and develop user interfaces for the Android platform.	Up to K3
CLO 4	Design Android applications which make use of internal storage.	Up to K4
CLO 5	Rate the importance of animation techniques and graphics with simple graphical objects on a display screen.	Up to K4

K1- Remembering facts with specific answers
K2- Basic understanding of facts.
K3- Application oriented
K4- Analyzing, examining and making presentations with evidences

Annexure - 2

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CLOs / POs	PO1	PO2	PO3	PO4	PO5	PO6
CLO 1	2	2	1	1	1	2
CLO 2	2	2	1	2	1	2
CLO 3	2	2	1	2	1	2
CLO 4	2	2	2	2	3	2
CLO 5	2	2	3	3	3	2

1-Basic Level 2- Intermediate Level 3- Advanced Level

Continuous Internal Assessment (CIA) - Blue Print

Articulation Mapping – K Levels with Course Leaning Outcomes (CLOs)

CIA Test I (30 marks)										
CIA	**CLOs**	**K-Level**	**Section A MCQs**		**Section B Short Answer**		**Section C Either / or choice**		**Section D Open Choice**	
			No of Questions	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**
I	CLO1	Up to K3	4	2K1, K2 &K3	3	2K1 & K2	4	2K2 & 2K3	2	K2, K3
No of questions to be asked			4		3		4		2	
NO of questions to be answered			4		3		2		1	
Marks for each question			1		2		5		10	
Total marks for each section			**4**		**6**		**10**		**10**	
CIA Test II and III (60 marks)										
II	CLO2	Up to K3	4	2K1 & 2K2	3	K1, K2 & K3	4	K1,K2 & 2K3	2	K2, K3
	CLO3	Up to K3	4	2K1 & 2K3	3	2K2 & K3	4	K1,K2 & 2K3	2	K2, K3
III	CLO4	Up to K4	4	2K2, K3&K4	3	2 K2 & K3	4	2K3 & 2K4	2	K3, K4
	CLO5	Up to K4	4	2K2,K3 & K4	3	2K2 & K3	4	2K3 & 2K4	2	K2, K4
No of questions to be asked			8		6		8		4	
NO of questions to be answered			8		6		4		2	
Marks for each question			1		2		5		10	
Total marks for each section			**8**		**12**		**20**		**20**	

Annexure - 2

Distribution of Marks with K Levels CIA I, CIA II and CIA III

CIA	K Levels	Section A MCQ	Section B (Short Answer Questions)	Section C (Either/Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)
I	K1	2	4		-	6	12%
	K2	1	2	10	10	23	46%
	K3	1		10	10	21	42%
	Marks	**4**	**6**	**20**	**20**	**50**	**100%**
II	K1	4	2	10	-	16	16%
	K2	2	6	10	20	38	38%
	K3	2	4	20	20	46	46%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**
III	K2	4	8	-	10	22	22%
	K3	2	4	20	10	36	36%
	K4	2	-	20	20	42	42%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**

Summative Examination -Blue Print

Articulation Mapping – K Levels with Course Learning Outcomes (CLOs)

Units	CLOs	K- Level	Section A MCQs	Section B Short Answers	Section C (Either/or Choice)	SectionD (Open Choice)
1	CLO 1	Up to K3	2 (K1&K2)	1 (K1)	2 (K1&K1)	1(K2)
2	CLO 2	Up to K3	2 (K1&K2)	1 (K3)	2 (K2&K2)	1(K3)
3	CLO 3	Up to K3	2 (K2&K3)	1 (K2)	2 (K3&K3)	1(K3)
4	CLO 4	Up to K4	2 (K2&K3)	1 (K3)	2 (K3&K3)	1(K4)
5	CLO 5	Up to K4	2 (K1&K3)	1 (K4)	2 (K4&K4)	1(K4)
No. of Questions to be asked			10	5	10	5
No. of Questions to be answered			10	5	5	3
Marks for each question			1	2	5	10
Total Marks for each Section			**10**	**10**	**25**	**30**

(75 Marks)

K1- Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – solving problems

K4- Examining, analyzing, presentation and make inference with evidences.

Distribution of Marks with K Level for Summative Examination

K Levels	Section A (MultipleChoice Questions)	Section B (Short Answer Questions)	Section C (Either/OrChoice)	Section D(Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	3	2	10	-	**15**	**12.5%**	**12%**
K2	4	2	10	10	**26**	**21.6%**	**22%**
K3	3	4	20	20	**47**	**39.1%**	**39%**
K4	-	2	10	20	**32**	**26.6%**	**27%**
K5	-	-	-	-	-	-	-
Total	**10**	**10**	**50**	**50**	**120**	**100**	**100**

LESSON PLAN

Unit	Course Content	Hours	Mode
I	**Activities and Layout:** Introduction-Declaring an Activity-Starting a new activity with an intent object-Switching between activities-Passing data to another activity-Returning a result from an activity-Saving an activity's state-Storing persistent activity data-Understanding the activity life cycle.	8	Lecture, PPT
	Layouts: Introduction –Defining and inflating a layout- Using Relative layout- Using linear layout- Creating tables- Table Layout and Grid Layout-Recycler View replaces List View – Changing layout properties during runtime.	7	Lecture, PPT
II	**Views, Widgets and Styles:** Introduction- Inserting a widget into a layout-Using Graphics to show button state-Creating a widget at runtime-Creating a custom component-Applying a style to a view-Turning a style into a theme-Selecting a theme based on the Android version.	8	Lecture, PPT Lecture

	Menus and Action Mode: Introduction-Creating an options menu-Modifying menus and menu items during runtime-Enabling Contextual Action Mode for a view-Creating a pop-up menu.	7	
III	**Fragments and System UI:** Introduction-Creating and Using a Fragment-Adding and Removing Fragments during runtime-Passing data between Fragments.	8	Lecture Lecture, PPT
	Home Screen Widgets, Search and the System UI: Introduction- Creating a shortcut on the Home Screen-Creating a Home Screen widget- Adding Search to the Action Bar-Showing your App full-screen	7	
IV	**Data Storage:** Introduction-Storing simple data-Read and Write a text file to internal storage-Read and Write a text file to external storage-Including resource files in your project-Creating and Using an SQLite database-Accessing data in the background using a Loader-Accessing external storage with scoped directories in Android N.	8	Lecture Lecture, Seminar Lecture, PPT
	Alerts and Notifications: Displaying a message box with AlertDialog- Displaying a progress dialog-Making a Flashlight with a Heads-up Notification.	7	
V	**Graphics and Animation: Using the Touchscreen and Sensors:** Listening for click and long-press events- Pinch-to-zoom with multi-touch gestures- Reading sensor data-using Android Sensor Framework events- Reading device orientation. **Graphics and Animation**: Introduction-Scaling down large images to avoid Out of Memory exceptions-A transition animation-defining scenes and applying a transition- Creating a Compass using sensor data and RotateAnimation- Creating a slideshow with ViewPager-Creating a Card Flip Animation with Fragments-Creating a ZoomAnimation with a Custom Transition-Displaying Animated image (GIF/WebP) with the new ImageDecoder library- Creating a Circle image with the new ImageDecoder.	8 7	Lecture, GD Lecture,PPT Lecture,PPT, Assignment

Annexure - 2

DEPARTMENT OF INFORMATION TECHNOLOGY				I M.Sc. Information Technology				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/Week**	**CIA**	**Ext**	**Total**
II	**Elective II**	**21OPIE2B**	**THEORY OF COMPUTATION**	**4**	**5**	**25**	**75**	**100**

Nature of the Course

Knowledge Oriented and Skill	√	Employability Oriented		Entrepreneurship oriented	

Course Objectives

1. To give an overview of the theoretical foundations of deterministic finite automata and non deterministic finite automata.
2. To Apply transformation between multiple representations of finite automata.
3. To illustrate Context Free Grammar, Relationship between Derivation and Derivation Tree.
4. To familiarize the various Properties of Context Free Languages.
5. To explain Turing Machines to solve problems in computing.

Unit	Course Content	Hours	K Level	CLO
I	**Finite Automata :** Introduction – Finite State Machine – Acceptance of Strings and Languages – Deterministic Finite Automata – Examples: 2.1 to 2.10 – NonDeterministic Finite Automata – Significance of Non Deterministic Finite Automaton – NFA with ε-Transitions – Conversions and Equivalence – NFA to DFA Conversion – Examples: 2.39 & 2.40 – Minimization of FSM – Equivalence between Two FSM's.	15	Up to K3	CLO1
II	**Regular Expressions :** Introduction – Regular Set – Regular Expressions – Finite Automata and Regular Expressions – Conversion of Finite Automata to Regular Expressions – Identity Rules – Proving Languages not to be Regular – Applications of Regular Expression – Closure Properties of Regular Languages.	15	Up to K3	CLO2

III	**Context Free Grammar :** Introduction – Regular Grammar – Equivalence between Regular Grammar and FA – Context Free Grammar – Derivation and languages – Derivation Trees – Relationship between Derivation and Derivation Tree – Ambiguity – Simplification of CFG.	15	Up to K3	CLO3
IV	**Properties of Context Free Languages:** Introduction – Normal Forms – Applications of Context free Grammar – Properties of Context Free Languages.	15	Up to K4	CLO4
V	**Turing Machines :** Introduction – Model of Turing machine – Definition of Turing machine – Programming Techniques for Turing Machines – Computable Language and Functions – Examples: 7.1 to 7.8 – Two way infinite Tape – Examples: 7.16 & 7.17 – Chomsky's Hierarchy – Power of Turing Machine – Comparison of FM, PDA and TM.	15	Up to K4	CLO5

Book for Study

Puntambekar A.A, *Theory of Computation*, Technical Publications, Pune, First Edition 2009.

UNIT I – Chapter 2 (2.1 - 2.11)
UNIT II – Chapter 3
UNIT III – Chapter 4
UNIT IV – Chapter 5
UNIT V – Chapter 7 (7.1 - 7.9)

Books for Reference

1. Dexter C. Kozen, *Theory of Computation*, Springer Publication, New York, 2006 edition, 2006.

2.John Hopcroft.E, Rajeev Motwani, Jeffrey D.Ullman, *Introduction to Automata Theory, Languages and Computation*, Pearson Education, New Delhi, Third Edition, 2014.

3. John Martin, Introduction to Languages and the Theory of Computation , McGraw-Hill Publication, Boston, First Edition, 2003.

4. Michael Sipser, *Introduction to the Theory of Computation*, PWS Publishing Company, Boston, Third edition, 2002.

5. Wayne Goddard, *Introducing the Theory of Computation*, *Jones & Bartlett* India Pvt Ltd, Delhi, 2008.

Web Resources

1. http://www.a-zshiksha.com/forum/viewtopic.php?f=133&t=61529
2. https://srecwarangal.ac.in/cse/cse-downloads/Theory-of-Computation.pdf
3. https://courses.engr.illinois.edu/cs373/fa2013/Lectures/

E-Books

1. https://www.mog.dog/files/SP2019/Sipser_Introduction.to.the.Theory.of.Computation.3E.pdf
2. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.465.3774&rep=rep1&type=pdf
3. https://www.cs.utexas.edu/~ear/cs341/automatabook/AutomataTheoryBook.pdf

Pedagogy

Power point Presentations, Seminar, Quiz, Assignment, video material and Brainstorming.

Activities to be given

- Group Discussion
- Quiz
- Seminar

Course Learning Outcomes (CLOs)

Upon successful completion of the Course, the students will be able to

No.	Course Outcomes	Knowledge Level(According to Bloom's Taxonomy)
CLO 1	To use basic concepts of formal languages of finite automata Techniques.	Up to K3
CLO 2	Understand and construct finite state machines and the equivalent regular expressions.	Up to K3
CLO 3	To Construct context free grammar for various languages.	Up to K3
CLO 4	Synthesizes Context Free Grammar with specific properties.	Up to K4
CLO 5	Construct model of Turing machine and the comparison of Finite Machine with Turing Machine.	Up to K4

K1- Remembering facts with specific answers
K2- Basic understanding of facts.
K3- Application oriented
K4- Analyzing, examining and making presentations with evidences

Annexure - 2

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO 1	2	2	3	2	-	-
CLO 2	3	3	3	1	2	1
CLO 3	2	2	2	2	1	2
CLO 4	2	2	1	2	2	1
CLO 5	2	2	1	2	1	-

1-Basic Level 2- Intermediate Level 3- Advanced Level

Continuous Internal Assessment (CIA) - Blue Print

Articulation Mapping – K Levels with Course Leaning Outcomes (CLOs)

CIA Test I (30 marks)										
CIA	**CLOs**	**K-Level**	**Section A MCQs**		**Section B Short Answer**		**Section C Either / or choice**		**Section D Open Choice**	
			No of Questions	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**	**No of Questions**	**K-Level**
I	CLO1	Up to K3	4	2K1, K2 &K3	3	2K1 & K2	4	2K2 & 2K3	2	K2, K3
No of questions to be asked			4		3		4		2	
NO of questions to be answered			4		3		2		1	
Marks for each question			1		2		5		10	
Total marks for each section			**4**		**6**		**10**		**10**	
CIA Test II and III (60 marks)										
II	CLO2	Up to K3	4	2K1 & 2K2	3	K1, K2 & K3	4	K1,K2 & 2K3	2	K2, K3
	CLO3	Up to K3	4	2K1 & 2K3	3	2K2 & K3	4	K1,K2 & 2K3	2	K2, K3
III	CLO4	Up to K4	4	2K2, K3&K4	3	2 K2 & K3	4	2K3 & 2K4	2	K3, K4
	CLO5	Up to K4	4	2K2,K3 & K4	3	2K2 & K3	4	2K3 & 2K4	2	K2, K4
No of questions to be asked			8		6		8		4	
NO of questions to be answered			8		6		4		2	
Marks for each question			1		2		5		10	
Total marks for each section			**8**		**12**		**20**		**20**	

Annexure - 2

Distribution of Marks with K Levels CIA I, CIA II and CIA III

CIA	K Levels	Section A MCQ	Section B (Short Answer Questions)	Section C (Either/Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)
I	K1	2	4		-	6	12%
	K2	1	2	10	10	23	46%
	K3	1		10	10	21	42%
	Marks	**4**	**6**	**20**	**20**	**50**	**100%**
II	K1	4	2	10	-	16	16%
	K2	2	6	10	20	38	38%
	K3	2	4	20	20	46	46%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**
III	K2	4	8	-	10	22	22%
	K3	2	4	20	10	36	36%
	K4	2	-	20	20	42	42%
	Marks	**8**	**12**	**40**	**40**	**100**	**100%**

Summative Examination -Blue Print

Articulation Mapping – K Levels with Course Learning Outcomes (CLOs)

Units	CLOs	K- Level	Section A MCQs	Section B Short Answers	Section C (Either/or Choice)	SectionD (Open Choice)
1	CLO 1	Up to K3	2 (K1&K2)	1 (K1)	2 (K1&K1)	1(K2)
2	CLO 2	Up to K3	2 (K1&K2)	1 (K3)	2 (K2&K2)	1(K3)
3	CLO 3	Up to K3	2 (K2&K3)	1 (K2)	2 (K3&K3)	1(K3)
4	CLO 4	Up to K4	2 (K2&K3)	1 (K3)	2 (K3&K3)	1(K4)
5	CLO 5	Up to K4	2 (K1&K3)	1 (K4)	2 (K4&K4)	1(K4)
No. of Questions to be asked			10	5	10	5
No. of Questions to be answered			10	5	5	3
Marks for each question			1	2	5	10
Total Marks for each Section			**10**	**10**	**25**	**30**

(75 Marks)

K1- Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – solving problems

K4- Examining, analyzing, presentation and make inference with evidences.

Distribution of Marks with K Level for Summative Examination

K Levels	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either/Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	3	2	10	-	**15**	**12.5%**	**12%**
K2	4	2	10	10	**26**	**21.6%**	**22%**
K3	3	4	20	20	**47**	**39.1%**	**39%**
K4	-	2	10	20	**32**	**26.6%**	**27%**
K5	-	-	-	-	**-**	**-**	-
Total	**10**	**10**	**50**	**50**	**120**	**100**	**100**

LESSON PLAN:

Unit	Course Content	Hrs	Mode of Teaching
I	**Finite Automata :** Introduction – Finite State Machine – Acceptance of Strings and Languages – Deterministic Finite Automata –Examples: 2.1 to 2.10 – Non Deterministic Finite Automata – Significance of Non Deterministic Finite Automaton .	8	Chalk & Talk, PPT
	NFA with ε-Transitions – Conversions and Equivalence – NFA to DFA Conversion – Examples: 2.39 & 2.40 – Minimization of FSM.	7	
II	**Regular Expressions :** Introduction – Regular Set – Regular Expressions – Finite Automata and Regular Expressions – Conversion of Finite Automata to Regular Expressions	8	Chalk & Talk, Spot test, Exercise, Assignment, PPT, Video material.
	Identity Rules – Proving Languages not to be Regular – Applications of Regular Expression – Closure Properties of Regular Languages.	7	
III	**Context Free Grammar :** Introduction – Regular Grammar – Equivalence between Regular Grammar and FA – Context Free Grammar .	8	Chalk & Talk, Exercise, PPT, video material

	Derivation and languages – Derivation Trees – Relationship between Derivation and Derivation Tree – Ambiguity – Simplification of CFG.	7	
IV	**Properties of Context Free Languages:** Introduction – Normal Forms .	8	Chalk & Talk, Exercise, Assignment, video material, Group Discussion
	Applications of Context free Grammar – Properties of Context Free Languages.	7	
V	**Turing Machines :** Introduction – Model of Turing machine – Definition of Turing machine – Programming Techniques for Turing Machines .	8	Quiz, Chalk & Talk, Exercise , Spot test, Assignment, Seminar
	Computable Language and Functions – Examples: 7.1 to 7.8 – Two way infinite Tape – Examples: 7.16 & 7.17 – Chomsky's Hierarchy – Power of Turing Machine – Comparison of FM, PDA and TM.	7	

Annexure - 2

DEPARTMENT OF INFORMATION TECHNOLOGY				I M.Sc. Information Technology				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/Week**	**CIA**	**Ext**	**Total**
II	**Core Lab**	**21OPI21P**	**Unix and Linux Programming Lab**	**2**	**5**	**40**	**60**	**100**

Nature of the Course

Knowledge Oriented and Skill	√	Employability Oriented	√	Entrepreneurship oriented	

Course Objectives

1. To learn the fundamental concepts of UNIX Operating System and its File System.
2. To gain an understanding of important aspects related to the SHELL and the process.
3. Demonstrate UNIX commands for file handling and process control.
4. To create the directory, change and remove the directory.
5. To demonstrate the basic knowledge of Linux commands and file handling utilities by using Linux shell environment .

Unit	Course Content	Hrs	K-Level	CLO
I	1. Write A Unix Program to Add Two Numbers. 2. Write A Unix Program to Factorial Of A Given Number. 3. Write A Unix Program to Print The Roman Value.	15	K2	1
II	4 Write A Unix Program to Check The Perfect Number. 5. Write A Unix Program to Sorting Array Of Names Using Awk. 6. Write A Unix Program to Check Palindrome or not Palindrome.	15	K2	2
III	7. Write A Unix Program to Prepare Electricity Bill Using Awk. 8. Write A Unix Program to Find The Larger Using Function. 9. Write A Unix Program to Find Student Grade.	15	K3	3
IV	10. Write A Linux Program to Various File and Directory Handling Commands. 11. Write A Linux Program to Arithmatic Calculation. 12. Write A Linux Program to Multiplication Table. 13. Write a awk script to find the number of characters, words and lines in a file.	15	K3	4
V	14. Write A Linux Program Swapping The Number. 15. Write A Linux Program System Variables Path, Home.	15	K4	5

	16. Write A Linux Program Check And List Attributes Of Processes. 17. Write A Linux Program Display List Of Users Currently Logged In			

Books for Study

Michael Kerrisk , *The Linux Programming Interface: A Linux and UNIX System Programming Handbook*, BS Publications, 1st Edition ,2008.

Books for Reference

1.Richard Petersen, "*Linux: The Complete Reference*", McGraw-Hill, Sixth Edition,2008.

2.William E. Shotts, Jr., "*The Linux Command Line: A Complete Introduction*", No Starch Press, Second Edition,2013

3. Sumitabha Das "*Unix Concept and Application*" Published by Tata McGraw-Hill Fourth Edition 2006,

4.Syed mansoor sarwar Robert M.Koretsky "*Unix*" published by Taylor & Francis group 3rd Edition 2005

5.Richard Stevens.W, Stephen A.Rago "*Advanced programming in the Unix*" published by Addison-Wesley Professional 3rd Edition 2013.

Web Resources

1. http://aryacollegeludhiana.in/E_BOOK/computer/Unix.pdf

2.https://books.google.co.in/books?id=uhgNDgAAQBAJ&pg=PA406&lpg=PA406&dq=unix:+the+textbook#v=onepage&q=unix%3A%20the%20textbook&f=false

3.https://books.google.co.in/books?id=kCTMFpEcIOwC&pg=PA115&source=gbs_selected_pages&cad=2#v=onepage&q&f=false

4.https://doc.lagout.org/operating%20system%20/linux/Linux%20The%20Complete%20Reference.pdf

5.https://wiki.lib.sun.ac.za/images/c/ca/TLCL-13.07.pdf

E-Book

1. https://doc.lagout.org/operating%20system%20/linux/Linux%20-%20The%20Complete%20Reference.pdf

2. https://wiki.lib.sun.ac.za/images/c/ca/TLCL-13.07.pdf

3. http://index-of.es/OS/Venkateswarlu%20N.Introducing%20Linux.Installation%20and%20Programming.BSP.%5BENG,601p.,2008%5D.pdf

Pedagogy

Record Book Writing, Projector Demonstration and Practical sessions.

Nature of the course

- Developing logic and structured program, organizing data in software development.

Activities to be given

- Implement Programming

Activities on Employability Oriented

- Software Development
- Data Analysis

LESSON PLAN

Unit	Course Content	Hrs	Mode of Teaching
I	1. Write A Unix Program to Add Two Numbers. 2. Write A Unix Program to Factorial Of A Given Number. 3. Write A Unix Program to Print The Roman Value.	15	Demo & Practical Session
II	4 Write A Unix Program to Check The Perfect Number 5. Write A Unix Program to Sorting Array Of Names Using Awk. 6. Write A Unix Program to Check Palindrome or not Palindrome.	15	Demo & Practical Session
III	7. Write A Unix Program to Prepare Electricity Bill Using Awk. 8. Write A Unix Program to Find The Larger Using Function. 9. Write A Unix Program to Find Student Grade.	15	Demo & Practical Session
IV	10. Write A Linux Program to Various File and Directory Handling Commands. 11. Write A Linux Program to Arithmetic Calculation. 12. Write A Linux Program to Multiplication Table. 13. Write a awk script to find the number of characters, words and lines in a file	15	Demo & Practical Session
V	14. Write A Linux Program Swapping The Number 15. Write A Linux Program System Variables Path, Home 16. Write A Linux Program Check And List Attributes Of Processes 17. Write A Linux Program Display List Of Users Currently Logged In	15	Demo & Practical Session

Annexure - 2

COURSE LEARNING OUTCOMES

On the completion of the course, the students will be able to

CLOs	Course Outcome	K – Level
CLO 1	Understanding the basic set of commands and utilities in Linux/UNIX systems.	Up to K2
CLO 2	To learn the important Linux/UNIX library functions and system calls	Up to K2
CLO 3	Develop UNIX programs Using Function and AWK.	Up to K3
CLO 4	Analyze Various File and Directory Handling Commands in LINUX Programming.	Up to K3
CLO 5	Analyze System Variables Path, Home.	Up to K4

K1- Remembering facts with specific answers
K2- Basic understanding of facts.
K3- Application oriented
K4- Analyzing, examining and making presentations with evidences

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CLOs / POs	PO1	PO2	PO3	PO4	PO5	PO6
CLO 1	2	2	3	1	-	1
CLO 2	2	2	2	1	1	2
CLO 3	3	3	2	2	1	1
CLO 4	2	3	2	3	-	-
CLO 5	2	2	3	3	-	-

1-Basic Level **2- Intermediate Level** **3- Advanced Level**

Annexure - 2

DEPARTMENT OF INFORMATION TECHNOLOGY				I M.Sc. Information Technology				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/Week**	**CIA**	**Ext**	**Total**
II	**Core Lab**	**21OPI22P**	**DIGITAL IMAGE PROCESSING LAB**	**2**	**5**	**40**	**60**	**100**

Nature of the Course

Knowledge Oriented and Skill	√	Employability Oriented	√	Entrepreneurship oriented	

Course Objectives

1. To develop program for extract image attributes and image negation.
2. To cover the fundamentals of digital image processing.
3. To perform image enhancement techniques.
4. Use image processing operations that process digital images and mapping technique.
5. To develop image Chain Coding procedure.

Unit	Content	Hrs	K-Level	CLO
I	1. Write a MATLAB program to extract different Attributes of an Image. 2. Write a MATLAB program for Image Negation.	15	K2	1
II	3. Write a MATLAB program for Power Law Transformation. 4. Write a MATLAB program for Histogram Mapping and Equalization	15	K2	2
III	5. Design a MATLAB program for Image Smoothening and Sharpening. 6. Design a MATLAB program for Edge Detection using Sobel, Prewitt and Roberts Operators.	15	K3	3
IV	7. Design a MATLAB program for Morphological Operations on Binary Images. 8. Design a MATLAB program for Pseudo Coloring	15	K3	4
V	9. Develop a MATLAB program for Chain Coding. 10. Develop a MATLAB program for DCT/IDCT Computation.	15	K4	5

Books for Study

1. Gonzales and Woods, "*Digital Image Processing*", Pearson Education, India, Third Edition.

Books for Reference

1. Ze-Nian Li and Mark S. Drew, "*Fundamentals of Multimedia*", PHI 2011.

2. Rafael C. Gonzalez,Richard E. Woods,Steven L. Eddins,"*Digital Image Processing Using MATLAB*",Gatesmark Publishing,Second Edition,2009.

3. Murat Tekalp, "*Digital Video Processing*", Pearson, 2010.

4. John W. Woods, "*Multidimensional Signal, Image and Video Processing*", Academic Press 2012.

5. Anil K.Jain, "*Fundamentals of Image Processing*", Prentice Hall of India, First Edition, 1989.

Web Resources

1. https://www.tutorialspoint.com/dip/index.htm
2. https://en.wikipedia.org/wiki/Digital_image_processing
3. https://www.cs.umd.edu/class/fall2016/cmsc426/matlab/matlab_imageprocessing.pdf
4. https://kanchiuniv.ac.in/coursematerials/Digital%20image%20processing%20-Vijaya%20Raghavan.pdf
5. https://blogs.mathworks.com/steve/2011/09/27/digital-image-processing-using-matlab-reading-image-files

E-Books

1.http://sdeuoc.ac.in/sites/default/files/sde_videos/Digital%20Image%20Processing%203rd%20ed.%20-%20R.%20Gonzalez%2C%20R.%20Woods-ilovepdf-compressed.pdf

2.http://imageprocessingplace.com/downloads_V3/dipum2e_downloads/dipum2e_sample_book_material_downloads/DIPUM2E_Chapter02_Pgs_13-50.pdf

3.https://preetikale.files.wordpress.com/2018/07/fundmentals-of-digital-image-processing-ak-jain.pdf

4.https://preetikale.files.wordpress.com/2018/07/handbook-of-image-and-video-processing-al-bovik1.pdf

Pedagogy

Record Book Writing, Projector Demonstration and Practical sessions.

Nature of the course

- Developing logic and structured program, organizing data in software development.

Activities to be given

- Implement Programming

- Mini Projects
- Web page Designing
- Software development

LESSON PLAN

Unit	Course Content	Hrs	Mode of Teaching
I	1.Write a MATLAB program to extract different Attributes of an Image. 2.Write a MATLAB program for Image Negation.	15	Demo & Practical Session
II	3.Write a MATLAB program for Power Law Transformation. 4. Write a MATLAB program for Histogram Mapping and Equalization	15	Demo & Practical Session
III	5. Design a MATLAB program for Image Smoothening and Sharpening. 6.Design a MATLAB program for Edge Detection using Sobel, Prewitt and Roberts Operators.	15	Demo & Practical Session
IV	7.Design a MATLAB program for Morphological Operations on Binary Images. 8.Design a MATLAB program for Pseudo Coloring	15	Demo & Practical Session
V	9.Develop a MATLAB program for Chain Coding. 10.Develop a MATLAB program for DCT/IDCT Computation.	15	Demo & Practical Session

COURSE LEARNING OUTCOMES

On the completion of the course, the students will be able to

CLOs	COURSE LEARNING OUTCOMES	K – Level
CLO 1	Understand program for extract image attributes and image. negation.	Up to K2
CLO 2	Interpret and analyze graphical representation through image transforms.	Up to K2
CLO 3	Apply image and video processing for various image smoothening applications.	Up to K3
CLO 4	Design for Morphological Operation on binary image and pseudo coloring.	Up to K3
CLO 5	Develop various compression techniques on digital images.	Up to K4

K1- Remembering facts with specific answers
K2- Basic understanding of facts.
K3- Application oriented
K4- Analyzing, examining and making presentations with evidences

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CLOs / POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
CLO 1	2	2	3	1	-	1
CLO 2	2	2	2	1	1	2
CLO 3	3	3	2	2	1	1
CLO 4	2	3	2	3	-	-
CLO 5	2	2	3	3	-	-

1-Basic Level **2- Intermediate Level** **3- Advanced Level**

Annexure - 2

DEPARTMENT OF INFORMATION TECHNOLOGY				I M.Sc. Information Technology				
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**Ext**	**Total**
II	**NME**	**21OPINM2**	**TECHNOLOGIES OF INTERNET**	**2**	**2**	**25**	**75**	**100**

Nature of the Course

Knowledge Oriented and Skill	√	Employability Oriented	√	Entrepreneurship oriented	

Course Objectives

1. To impart the knowledge of basics of Internet.
2. Learning the various aspects of internet design and functionalities.
3. To learn the concept of sending and receiving the Email.
4. To familiarize the concept of Computer Security.
5. To provide the knowledge of computer Viruses, Bombs and Worms.

Unit	Course Content	Hrs	K-Level	CLO
I	**Internet:** Internet Definition - Network Definition-Common terminologies – Node - Host- Workstation -Network Administrator - Network security - Network Components – Types of Networks - Addressing in Internet – DNS - Network topologies.	6	K2	CLO1
II	**Browsers and Search engines:** Browsers – browser - Introduction – Parts of a browser window -Running a browser - working with a Browser. Search Engines: What is Search Engine? - Types of Search Engines.	6	K2	CLO2
III	**E-mail:** E-mail - E-mail Networks and Servers - E-mail Protocols - Structure of E-mail - Attachments – E-mail Clients - web based E-mail- Address book – Signature File.	6	K2	CLO3
IV	**Computer Security:** Types of Computer Crimes – Computer Security – Crime and Security – Computer Crime by Authorized Users – Computer Crime through Unauthorized access – Malicious Computer Programs.	6	K2	CLO4
V	**Computer Viruses, Bombs, and Worms:** What do Viruses do? – Virus Prevention guidelines – Types of Viruses – Characteristics of Viruses – Categories of Viruses – Antivirus Software or Virus vaccines.	6	K3	CLO5

Books for Study

1. Ramesh Bangia "*Internet Technology and Web design* ", Firewall Media, Third Edition, Lakshmi Publications Pvt. Ltd, 2011.
2. Alexis Leon & Mathews Leon, *Fundamentals of Information Technology* Vikas Publishing House Pvt. Ltd., Second Edition, 2009.

Chapters

Text Book: 1

Unit I : Chapter 1,2

Unit II : Chapter 3 & Chapter 4

Unit III : Chapter 5(5.6), Chapter 8(8.11 &8.13)

Text Book: 2

Unit IV : Chapter 30

Unit V : Chapter 32

Books for Reference

1. The Internet Book by Douglas E. Comer, Fourth Edition, PHI Learning Pvt. ltd., New Delhi, 2009.
2. Using the Internet the Easy Way by Young Kai Seng, Minerva Publications, First Edition, 2000.

Web Resources

1. https:// www.tutorialspoint.com
2. https://www.simlilearn.com
3. https://www.w3schools.com
4. https://www.top-windows-tutorials.com

Pedagogy

Chalk and talk , Materials, PPT, Assignment , Seminar , Problem solving , Group discussion , Interaction and Demonstration.

Nature of the course

- Helps to get a chance to showcases their skills and capabilities in an interactive and advanced environment.

Activities to be given

- Creating and Accessing E-Mail
- Surfing on Web

Course Learning Outcomes

On the completion of the course, the students will be able to

CLOs	Course Learning Outcome	K- Levels
CLO 1	Describe the concept of Network Definition, Network Administrator, Network Security and Network Topologies	Up to K2
CLO 2	Discuss the concepts of Browsers and Search Engines	Up to K2
CLO 3	Describe on E-mail Networks and Servers, E-mail Protocols, Structure of E-mail, Attachments, E-mail Clients, web-based E-mail-Address book, Signature File	Up to K2
CLO 4	Elaborate the concept of Computer Security and Computer Crimes.	Up to K2
CLO 5	Discuss the concept of Computer Viruses, Bombs and Worms	Up to K3

K1- Remembering facts with specific answers
K2- Basic understanding of facts.
K3- Application oriented
K4- Analyzing, examining and making presentations with evidences

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CLO / PO	PO1	PO2	PO3	PO4	PO5	PO6
CLO 1	2	-	-	-	1	1
CLO 2	2	-	-	-	1	1
CLO 3	2	2	1	2	1	2
CLO 4	2	-	-	2	3	2
CLO 5	2	-	-	3	3	2

1-Basic Level 2- Intermediate Level 3- Advanced Level

Continuous Internal Assessment (CIA) - Blue Print
Articulation Mapping – K Levels with Course Leaning Outcomes (CLOs)

units	CLOs	K-level	Section A		Section B		Section C	Section D
			MCQs		Short Answers			
			No. of Questions	K-Level	No. of Questions	K-Level	(Either/or Choice)	(Open Choice)
I	CLO 1	Up to K2	1	K1	-			
II	CLO 2	Up to K2	1	K1	1	K1		
III	CLO 3	Up to K2	1	K2	1	K2		
IV	CLO 4	Up to K2	1	K2	1	K2	2 (K2 & K2)	1 (K2)
V	CLO 5	Up to K3	-					1 (K3)
No. of Questions to be asked			4		3		2	2
No. of Questions to be answered			4		3		1	1
Marks for each question			1		2		5	10
Total Marks for each Section			**4**		**6**		**5**	**10**

Annexure - 2

Distribution of Marks with K Level for Formative Examination

CIA	K Levels	Section A MCQ	Section B (Short Answer Questions)	Section C (Either/Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
I	K1	2	2	10	-	14	28%	28%
	K2	2	4	10	10	26	52%	52%
	K3				10	10	20%	20%
	Marks	**4**	**6**	**20**	**20**	**50**	**100 %**	**100%**

Summative Examination -Blue Print

Articulation Mapping – K Levels with Course Learning Outcomes (CLOs)

Units	CLOs	K- Level	Section A MCQs	Section B Short Answers	Section C (Either/or Choice)	Section D (Open Choice)
1	CLO 1	Up to K2	2 (K1&K2)	1 (K1)	2 (K1&K1)	1(K2)
2	CLO 2	Up to K2	2 (K1&K2)	1 (K2)	2 (K2&K2)	1(K2)
3	CLO 3	Up to K2	2 (K1&K2)	1 (K2)	2 (K2&K2)	1(K2)
4	CLO 4	Up to K2	2 (K1&K2)	1 (K2)	2 (K2&K2)	1(K2)
5	CLO 5	Up to K3	2 (K1&K2)	1 (K2)	2 (K2&K2)	1(K3)
No. of Questions to be asked			10	5	10	5
No. of Questions to be answered			10	5	5	3
Marks for each question			1	2	5	10
Total Marks for each Section			**10**	**10**	**25**	**30**

K1- Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – solving problems

Distribution of Marks with K Level for Summative Examination

K Levels	Section A (No choice)	Section B (No choice)	Section C (Either/ or)	Section D (Open choice)	Total marks	% of marks without choice	Consolidated
K1	4	4	20	20	48	40.00	40%
K2	4	4	20	20	48	40.00	40%
K3	2	2	10	10	24	20.00	20%
Total marks	10	10	50	50	120	100	100%

Annexure - 2

LESSON PLAN

Unit	Content	Hours	Mode
I	**Internet:** Internet Definition - Network Definition-Common terminologies – Node - Host- Workstation -Network Administrator .	3	Lecture, GD
	Network security - Network Components – Types of Networks - Addressing in Internet – DNS - Network topologies.	3	
II	**Browsers and Search engines:** Browsers – browser - Introduction – Parts of a browser	3	Lecture
	window -Running a browser - working with a Browser. Search Engines: What is Search Engine? - Types of Search Engines.	3	
III	**E-mail:** E-mail - E-mail Networks and Servers - E-mail Protocols - Structure of E-mail	3	Lecture, PPT
	Attachments – E-mail Clients - web based E-mail-Address book – Signature File.	3	
IV	**Computer Security:** Types of Computer Crimes – Computer Security – Crime and Security – Computer Crime by Authorized Users .	3	Lecture, PPT
	Computer Crime through Unauthorized access – Malicious Computer Programs.	3	
V	**Computer Viruses, Bombs, and Worms:** What do Viruses do? – Virus Prevention guidelines – Types of Viruses	3	Lecture, GD, Assignment
	Characteristics of Viruses – Categories of Viruses – Antivirus Software or Virus vaccines.	3	