



PSGR Krishnammal College for Women



**DEPARTMENT OF INFORMATION TECHNOLOGY**

**CHOICE BASED CREDIT SYSTEM (CBCS)  
&  
LEARNING OUTCOMES BASED CURRICULAR FRAMEWORK (LOCF)**

**BACHELOR OF INFORMATION TECHNOLOGY**

**2021-2024 BATCH**



## PROGRAMME LEARNING OUTCOMES (PLO's)

After Completion of the programme, the student will be able to

**PLO1:** Design, implement, and evaluate a computing-based solution to meet the industry standards.

**PLO2:** Apply computing theory and programming principles to real-time software design and development.

**PLO3:** Explore Current and emerging techniques and technologies to formulate solutions for systems and organizations.

**PLO4:** Pursue higher studies in the specialized area and also promote life-long learning for professional development.

**PLO5:** Recognize as world class professionals in IT and produce women entrepreneurs to increase more employability.

## PROGRAMME SPECIFIC OUTCOMES (PSO's)

The students at the time of graduation will

**PSO1:** Professionally be equipped in the areas of programming, Cloud Infrastructure, Internet of Things, Mobile Application Development and to be ease with the recent technologies of various domains.

**PSO2:** Apply the knowledge of technology and soft skills to carry out societal software development.

**PSO3:** Analyze modern computer languages and applications for their successful Career, to create platforms to become an entrepreneur and a relish for higher studies.



DEPARTMENT OF INFORMATION TECHNOLOGY

CHOICE BASED CREDIT SYSTEM & LEARNING OUTCOMES BASED CURRICULAR FRAMEWORK (LOCF)

BACHELOR OF INFORMATION TECHNOLOGY – 2021-2024 BATCH

Semester	Part	Subject Code	Title of paper	Category	Instruction hours / week	Contact hours	Tutorial hours	Duration of Examination	Examination Marks			Credits
									CA	ESE	Total	
I	I	TAM2101/ HIN2101/ FRE2101	Language I	Language	6	86	4	3	50	50	100	3
	II	ENG2101	English Paper I	English	6	86	4	3	50	50	100	3
	III	PP21C01	<b>Core-1:</b> Programming in C	CC	4	56	4	3	50	50	100	4
	III	PB21C02	<b>Core-2:</b> Bioinformatics	CC	3	41	4	3	50	50	100	3
	III	IN21CP1	<b>Lab 1:</b> C Programming lab	CC	3	45	-	3	50	50	50*	2
	III	TH21A03	<b>Allied A1:</b> Numerical and Statistical Techniques	GE	6	86	4	3	50	50	100	5
	IV	NME21ES NME19A1/ NME19B1	Introduction to Entrepreneurship Advance Tamil/ Basic Tamil	AEC	2	28	2	2	50	50	100	2
II	I	TAM2102/ HIN2102/ FRE2102	Language II	Language	6	86	4	3	50	50	100	3
	II	ENG2102	English Paper II	English	5	71	4	3	50	50	100	3
	III	IN21C03	<b>Core-3:</b> OOP's with JAVA.	CC	5	71	4	3	50	50	100	5
	III	IN21CP2	<b>Lab -2:</b> OOP's Programming & Bio-Computing Lab	CC	5	75	-	3	50	50	50*	3

II	III	TH21A06	<b>Allied A2:</b> Discrete Mathematics	GE	6	86	4	3	50	50	100	5	
	IV		Open Course: (Self study - Online Course)	AEC	-	-	-	-	-	-	-	Grade	
		NME19A2/ NME19B2	**Advance Tamil/Basic Tamil	AEC	-	-	-	-	-	-	-	Grade	
III	V	21PEPS1	Professional English for Physical Sciences	AEC	3	40	5	2	50	50	100	2	
	VI	NM12GAW	General Awareness	AEC	Self Study	-	-	Online Test	100	-	-	Grade	
	III	IN21C04	<b>Core - 4:</b> Operating System	CC	5	71	4	3	50	50	100	4	
	III	IN21C05	<b>Core - 5:</b> Data Structures	CC	5	71	4	3	50	50	100	4	
	III	PDB2103	<b>Core - 6 :</b> Database Management Systems	CC	5	71	4	3	50	50	100	4	
	III	IN21CP3	<b>Lab 3 :</b> DBMS Lab	CC	4	60	-	3	25	25	50	2	
	III	TH21A13	<b>Allied A3:</b> Allied Optimization Techniques	GE	6	86	4	3	50	50	100	5	
	III	IN21SBP1 IN21SBCE	<b>SBS I:</b> Full Stack Java Development Lab/ <b>Coursera:</b> Programming in PHP and MYSQL	SEC	3	45	-	2	40	60	100	3	
	IV	NM21EVS	<b>Foundation Course-II:</b> Environmental Studies	AECC	Self-Study	-	-	-	100	-	100	Grade	
	IV	NM21UHR	<b>Foundation Course III:</b> Universal Human Values & Human Rights	AECC	2	26	4	-	100	-	100	2	
	III & IV	VI	JOB21	<b>Job Oriented Course-Mobile Services</b>		-	-	-	3	-	-	-	Grade
	V	III	IN21C10	<b>Core 10:</b> Python Programming	CC	5	73	2	3	50	50	100	4
III		IN21C11	<b>Core 11:</b> Computer Graphics	CC	5	73	2	3	50	50	100	4	

V	III	IN21C12	<b>Core 12:</b> Principles of Data Communications and Networks	CC	5	73	2	3	50	50	100	4
	III	IN21E01	<b>Elective 1:</b> Cloud Computing	DSE	5	73	2	3	50	50	100	5
		IN21E02	<b>Elective 2:</b> Wireless Sensor Networks									
		IN21E03	<b>Elective 3:</b> Augmented Reality /Virtual Reality									
	III	IN21CP5	<b>Lab -5:</b> Python Lab	CC	5	75	-	3	25	25	50	3
	III	IN20SBCE	<b>Coursera:</b> Programming in PHP and MySQL	SEC	3	45	-	-	-	100	100	3
	IV	NM21CS1	Cyber Security 1	AECC	2	30	-	-	100	-	100	Grade
	III	IN16AC1 IN16AC2	<b>Advanced Learner Course Paper 1:</b> Data Mining <b>Paper 2:</b> Information Retrieval			-	-	3	25	75	100*	5*
	III	CE	Comprehensive Exam		-	-	-	1	-	100	100	Grade
	IV	INST1	Field work/ Institutional Training		-	-	-	-	-	-	100	2
		Personality Development		-	-	-	-	-	-	-	Grade	

\* \*The credit is applicable to candidates who takes up the advanced level course exam-Additional Credits

CC: Core Courses

CA: Continuous Assessment

GE: Generic Elective

ESE: End Semester Examination

AEC: Ability Enhancing Course

SEC: Skill Enhancement Course

AECC: Ability Enhancement Compulsory Course

DSE: Discipline Specify Elective

**MAPPING OF POs WITH Cos**

COURSE	PROGRAMME OUTCOMES				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5
<b>PP21C01</b>					
CLO1	M	S	S	S	M
CLO2	S	S	M	S	M
CLO3	S	S	S	S	S
CLO4	S	S	S	S	S
<b>IN21CP1</b>					
CLO1	S	S	M	S	M
CLO2	S	S	S	S	S
CLO3	S	S	S	S	M
CLO4	S	S	M	S	M
<b>PB21C02</b>					
CLO1	S	S	S	M	M
CLO2	S	S	S	S	S
CLO3	S	S	S	S	M
CLO4	S	S	S	S	M
<b>IN21C03</b>					
CLO1	S	M	S	S	M
CLO2	S	S	S	S	M
CLO3	S	M	M	S	S
CLO4	S	M	S	S	S
<b>IN21CP2</b>					
CLO1	S	S	M	S	M
CLO2	S	S	S	S	M
CLO3	S	S	M	S	S
CLO4	S	S	S	S	S
<b>IN21C04</b>					
CLO1	S	M	S	M	S
CLO2	S	S	S	M	S
CLO3	S	S	M	S	S
CLO4	S	S	M	M	S
<b>IN21C05</b>					
CLO1	S	M	M	S	S
CLO2	S	M	S	M	M
CLO3	M	M	S	M	S
CLO4	S	S	S	M	S
<b>PDB2103</b>					
CLO1	M	S	M	S	M
CLO2	S	M	M	S	M
CLO3	M	S	S	S	S

<b>CLO4</b>	S	S	S	S	S
<b>IN21CP3</b>					
<b>CLO1</b>	M	M	S	S	M
<b>CLO2</b>	S	M	S	S	M
<b>CLO3</b>	S	S	S	S	S
<b>CLO4</b>	S	S	S	S	S
<b>IN21SBP1</b>					
<b>CLO1</b>	S	S	M	M	S
<b>CLO2</b>	S	M	S	M	S
<b>CLO3</b>	S	M	M	S	S
<b>CLO4</b>	M	S	S	S	S
<b>IN21C10</b>					
<b>COL1</b>	S	S	M	S	S
<b>COL2</b>	S	M	S	S	M
<b>COL3</b>	S	S	M	S	S
<b>COL4</b>	S	S	S	S	M
<b>IN21C11</b>					
<b>CLO1</b>	M	S	M	S	M
<b>CLO2</b>	S	M	S	M	S
<b>CLO3</b>	S	M	S	S	M
<b>CLO4</b>	S	S	S	M	S
<b>IN21C12</b>					
<b>CLO1</b>	M	M	S	S	M
<b>CLO2</b>	M	M	S	S	S
<b>CLO3</b>	S	S	S	S	M
<b>CLO4</b>	S	S	S	S	S
<b>IN21E01</b>					
<b>CLO1</b>	M	S	M	M	M
<b>CLO2</b>	S	M	S	S	M
<b>CLO3</b>	M	S	S	M	S
<b>CLO4</b>	S	S	M	S	S
<b>IN21E02</b>					
<b>CLO1</b>	S	M	S	S	S
<b>CLO2</b>	M	S	S	M	S
<b>CLO3</b>	S	M	M	S	M
<b>CLO4</b>	M	S	S	M	M
<b>IN21E03</b>					
<b>CLO1</b>	S	M	S	M	S
<b>CLO2</b>	S	S	S	M	M
<b>CLO3</b>	M	S	S	S	S
<b>CLO4</b>	S	S	M	S	M
<b>IN21CP5</b>					
<b>CLO1</b>	S	S	M	S	S
<b>CLO2</b>	S	S	S	S	M
<b>CLO3</b>	S	S	M	M	M

<b>CLO4</b>	S	S	S	S	S
<b>IN16AC1</b>					
<b>CLO1</b>	S	S	M	S	M
<b>CLO2</b>	S	S	S	S	S
<b>CLO3</b>	S	S	M	M	M
<b>CLO4</b>	S	S	S	S	S
<b>IN16AC2</b>					
<b>CLO1</b>	S	S	M	S	M
<b>CLO2</b>	M	S	S	S	S
<b>CLO3</b>	S	S	M	M	S
<b>CLO4</b>	S	M	S	S	M



COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
PP21C01	PROGRAMMING IN C	Theory	56	4	-	4

### Preamble

*This course introduces fundamental programming constructs in C. It covers the concepts such as arrays, functions, structures, pointers and file handling. It provides comprehensive coverage on industry 4.0.*

### Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Know the programming constructs and structure of C programming	K1
CLO2	Differentiate arrays, strings and structures	K2
CLO3	Apply functions to solve problems using procedure-oriented approach	K3
CLO4	Illustrate data handling through files and analyze various industry 4.0 technologies and automation processes in different domains	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	S	S	M
CLO2	S	S	M	S	M
CLO3	S	S	S	S	S
CLO4	S	S	S	S	S

S- Strong; M-Medium; L-Low

**PROGRAMMING IN C - PP21C01**

**56 Hrs**

### Syllabus

#### Unit I

**12 Hrs**

Overview of C - Constants, Variables and Data types - Operators and Expressions - Managing Input and Output Operations - Decision Making and Branching - Decision Making and Looping.

#### Unit II

**11 Hrs**

Arrays: One-Dimensional - Two Dimensional - Multidimensional Arrays. Character Arrays and Strings: Declaring and Initializing String Variables - Reading Strings from Terminal - Writing Strings to Screen - String Handling Functions.

#### Unit III

**11 Hrs**

User-Defined Functions: Need - Return Values and Types - Function Calls - Function declaration - Category of Functions - No Arguments and No Return Values - Arguments but No Return Values - Arguments with Return Values - Recursion - Scope Visibility and Life time of Variables.

Structure Definition: Structure Initialization - Comparison of Structure Variables - Arrays of Structures - Arrays within Structures.

**Unit IV****12 Hrs**

Pointers: Understanding Pointers - Accessing the Address of a Variable - Declaring and Initializing Pointers - Accessing a Variable through its Pointers - Pointers and Arrays - Pointers and Character Strings - Pointers and Functions.

File Management in C: Defining and Opening a File - Closing File - I/O Operations on Files - Error Handling during I/O Operations - Command Line Arguments.

**Unit V****10 Hrs**

Introduction to Industry 4.0 - Need - Reasons for Adopting Industry 4.0 - Definition - Goals and Design Principles - Technologies of Industry 4.0 - Skills required for Industry 4.0 - Advancements in Industry 4.0 - Impact of Industry 4.0 on Society, Business, Government and People - Introduction to 5.0.

**Text Book**

S. No	Author	Title of the Book	Publisher	Year of Publication
1	E. Balagurusamy	ANSI C	Tata Mc Graw Hill	8 <sup>th</sup> Edition, 2019
2	P. Kaliraj, T. Devi	Higher Education for Industry 4.0 and Transformation to Education 5.0	CRC Press - Taylor & Francis Group	1 <sup>st</sup> Edition, 2021

**Reference Books**

S. No	Author	Title of the Book	Publisher	Year of Publication
1	Byron Gottfried	Programming with C	Tata McGraw Hill	4 <sup>th</sup> Edition, 2018
2	Yashwvant Kanetkar	Let Us C: Authentic Guide to C Programming Language	BPB Publications	17 <sup>th</sup> Edition, 2020

**Pedagogy**

Lectures, Group discussions, Demonstrations

**Course Designer**

Mrs. Maria Shyla J

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN21CP1	C PROGRAMMING LAB	PRACTICAL	-	-	45	2

### Preamble

- The course gives hands-on experience on C Programming and improves the practical skill set.
- The learner will be able to develop the logic for the given problem, recognize and understand the syntax and construction of C code.
- The course involved in compiling, linking and debugging C code and developing some complex programs.

### Course Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Outline the logic using flowchart for a given problem and develop programs using conditional and looping statements	K1
CLO2	Develop programs with implementation of arrays, functions, string handling functions and parameter passing techniques.	K2
CLO3	Construct programs with features of Structure, Union and Pointers	K3
CLO4	Develop readable programs with files for reading input and storing the output with perform operations	K4

### Mapping with Programme Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	M	S	M
CLO2	S	S	S	S	S
CLO3	S	S	S	S	M
CLO4	S	S	M	S	M

S-Strong; M-Medium; L-Low

### C PROGRAMMING LAB- IN21CP1

45 Hrs

### Program List

- Exercise in basics Operations Statement.
- Exercise in Control Structures.
- Exercise in arrays.
- Exercise in String handling functions.
- Exercise in User defined functions.
- Exercise in Structure.
- Exercise in Pointers.
- Exercise in file operations.

### Pedagogy

- Demonstration of working environment/Tools/Software/Program

### Course Designer

Dr.K.Sathiyakumari

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
PB21C02	BIOINFORMATICS	THEORY	41	4	-	3

### Preamble

- The course explores the areas of Bioinformatics like Sequencing, DNA and Protein Structure.
- To attain familiarized with Biological Databases.

### Course Outcomes

On the successful completion of the course, student will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Define the basic concepts of Bioinformatics and its significance in biological data analysis.	K1
CLO2	Classify the different types of biological databases.	K2
CLO3	Apply the knowledge about database search tools	K3
CLO4	Analyze the concept of Pairwise sequence alignment, algorithms, tools for pairwise alignment and Exposure to biological Protein structures	K4

### Mapping with Programme Outcome

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	M	M
CLO2	S	S	S	S	S
CLO3	S	S	S	S	M
CLO4	S	S	S	S	M

S-Strong; M-Medium; L-Low

## BIOINFORMATICS - PB21C02

41 Hrs

### Syllabus

#### UNIT I

8 Hrs

Bioinformatics: Introduction to Bioinformatics – Goal – Scope – Applications – Limitations –DNA Sequence Analysis: Analyses DNA – Gene Structure & DNA Sequence – Features of DNA Sequence Analysis.

#### UNIT II

8 Hrs

Introduction to Biological Databases: Database – Types of Database – Biological Database – Pitfalls of Biological Database – Information retrieval from Biological databases.

#### UNIT III

8 Hrs

Database Similarity Searching: Unique Requirements of database searching – Heuristic database searching – Basic local alignment search tool (BLAST) – FASTA – Comparison of FASTA & BLAST – Database searching with smith – waterman method.

#### UNIT IV

8 Hrs

Sequence Alignment: Pairwise Sequence Alignment: Evolutionary basis – Sequence Homology versus Sequence Similarity- Sequence Similarity versus Sequence Identity – Methods. Multiple Sequence Alignment: Scoring Function, Exhaustive Algorithms.

**UNIT V****9 Hrs**

Protein Structure Basics: Amino Acids- Peptide Formation-Secondary Structure - Tertiary Structure. Protein Secondary Structure Prediction: Secondary structure prediction for Globular Proteins. Tertiary Structure Prediction: Methods-Homology modeling. Protein Structure Visualization, Comparison and classification.

**Text Books**

S.No	Author	Title of the Book	Publishers	Year of Publication
1	JinXiong	Essential Bioinformatics	Cambridge University Press	2016
2	T K Attwood & D J Parry Smith	Introduction to Bioinformatics	Pearson Education	2007

**Reference Books**

S.No	Author	Title of the Book	Publishers	Year of Publication
1	Jean-Michel Claverie , Cedric Notredame	Bioinformatics – A Beginner’s Guide	Wiley Computer Publishing	2009
2	ShubaGopal, Rhys Price Jones, PaulTymann,AnneHaake	Bioinformatics with Fundamentals of Genomics and Proteomics”	Tata McGraw Hill	2010

**Pedagogy**

- Lectures, Group discussions, Demonstrations

**Course Designer**

Mrs.B.Sivaranjani

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN21C03	OOP'S WITH JAVA	III	71	4	-	5

### Preamble

*This course gives in-depth knowledge of JAVA and OOPs concepts. It has been designed to enable novice programmers to enhance their programming skills. It also sheds light around wide spread applications of the internet*

### Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Define the fundamentals of OOP's and Java Concepts	K1
CLO2	Apply the functions of Methods & Exceptions	K2
CLO3	Develop the applications by applying Java Packages	K3
CLO4	Analyze the usage of OOP's with Java in real- time applications	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PL03	PL04	PL05
CLO1	S	M	S	S	M
CLO2	S	S	S	S	M
CLO3	S	M	M	S	S
CLO4	S	M	S	S	S

S-Strong; M-Medium; L-Low

## OOP'S WITH JAVA - IN21C03

71 Hrs

### Syllabus

#### UNIT I

14 Hrs

Introduction to Object Oriented Programming Paradigm and Java Language: Introduction – Evaluation of Higher Level Languages – Object Oriented Programming Paradigm – Evolution of Java – Java, Salient Features of Java Language -Internet and world wide web – Java Environment – Java Language Preliminaries: Keywords and Identifiers, Constants –Variables – Data Types- Console I/O, Structure of a Java program – Executing a Java Program.

#### UNIT II

14 Hrs

Classes, Objects and Methods: Introduction- Class Definition Instance Variables and Member Methods- Declaration of Objects and Accessing Members – Classification of Members methods- Constructors- Passing Objects to Methods as Arguments – Static Member Data – Static member Methods –Recursion-Variable Arguments- Garbage Collection and Finalize method.

#### UNIT III

15 Hrs

Inheritance: Introduction – Types of Inheritance: Single level Inheritance – Multi level Inheritance –Hierarchical Inheritance-Hybrid Inheritance- Constructors and Inheritance – Abstract classes and methods- Interface. Exception

Handling: Threads in Java- Types of Exceptions: - Built-in-Exceptions- Custom Exception–Try Block – Nested Try Blocks –Throw Statement – Finally Statement.

#### UNIT IV

14 Hrs

The I/O Package: Byte Streams – Character Streams – InputStreamReader and OutputStreamWriter - The Stream Classes: Synchronization – Filter streams – Buffered Streams – ByteArray Byte Streams - CharArray Character Streams – String Character Streams – StreamTokenizer. The data Byte Streams – Working with Files – Object Serialization – The IOException Classes.

#### UNIT V

14 Hrs

Collections & GUI Programming: Collections: Exception Conventions – Iterations – The Collection Interface – Set and SortedSet – List – Map and SortedMap – Wrapped Collections and the Collections Class. Graphical Programming: Introduction – Graphics Programming – Handling Events – Swing Components.

#### Text Book

S.No	Author	Title of the Book	Publishers	Year of Publication
1.	M.T. Somashekara, D.S,Guru&K.S.M anjunatha.	Object Oriented Programming with Java	PHI Learning Pvt Ltd,Delhi	2017

#### Reference Books

S.No	Author	Title of the Book	Publishers	Year of Publication
1	Rajkumar Buyya, S Thamarai Selvi, Xingchen Chu	Object Oriented Programming with Java	Tata McGraw Hill	2009
2	Ken Arnold,James Gosling, David Holmes	The Java Programming Language	Addison-Wesley	2005

#### Pedagogy

- Chalk and talk PPT, Discussion, Assignment, Demo, Quiz, Case study.

#### Course Designer

Dr. S. Nithya

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN21CP2	OOP'S PROGRAMMING & BIO-COMPUTING LAB	III	-	-	75	3

### Preamble

The course is designed to develop application using Java Principles. It helps to apply the concepts of Java and OOPs in different applications. The course also covers basic concepts of Bioinformatics.

### Course Learning Outcomes

On the Successful Completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Relate the concepts of OOP's & Java using classes and objects.	K1
CLO2	Demonstrate the execution of the Java programs by using Methods	K2
CLO3	Apply the concepts of OOP's with Java in real-time applications	K3
CLO4	Analyze the programming skills to experiment DNA sequence.	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	M	S	M
CLO2	S	S	S	S	M
CLO3	S	S	M	S	S
CLO4	S	S	S	S	S

S- Strong;  
Medium; L-Low

M-

### OOP'S PROGRAMMING &S BIO-COMPUTING LAB - IN21CP2

75 Hrs

### Program List

- Exercise in Class & Objects
- Exercise in Inheritance
- Exercise in Interface
- Exercise in Thread Priority
- Exercise in Exception Handling
- Exercise in I/O Streams
- Exercise in Collections
- Exercise in Swing
- DNA sequence - length, base composition and GC content.
- Split a DNA sequence into codons.
- Pairwise Sequence Alignment using Needleman-Wunsch, and Smith-Waterman method.
- Pairwise Structure Alignments by using different methods and visualize the structure in Jmol.

### Pedagogy



- Demonstration of working environment/Tools/Software/Program

**Course Designer**

Dr.S.Nithya

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN21C04	OPERATING SYSTEM	THEORY	71	4	-	4

### Preamble

*To provide a discussion of the fundamentals of operating system design and to relate these to contemporary design issues and to current directions in the development of operating systems.*

### Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall about the basic concepts of operating system.	K1
CLO2	Understand the concept of storage, processor, multiprogramming and Various disk optimization approaches.	K2
CLO3	Applying various algorithms for scheduling, partitioning and storage Management concepts.	K3
CLO4	Analyze UNIX system and MS DOS for various file and memory Management system.	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	M	S
CLO2	S	S	S	M	S
CLO3	S	S	M	S	S
CLO4	S	S	M	M	S

S- Strong; M-Medium; L-Low

## OPERATING SYSTEM – IN21C04

71 Hrs

### Syllabus

#### UNIT I

14 hrs

Introduction and process concepts: Definition of OS-Early History - History of DOS and Unix Operating System - **Definition of process - Process States - Process State Transition - Interrupt Processing - Interrupt classes - Context switching - Semaphores - Deadlock and Indefinite postponement.**

#### UNIT II

14 hrs

Storage management: Real storage: Real storage management strategies - **Contiguous Vs non-contiguous storage allocation - Single user contiguous storage allocation** - Fixed partition multiprogramming - Variable partition multiprogramming - Multiprogramming with storage swapping

**-Virtual storage: Virtual storage management strategies:** Page replacement strategies - workingsets - Demand paging - Page size.

#### UNIT III

15 hrs

Processor management: Job and processor scheduling: Preemptive Vs Non-preemptive scheduling – **priorities - Deadline scheduling** - FIFO-RR-Quantum size - **SJF-SRT-HRN** - distributed computing –Pipelining – **Vector processing - Array processors** - Dataflow computers – Multiprocessing - **Fault Tolerance.**

#### UNIT IV

14 hrs

Device and information management: Disk performance optimization: Operation of moving head disk storage - **Need for disk scheduling** -Seek optimization – **FCFS - SSTF – SCAN** - RAM Disks - Optical Disks - **file and database systems: File system – functions – Organization** - Allocating and freeing space - file descriptor -**Access control by user Classes-Backup and Recovery.**

#### UNIT V

14 hrs

#### Case Studies

UNIX Systems: Kernel-Shell- **File System-Process Management- Memory Management-** Distributed UNIX Systems-**UNIX Systems Standardization and open systems.**

**MS-DOS: MS DOS various Versions-**The user’s view of MS-DOS-the system’s view of MS-DOS.

#### Text Book

S.No.	Authors	Title	Publishers	Year Of Publication
1.	Deitel H.M	An Introduction to Operating System	Addison Wesley Publishing Company, Second edition	2005

#### Reference Books

S.No.	Authors	Title	Publishers	Year Of Publication
1.	Andrew S.Tanenbaum, Albert S.Woodhull,	Operating Systems- Design and Implementation	Pearson Education, 3 <sup>rd</sup> Edition	2011
2.	Abraham Silberschatz, Peter Baer Galvin, Greg Gagne	Operating System Concepts	John Wiley & Sons,8 <sup>th</sup> edition	2010
3.	Archer J Harries	Operating Systems	Tata McGraw Hill, First Edition	2008

#### Pedagogy

- Chalk and talk PPT, Discussion, Assignment, Demo, Quiz, Case study.

#### Course Designer

Mrs. G.Rubadevi

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN21C05	DATA STRUCTURE AND ALGORITHM	THEORY	71	4	-	4

### Preamble

To provide an overview of data structures and algorithm design methods for programming and problem-solving process.

### Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall about the concepts of Arrays, Stack, Queue, Link List, Trees and Graph.	K1
CLO2	Understand sorting, searching and hashing algorithm	K2
CLO3	Apply the data structures to solve various computing algorithms and sorting algorithms.	K3
CLO4	Analyze lists, queues, stacks, trees and graph according to the needs of different applications	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	M	S	S
CLO2	S	M	S	M	M
CLO3	M	M	S	M	S
CLO4	S	S	S	M	S

S- Strong; M-Medium; L-Low

### DATA STRUCTURE AND ALGORITHM- IN21C05

71 Hrs

#### Syllabus

#### UNIT-I

15 Hrs

**Introduction to Data Structure: Definition: Common Operation on Data Structures.**

**Algorithms.**Complexities. Program Design: Top-Down Design-Bottom-Up Design. **Abstract Data Types- Advantages of ADT. Generic Abstract Data Types.**

Arrays: Defining an Array-Types of Arrays: One Dimensional Array, Multidimensional Array-CharacterArray-Sparse Array-Special Types of Matrices.

#### UNIT-II

14Hrs

Stacks and Queues: Stack-Stack Representation & Implementation-Stack Operations-**Applications of Stack.** Queue- Queue Representation & Implementation-Queue Operations-**Types of Queues.**

#### UNIT-III

14Hrs

**Linked List: Linked List as Data Structures-** Representation of Linked List-Operations on

Linked List-Stack as Linked List-Queue as Linked List-**Doubly Linked List-Circular List.**

**UNIT-IV**

**14 Hrs**

Trees: Preliminaries-Binary Trees-**AVL Trees-B-Trees.** Graph: Graph Terminologies-**Types of Graphs**-Graph Representation. **Hashing: Hash Functions.** Sorting: Bubble Sort-Selection Sort-QuickSort-Heap Sort-Merge Sort.

**UNIT-V**

**14 Hrs**

Algorithm Design Techniques: Greedy Algorithms: A Simple Scheduling problem-Huffman Codes. **Divide and Conquer: Running Time of Divide and conquer algorithms-Closest-points Problem-** The Selection problem.

**Randomized Algorithms: Random Number Generators-Skip Lists. Backtracking Algorithms: The Turnpike Reconstruction problem.**

**Text Books**

S.No.	Authors	Title	Publishers	Year of Publication
1.	Rajesh K. Shukla	Data Structures using C & C++	Wiley India	2009
2.	Mark Allen Weiss	Data Structures and Algorithm Analysis in C++	Pearson Education, 3 <sup>rd</sup> Edition	2011

**Reference Books**

S.No.	Authors	Title	Publishers	Year of Publication
1.	Micheal T. Goodrich, Roberto Tamassia, David Mount	Data Structures and Algorithms in C++	John Wiley & sons	2004
2.	Wisnu Anggoro	C++ Data Structures and Algorithms	Packt Publishing	2018
3.	YedidyahLangsam, Moshe J.Augentein, aronM.Tenenbaum	Data Structures using C & C++	PHI Learning, 2 <sup>nd</sup> Edition	2009

**Pedagogy**

- Chalk & talk, PPT, Group Discussion, Assignment, Demo, Quiz, Role play.

**Course Designer**

Mrs. R.Jeevitha

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
PDB2103	DATABASE MANAGEMENT SYSTEMS	Theory	71	4	-	4

### Preamble

*This course provides an insight on the basics of database, database design, relational model and querying a database. It also gives an overview of NoSQL databases and storing and accessing data in a key/value database MongoDB.*

### Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the basic concepts of database management and NoSQL Databases	K1
CLO2	Understand DDL, DML SQL statements and PL/SQL programming	K2
CLO3	Apply various queries, PL/SQL program to store and retrieve data from databases	K3
CLO4	Analyze the working of SQL, PL/SQL program, NoSQL database to solve real-world problems	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	M	S	M
CLO2	S	M	M	S	M
CLO3	M	S	S	S	S
CLO4	S	S	S	S	S

S- Strong; M-Medium; L-Low.

**DATABASE MANAGEMENT SYSTEMS - PDB2103**

**71 Hrs**

### Syllabus

#### Unit - I

**14 Hrs**

Database Concepts: Introduction -Relationships - **DBMS** -Relational data model - Integrity rules - **Theoretical relational languages**. Database Design: Data modeling -**Dependency** -Database design - Normal forms - **Dependency diagrams – Denormalization**.

#### Unit - II

**14 Hrs**

Structured Query Language (SQL): Introduction – DDL - Naming rules and conventions - Datatypes – **Constraints** - Creating table- Displaying table information - **Altering an existing table– Dropping, renaming, and truncating table** - Table type. Working with tables: DML - adding a new row/record – updating and deleting existing rows/records - Retrieving data from table - Sorting - CASE structure.

#### Unit - III

**14 Hrs**

**Functions and Grouping: Built-in functions** - Grouping data. Joins and Views: **Join -Join types**. Views: Views - **Creating a view - Removing a view - Altering a view**. PL/SQL: Fundamentals - Block structure - comments - Data types – Other data types - Variable declaration - Assignment

operation

#### Unit - IV

14 Hrs

Control Structures and Embedded SQL: Control structures - Nested blocks - SQL in PL/SQL - Data manipulation - **Transaction control statements**. PL/SQL Cursors: **Cursors -Implicit & explicit cursors and attributes** - cursor FOR loops - Records - Tables - **Procedures -Functions –Triggers**

#### Unit - V

15 Hrs

An overview of NoSQL - **Characteristics of NoSQL – NoSQL storage types** - Advantages and Drawbacks - MongoDB Introduction – **Creating database and Dropping database - Creating collection and Dropping collection** – Insert, query and update document.

#### Text Book

S. No	Author	Title of the Book	Publisher	Year of Publication
1.	Nilesh Shah	Database Systems Using Oracle	PHI	2 <sup>nd</sup> Edition, 2016
2.	Gaurav Vaish	Getting Started with NoSQL	Packt	2013

#### Reference Books

S. No	Author	Title of the Book	Publisher	Year of Publication
1	Rajesh Narang	Database Management Systems	Prentice Hall of India,	2 <sup>nd</sup> Edition, 2011
2	Pramod Sadalge, Martin Fowler	NoSQL Distilled	Addison-Wesley	2012
3	Kristina Chodorow	MongoDB: Definitive Guide	Oreilly	2 <sup>nd</sup> Edition, 2015

#### Pedagogy

- Chalk and talk PPT, Discussion, Assignment, Demo, Quiz, Flipped mode.

#### Course Designers

Dr. J. Maria Shyla

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN21CP3	DBMS LAB	PRACTICAL	-	-	60	2

### Preamble

The lab course provides a way to explore storing and accessing data in database through query languages and PL/SQL programming language. It enables to experience a NoSQL key/value store database MongoDB.

### Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand basic SQL query statements	K2
CLO2	Gain knowledge on primary and foreign key constraints	K2
CLO3	Apply functions and joins on data	K3
CLO4	Demonstrate PL/SQL programming on databases and differentiate Key/value store database from relational database	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	M	S	S	M
CO2	S	M	S	S	M
CLO3	S	S	S	S	S
CLO4	S	S	S	S	S

S- Strong; M-Medium; L-Low.

**DBMS LAB - IN21CP3**

**60 Hrs**

### Program List

- Different datatypes and operators.
- Integrity constraints
- Built-in functions and views.
- Create, insert, update and alter table.
- Implement PL/SQL Block.



- Control Structures and Embedded SQL
- Splitting and Joining the table
- Functions
- Database Cursors and Triggers
- Create and drop database in MongoDB
- Insert, query and update document in MongoDB

**Pedagogy**

- Demonstration of working environment/Tools/Software/Program

**Course Designers**

Dr.J.Maria Shyla

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN21SBP1	SBS I: FULL STACK JAVA DEVELOPMENT LAB	PRACTICAL	-	-	45	3

### Preamble

*To develop will help you master both front-end and backend Java technologies and accelerate your career as a full stack software developer.*

### Course Learning Outcomes

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

CLOs	CLO Statement	Knowledge Level
CLO1	Tell about basics of Core Java, Data Structures, Frontend Design and Backend development	K1
CLO2	Understand the Data Structure and testing concepts for working in databases, implementing responsive design to scale well across gadgets (PC, Tablets, Mobiles)	K2
CLO3	Applying the servlet services for extend the capabilities of services that host Application	K3
CLO4	Analyze the challenges and inculcating the concepts in real time web-based Applications	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	M	M	S
CLO2	S	M	S	M	S
CLO3	S	M	M	S	S
CLO4	M	S	S	S	S

S- Strong; M-Medium; L-Low

**FULL STACK JAVA DEVELOPMENT LAB - IN21SBP1      45 Hrs**

### Program List

- Create a java program to get numbers from the user and display the numbers in ascending and descending order using array.
- Create a java program for file handling.

- Create a java program to implement interface.
- Create a login page with database connectivity using java.
- Write a selenium test case for opening our college website's home page.
- Develop a CMS to implement a blog for article writing using java.
- Develop a java program to monitor bitcoin price using coin desk API.
- Develop a java program for implementing ATM Interface.

### **Pedagogy**

- Demonstration of working environment/Tools/Software/Program

### **Course Designer**

Mrs. R. Jayasree

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN21C07	OPEN SOURCE TECHNOLOGIES	THEORY	71	4	-	4

### Preamble

*To provide the concepts of open source software and enable the students to learn Linux environment and implement the basics of MYSQL database.*

### Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1.	Recall the concepts of Open Source Softwares, Networks, Operating Systems and Databases.	K1
CLO2.	Understand the applications of Open Source Software.	K2
CLO3.	Apply Networking Commands, Shell Script and SQL Commands in Open Source	K3
CLO4.	Analyze the usage of Linux, Shell Programming and MYSQL in Open Source	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	S	M	S
CLO2	S	S	M	M	M
CLO3	S	S	M	S	S
CLO4	M	M	S	S	S

S- Strong; M-Medium; L-Low

### OPEN SOURCE TECHNOLOGIES- IN21C07

(71 Hours)

### Syllabus

#### UNIT I:

(14 Hrs)

Open-Source Software Overview: Introduction – Need and Advantage of Open-Source Software – Foss- Free Software Movement –Open Source Movement- **Open Source Licensing-Certification-OSS**

## Development Model-Run a Free Software Project-Comparing OSS with other Software-OSS Licenses

### UNIT II: (15 Hrs)

Open Source Operating System (LINUX): Installation of Linux (Red hat-CentOS): Hardisk Partitioning, Swap space, LVM, and Boot loader. Command Line: Basic File System Management Task, working with files, Piping and Redirection, working with VI editor, use of sed and understanding FHS of Linux. **System Administration: Job management, Process Management, Mounting Devices and file system, Backup, Handling User Accounts, Groups and permission, Managing Software. Understanding Boot process and related files, Common kernel management Task**

### UNIT III: (14 Hrs)

Open Source (NETWORK AND SECURITY ADMINISTRATION): Networking Commands, Configuration of Apache Web Servers, **DNS servers, DHCP servers, mail servers, NFS, FTP Servers. Securing servers with IPTables.** Setting up Network and cryptographic services: SSL, Managing Certificate with Open SSL, working with the GNU Privacy guard.

### UNIT IV: (14 Hrs)

Open Source Operating System (SHELL PROGRAMMING): Bash Shell Scripting, Executing Script, Working with Variables and Input, **Using Control Structures, Handling signals**, creating functions, working sed and gawk, working with web using shell script: **Downloading webpage, Converting Web page content to a text file, parsing data**, working cURL.

### UNIT V: (14 Hrs)

Open Source Database And Application: MySQL: Configuring MySQL Server, working with MySQL Databases, **MySQL Tables, SQL Commands – INSERT, SELECT, UPDATE, REPLACE, DELETE. Date and Time functions in MySQL.** PHP – MySQL Application Development: Connecting to MySQL with PHP, **Inserting data with PHP, Retrieving data with PHP.**

#### Text Books

S.no	Author	Title of book	Publisher	Year of publication
1	Prof.DayanandAmbawade, Deven Shah	Linux Labs And Open Source Technologies	Dream Tech Press	2014
2	Julie C Meloni	PHP, MySQLand Apache	Pearson Education	2009

#### Reference books

S.no	Author	Title of book	Publisher	Year of publication
1	Peterson	The Complete Reference Linux	Tata McGraw HILL	2010
2	Steve Suehring, Tim Converse and Joyce Park	PHP6 and MySQL Bible	Wiley-India, New Delhi	2009

**Pedagogy**

- Chalk and talk, PPT, Discussion, Assignment, Demo, Quiz, Case Study.

**Course Designer****Mrs. G. Sangeetha**

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN21C08	DIGITAL LOGIC AND CIRCUITS	THEORY	71	4	-	4

### Preamble

To impart the knowledge on simulation of digital system and functionality of Combinational circuits Boolean Algebra and flip flops.

### Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the principles of binary number system and basic logicgates.	K1
CLO2	Understand the operations on Boolean laws and Theorems and Karnaugh Map	K2
CLO3	Applying the basic principles and types of registers, counters and the functionality of Multiplexers and Flip Flops	K3
CLO4	Analyze the concept of Memory Addressing and programmable logic devices	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	M	M	S
CLO2	M	M	S	S	M
CLO3	S	S	S	M	S
CLO4	M	S	S	M	M

S- Strong; M-Medium; L-Low

### DIGITAL LOGIC AND CIRCUITS - IN21C08

(71Hrs)

### Syllabus

#### UNIT I:

(15 hrs)

**Number Systems and Codes:** Binary Number system – Binary to Decimal –Decimal to Binary – Hexa Decimal – ASCII code – Excess-3 Code – Gray code- **Error Detection and**

**Correction. DIGITAL LOGIC: The Basic Gates – NOT, OR, AND - Universal Logic Gates – NOR, NAND.**

**UNIT II: (14 hrs)**  
**Combinational Circuits: Boolean Laws and Theorems - Sum of Products method – Truth table to Karnaugh Map –Don't Care Conditions- Product-of sums method -Product-of sums Simplifications.**

**UNIT III: (14 hrs)**  
**Data Processing Circuits: Multiplexers – Demultiplexers- Encoders –Decoders. Flip-Flops- RS Flip- Flops - Edge-triggered D Flip-flops--Edge-triggered JK Flip-Flops-JK Master Slave Flip-flops.**

**UNIT IV: (14 hrs)**  
**Types of Registers: Serial In-Serial Out – Serial In-Parallel Out – Parallel in Serial Out - Parallel In- Parallel Out – Universal Shift Register. COUNTERS: Ring Counter –Ripple Counter – Asynchronous Counter - Synchronous Counter.**

**UNIT V : (14 hrs)**  
**Memory: Magnetic Memory – optical memory – Memory Addressing – ROM – RAM – EPROM – PROM –Sequential programmable logic devices – Content Addressable memory.**

**Text Book**

S.No.	Authors	Title	Publishers	Year of Publication
1	Donald P Leach, Albert Paul Malvino, Goutam Saha	Digital Principles and Applications	McGraw-Hill Education,8th edition	2015

**Reference Books**

S.No.	Authors	Title	Publishers	Year of Publication
1	R.Anantha Natarajan	Digital Design	PHI Learning	2015
2	K.Meena	Principles of Digital Electronics	PHI Learning	2013

**Pedagogy**

Chalk & talk, PPT, Group Discussion, Assignment, Demo, Quiz, Role play.

**COURSE DESIGNER**  
**Mrs. V .Deepa**



COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN21C09	VB.NET PROGRAMMING	THEORY	71	4	-	4

**Preamble**

*To understand .Net frame work and enhancing in depth knowledge in VB.net and to enable them to developing simple projects.*

**Course Learning Outcomes**

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

CLO Number	CLO Statement	Knowledge Level
CLO1.	Tell about the .Net frame work features, common controls, and advanced concepts of VB.Net	K1
CLO2.	Understand the usage of various Elements of VB.Net, Conditional statements, controls, Menus and Toolbars	K2
CLO3.	Use variables, operators, constants and apply the concepts of looping, branching and arrays, procedures, OOP's, SQL statements to solve the real-world problems	K3
CLO4.	Analyze the complexity of problems, modularize the problems into small modules and then convert them into programs	K4

**Mapping with Programme Learning Outcomes**

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1.	S	M	S	M	M
CLO2.	S	S	S	M	S
CLO3.	M	M	S	S	S
CLO4.	S	S	S	S	M

S- Strong M-Medium L-Low

**VB.NET PROGRAMMING – IN21C09**

**(71 Hours)**

**Syllabus**

**UNIT 1:**

**(14 Hrs)**

**Visual Basic .NET and the .NET Framework:** Introduction to .net framework- Components of .NET-Framework Class Library(FCL), Common Language Runtime (CLR) –**Garbage collection-Assemblies – IDE components –toolbox, Solution explorer window, properties window, Server Explorer window,** Adding controls the windows forms applications and Adding source code to the control, **Application, Executing The web application. Variables, operators and constants**

**UNIT II:**

**(14 Hrs)**

**Common Controls:** Introduction- Textbox, label, Link label, **List Box Control, Checked List box Control, Picture box control, Pickers, Tree View Control, List View controls, Rich Text Box, Button, Check Box Control, Combo Box Control, Masked Text Box Control, Notify Icon control, Progress bar control, tooltip control, Web browser control.**

**UNIT III:**

**(14 Hrs)**

**Programming in Visual basic .net : Conditional Logic: The If-then-Else statement, The Select-case statement, Do-Loop Statement, While-End While Statement, For..Next Statement, For-Each Next Statement, A Complete Example. Arrays- Introducing Arrays, Multidimensional Arrays, The Array Class Members- An Example- Array of Arrays.**

**UNIT IV:**

**(14Hrs)**

**Menus and Toolbar, Dialog Boxes, Procedures:** Menus and toolbars- Context Menu Strip, **Status Strip, Tool strip, Tool Strip Container, working with MDI,** In-built Dialogs- Page Setup Dialog, Print Dialog, Print Document, Print Preview Control, Print Preview Dialog, **Color Dialog, Folder Browser Dialog, Font Dialog, Open File Dialog, Save File Dialog, Procedures-Overview, Types of Procedures, Built-in functions.**

**UNIT V:**

**(15 Hrs)**

**Advanced Concepts in VB.Net : Concepts of Object-Oriented Programming- Introduction, Classes, Constructors, Destructors, Inheritance, Overriding, Overloading, Polymorphism, Working with Database: Introduction, Databases, Server Explorer, Basic SQL Commands, Relational Database, Data Binding, Data Binding with Controls.**

ADO.Net – Accessing ADO.NET Features and Namespaces- Using ADO.NET – Understanding Data Providers, **Datasets.**

**Text Books**

S.No	Author	Title	Publishers	Year of publication
1	Sham Tickoo, MeenuBhat	Learning Visual Basic 2008 with .NET Framework 3.5	CADCIM Technologies, Pearson Education	2009
2	Bill Evjen, Jason Beres, et.al	Visual Basic .NET Programming Bible	Wiley	2014

**Reference Books**

S.No	Author	Title	Publisher	Year of publication
1	David Chappell	Understanding .NET	Pearson education	2006
2	Jeffery R. Shapiro	The Complete Reference Visual Basic .NET	Tata McGraw Hills	2002
3	Julia Case Bradley, Anita C.Millspaugh	Programming in VB.Net	Tata McGraw Hills	2007

**Pedagogy**

- Chalk and talk , PPT, Discussion , Assignment, Demo, Quiz, Case study

**Course Designer**

**Mrs. T. Hashini**

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN21CP4	VB.NET PROGRAMMING LAB	PRACTICAL	-	-	60	3

**Preamble**

*To develop both windows and web applications using VB.Net programming.*

**Course Learning Outcomes**

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

CLOs	CLO Statement	Knowledge Level
CLO1	Tell about the conditional statements, Array & Exceptions handling and object-oriented concepts, menus, Dialog controls, Connectivity and reports	K1
CLO2	Understand the execution of the VB.Net program using Toolbars, Menus, Dialog controls and crystal reports and connectivity	K2
CLO3	Apply the OOP's concept and use the Dialog Controls, Mouse events & Menu Creation, Data Grid for creating an application	K3
CLO4	Analyze the concept of arrays, exception handling, menu creation and generate Data Grid & Crystal Report and ADO Connectivity	K4

**Mapping with Programme Learning Outcomes**

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	M	M	M
CLO2	S	M	S	M	S
CLO3	S	M	M	S	M
CLO4	M	S	M	S	S

S- Strong; M-Medium; L-Low

**VB.NET PROGRAMMING LAB – IN21CP4 (60 Hours)**

**Program List**

1. Conditional statements.
2. Array & Exceptions handling.
3. OOP concepts.
4. Tool bars, Message box & Input Box functions.

5. Dialog Controls.
6. Mouse events & Menu Creation.
7. Data Grid & Crystal Report.
8. ADO Connectivity.

### **Pedagogy**

Demonstration of working environment/Tools/Software/Program

**Course Designer**

**Mrs. T. Hashini**

<b>COURSE NUMBER</b>	<b>COURSE NAME</b>	<b>CATEGORY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>CREDIT</b>
<b>IN21SBP2</b>	<b>SBS:2 LINUX PROGRAMMING LAB</b>	III	-	-	45	3

### **Preamble**

*The course is designed to exercise basic linux commands, file and disk handling utilities by using Linux shell environment. To implement shell programming, pipes, control structures, functions, debugging shell scripts.*

### **Course Learning Outcomes**

On the Successful Completion of the course, students will be able to

<b>CLO Number</b>	<b>CLO Statement</b>	<b>Knowledge Level</b>
CLO1	Understand basic linux commands, shell scripting	K2
CLO2	Demonstrate the shell scripting using control structures	K2
CLO3	Apply the shell programming to solve real-time problems	K3
CLO4	Analyze file handling utilities and functions in linux shell environment	K4

<b>CLOs</b>	<b>PLO1</b>	<b>PLO2</b>	<b>PLO3</b>	<b>PLO4</b>	<b>PLO5</b>
CLO1	M	M	S	S	M
CLO2	M	S	S	S	M
CLO3	S	S	S	S	S
CLO4	S	S	S	S	S

### **Mapping with Programme Learning Outcomes**

S- Strong; M-Medium; L-Low

## **LINUX PROGRAMMING LAB - IN21SBP2**

**45 Hrs**

### **Program List**

1. Install Linux and exercise Linux basic Commands
2. Exercise Shell variables and environments
3. Exercise Control Structures
4. Exercise a Shell Script that accepts a file name, starting and ending line numbers as arguments and displays all lines between the given line numbers.
5. Exercise a shell script that deletes all lines containing the specified word in one or more files supplied as arguments to it.
6. Exercise a shell script that displays a list of all files in the current directory to which the user has read, write and execute permissions.
7. Exercise a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
8. Exercise a shell script to list all of the directory files in a directory
9. Exercise a shell script to find factorial of a given number.
10. Exercise a shell script to display fibonacci series
11. Exercise a shell script to perform arithmetic operation
12. Exercise a shell script to check palindrome
13. Exercise a shell script to find area and perimeter
14. Exercise a shell script to perform bubble sort
15. Exercise a shell script using function

### **Pedagogy**

Demonstration of working environment/Tools/Software/Program

### **Course Designer**

**Dr. Maria Shyla**

<b>COURSE NUMBER</b>	<b>COURSE NAME</b>	<b>CATEGORY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>CREDIT</b>
<b>PD21A01</b>	<b>DIGITAL MARKETING</b>	<b>Theory</b>	86	4	-	5

**Preamble**

*This course provides an overall understanding of the various digital marketing platforms and tools available for creating an effective digital marketing strategy. It provides technical skills to design and develop an integrated digital marketing plan for an organization.*

**Course Learning Outcomes**

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

<b>CLO Number</b>	<b>CLO Statement</b>	<b>Knowledge Level</b>
<b>CLO1</b>	Recall the role of digital marketing in marketing strategy	K1
<b>CLO2</b>	Understand the key elements of a digital marketing strategy	K2
<b>CLO3</b>	Apply the role that social marketing plays in the digital marketing	K3
<b>CLO4</b>	Analyze common digital marketing tools such as SEO and social media and apply conceptual frame works of digital marketing	K4

**Mapping with Programme Learning Outcomes**

<b>CLOs</b>	<b>PLO1</b>	<b>PLO2</b>	<b>PLO3</b>	<b>PLO4</b>	<b>PLO5</b>
<b>CLO1</b>	S	M	S	M	S
<b>CLO2</b>	S	S	M	S	M
<b>CLO3</b>	M	M	S	M	M
<b>CLO4</b>	S	S	S	M	S

S- Strong; M-Medium; L-Low.

**Digital Marketing - PD21A01**

**(86 Hrs)**

## **Syllabus**

### **Unit I:**

**17 Hrs**

Introduction to Digital Marketing: Introduction - Original and Development of Digital Marketing - Internet Users: Penetration and Kind of Internet Use - Digital Marketing strategy – Digital Advertising Marketing Plan - Ethical and legal of framework of Digital Marketing - Skills Required in Digital Marketing - Digital Advertising: Introduction - Concept of display advertising - Digital Metrics - Types of Digital Ad - Targeting in digital marketing - Challenges faced by display marketing.

### **Unit II:**

**17 Hrs**

Search Engine Advertising: Introduction – Why pay for search advertising? – Understanding Ad Placement – Understanding Ad Ranks – Why is the Ad rank important? – Create your first Ad Campaign – Google Ads Account – Best practices for creating effective Ads - Enhance your Ad Campaign – Performance Reports – E-Commerce Social Media Marketing: Introduction - Strategy - Implementation - Measure - Improve - Social Entertainment - Different forms of social entertainment – Gamification.

### **Unit III:**

**17 Hrs**

Face book Marketing: Introduction – Organic Marketing – Paid Marketing – Facebook Insights LinkedIn: Introduction - LinkedIn Strategy - Content Strategy - LinkedIn Native Videos - LinkedIn Analytics - Asset Copying - LinkedIn Sales Navigator - Ad campaign - Emerging Platforms: Instagram – Pinterest.

### **Unit IV:**

**18 Hrs**

Search Engine Optimization: Introduction – Search Engine – The Concept of SEO – SEO Phases – Website Audit – Content – On-Page Optimization – Off-Page Optimization – Social Media Reach – Maintenance – Local Search SEO – SEO Visual Search – Voice Change will change the SEO Industry – Sub domains vs Subfolders – SEO – UX and UI – Website Navigation - Social Media Icons – External Links – Pop-ups – Advanced Website Features.

### **Unit V:**

**17 Hrs**

Mobile Marketing: Introduction – Mobile Advertising – Mobile Marketing Toolkit – Mobile Marketing Features – Mobile Analytics – Mobile APPS. Digital Analytics: Introduction – Data Collection – Key Metrics – Outcome Analysis – Experience Analysis – Making Web Analytics



Actionable – Creating High- Impact Executive Dashboards – Types of Tracking Code – Competitive Intelligence.

### **Text Book**

<b>S.NO</b>	<b>AUTHOR</b>	<b>TITLE OF THE BOOK</b>	<b>PUBLISHERS \ EDITION</b>	<b>YEAR OF PUBLICATION</b>
1	Seema Gupta	Digital Marketing	McGraw Hill Eduaction	2 <sup>nd</sup> Edition,2018

### **Reference Books**

<b>S.NO</b>	<b>AUTHOR</b>	<b>TITLE OF THE BOOK</b>	<b>PUBLISHERS \ EDITION</b>	<b>YEAR OF PUBLICATION</b>
1	Simon Kingsnorth	Digital Marketing Strategy: An Integrated Approach to Online Marketing 2nd Edition	Kogan Page	2 <sup>nd</sup> Edition, 2019
2	Dave Chaffey	Digital Marketing	Pearson	7 <sup>th</sup> Edition, 2019
3	Stephanie Diamond	Digital Marketing All-in-One for Dummies	For Dummies	1 <sup>st</sup> Edition, 2019
4	Kevin Hartman	Digital Marketing Analytics: In Theory and In Practice	Ostmen Bennett Bridge Publishing Services	2 <sup>nd</sup> Edition, 2020

### **Pedagogy**

- Lectures, Group discussions, Demonstrations, Case studies

### **Course Designer**

- Mrs.G.Rubadevi

Course Number	Course Name	Category	L	T	P	Credit
PM21A02	M-Commerce	Theory	86	4	-	5

### Preamble

*This course provides an insight on M-Commerce principles and business models. It also explore the concept of mobile commerce technologies, applications, mobile payment methods, security, and ethics.*

### Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the fundamental concept of E-commerce and process of business models	K1
CLO2	Understand the architecture and applications of M-Commerce	K2
CLO3	Illustrate the risks, issues, legal and security aspects in M-Commerce	K3
CLO4	Analyze the infrastructure, fraud prevention and payment methodologies and examine the legal and ethical issues in mobile commerce	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	S
CLO2	S	S	M	S	M
CLO3	S	S	S	S	M
CLO4	S	S	S	M	S

S-Strong; M-Medium; L-Low.

**M-Commerce - PM21A02****(86 Hrs)****Syllabus****Unit I:****17 Hrs**

Introduction to E- commerce: Introduction - E-commerce - E-business - Categories of E-commerce applications - Global trading environment - Adoption of E-commerce - Traditional and Electronic commerce - Advantages and disadvantages of E-commerce. Business Models of E-commerce: Introduction - Business models of E-commerce- Business to Consumer (B2C) - Business to Business (B2B) - Difference between B2C and B2B - C2C: Definition - Characteristics and Applications of C2C EC - Consumer to Business (C2B) - Business to Government (B2G).

**Unit II:****17 Hrs**

Mobile commerce and WAP: Introduction to Mobile commerce - Application - Advantages of M-commerce - Wireless Application Protocol - WAP Browser - Features of WAP 2.0 - Technologies of M-commerce - Overview of WML - Architectures of mobile commerce.

**Unit III:****17 Hrs**

Mobile commerce Risk, Security and Payment Methods: Introduction - Security and Payment Methods - Mobile Commerce Security - Security Mechanism - Mobile Security - Network Infrastructure and Security- WLAN and Security - WAP and Security - Mobile commerce payment methods - Mobile payment operations - Mobile payment standardization - Reputation and trust - Application and Risk scenarios - Reputation systems - Trust model.

**Unit IV:****18 Hrs**

Mobile Money Infrastructure and Fraud Prevention for M- Payment: Introduction - Requirement for authentication infrastructure for M-commerce - Trust relationship - Requirement for Mobile commerce - Password based authentication for mobile users with support for public key technology - M - payment value chain - Life cycle - Operational Issues in M-Commerce payment - Mobile payment systems - General analysis of the payment solutions - Fraud management systems in M-commerce - Mobile payment and money transfers - Mobile payment landscapes.

**Unit V****17 Hrs**

Legal and Ethical Issues : Introduction - Issues related to E-commerce - Legal issues - Taxation and E-commerce - Cyber Laws : Introduction - Cyber laws in India - Salient Provisions of Cyber Law - Contracting and contract Enforcement - IT act 2000 - Jurisprudence of Indian cyber law - Salient features of the Information Technology act 2008.

**Text Book**

<b>S. No</b>	<b>Author</b>	<b>Title of the Book</b>	<b>Publisher</b>	<b>Year of Publication</b>
<b>1</b>	Dr. U.S. Pandey & Er. Saurabh	E- Commerce and Mobile	S. Chand & Company	2 <sup>nd</sup> Revised

	Shukla	Commerce Technologies	Pvt. Ltd	Edition, 2014
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### Reference Books

S. No	Author	Title of the Book	Publisher	Year of Publication
1	Karabi Bandyopadhyay	Mobile Commerce	Prentice Hall India Learning Private Limited	2013
2	Paul May	Mobile Commerce: Opportunities, Applications, and Technologies of Wireless Business	Cambridge University Press;	1 <sup>st</sup> Edition, 2001
3	Norman Sadeh	M-Commerce: Technologies, Services, and Business Models	John Wiley & Sons,	2003

### Pedagogy

- Lectures, Group discussions, Demonstrations, Case studies

### Course Designer

- Dr. R.Jeevitha

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN21C10	PYTHON PROGRAMING	THEORY	73	2	-	4

### Preamble

*This course is designed to introduce the python programming language. The focus of the course is to provide students with an introduction to programming the Functions, Module and Packages, sets, Lists, Exception, Tuples, Files, Directories and explores the object-oriented programming aspects of python with help of built in modules.*

### Course Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Remembering the concept of operators, data types, looping statements in Python programming.	K1
CLO2	Understanding the concepts of Input / Output operations in file.	K2
CLO3	Applying the concept of functions and exception handling	K3
CLO4	Analysing the structures of list, Packages, tuples, Sets, Module and packages, files and maintaining dictionaries	K4

### Mapping with Programme Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
COL1	S	S	M	S	S
COL2	S	M	S	S	M
COL3	S	S	M	S	S
COL4	S	S	S	S	M

**S- Strong; M-Medium; L-Low**

### PYTHON PROGRAMING-IN21C10

(73 hours)

### Syllabus

#### UNIT I

(14 Hrs)

**Introduction:** Rapid Introduction to Procedural Programming- Creating and Running Python Programs- Data Types- Object Reference -Collection Data Types-Logical Operations-**Control Flow Statements-Arithmetic Operator-Input/output-Creating and Calling Functions. Data Types:** Identifiers and Keywords-Integral Types-Floating Point Types-Strings.

#### UNIT II

(14Hrs)

**Collection Data Types:** Sequence Types - Set Types -Mapping Types – Iterating and Copying Collections. **Control Structures and Functions:** Control Structures – Exception Handling-Custom Functions- **Modules: Modules and Packages – Overview of Python Standard Library. Object Oriented Programming:** The Object-Oriented Approach- Custom Classes.

**UNIT III****(15 Hrs)**

**Lists:** Introduction- Creating Lists-Assessing the Elements of a List -Accessing the Elements of a List-Negative List Indices-List Slicing-List Slicing with Step Size-Python Inbuilt Functions for Lists-**The List Operator- List Methods – List and Strings - Splitting a String in List- Passing List to a Function-Returning List from a Function.**

**UNIT IV****(15 Hrs)**

**Tuples and Sets:** Introduction to Tuples: Creating Tuples-Tuple () Function – Inbuilt Functions for Tuples- Indexing and slicing-Operations on Tuples-Passing Variables Length Arguments to Tuples-Lists and Tuples-Sort Tuples- Traverse Tuples- from a List – The zip () Function- The Inverse zip(\*) Function- **Sets: Creating Sets-The Set in and not in Operator- The Python Set Class-Set Operations**

**UNIT V****(15 Hrs)**

**Dictionaries:** Need of Dictionaries – Basics of Dictionaries-Creating a Dictionary- Adding a and Replacing Values-**Retrieving Values-Formatting Dictionaries-Deleting Items-Comparing Two Dictionaries** -The Methods of Dictionaries-Traversing Dictionaries -Nested Dictionaries-Traversing Nested Dictionaries - **File Handling:** Introduction – Need of file Handling-Text Input and Output - **The Seek () Function -Binary Files - Accessing and Manipulating Files and Directories on a Disk.**

**Text Book**

S.No	Authors	Title	Publishers	Year of Publication
1	Mark Summerfield	Programming in Python 3: A Complete introduction to the Python Language, Second Edition	Addison-Wesley Professional	2009
2	Ashok Namdev Kamthane, Amit Ashok Kamthane	Programming and Problem Solving with PYTHON	McGraw-Hill	2018

**Reference Book**

S.No	Authors	Title	Publishers	Year of Publication
1	E. Balagurusamy	Problem Solving and Python Programming	McGraw-Hill, First Edition	2017
2	Guido van Rossum and Fred L. Drake Jr	An Introduction to Python – Revised and updated for Python 3.2	Python Software Foundation, Network Theory Ltd	2011
3	Wesley J Chun	Core Python Applications Programming	Prentice Hall	2012

**Pedagogy**

- Chalk and Talk PPT, Discussion, Assignment, Demo, Quiz, Case study.

**Course Designer**

Dr. K. Sathiyakumari

Course Number	Course Name	Category	L	T	P	Credit
IN21C11	Computer Graphics	III	73	2	-	4

### Preamble

This course provides the fundamentals of computer graphics and Augmented Reality (AR). It also focusses on 2D & 3D Transformations & viewing and applications of AR Technology

### Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the fundamentals of computer graphics, transformations, rotation and scaling	K1
CLO2	Understand the working principle of display devices, 2D & 3D transformations & viewing and detection methods	K2
CLO3	Apply Computer graphic algorithms to solve problems with input functions	K3
CLO4	Illustrate the steps to perform 2D & 3D graphic representation in applications	K4

### Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	M	S	M
CLO2	S	M	S	M	S
CLO3	S	M	S	S	M
CLO4	S	S	S	M	S

S- Strong; M-Medium; L-Low.

## COMPUTER GRAPHICS- IN21C11

(73 hrs)

### Syllabus

#### Unit I

14 Hrs

Basic Concepts: Uses of computer graphics – Display devices - Color CRT monitors – Direct view storage tube – Flat panel displays – **Raster scan systems - Random scan system**, Input and Hard copy device.

#### Unit II

14 Hrs

Line drawing algorithms: DDA algorithm, Bresenham's line drawing algorithm, parallel line algorithms –**circle generating algorithms: properties of circles**, midpoint circle algorithm.

#### Unit III

15 Hr

Two dimensional transformations: Basic transformations - **Composite transformation of translation, Rotation, Scaling – General Pivot point rotation** – General fixed point scaling - Other transformations: Reflection, Shear

Two dimensional viewing: Clipping Operations – Point clipping – Line clipping: Cohen Sutherland line clipping - **Curve clipping – Text clipping – Exterior clipping**.

#### Unit IV

15 Hrs

Graphical User Interface and Interactive Input methods: Input of graphical Data: **Logical input devices, locator devices, stroke devices, string devices, valuator devices, choice devices, pick devices** – Input Functions: Input modes, request modes, locator and stroke input request modes, string modes, valuator modes, choice modes, pick modes, sample modes, event modes.

### Unit V

15 Hrs

Three dimensional concepts: **Three-dimensional display methods – Colour models and colour applications – properties of light** – xyz colour model – CIE chromaticity diagram – RGB colour model – YIQ, CMY, HSV colour models, conversion between HSV and RGB models, HLS colour model, colour selection and applications.

### Text Books

S.No	Author	Title of the Book	Publishers	Year of Publication
1	Donald Hearn, M. Pauline	Computer Graphics	Pearson	2 <sup>nd</sup> Edition, 2012

### Reference Books

S.No	Author	Title of the book	Publisher	Year of Publication
1	Steve Marschner, Peter Shirley	Fundamentals of Computer Graphics	Taylor & Francis Group	5 <sup>th</sup> Edition, 2021
2	Jay David Bolter, Morya Engberg, Blair MacIntyre	Reality Media Augmented & Virtual Reality	The MIT Press, Cambridge	2021
3	Jonathan Linowes	Augmented Reality with Unity AR Foundations	Packt Publishing	2021

### Pedagogy

- Lectures, Group discussions, Demonstrations, Case studies.

### Course Designer

Dr. R. Divya



COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN21C12	PRINCIPLES OF DATA COMMUNICATIONS AND NETWORKS	THEORY	73	2	-	4

### Preamble

The subject is intended to provide the student with the in-depth knowledge of Networks. It also sheds light around wide spread applications of the Internet.

### Course Outcomes

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

CLO Number	CO Statement	Knowledge Level
CLO1	Tell about the Fundamental concepts of Data communication, Transmission Media and Cellular Technologies.	K1
CLO2	Understand data communication using the network topologies, layered model and internetworking.	K2
CLO3	Apply the networking concepts and communication protocol in real-time Applications	K3
CLO4	Analyze the principles of data communication, devices, transmission mechanism and network protocols.	K4

### Mapping with Programme Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	M	S	S	M
CLO2	M	M	S	S	S
CLO3	S	S	S	S	M
CLO4	S	S	S	S	S

S- Strong; M-Medium; L-Low

## PRINCIPLES OF DATA COMMUNICATIONS AND NETWORKS – IN21C12 73Hrs

### Syllabus

#### UNIT I

14 Hrs

Introduction to Data Communications and Networking: Fundamental concepts, Data communication - Protocols, **Standard and its Organization**-Analog and digital signals - Modes of Data Transmission: Parallel and serial Communication-Asynchronous, Synchronous, Isochronous Communication-**Simple, Half duplex, Full duplex communication** – Transmission Errors: Detection and Correction: Error Classification-Types of Errors-Error Detection.

**UNIT II****15 Hrs**

Transmission Media: Guided Media, Unguided Media – **Network Topologies: Mesh, Star, Tree, Ring, Bus** – Switching: Circuit switching; Message switching, Packet switching – Routing Algorithms: Routers and Routing –Routing Algorithms.

**UNIT III****14 Hrs**

**Local Area Networks (LAN), Metropolitan Area Networks (MAN) and Wide Area Networks (WAN): LAN** - Ethernet-Token Ring – FDDI - **MAN -WAN Architecture**-Transmission Mechanism - Addressing – Network Protocols and OSI Model: Protocols in computer communication-OSI Model-OSI Layer Function.

**UNIT IV****15 Hrs**

Internetworking & TCP/IP: Internetworking concepts, Devices, Internet Basics, History and Architecture-Problems in Internetworking. TCP/IP Basics- IP Addresses-Internet Control Message Protocol (ICMP) - **Features of TCP, Relationship between TCP and IP**, Ports and Sockets, TCP connections, TCP Packet Format – User Datagram Protocol (UDP)- UDP Packet, **Difference between UDP and TCP** – Domain Name System (DNS)–File Transfer Protocol (FTP).

**UNIT V****15 Hrs**

Wireless and Mobile Networks: Wireless links, Characteristics-CDMA-IEEE 802.11 Wireless LANs, Bluetooth - Architecture-Bluetooth layers. **Satellite Networks -Operation, GEO, MEO and LEO satellites.** Cellular Internet Access- Architecture, **Standards-3G,4G,5G**, Near Field Communication (NFC). M obility - Principles, Addressing and routing to mobile users, Mobile IP, Handling mobility in Cellular Networks.

**Text Book**

S. No	Authors	Title	Publishers	Year of Publication
1.	AchyutS.Godbole, AtulKahate	Data Communications and Networks	Tata McGraw- HillEducation, 2 <sup>nd</sup> Edition	2012
2	Behrouz A. Forouzan	Data Communications and Networking	Tata McGraw-Hill PubCompany Ltd, 5 <sup>th</sup> Edition,	2012

**Reference Books**

S. No	Authors	Title	Publishers	Year of Publication
1.	Andrew S. Tanenbaum	Computer Networks	Prentice Hall of India, 4 <sup>th</sup> Edition	2012
2	PrakashC.Gupta	Data Communication & Computer Networks	PHI Learning Pvt Ltd 2nd Edition	2014

**Pedagogy**

- Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz, Case study, ICT tools.

**Course Designer**

Dr. R. Jeevitha

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN21E01	CLOUD COMPUTING	THEORY	73	2	-	5

### Preamble

Articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing.

### Course Outcomes

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

CO Number	CLO Statement	Knowledge Level
CLO1	Recall the fundamentals of cloud computing, data centre and cloud Environment	K1
CLO2	Understand the nature of the cloud, value of cloud for business, managing the data and cloud service	K2
CLO3	Apply the various cloud services like IaaS,PaaS and cloud environment	K3
CLO4	Analyze the Service-oriented architecture, cloud strategy , Virtualization	K4

### Mapping with Programme Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	M	M	M
CLO2	S	M	S	S	M
CLO3	M	S	S	M	S
CLO4	S	S	M	S	S

S- Strong; M-Medium; L- Low

### CLOUD COMPUTING- IN21E01

73 Hrs

### Syllabus

#### UNIT I

14 hrs

Introduction cloud computing: Grasping the fundamentals- Discovering the value of the cloud for business getting inside the cloud-developing your cloud strategy.

#### UNIT II

15 hrs

Understanding the nature of the cloud-seeing the advantages of highly scaled data centre-Exploring the technical foundation for scaling computer systems-checking the cloud workload strategy – managing data

**UNIT III****14 hrs**

Examining the cloud elements: Seeing infrastructure as a service-Exploring platform as service.

**UNIT IV****15 hrs**

Managing the cloud: Managing and securing cloud service – Governing the cloud –Virtualization and the cloud.

**UNIT V****15 hrs**

Managing the cloud: Managing desktops and devices in the cloud- Service-oriented architecture and the cloud – Managing the cloud environment.

**Text Book**

S.No.	Authors	Title	Publishers	Year of Publication
1.	Judith Hurwitz,Robin Bloor Marcia Kaufman and Dr. Fernhalper	Cloud Computing For Dummies	Willey India Publication Edition	2010

**Reference book**

S.No	Author	Title of book	Publisher	Year of Publication
1	Prasant Kumar Pattnaik	Fundamentals of Cloud Computing	Vikas Publishing House	2014
2	RajkimarBuyya.,et.al	Cloud Computing: Principles and Paradigms	Wiley publications	2013

**Pedagogy**

- In Class lecture , PPT, Discussion, Assignment, Seminar ,Quiz.

**Course****Designer**

Mrs. G. Sangeetha

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN21E02	WIRELESS SENSOR NETWORKS	THEORY	73	2	-	5

### Preamble

The course is designed to understand about the networking sensor routing and networking database. Examine the essential sensor nodes, general issues and energy constraints. Learn the networking and sensor platform tools.

### Course Outcomes

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CLO1	Recall the applications, platforms and tools of sensor network,	K1
CLO2	Understand the challenges in sensor network database, high level database organization	K2
CLO3	Apply the geographic and energy aware routing, collaborative processing and future research directions	K3
CLO4	Analyze the medium access control, temporal data and emerging applications	K4

### Mapping with Programme Outcomes

CLOs	PLO1	PLO 2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	S
CLO2	M	S	S	M	S
CLO3	S	M	M	S	M
CLO4	M	S	S	M	M

S – Strong; M – Medium; L – Low

## WIRELESS SENSOR NETWORKS- IN21E02

73 Hrs

### Syllabus

#### UNIT 1

14hrs

Introduction: Unique Constraints and challenges of sensor network – Advantages of sensor Network – Sensor Network Applications – Collaborative Processing – Definition of Sensor Networks

**UNIT II****15hrs**

Networking Sensors: Medium Access Control – General issues - Geographic, Energy Aware Routing – Attribute Based Routing.

**UNIT III****15hrs**

Sensor Network Database: challenges - Querying the physical environment – High level database organization –Network Aggregation -Data centric storage – Temporal Data.

**UNIT IV****15hrs**

Sensor Network Platforms and Tools: Sensor node hardware – Sensor Network Programming challenges – Node level Software platforms – Node level simulators.

**UNIT V****14hrs**

Application and future Directions: Emerging Applications - Future Research directions.

**Text Books**

S.NO	AUTHOR	TITLE OF BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Fengzhao and Leonidas J. Guidas	Wireless Network- An Information processing Approach	Elesiver publication	2007

**Reference Books**

S.NO	AUTHOR	TITLE OF BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Fengzhao and Leonidas J. Guidas	Wireless Sensor Network Design	John willey	2003
2	Kazemsobry Daniel minoli and Taiedznati	Wireless sensor network- Technology Protocol and Design	John willey	2007

**Pedagogy**

In Class lecture, PPT, Discussion, Assignment, Seminar, Quiz.

**Course Designer**

Mrs. G. Rubadevi

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN21E03	AUGMENTED REALITY/ VIRTUAL REALITY	THEORY	73	2	-	5

### Preamble

The objective of this course is to provide a detailed understanding of the concepts of Augmented /Virtual Reality and its applications.

### Course Outcomes

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

CLO Number	CO Statement	Knowledge Level
CLO1	o Recall fundamental concepts of computer vision, computer graphics and human-computer interaction techniques related to AR/VR.	K1
CLO2	o understand virtual environment and human factors in VR.	K2
CLO3	o apply various types of hardware and software in virtual reality systems	K3
CLO4	analyze and implement Augmented/ Virtual Reality applications.	K4

### Mapping with Programme Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO4
CLO1	S	M	S	M	S
CLO2	S	S	S	M	M
CLO3	M	S	S	S	S
CLO4	S	S	M	S	M

S- Strong; M-Medium; L- Low

**AUGMENTED REALITY / VIRTUAL REALITY - IN21E03**

**73 Hrs**

### Syllabus

#### UNIT I

**14 Hrs**

**Augmented Reality:** Taxonomy, Technology and features of augmented reality, Difference between AR and VR, Types Of AR, Challenges with AR, Advantages of AR, Ingredients of an Augmented Reality experience, Visualization techniques for augmented reality, Applying Augmented Reality to a problem.

#### UNIT II

**15 Hrs**

**Virtual Reality Environment:** Introduction, The Three I's of VR, Computer graphics, Real time computer graphics, Flight Simulation, Virtual environment requirement, Benefits of virtual reality, Historical development of VR. **3D Computer Graphics:** Introduction, The Virtual world space, B positioning the virtual observer, the perspective projection, human vision, stereo perspective projection,

3D clipping, Colour theory, Realism-Stereographic image.

### UNIT III

14 Hrs

**VR Hardware:** Introduction, Computers, Tracking, Input Devices, Output Devices, Glasses, Displays and Audio. **VR Software:** Introduction, VR Software Features, Web-Based VR, Division's dVISE and Blueberry3D.

### UNIT IV

15 Hrs

**Human Factors:** Introduction, Vision, Vision and Display Technology, Hearing, Tactile, Cybersickness, VR and Society.

### UNIT V

15 Hrs

**Applications of AR and VR:** Applications of AR in education, science, business, manufacturing and medicine. Application of VR in Film and TV Production, Military VR applications, VR Technology in Robotics and Games.

### Text Book

S.No	Author	Title of book	Publisher	Year of Publication
1	John Vince	Introduction to Virtual Reality	Springer	2004
2	Alan B. Craig	Understanding Augmented Reality, Concepts and Applications	Morgan Kaufmann	2013

### Reference Books

S.No	Author	Title of book	Publisher	Year of Publication
1.	Alan Craig, William Sherman and Jeffrey Will	Developing Virtual Reality Applications, Foundations of Effective Design	Morgan Kaufmann	2009
2.	Grigore C. Burdea, Philippe Coiffet	Virtual Reality Technology	Wiley	2016
3.	Anand R	Augmented and Virtual Reality	Khanna PublishingHouse	2010

### Pedagogy

Chalk and talk, PPT, Group Discussion, Assignment

### Course Designer

Dr. R. Jeevitha



COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN21CP5	PYTHON PROGRAMING LAB	LAB	75	-	-	4

### Preamble

To implement python programs with conditional loops and represent compound data using Python List, Tuples, Sets, Packages and Modules and Dictionaries, read write data from/to files in Python.

### Course Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Define the basic syntax and statements of Python programming.	K1
CLO2	Discuss the various functions and exception handling of python programming	K2
CLO3	Apply object-oriented programming concept in real time problems.	K3
CLO4	Analyze the data structures of list, tuples, dictionaries, Sets, Module and Packages and to develop the python application	K4

### Mapping with Programme Outcomes

CLOs	PLO1	PLO2	PL03	PL04	PLO5
CLO1	S	S	M	S	S
CLO2	S	S	S	S	M
CLO3	S	S	M	M	M
CLO4	S	S	S	S	S

S- Strong; M-Medium; L-Low

### PYTHON PROGRAMMING LAB

75 Hours

- Exercises using conditionals and loops.
- Exercises for implementing functions.
- Exercises using list and their built-in functions.
- Exercises by implementing tuples.
- Exercise by implementing Dictionaries and Sets
- Exercises using apply (), filter (), map () and reduce () functions.
- Exercises by implementing Modules and Packages
- Exercises by implementing classes and instances
- Exercises for implementing files concept.
- Exercises using strings and their built-in functions.
- Exercises for Data exploration using pandas.
- Exercises for Plotting special types of scatter plots

### Pedagogy

System, White board, Demonstration through PPT

### Course Designer

Dr.K.Sathiyakumari

<b>COURSE NUMBER</b>	<b>COURSE NAME</b>	<b>CATEGORY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>CREDIT</b>
<b>IN20SBCE</b>	<b>Coursera: PROGRAMMING IN PHP AND MYSQL</b>	<b>Theory</b>	<b>41</b>	<b>4</b>	<b>-</b>	<b>3</b>

### **Coursera - Programming in PHP and MySQL**

#### **Course Contents**

**45 Hrs**

- PHP Objects (3 hrs)
- Connecting PHP and MySQL (6 hrs)
- PHP Cookies and Sessions (3 hrs)
- PHP Redirect, Routing, and Authentication (6 hrs)
- Introduction to JavaScript and JavaScript Objects (10 hrs)
- Using JQuery (7 hrs)
- JSON - JavaScript Object Notation (9 hrs)

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
NM21CS1	CYBER SECURITY 1	Theory	30	-	-	Grade

### Preamble

*This course introduces fundamental concepts of Cyber Security in the digital era. It provides the knowledge of cybercrimes, cyber laws and also the security of digital devices. It helps to do secure digital transactions and safe usage of social media.*

## CYBER SECURITY

30 Hrs

### Syllabus

#### Unit I (6 Hrs)

**Principles of Cyber security:** Introduction to Cyber security - Defining cyberspace - Architecture of cyberspace - Communication and web technology - Internet infrastructure for data transfer and governance - Regulation of cyber space - Concept of Cyber security - Issue and challenges of cyber security.

#### Unit II (6 Hrs)

**Cyber Crime:** Introduction to Cyber crime - Classification of Cyber-crimes – Cyber-crime against women and children – Financial frauds - Social engineering attacks – Malware - Zero day and zero click attacks.

#### Unit III (6 Hrs)

**Cyber Law:** Cyber Criminals modus-operandi – Reporting of cybercrimes – remedial and mitigation measures – Legal perspective of cybercrime– IT Act 2000 and its amendments – Organization dealing with cyber crimes and cyber security in India.

#### Unit IV (6 Hrs)

**Social Media Security:** Introduction to social network – Types of social media – Social media platform – Hashtag – Viral content – Security issues related to social media. – **Cyber Security tools:** Nmap – Introduction to Nmap – Nmap scan types- Nmap command list.

**Digital Transaction:** Introduction to digital payments – Components of digital payments – Modes of digital payments – Banking cards – UPI (Unified Payment Interface) – e-Wallets. (Aligned 90% with UGC)

#### Unit V (6 Hrs)

**Digital Devices Security:** End point device and Mobile phone security – Password policy – Security patch management – Data backup – Device security policy – Cyber security best practices. Installation and configuration of Computer Anti-Virus.

**Case studies:** Illustrations of Financial frauds – Digital Signature. Prepare a checklist for secure net banking

**Reference books:**

1. Raef Meeuwisse , Cybersecurity For Beginners, Lulu Publishing Services,2<sup>nd</sup> Edition,2017
2. Scott Augenbaum, The Secret to Cybersecurity-A Simple Plan to Protect Your Family and Business from Cybercrime , Forefront Books Publisher,2019
3. Sumit Belapure and Nina GodBole, Cyber security understanding cyber crimes computer forensics and Legal perspectives, Wiley India Pvt Ltd, 2011
4. Christopher Hadnagy, Social Engineering: The Science of Human Hacking,Wiley Publisher, 2<sup>nd</sup> Edition,2018
5. Pavan Duggal, Artificial Intelligence, Cybercrimes & Cyberlaw,2018
6. Joe Gray, Practical Social Engineering: A Primer for the Ethical Hacker, 2022 Security in the digital age: social media security threats and vulnerabilities by Henry A. Oliver, Create Space Independence publishing platform.

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN16AC1	DATA MINING	Theory	-	-	-	5

### Preamble

*This paper helps the students to gain knowledge about various techniques used in variety of industries. Data mining has become an essential practice for maintaining a competitive edge in every phase of the customer life cycle. To understand various tools of Data Mining and their techniques to solve the real time problems*

### Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CLO1	Understand the importance of Data mining and its various kinds of datamining functionalities.	K2
CLO2	Discuss the concept of data processing, data cleaning, data integration and transformation, data reduction and discrimination.	K3
CLO3	Apply Data warehouse OLAP Technology and Mining Methods.	K3
CLO4	Analyses the various tools of data mining and techniques to solve the realtime problems.	K4

### Mapping with Programme Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	M	S	M
CLO2	S	S	S	S	S
CLO3	S	S	M	M	M
CLO4	S	S	S	S	S

S- Strong; M-Medium; L-Low

### DATA MINING - IN16AC1

#### UNIT-I

Introduction -What is Data mining , Data mining -important Data mining -various kind of data Data mining Functionalities –Various kinds of Patterns Pattern Interesting Classification of Data mining Systems Data mining Task Primitives Integration of Data Mining System Major issues in Data Mining

#### UNIT-II

Data Processing -Process the Data Descriptive Data Summarization –Measuring Central Tendency Dispersion of Data Graphic Displays of –Basic Descriptive Data Summaries Data Cleaning. Data Integration and Transformation- data Reduction-Data Discrimination -Concept Hierarchy Generation.

### UNIT-III

Data Warehouse OLAP Technology An overview -Data Warehouse Multidimensional Data Model, Data Warehouse Architecture- Data Warehouse Implementation From Data Warehouse to Data Mining

### UNIT-IV

Mining –Frequent Patterns Associations Correlations -Basic Concepts Road Map Efficient Scalable Frequent Item set Mining methods Mining –Various Kinds of Association rules Analysis -Association mining to Correlation Constrain Based Association mining

### UNIT-V

Applications Trends -Data mining Applications Data mining –System Products Research Prototype Additional Themes on Data Mining Social impact of Data mining Trends in Data mining.

#### Text Books

S.NO	AUTHOR	TITLE OFBOOK	PUBLISHER	YEAR OF PUBLICATION
1	Karguta, Joshi, Sivakumar	Data Mining	PHI	2007
2.	Ian H. Witten &Eibe Frank	Data Mining	Morgan Kaufmann Publishers	2009

#### Reference Books

S.NO	AUTHOR	TITLE OF BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Jiawei Han and MichelineKamber	Data Mining Concepts and Techniques	Morgan Kaufmann Publishers	An imprint of Elsevier
2.	N.P.Gopalan,B.Sivaselvan	Data Mining Techniques and Trends	PHI	2009

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN16AC2	INFORMATION RETRIEVAL	Theory	-	-	-	5

### Preamble

Understand the concepts of document representation, document indexing, digital information storage, retrieval, and distribution. Summarize the advantages and disadvantages of different information-retrieval design models. Translate vague information needs into specific queries that a given IR system can parse and execute correctly.

### Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CLO1	Understand the basic techniques in Information Retrieval scenarios.	K2
CLO2	Discuss the structure of dictionaries, wildcard queries, memory indexing.	K3
CLO3	Build a document retrieval system for real-time document retrieval problems.	K3
CLO4	Analyze about the XML retrieval, Text classification and Naive Bayes	K4

### Mapping with Programme Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	M	S	M
CLO2	M	S	S	S	S
CLO3	S	S	M	M	S
CLO4	S	M	S	S	M

S- Strong; M-Medium; L-Low

## INFORMATION RETRIEVAL - IN16AC2

### UNIT I

Boolean retrieval: Information retrieval problem - Processing Boolean queries - Boolean model versus ranked retrieval. The term vocabulary and postings lists: Document delineation and character sequence decoding - Determining the vocabulary of terms - Faster postings list intersection via skip pointers

### UNIT II

Dictionaries and tolerant retrieval: Search structures for dictionaries - Wildcard queries - Spelling correction - Phonetic correction. Index construction: Hardware basics - Blocked sort-based indexing - Single-pass in-memory indexing - Distributed indexing - Dynamic indexing .

### UNIT III

Scoring, term weighting and the vector space model: Parametric and zone indexes - Term frequency and weighting - The vector space model for scoring. Evaluation in information retrieval: Information retrieval system evaluation - Standard test collections - Evaluation of unranked retrieval sets - Evaluation of ranked retrieval results

### UNIT IV

XML retrieval: Basic XML concepts - Challenges in XML retrieval - A vector space model for XML retrieval - Evaluation of XML retrieval - Text-centric vs. data-centric XML retrieval.

### UNIT V

Text classification and Naive Bayes: The text classification problem - Naive Bayes text classification - Properties of Naive Bayes - Feature selection - Evaluation of text classification.

#### Text Book

S.NO	AUTHOR	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	Christopher D. Manning, Prabhakar Raghavan, Henrich Schutze	Introduction to Information Retrieval	Cambridge University Press, New York, 1 <sup>st</sup> Edition	2008

#### Reference Books

S.NO	AUTHOR	TITLE OF BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Stefan Buttcher et.al	Information Retrieval - Implementing and Evaluating	MIT Press	2012
2	Dr Ricardo Baeza-Yates et.al	Modern Information Retrieval: The Concepts and Technology	Addison Wesley	2011
3	DavidA. Grossman and OphirFrieder	Information Retrieval	Universities Press, 2 <sup>nd</sup> Edition,	2010