UG Syllabus Model

Semester I To VI

(With effect from the academic year 2020-2021)

Holy Cross College (Autonomous), Nagercoil

Nationally Re-Accredited with A+ by NAAC (CGPA 3.35)

Nagercoil, Kanyakumari District, Tamil Nadu, India.

Affiliated to

Manonmaniam Sundaranar University, Tirunelveli

DEPARTMENT OF COMPUTER SCIENCE

Vision

1. To demonstrate proficiency in problem-solving techniques using the computer.
2. To demonstrate proficiency in at least two high-level programming languages and two operating systems
3. To show the ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
4. To show the ability to function effectively on teams to accomplish a common goal.
5. To sensitize the students to the social realities around them with the vision of making them responsible citizen.

Mission

To provide a high-quality undergraduate education in computer science that prepares students for productive careers and lifelong learning.

Programme Educational Objectives (PEOs)

PEO -1	The graduates will apply appropriate theory and scientific knowledge to participate in activities that support humanity and economic development nationally and globally, developing as leaders in their fields of expertise.
PEO - 2	The graduates pursue lifelong learning and continuous improvement of the knowledge and skills with the highest professional and ethical standards.
PEO - 3	The graduates are trained to be employed in IT industries by providing do main knowledge, career and entrepreneurial skills.

Programme Outcomes (POs)

POs	**Upon completion of B.Sc. Computer Science programme, the graduates will be able to:**
PO - 1	utilize scientific knowledge to pursue higher studies in the relevant field.
PO - 2	create innovative ideas to enhance entrepreneurial skills for economic independence.
PO – 3	face challenging competitive examinations that offer rewarding careers.
PO – 4	reflect upon green initiatives and take responsible steps to build a sustainable environment.
PO – 5	handle ethical issues with social responsibility.
PO – 6	communicate effectively and collaborate successfully with peers to become competent professionals.

Programme Specific Outcomes (PSOs)

PSOs	Upon completion of the B.Sc. Degree Programme, the graduates will be able to:
PSO – 1	acquire the domain knowledge with critical thinking to serve the technical society as software engineer, data analyst and designing professional.
PSO - 2	enrich the managerial skills through team building and social responsibility.
PSO – 3	enhance the communication skills with lifelong learning.
PSO - 4	apply modern techniques to sustain the ever-changing era with values.

Eligibility Norms for Admission

Those who seek admission to B.Sc. Computer Science must have passed the Higher Secondary Examinations conducted by the Board of Higher Secondary Examination, Tamil Nadu with Computer Science or Mathematics as one of the subjects or any other examination recognized and approved by the Syndicate of the Manonmaniam Sundaranar University, Tirunelveli.

Duration of the Programme:3 years

Medium of Instruction: English

Passing Minimum

A minimum of 40% in the external examination and an aggregate of 40% is required. There is no minimum pass mark for the Continuous Internal Assessment.

Components of the B.Sc. Computer Science Programme

Part III (Major and Allied)

Major	Core – Theory papers	12 x100	1200
	Practicals (Core applied)	9 x100	900
	Elective - Theory papers	3 x 100	300
	Project		100
	Total marks		**2500**
Allied (I & II)	Theory	4x100	400
	Total marks		**400**
Part III - Total marks			**2900**

Course Structure

Distribution of Hours and Credits

Course	Sem. I	Sem. II	Sem. III	Sem. IV	Sem. V	Sem. VI	Total	
							Hours	Credits
Part I–Language	6 (4)	6 (4)	-	-	-	-	12	8
Part II-English	6 (4)	6 (4)	-	-	-	-	12	8
Part-III								
Major Core - Theory	4(4)	4(4)	5(4) + 5(4) + 5(4)	5(5) + 5(5)	6(5) + 5(5)	5(5) + 5(5) + 5(5)	59	55
Major Core - Practical	4(2)	4(2)	4(2) 4(2)	4(2) 4(2)	6(3)	4(2) 4(2)	38	19
Elective	-	-	-	5(4)	5(4)	5(4)	15	12
Project	-	-	-	-	6(6)		6	6
Allied- Theory	4(3)	4(3)	5(3)	5(3)	-	-	18	12
Part IV								
Add on Course (Professional English)	2(2)	2(2)	2 (2)	2 (2)	-	-	8	8
Non-Major Elective	2 (2)	2 (2)	-	-	-	-	4	4
SEC (Skill Enhancement Course)	2 (2)	2 (2)	-	-		2 (2)	6	6
AEC (Ability Enhancement Course)					2(2)		2	2
Total	**30(23)**	**30(23)**	**30(21)**	**30(23)**	**30(25)**	**30(25)**	**180**	**140**
Non Academic Courses								
Part V								
FC –I(Values for Life)	-	(1)	-	-	-	-	-	1

FC– II (Personality Development)	-	-	-	(1)	-	-	-	1
FC–III (Human Rights Education)	-	-	-	-	(1)	-	-	1
FC –IV (Gender Equity Studies)	-	-	-	-	-	(1)	-	1
SLP-Community Engagement Course	-	-	(2)	-	-	-	-	2
SLP-Extension activity (RUN)			-	(2)				2
STP - Clubs & Committees / NSS	-	-	-	(2)	-	-	-	2

Total number of hours = 180

Total number of credits = 140+10

Non Academic Courses are Mandatory and conducted outside the regular working hours

Skill Development Programme (Mandatory Certificate Course- 60 hours) will be offered in the first year for all the students.

Courses Offered

Semester	Course	Course Code	Title of the Course	Hours / Week	Credits
I	**Part I**	TL2012/ FL2111	Language: Tamil/French	6	4
	Part II	GE2013	General English	6	4
	Part III	SC2011	Major Core I: Programming Concepts in C	4	4
		SC20P1	Major Practical I: C Programming	4	2
		SA2011	Allied I: Theory: Digital Principles and Applications	4	3
	Part IV	APS201	Add on Course: Professional English for Physical Sciences - I	2	2
		SNM201	Non Major Elective (NME): Internet and Web Designing with HTML	2	2
		SEC201 / SEC202	Skill Enhancement Course (SEC): Meditation and Exercise / Computer Literacy	2	2
	Part V	FCV201	Foundation Course I: Values for Life	-	-
		STP201	Student Training Programme (STP): Clubs & Committees / NSS	-	-
II	**Part I**	TL2021/ FL2121	Language: Tamil/French	6	4
	Part II	GE2023	General English	6	4
	Part III	SC2021	Major Core II: Object Oriented Programming Using C++	4	4
		SC20P2	Major Practical II: C++ Programming	4	2
		SA2021	Allied II: Theory: Computer Organization and Architecture	4	3
	Part IV	APS202	Add on Course: Professional English for Physical Sciences – II	2	2
		SNM202	Non Major Elective (NME): Desktop	2	2

			Publishing using Scribus		
		SEC201 / SEC202	Skill Enhancement Course (SEC): Meditation and Exercise / Computer Literacy	2	2
	Part V	FCV201	Foundation Course I: Values for Life	-	1
		SLP201	Service Learning Programme: Community Engagement Course		
		STP201	Student Training Programme (STP): Clubs & Committees / NSS	-	-
III	**Part III**	SC2031	Major Core III: Programming in Java	5	4
		SC2032	Major Core IV: Data Structures and Algorithms	5	4
		SC2033	Major Core V: Computer Networks	5	4
		SC20P3	Major Practical III: Java Programming	4	2
		SC20P4	Major Practical IV: Data Structure Using C++	4	2
		SA2031	Allied III: Theory: Numerical and Statistical Methods	5	3
	Part IV	APS203	Add on Course: Professional English for Physical Sciences	2	2
	Part V	FCV202	Foundation Course II: Personality Development	-	-
		STP201	Student Training Programme (STP): Clubs & Committees / NSS	-	-
		SLP201	Service Learning Programme (SLP):Community Engagement Course	-	2
		SLP202	Service Learning Programme (SLP): Extension Activity (RUN)	-	-

IV	**Part III**	SC2041	Major Core VI: UNIX and Shell Programming	5	5
		SC2042	Major Core VII: Relational Database Management Systems	5	5
		SC2043 SC2044 SC2045	**Elective I:** (a) Software Engineering (b) System Administration and Maintenance (c) Software Testing	5	4
		SC20P5	Major Practical V: Shell Programming	4	2
		SC20P6	Major Practical VI: SQL and PLSQL	4	2
		SA2041	Allied IV: Theory: Discrete Mathematics	5	3
	Part IV	APS204	Add on Course: Professional English for Physical sciences	2	2
	Part V	FCV202	Foundation Course II: Personality Development	-	1
		SLP202	Service Learning Programme (SLP) Extension Activity (RUN)		
		STP201	Student Training Programme (STP): Clubs & Committees / NSS	-	2
V	**Part III**	SC2051	Major Core VIII: Web Technology: Theory and Practice	6	5
		SC2052	Major Core IX: Mobile Computing and its Applications	5	5
		SC2053 SC2054 SC2055	**Elective II:** (a) Multimedia Systems (b) Microprocessor &Assembly Language Programming (c) Open Source Technology	5	4
		SC20P7	Major Practical VII: Web Technology Lab	6	3

		SC20PR	Project	6	6
	Part IV	AEC201	Ability Enhancement Course (AEC): Environmental Studies	2	2
	Part V	FCV203	Foundation Course III: Human Rights Education	-	1
VI	**Part III**	SC2061	Major Core X: Android Programming	5	5
		SC2062	Major Core XI: Computer Graphics	5	5
		SC2063	Major Core XII: Operating Systems: Design Principles	5	5
		SC2064 SC2065 SC2066	**Elective III** (a) PHP Programming (b) Network Security (c) E-Commerce Technologies	5	4
		SC20P8	Major Practical VIII: Android Programming Lab	4	2
		SC20P9	Major Practical IX: Computer Graphics Lab	4	2
	Part IV	SSK206	Skill Enhancement Course (*SEC): Photoshop CS6	2	2
	Part V	FCV204	Foundation Course IV: Gender Equity Studies (GES)	-	1
			TOTAL	**180**	**140+10**

***SBC for the VI semester is offered by the departments for their students**

SBC - We offer PHP Programming during VI semester. The objective of this SBC is to develop webpage.

NMEC – We offer Internet and Web Designing with HTML and Desktop Publishing using Scribus during I and II semester. The objective of Internet and Web Designing with HTML is to design webpage and browse in internet and Desktop Publishing using Scribus to design and create magazines, newsletter, broachers etc. and to easily produce stylized documents. **Projec**t – We offer project in V semester. The aim is to equip the students to develop real time projects.

Self-Learning – Extra Credit Courses

Semester	Course Code	Title of the Course	Hours / Week	Credits
III	SC20S1	Web Designing with HTML	-	2
IV	SC20S2	Maya	-	2

Value Added Courses

Semester	Course Code	Title of the course	Total hours
I	VASC201	DCA-I	30
II	VASC202	DCA-II	30

Instruction for Course Transaction

Distribution of total hours for Theory (Major Core)

Components	Sem I	Sem II	Sem III	Sem IV	Sem V	Sem VI
Lecture Hours	45	45	60	60	75/60	60
Continuous Internal Assessment (2)	5	5	5	5	5	5
Quiz (2)	1	1	1	1	1	1
Class test (3)	3	3	3	3	3	3
* Class assignment/Group discussion/ Problem Solving (any other)	6	6	6	6	6	6
Total Hours	**60**	**60**	**75**	**75**	**90/75**	**75**

Distribution of total hours for Theory (Elective / Allied)

Components	Elective			Allied			
	Sem IV	Sem V	Sem VI	Sem I	Sem II	Sem III	Sem IV
Lecture Hours	60	60	60	45	45	60	60

Continuous Internal Assessment (2)	5	5	5	5	5	5	5
Quiz (2)	1	1	1	1	1	5	1
Class test (3)	3	3	3	3	3		3
* Class assignment/Group discussion/ Problem Solving (any other)	6	6	6	6	6	6	6
Total Hours	**75**	**75**	**75**	**60**	**60**	**75**	**75**

Distribution of total hours for Practical

	Semester	**Hours / Week**	**Total Hours / Semester**
Major	**I /II**	4/4	120
	III / IV	4/4	120
	V	6	90
	VI	4/4	120

Examination Pattern Ratio of Internal and External Components

Each paper carries an internal component. •

There is a passing minimum for external component.

A minimum of 40% in the external examination and an aggregate of 40% is required.

i) a. Part I - Tamil

Ratio of Internal and External= 30:70

Continuous Internal Assessment (CIA)

Internal Components and Distribution of Marks

Components	**Marks**
Internal test (2)	15
Quiz (2)	4
Class Test (2)	6
Class assignment/ Home assignment/ Field assignment/ Article review/ Group discussion/ Problem solving	5
Total	**30**

Question Pattern

Internal Test	Marks	External Exam	Marks
Part A 4 x 1	4	Part A 10 x 1 (No choice)	10
Part B 3 x 4	12	Part B 5 x 4 (Internal choice)	20
Part C 3 x 8	24	Part C 5 x 8 (Internal choice)	40
Total	**40**	**Total**	**70**

b. Part I -French

Ratio of Internal and External= 30:70

Continuous Internal Assessment (CIA)

Internal Components and Distribution of Marks

Components	Marks
Internal test (2)	15
Quiz (2)	4
Class Test (2)	6
Class assignment/ Home assignment/ Field assignment/ Article review/ Group discussion/ Problem solving	5
Total	**30**

Question Pattern for I & II Semesters

Internal Test	Marks	External Exam		Marks
Part A (Translation)	5	Part A (Translation)	4x5	20
Part B (Grammar) 5x5	25	Part B (Grammar)	6x5	30
		(Paragraph Writing)	15x1	
Part C (Paragraph Writing)10x1	10	Part C (Translation, Comprehension)	2x5	10
		Part D	5x2	10
Total	**40**	**Total**		**70**

ii) Part II - General English

Ratio of Internal and External= 30:70

Continuous Internal Assessment (CIA)

Internal Components and Distribution of Marks

Components	Marks
Internal test (2)	15
Quiz (2)	4
Class Test (3)	6
GD/Open Book Test/Role Play/Assignment/Article Review/Seminar	5
Total	**30**

Question Pattern

Internal Test	Marks	External Exam	Marks
Part A (Objective Type)	4 x 1 = 4	Part A (Objective Type)	10 x 1 = 10
Part B	3 x 4 = 12	Part B	5 x 4 = 20
Part C	3 x 8 = 24	Part C	5 x 8 = 40
Total	**40**	**Total**	**70**

iii) Part III (Major/ Elective/ Allied)

Ratio of Internal and External= 30:70

Continuous Internal Assessment (CIA)

Internal Components and Distribution of Marks

Internal Components	Marks
Internal test (2)	15
Quiz (2)	4
Class test (3)	6
Open Book Test/ Home assignment / Class Assignment/ Group Discussion	5
Total	**30**

Question Pattern

Internal Test	Marks	External Exam	Marks
Part A 4 x 1	4	Part A 10 x 1 (No choice)	10
Part B 3 x 4	12	Part B 5 x 4 (Internal choice)	20
Part C 3 x 8	24	Part C 5 x 8 (Internal choice)	40
Total	**40**	**Total**	**70**

Practicals: Major Core & Allied papers

Ratio of Internal and External= 40:60

Total: 100 marks

Internal Components and Distribution of Marks

Internal Components	Marks
Performance of the Experiments	10
Regularity in attending practical and submission of records	10
Record	5
Model exam	15
Total	**40**

Question pattern

External Exam	Marks
Major Practical	60
Minor Practical / Spotters /Record	
Total	**60**

iv) **Part IV**

Ratio of Internal and External = **50: 50**

a) Add-on Course: Professional English for Physical Sciences

Internal Components and Distribution of Marks

Internal Components	Marks
Listening and speaking	25
Reading and Writing	25
Total	**50**

Question pattern

External Exam	Marks
Written Test: Open choice – 5 out of 7 questions (5 x 10)	50
Total	**50**

b) Non – Major Elective (NME)

Continuous Internal Assessment (CIA)

Internal Components and Distribution of Marks

Internal Components	Marks
Internal test (2)	20
Quiz (2)	15
Class assignment/ Home assignment/ Project report	15
Total	**50**

Question Pattern

Internal Test	Marks	External Exam	Marks
Part A 4 x 1 (No Choice)	4	Part A 5 x 1 (No Choice)	5
Part B 3 x 4 (Internal Choice)	12	Part B 5 x 3 (Internal Choice)	15
Part C 3 x 8 (Internal Choice)	24	Part C 5 x 6 (Internal Choice)	30
Total	**40**	**Total**	**50**

c) Skill Enhancement Course (SEC) - Computer Literacy

Internal Components

Component	Marks
Objective type questions (30x1)	30
Exercise (Book) compulsory (2x10)	20
Total	**50**

External Components

Component	Marks
Exercise 1	20
Exercise 2	10
Procedures for both Exercises	20
Total	**50**

d) Skill Enhancement Course (SEC) - Meditation and Exercise

Internal Components

Component	Marks
Objective type questions (20x1)	20
Exercise (2x10)	20
Assignment	10
Total	**50**

External Components

Component	Marks
Quiz	20
Written test: Open choice –10 out of 15 questions (10x3)	30
Total	**50**

e) Ability Enhancement Course (AEC) - Environmental Studies

Internal Components

Component	Marks
Project Report	30
Viva voce	20
Total	**50**

External Components

Component	Marks
Quiz	20
Written Test: Open choice – 10 out of 15 questions (10x3)	30
Total	**50**

v) **Part V**

i) **Foundation course (Values for life, Personality development, Human rights education and Gender equity studies)**

Ratio of Internal and External = 50: 50

a) Foundation Course I: Values for Life

Internal Components

Component	Marks
Song, Mime, Skit	20
Book Activities	20
A Kind Action	10
Total	**50**

External Components

Component	Marks
Quiz	20
Written Test: Open choice – 5 out of 7 questions (5 x 6)	30
Total	**50**

b) Foundation Course II: Personality Development

Internal Components

Component	Marks
Exercise from book	20
Skit	10
Group Album	20
Total	**50**

External Components

Component	Marks
Quiz	20
Written Test: Open choice – 5 out of 7 questions (5 x 6)	30
Total	**50**

c) Foundation Course III: Human Rights Education

Internal Components

Component	Marks
Album on current issues	20
Group Song/ Mime/ Skit	10
Open book test (Objective type questions)	20
Total	**50**

External Components

Component	Marks
Quiz	20
Written Test: Open choice – 5 out of 7 questions (5 x 6)	30
Total	**50**

d) Foundation Course IV: Gender Equity Studies

Internal Components

Component	Marks
Album on current issues	20
Group Song/ Mime/ Skit	10
Open book test (Objective type questions)	20
Total	**50**

External Components

Component	Marks
Quiz	20
Written Test: Open choice – 5 out of 7 questions (5 x 6)	30
Total	**50**

e) SLP -Community Engagement Course (CEC)

(Field Work – 15 hrs, Class Hours – 15 hrs)

Internal Components

Component	Marks
Assignment	10
Group Discussion	10
Attendance (Field work)	30
Total	**50**

External Components

Component	Marks
Project Report / Case Study (10-15 pages in print) Group project	50
Total	**50**

f) SLP – Service Learning Programme: Reaching the Unreached Neigh bour hood (RUN)

- 60 Hours mandatory programme included in the curriculum (2 credits).

g) STP – Student Training Programme

- Compulsory for all I &II year students (2 credits).
- Clubs and Committees – Eco Club, YRC, Rotaract Club, NSS/ RRC, AICUF, Consumer Club, Sports, Legal Literacy and Women's Cell.
- Each student can opt for one club/ committee.

Semester I

Major Core I: Programming Concepts in C

Sub. Code: SC2011

No. of hours per week	No. of credits	Total no. ofhours	Total marks
4	**4**	**60**	**100**

Objectives:

1. To develop programming skills using the fundamentals and basics of C language
2. To develop programs using the basic elements like control statements, Arrays and Strings

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	recall the basic structure and key elements.	**PSO - 3**	**R**
CO - 2	understand the fundamentals of C programming	**PSO - 1**	**U**
CO - 3	analyze the various programming constructs and implement it to perform specific task.	**PSO - 4**	**AN, AP**
CO - 4	design and develop modular programming skills	**PSO - 1**	**C**

Unit I

C fundamentals Character set - Identifier and keywords - data types - constants - Variables - Declarations - Expressions - Statements - Arithmetic, Unary, Relational and logical, Assignment and Conditional Operators - Library functions.

Unit II

Data input output functions - Simple C programs - Flow of control - if, if-else, while, do-while, for loop, Nested control structures - Switch, break and continue, go to statements - Comma operator.

Unit III

Functions -Definition - proto-types - Passing arguments - Recursions. Storage Classes - Automatic, External, Static, Register Variables - Multi-file programs.

Unit IV

Arrays - Defining and Processing - Passing arrays to functions - Multi-dimension arrays - Arrays and String. Structures - User defined data types - Passing structures to functions - Self-referential structures - Unions - Bit wise operations.

Unit V

Pointers - Declarations - Passing pointers to Functions - Operation in Pointers - Pointer and Arrays - Arrays of Pointers - Structures and Pointers - Files: Creating Processing, Opening and Closing a data file.

Text Book:

E. Balagurusamy, "Programming in ANSI C", Fifth Edition, Tata McGraw Hill.

Reference Books:

1. Byron S. Gottfried, (1998). *Programming in C.* (3rd edition). New Delhi: Tata McGraw Hill Education Private Limited.
2. Stephen Prata, (2004). *C Primer Plus.* (5th edition). New York: Addison-Wesley Publication.
3. King, K.N. (2008). *C Programming: A Modern Approach.* (2nd edition). New York: W.W. Norton & Company.
4. Paul Deitel, &Harvey Deitel, (2009). *How to Program C.* (6th edition). New Delhi: PHI Learning Private Limited.
5. Herbert Schildt, (2012). *C: The Complete Reference.* (4th edition). New Delhi: McGraw Hill Education Private Limited.
6. Balagurusamy, E. (2012). *Programming in ANSI C.* (5th edition). New Delhi: Tata McGraw Hill.

Semester I

Major Practical I: C Programming

Sub. Code: SC20P1

No. of hours per week	No. of credits	Total no. of hours	Total marks
4	**2**	**60**	**100**

Objectives:

1. It aims to train the student to the basic concepts of the C-programming language
2. To improve the programming skills through C language

Learning Outcome

7.

LO	Upon completion of this course the students will be able to:	PSO addressed	CL
LO- 1	understand and solve simple physical problems	**PSO - 1**	**U**
LO- 2	solve mathematical equations using C programs	**PSO - 1**	**AP**
LO- 3	understanding a concept of functional hierarchical code organization	**PSO - 4**	**U**
LO- 4	write simple C programs to define the key concepts	**PSO - 3**	**R**
LO -5	develop simple C programs	**PSO - 1**	**C**

Programs:

1. Program using if statement.
2. Program using for loop statement.
3. Program using while loop statement.
4. Program using do-while loop statement.
5. Program using array.
6. Program to sort elements in an array.
7. Program to search an element in an array.
8. Program using function.
9. Program using recursion.
10. Program using structure.
11. Program using pointers.

Semester I

Allied I: Digital Principles and Applications

Course Code: SA2011

Hours / Week	Credits	Total Hours	Marks
4	3	60	100

Objectives:

1. It aims to train the student to the basic concepts of Digital Computer Fundamentals
2. To impart the in-depth knowledge of logic gates, Boolean algebra, combinational circuits and sequential circuits

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	recall and understand the basic architecture of a computer system	PSO – 1	R, U
CO - 2	understand the concepts of memory and storage systems.	PSO – 1	U
CO - 3	classify the various input and output devices.	PSO – 1	AN
CO -4	analyze the basic logic gates and interpret Boolean algebra and simplify simple Boolean functions by using basic Boolean properties	PSO – 2	AN, AP
CO - 5	perform conversion among different number systems and find complements of various numbers.	PSO – 4	AP
CO - 6	design various sequential and combinational circuits	PSO – 4	C

Unit I

Number Systems and Codes: Number System – Base Conversion – Binary Codes – Code Conversion. Digital Logic: Logic Gates – Truth Tables – Universal Gates.

Unit II

Boolean Algebra: Laws and Theorems – SOP, POS Methods – Simplification of Boolean Functions – Using Theorems, K-Map, Prime – Implicant Method – Binary Arithmetic: Binary Addition – Subtraction – Various Representations of Binary Numbers –Arithmetic Building Blocks – Adder – Subtractor.

Unit III

Combinational Logic: Multiplexers – Demultiplexers – Decoders – Encoders – Code Converters – Parity Generators and Checkers.

Unit IV

Sequential Logic: RS, JK, D, and T Flip-Flops – Master-Slave Flip-Flops. Registers: Shift Registers – Types of Shift Registers.

Unit V

Counters: Asynchronous and Synchronous Counters - Ripple, Mod, Up-Down Counters– Ring Counters. Memory: Basic Terms and Ideas –Types of ROMs – Types of RAMs.

Text Books:

1. Rajaraman V. and Radhakrishnan T., (2001). *Digital Computer Design*. New Delhi: Prentice Hall of India.
2. Leach D.P. and Malvino A.P. (2002). *Digital Principles and Applications. (5th edition). New Delhi:* TMH.
3. Moris Mano. M. (2001). *Digital Logic and Computer Design*. New Delhi: PHI
4. Bartee. T. C (1991). *Digital Computer Fundamentals*. (6th edition). New Delhi: Tata McGraw Hill

Reference Books:

1. Norton Peter, (2004). *Introduction to Computers.* (6th edition). New Delhi: McGraw-Hill Education.
2. Ram, B. (2005). *Computer Fundamentals: Architecture and Organization.* (3rdedition). New Delhi: New Age International Publishers.
3. Rajaraman, V. (2010). *Fundamentals of Computers.* (5th edition). New Delhi: Prentice Hall India Learning Private Limited.
4. Thomas C. Bartee, (2011). *Digital Computer Fundamentals.* (6th edition). New Delhi: JBA Publishers.
5. Balagurusamy, E. (2009). *Fundamentals of Computers.* (6th edition). New Delhi: TataMcGraw Hill Education India Pvt Ltd.
6. Morris Mano, M., Micheal D. Ciletti, & John F. Wakerly, (2012). *Digital Design.* (4thedition). New Jersey: Pearson Publication.

Semester I

NME: Internet and Web Designing with HTML

Course Code: SNM201

No. of Hours per Week	Credits	Total No. of Hours	Marks
2	**2**	**30**	**100**

Objectives:

1. To enable the students to specify design rules in constructing web pages and sites.
2. To enable the students to learn the basic working scheme of the Internet and World Wide Web.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO Addressed	CL
CO - 1	analyze a web page and identify its elements and attributes.	**PSO-1**	**AN**
CO - 2	design web pages using DHTML and Cascading Style Sheets.	**PSO-2**	**C**
CO - 3	design and construct web sites.	**PSO-4**	**C**
CO – 4	create e-mail ID and browse in internet.	**PSO-4**	**AP, C**

nit I

Introduction to Internet: Internet –World Wide Web - Web Browsers. **E-mail:** E-mail - Creating an E-mail id - Sending and Receiving mails – Attaching a File – Functions of e-mail – Advantages and Disadvantages of e-mail

Unit II

Introduction to HTML: Designing a Home Page - HTML Documents - Anchor Tag. **Head and Body Section:** Colorful Web Page. **Designing the Body Section:** Horizontal Rule –Aligning the Headings - Image and Pictures.

Unit III

Ordered and Unordered lists: List - Unordered lists - Ordered Lists - Nested Lists. **Table Handling:** Tables - Table Creation in HTML - Cells Spanning Multiple Rows/ Columns - Coloring Cells.

Unit IV

DHTML and Style Sheets: Defining Styles - Linking a Style Sheet to an HTML Document - Inline Styles – Internal Style Sheets - External Style Sheets. **Frames:** Frameset Definition - Frame Definition.

Unit V

Forms: Action Attributes - Method Attributes - Enctype Attribute - Drop Down List.

Text Books:

1. Xavier, C. (2010). *World Wide Web Design with HTML*. (23rd edition). New Delhi: TMH Publication.
2. Rizwan Ahmed, P. (2013). *Internet and its Application*. (2nd edition). Chennai: Margham Publications.

Reference Books:

1. Paul J. Deitel, Deitel, (2008). *Internet & World Wide Web: How to Program.* (5th edition). Pearson Education.
2. Raymond Greenlaw, Ellen Hepp. (2007). *Fundamentals of Internet and www*. (2nd edition). New Delhi: Tata McGrawHill.
3. Ivan Bayross. (2010). *HTML, DHTML, JavaScript, Perl CGI*. (4th edition). BPB Publications.
4. Kogent Learning Solutions Inc., (2012). *Web Technologies Black Book.* (New Edition). New Delhi: Dream Tech Press Publishers.
5. David Pitt, (2014) *Modern Web Essential Java script & Html5*. (2nd edition), New Delhi: Info Publication.

Semester II

Major Core II: Object Oriented Programming Using C++

Sub. Code: SC2021

No. of Hours per Week	Credits	Total No. of Hours	Marks
4	**4**	**60**	**100**

Objectives:

1. To study the OOP concepts
2. To impart basic knowledge of Programming Skills in C++language.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO Addressed	CL
CO – 1	understand Object Oriented Programming and Procedure Oriented Language and data types in C++.	**PSO - 1**	**U**
CO – 2	list out the tokens, keywords, identifiers used in C++ programming language	**PSO – 1**	**R**
CO – 3	to program using C++ features such as composition of objects, operator overloading, inheritance, polymorphism etc.	**PSO – 4**	**AP**
CO – 4	build knowledge about important concepts like functions, classes and constructors.	**PSO – 1**	**U**
CO – 5	to build C++ classes using appropriate encapsulation and design.	**PSO – 2**	**C**
CO – 6	evaluate the process of data file manipulations using C++	**PSO – 1**	**E**
CO – 7	apply virtual and pure virtual function and complex programming situations	**PSO - 4**	**AP**

Unit I

Principles of Object- Oriented Programming – A look at Procedure-Oriented Programming - Object Oriented Programming Paradigm – Basic Concepts of Object Oriented Programming - Benefits of OOP. **Beginning with C++**Definition of C++ - A Simple C++ Program – An Example with Class - Structure of C++ Program.**- Tokens-Expressions and Control Structures –**Tokens – Keywords –Identifiers – Basic Data Types – Storage classes - Operators in C++ - Scope Resolution Operator – Memory Dereferencing Operators - Memory Management Operators - Manipulators – Control Structures.

Unit II

Functions in C++ - The Main Function - Function Prototyping – Call by Reference – Return by Reference - Inline Functions – Default Arguments - **Classes and Objects –** Specifying a Class – Defining Member Function - Private Member Functions – Arrays with in a class-Static Data Members – Arrays of Objects – Friendly Functions **-. Constructors and Destructors –** Constructors – Parameterized Constructors-Multiple Constructors in a Class – Copy Constructors-Dynamic Constructors-Destructors. **Operator Overloading and Type Conversions:** Overloading Unary Operators - Overloading Binary Operators- Function Overloading - Rules for Operator Overloading

Unit III

Inheritance: Extending Classes – Single Inheritance – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance – Abstract Classes – Member Classes: Nesting of Classes. **Pointers- Virtual Functions and Polymorphism :**Pointers-Pointers to Objects – this Pointer-Virtual Functions-Pure Virtual Functions. **Managing Console I/O Operations –** C++ Streams – C++ Stream Classes – Formatted Console I/O Operations - Managing Output with Manipulators.

Unit IV

Managing Console I/O Operations – C++ Streams – C++ Stream Classes – Formatted Console I/O Operations - Managing Output with Manipulators. **Working with Files –** Classes for File Stream Operations – Opening and Closing a File –More about Open():: File Modes - File Pointers and their Manipulators – Sequential Input and Output Operations – Updating a File: Random Access – Command-Line Arguments. **Templates** Class Templates – Class Templates with Multiple Parameters – Function Templates – Function Templates with Multiple Parameters.

Unit V

Exception Handling: Basics of Exception Handling-Exception Handling Mechanism-Throwing Mechanism-Catching Mechanism. **Standard Template Library –**Components of STL-Containers-Algorithms-Iterators **Manipulating Strings:** Creating (String) Objects – Manipulating String Objects – Relational Operations on string objects – String Characteristics-Comparing and swapping.

Text Book:

1. Balagursamy E. (2013). *Object Oriented Programming with C++*. (6thedition). New Delhi: Tata McGraw Hill Publications.

Reference Books:

1. RavichandranD. (2001). *Programming with C++*. (5th edition). New Delhi: Tata McGraw Hill.
2. HerbtzSchildt, (2003).*C++: The Complete Reference*. (4th edition). New Delhi: McGraw Hill.
3. Paul Deitel, & Harvey M.Deitel, (2009). *C++ How to Program*. (7th edition). New Delhi: Prentice Hall.
4. Stanley B. Lippman, JoseeLajoie, Barbara E. Moo, (2012). *C++ Primer*.(5th edition). New York: Addison-Wesley.
5. Bjarne Stroustrup, (2013). *The C++ Programming Language*.(5th edition). New York: Addison-Wesley.

Semester II

Major Practical II: C++ Programming

Sub. Code: SC20P2

No. of hours per week	No. of credits	Total no. of hours	Total marks
4	**2**	**60**	**100**

Objectives:

1. To develop skill to make use of arrays and pointers in C++ programs.
2. To build knowledge about important concepts like functions, classes and constructors.

Learning Outcome

LO	Upon completion of this course the students will be able to:	PSO addressed	CL
LO- 1	understand and solve simple physical problems	**PSO – 1**	**U**
LO- 2	solve mathematical equations using C programs	**PSO – 2**	**AP**
LO- 3	write simple C programs to define the key concepts	**PSO - 2**	**R**
LO -4	develop simple C programs	**PSO – 1**	**C**

Programs:

1. Program with class
2. Inline Function
3. Friend Function
4. Constructor
5. Function Overloading
6. Single Inheritance
7. Multilevel Inheritance
8. Multiple Inheritance
9. Hybrid Inheritance
10. Program using File Handling
11. Program using Templates
12. Virtual Function

Semester II

Allied II: Computer Organization and Architecture

Course Code: SA2021

No. of Hours per Week	Credits	Total No. of Hours	Marks
4	3	60	100

Objectives

1. To understand the concept of computer architecture
2. To understand the working of a central processing unit & architecture of a computer.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	understand the theory and architecture of central processing unit	PSO – 1	U
CO -2	use appropriate tools to design verify and test the CPU architecture.	PSO – 2	Ap
CO -3	learn the concepts of parallel processing, pipelining and inter processor communication.	PSO - 3	U
CO -4	define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.	PSO – 4	Ap
CO -5	exemplify in a better way the I/O and memory organization	PSO –2	U

Unit I

Basic of Computer, Von Neumann Architecture, Generation of Computer, Classification of Computers, Instruction Execution. Register Transfer and Micro operations: Register Transfer, Bus and Memory Transfers, Three-State Bus Buffers, Memory Transfer, Micro-Operations, Arithmetic Micro-Operations, Logic Micro-Operations, Shift Micro-Operations.

Unit II

Stack Organization, Register Stack, Memory Stack, Reverse Polish Notation. Instruction Formats, Three- Address Instructions, Two – Address Instructions, One - Address Instructions, Zero - Address Instructions, RISC Instructions, Addressing Modes. RISC & CISC and their characteristics.

Unit III

Addition And Subtraction with Signed-Magnitude, Multiplication Algorithm, Booth Multiplication Algorithm, Array Multiplier, Division Algorithm, Hardware Algorithm, Divide Overflow, Floating-Point Arithmetic Operations.

Unit IV

Modes Of Transfer, DMA-DMA Controller, DMA Transfer, Input-Output Processor (IOP), CPU-IOP Communication. Memory Organization: Memory Hierarchy, Main Memory-RAM and ROM Chips, Memory Address Map, Memory Connection to CPU, Auxiliary Memory, Cache Memory.

Unit V

Control memory – Address sequencing – Design of Control unit. Pipelining - Arithmetic Pipeline, Instruction Pipeline. Multiprocessors: Characteristics of Multiprocessors, Interconnection Structure: Time-Shared Common Bus, Multi-Port Memory, Crossbar Switch, Multistage Switching Network, Hypercube Interconnection.

Text Book:

"Computer System Architecture", M.Morris Mano.

Reference Books:

1. "Computer System Architecture", John. P. Hayes.
2. "Computer Organization, C. Hamacher, Z. Vranesic, S.Zaky.
3. "Computer Architecture and parallel Processing ", Hwang K. Briggs.

Semester II

NME: Desktop Publishing using Scribus

Course Code: SNM202

No. of Hours per Week	Credits	Total No. of Hours	Marks
2	2	30	100

Objectives:

1. To provide information about open source philosophy surrounding scribus and understand what scribus can help youdo.
2. To learn how the different aspects of scribus's interface can be used to develop all of the different document needs that we might have for desktop publishing.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO Addressed	CL
CO - 1	use critical thinking skills to independently design and create magazines, newsletter, broachers etc.	**PSO-1**	**C**
CO - 2	understand the importance of lifelong, student driven learning	**PSO-2**	**U**
CO - 3	know the fundamentals of DTP and easily produce stylized documents	**PSO-2**	**U**
CO - 4	apply major design and marketing concepts to real world projects	**PSO-4**	**AP**

Unit I

Scribus Basics: Welcome to Scribus – Download and Installation: Ghost Script - Scribus 1.4.5 –Installation of Scribus on Windows. Before you open Scribus - An introductory tour of the Scribus Workspace: Introduction to Frames: Insert Sample Text, Working with Image Frames, Creating Inline Characters, Saving a Document, Zoom in on your Documents. Navigating your Documents: The Page List, Page Arrows, Document Outline, Switching between Documents, Adding and Deleting Pages, Arranging Pages.

Unit II

Getting to know the Workspace: The Scribus Workspace: The Menu Bar, The File Menu: Preferences, Preferences: The General Tab, The Document Tab, The Fonts Tab, The Guides Tab, Grab Radius, The Typography Tab, The Tools Tab, The Scrapbook. The Edit Menu – The Page Menu – The Insert Menu – The Item Menu: The Toolbar – The Properties Palette.

Unit III

Text Frames and Font Management: Using Frames– Editing your Text Frames –The Story Editor – The Text Tab – Text Wrapping: Flowing Text Around a Quote – Text Alignment – kerning and Tracking– Adding a Text Frame Background – Creating Text over a Semi-transparent Background.

Unit IV

Working with Graphics: Working with Graphics Files – Working with Image Effects – Image Formats. Working with Colors: Choosing Colors: The Color Wheel – Applying Colors – Gradients.

Unit V

Exporting and Printing your Documents: Copy Editing and Proofreading – Print Preview. Automating Scribus: Styles – Master Pages.

Text Book:

Robert White. (2015). *Beginning Scribus*.(3rd edition). New York: A press Publication.

Reference Books:

1. Cedric Gemy, (2010). *Scribus 1.3.5: Beginner's Guide.* (1st edition). Packt Publishing.
2. Thomas Ecclestone. (2015). *Use Scribus: The Desk Top Publishing Program*. (1st edition). CreateSpace Independent Publishing Platform.
3. Gregory Pittman, Christoph Schafer, (2009). *Scribus: Open Source Desktop Publishing: the Official Manual*. (reprint edition). FLES Books Publications.
4. Alice Chen, Gang Chen., (2010). *Using Free Scribus Software to Create Professional Presentations*. (New Edition). California: Archite G, Inc Publishers.
5. John R. Culleton, (2011). *Create Book Covers with Scribus 1. 4. 0 and Gimp 2. 6. 11: Desktop Guide with Layflat Wire-O Binding*. (illustrated edition), Wexford Press Publishers.

Semester II

Skill Enhancement Course (SEC): Computer Literacy

Course Code: SEC202

No. of Hours per Week	Credits	Total No. of Hours	Marks
2	2	30	100

Objective

To enable students to understand the basic working of ms office which includes ms word, exceland, powerpoint.

Unit I

Microsoft Word: Starting MS-Word – Introduction to word 2007 user interface – Understanding document views – Creating a new document – Saving a file – Printing a document – Opening an existing file – Microsoft word 2007 basic features.

Unit II

Formatting text – Formatting paragraphs – Graphics – Tables – Page Setup – Bullets and Numbering – Columns and Ordering – Text Boxes – Mail Merge.

Unit III

Microsoft Excel: Starting MS- Excel – Introduction to Excel 2007 user interface – Creating a New workbook – Saving a workbook – Opening an Existing workbook – Entering data into a cell – Selecting cells – Entering data using autofill – Using merge & center – Sorting data –Creating a table – Formatting a table.

Unit IV

Adjusting cell data alignment – Changing cell data orientation - Adding borders to cell – Basic operations on worksheet – Advanced operations on worksheets – Resizing columns and rows in a worksheet – Using formulas and functions – Charts.

Unit V

Microsoft PowerPoint: The PowerPoint window – PowerPoint views – Create a new presentation - Changing a slide layout – Inserting text on a new slide – Inserting a new slide – Rearrange the order of slides – Delete a slide – Save a presentation – Applying themes to a presentation – Change background style – Creating a textbox – Format textboxes – Add an image – Format an image – WordArt – Slide transitions – Slide animation - Setup slide show.

Text Book

J. Anto Hepzie Bai & S. J. Jenepha Mary, “Step Into Microsoft Office 2007”.

LAB EXERCISES

MS WORD

1. Design an Invitation
2. Design a Book Cover
3. Prepare a Calander
4. Mail Merge

MS EXCEL

1. Mark Sheet Preparation
2. Chart
3. Macro
4. Built-in Functions

MS POWERPOINT

1. Creating Resume
2. Birthday Greeting Card

Semester III

Major Core III: Programming in Java

Course Code: SC2031

Hours / Week	Credits	Total Hours	Marks
5	4	75	100

Objectives:

1. To understand the basic programming constructs of Java Language.
2. To explore the features of Java by coding.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	Define the Concept of OOP and Arrays	PSO – 1	U
CO - 2	Analyze the Structure of the Java programming Language and Classes	PSO – 2	AN
CO - 3	Implement various Errors handling technique using Exception Handling to solve complicated problem.	PSO – 3	U
CO -4	Create Java program to understand the Applet program to display window based Activities.	PSO – 3	C
CO - 5	Design a java program by using AWT Classes	PSO – 4	C

Unit I

Genesis of Java: Creation of Java – why java is important to internet – An overview of Java Object Oriented Programming. Data types – Variables – Type conversion and casting – Automatic type promotion in Expressions – Strings. **Arrays**: One Dimensional Array – Multi Dimensional Array – Operators – Control statements.

Unit II

Class Fundamentals:– Declaring objects – Assigning object Reference variables – Introducing Methods – Constructors – Garbage collection – Finalize () Method. **A Closer Look at Methods and classes**: Overloading Methods –Inheritance Basics & Types - Method overriding – Dynamic Method Dispatch – Using Abstract class – Using final with inheritance.

Unit III

Packages & Interface - Exception Handling - Creating your own Exception subclasses. **Multithreaded Programming**: Java Thread Model – Main Thread – Creating a Thread - Creating Multiple Threads–Using is Alive () and join () – Thread priorities.

Unit IV

I/O & Applets: I/O Basics Reading console Input – writing console output – The Print Writer class – Reading and Writing Files. The Applet class: - Applet Architecture – Applet Skeleton – Applet Display method – Requesting Repainting – HTML APPLET tag- Passing Parameters to Applet – Audio Clip Interface. Event Handling Mechanisms – Delegation Event Model – Event classes – Sources of Events – Event Listener Interface

Unit V

AWT Classes – Window fundamentals – working with Frame Windows - working with Graphic Using AWT controls: Controls fundamentals – Labels – using Buttons – Applying check Boxes – Check Box group – Choice controls – Using a Text field – Using a Text Area – Understanding Layout Managers (Flow Layout only) – Menu Bars and Menus.

Text Book:

Herbert Schildt, “Java - The Complete Reference”, Ninth Edition, McGraw-Hill Education, 2014

Reference Books:

1. E. Balagurusamy, “Programming with Java”, Tata McGraw-Hill Education India, 2014
2. Sachin Malhotra & Saurabh Choudhary, “Programming in JAVA”, 2nd Ed, Oxford Press
3. Sagayaraj, Sagayaraj, Denis, Karthik and Gajalakshmi, “JAVA Programming for Core and Advanced Learners”, 2018

Semester III

Major Core IV: Data Structures and Algorithms

Course Code: SC2032

Hours / Week	Credits	Total Hours	Marks
5	**4**	**75**	**100**

Objectives:

1. To introduce the various data structures and their implementations.
2. Study various sorting algorithms

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	Summarize different categories of data Structures	**PSO – 1**	**U**
CO -2	Identify different parameters to analyze the performance of an algorithm.	**PSO – 2**	**AP**
CO -3	Explain the significance of dynamic memory management Techniques	**PSO - 3**	**U**
CO -4	Design algorithms to perform operations with Linear and Nonlinear data structures	**PSO – 4**	**AP**
CO -5	Illustrate various technique to for searching, Sorting and hashing	**PSO –2**	**U**
CO -6	Choose appropriate data structures to solve real world problems efficiently.	**PSO –4**	**AP**

Unit I

Introduction: Analyzing algorithms, Arrays: Representation of Arrays, Implementation of Stacks and queues, Application of Stack: Evaluation of Expression - Infix to postfix Conversion - Multiple stacks and Queues, Sparse Matrices.

Unit II

Linked list: Singly Linked list - Linked stacks and queues – polynomial addition - More on linked Lists - Doubly linked List and Dynamic Storage Management - Garbage collection and compaction.

Unit III

Trees: Basic Terminology - Binary Trees - Binary Tree representations – Binary trees Traversal - More on Binary Trees. Graphs: Terminology and Representations - Traversals, connected components and spanning Trees, Single Source Shortest path problem.

Unit IV

Symbol Tables: Static Tree Tables – Dynamic Tree Tables. Hash Tables: Hashing Functions – Overflow Handling. External sorting: Storage Devices -Sorting with Disks: K-way merging - Sorting with tapes: Balanced Merge sorts**.**

Unit V

Internal sorting: Insertion sort - Quick sort - 2way Merge sort - Heap sort - sorting on keys. Files: Files, Queries and sequential organizations -Index Techniques: Cylinder Surface Indexing-Hashed Indexes - File organization: Sequential organizations – Random organizations -Linked organizations.

Text Book:

Ellis Horowitz, Sartaj Shani, Data Structures, Galgotia publication.

Reference Books:

1. Data structures Using C Aaron M. Tenenbaum, Yedidyah Langsam, Moshe J.Augenstein, Kindersley (India) Pvt. Ltd.
2. Data structure and Algorithms, Alfred V. Aho, John E. Hopcroft, Jeffrey D.Ullman, Pearson Education Pvt. Ltd.,

Semester III

Major Core V: Computer Networks

Course Code: SC2033

Hours / Week	Credits	Total Hours	Marks
5	4	75	100

Objectives:

1. To understand the concept of Computer network
2. To impart knowledge about networking and inter networking devices.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	Independently understand basic computer network technology.	**PSO – 1**	**U**
CO -2	Understand and explain Data Communications System and its components.	**PSO – 2**	**U**
CO -3	Identify the different types of network topologies and protocols	**PSO - 3**	**U**
CO -4	Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.	**PSO – 3**	**U**
CO -5	Apply the different types of network devices and their functions within a network	**PSO – 3**	**AP**
CO -6	Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.	**PSO –4**	**AP**

Unit I

Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP Models – Example Networks: Internet, ATM, Ethernet and Wireless LANs - Physical Layer – Theoretical Basis for Data Communication - Guided Transmission Media

Unit II

Wireless Transmission - Communication Satellites – Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues – Error Detection and Correction.

Unit III

Elementary Data Link Protocols - Sliding Window Protocols – Data Link Layer in the Internet - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols.

Unit IV

Network Layer - Design Issues - Routing Algorithms - Congestion Control Algorithms – IP Protocol – IP Addresses – Internet Control Protocols.

Unit V

Transport Layer - Services - Connection Management - Addressing, Establishing and Releasing a Connection – Simple Transport Protocol – Internet Transport Protocols (ITP) - Network Security: Cryptography.

Text Book:

A. S. Tanenbaum, "Computer Networks", 4th Edition, Prentice-Hall of India, 2008.

Reference Books:

1. B. A. Forouzan, "Data Communications and Networking", Tata McGraw Hill, 4th Edition, 2007.
2. F. Halsall, "Data Communications, Computer Networks and Open Systems", Pearson Education, 2008.
3. D. Bertsekas and R. Gallagher, "Data Networks", 2nd Edition, PHI, 2008.
4. Lamarca, "Communication Networks", Tata McGraw- Hill, 2002

Semester III

Major Practical III: Java Programming

Course Code: SC20P3

Hours / Week	Credits	Total Hours	Marks
4	2	60	100

Objectives:

1. To be knowledgeable enough about basic Java language syntax and semantics to be able to successfully read and write Java computer programs.
2. To implement interfaces, inheritance, and polymorphism as programming techniques and apply exceptions handling.

Learning Outcome

LO	Upon completion of this course the students will be able to:	PSO addressed	CL
LO -1	Create a java program to calculate simple mathematical problems.	PSO – 1	C
LO -2	Create a java program using Error handling technique	PSO – 2	C
LO -3	Create Applet program to implement window based Activities	PSO - 3	C

Programs:

1. Define a class called Student with the attributes name, reg. number and marks obtained in four subjects(m1,m2,m3,m4).Write a suitable constructor and methods to find the total mark obtained by the student and display the details of the student.
2. Write a Java program to find the area of a square, rectangle and triangle by
   (i) Overloading Constructor (ii) Overloading Method.
3. Write a java program to add two complex numbers. [Use passing object as argument and return object].
4. Define a class called Student super with data members name, roll number and age. Write a suitable and a method output () to display the details.
5. Derive another class Student from Student super with data members height and weight. Write a constructor and a method output () to display the details which overrides the super class method output (). [Apply method Overriding concept].

6. Write a java program to create an interface called Demo, which contains a double type constant, and a method called area () with one double type argument. Implement the interface to find the area of a circle.
7. Write a java program to create a thread using Thread class.
8. Demonstrate Java inheritance using extends keyword.
9. Create an applet with four Checkboxes with labels MARUTI-800, ZEN, ALTO and ESTEEM and a Text area object. The program must display the details of the car while clicking a particular Checkbox.
10. Write a Java program to throw the following exception,

    1) Negative Array Size 2) Array Index out of Bounds
11. Write a java program to create a file menu with option New, Save and Close, Edit menu with option cut, copy, and paste
12. Write a java programming to illustrate Mouse Event Handling

Semester III

Major Practical IV: Data Structures Using C++

Course Code: SC20P4

Hours / Week	Credits	Total Hours	Marks
4	**2**	**60**	**100**

Objectives:

1. To understand importance of data structures in context of writing efficient programs.
2. To develop skills to apply appropriate data structures in problem solving.

Learning Outcome

LO	Upon completion of this course the students will be able to:	PSO addressed	CL
LO -1	Learn the basic types for data structure, implementation and application.	**PSO - 2**	**AP**
LO -2	Know the strength and weakness of different data structures.	**PSO - 1**	**U**
LO -3	Use the appropriate data structure in context of solution of given problem.	**PSO - 3**	**AP**
LO -4	Develop programming skills which require to solve given problem	**PSO - 4**	**C**

Programs:

1. Write a C++ program to create two array list of integers. Sort and store the elements of both of them in third list.
2. Write a C++ program to multiply two matrices A and B and store the resultant matrix in C using arrays.
3. Write a C++ program to experiment the operation of STACK using array.
4. Write a C++ program to create menu driven options to implement QUEUE to perform the following

   (i) Insertion (ii) Deletion (iii) Modification (iv) Listing of elements
5. Write a C++ program to create Linked list representations of employee records and do the following operations using pointers.

   a. To add a new record. b. To delete an existing record.

   c. To print the details about an employee. d. To find the number of employees in the structure.
6. Write a C++ Program to count the total nodes of the linked list.
7. Write a C++ program to insert an element at the end of the linked list.
8. Write a C++ program to insert an element at the beginning of a doubly linked list.
9. Write a C++ program to display the hash table, using the mid square method.
10. Write a program to demonstrate Binary Search.
11. Write a C++ program to insert nodes into a Binary tree and to traverse in pre order.
12. Write a C++ program to traverse the given binary tree using all traversal methods.
13. Write a C++ programto arrange a set of numbers in ascending order using QUICK SORT.

Semester III

Allied III: Numerical and Statistical Methods

Course Code: SA2031

Hours / Week	Credits	Total Hours	Marks
5	**3**	**75**	**100**

Objectives:

1. To equip the students with statistical tools and concepts that help in decision making.
2. To apply the knowledge of computing and mathematical methods appropriate to various discipline.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	Solve an algebraic and Transcendental Equations using an appropriate numerical methods	**PSO – 1**	**C**
CO -2	Find an error analysis for a given numerical method	**PSO – 4**	**R**
CO -3	Solve a simultaneous equation using an appropriate numerical method	**PSO – 4**	**C**
CO -4	Find inverse of a matrix using Back Substitution method	**PSO – 3**	**R**
CO -5	Find a polynomial using interpolation methods	**PSO – 2**	**R**
CO -6	Determine correlation and rank correlation coefficient between two variables	**PSO – 2**	**E**
CO -7	Find a regression equations using the given data	**PSO – 3**	**R**
CO -8	Acquire problem solving techniques and Baye's Theorem to solve real world problems	**PSO – 4**	**AP**

Unit I

Algebraic and Transcendental Equations: Introduction – Errors in Numerical Computation – Iteration Method – Bisection Method.

Unit II

Simultaneous Equations: Introduction – Simultaneous Equations – Back Substitution – Gauss Elimination Method – Gauss-Jordan Elimination Method – Calculation of Inverse of a Matrix.

Unit III

Interpolation: Introduction – Newton's Interpolation Formulae –Lagrange's Interpolation Formulae – Divided Differences – Newton's Divided Differences Formulae

Unit IV

Measures of central tendency: mean, median, mode (with frequency). **Measures of dispersion**: Range, Standard deviation, variance, quartile deviation

Unit V

Correlation and Regression: Introduction **–** Correlation – Rank correlation – Regression [Expect Correlation coefficient for a bivariate frequency distribution].

Text Books:

1. Arumugam, S., Thangapandi Issac, S., Soma Sundaram, A. (2013). *Numerical Analysis with Programming in C*. (4th edition). Bombay: New Gamma Publishing House.
2. Arumugam, S., Thangapandi Issac, S. (2013). *Statistics*. (1st edition). Andra: New Gamma Publishing House.

Reference Books:

1. Sastry, S.S. (2003). *Introduction Methods of Numerical Analysis*. (3rd edition). India: Prentice Hall Publication.
2. Sear Borough, J. N. (1966). *Numerical Mathematical Analysis*. (6th edition). New Delhi: Oxford and IBH Publishing Co.
3. Gupta, P.P., Malik, G. S., Sanjay Gupta, (1992). *Calculus of Finite Differences and Numerical Analysis*. (16th edition). Bombay: Krishna Prakashan Mandir.
4. Kapur, J. N., Saxena, (1986). *Mathematical Statistic*. (12th edition). NewDelhi: Chand and Company.
5. Mangaladoss, (1994). *Statistics and its Applications*. (11th edition). New Delhi: Suja Publishing House.

Semester IV

Major Core VI: UNIX and Shell Programming

Course Code: SC2041

Hours / Week	Credits	Total Hours	Marks
5	5	75	100

Objectives:

1. To familiarize students with the UNIX environment and shell scripting/programming.
2. To inculculate the knowledge of working process of UNIX operating systems.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	identify set of commands in UNIX	**PSO – 1**	**R**
CO -2	describe the features & functions of an operating system.	**PSO - 1**	**U**
CO -3	Customize environment settings using a text editor	**PSO – 1**	**U**
CO -4	demonstrate UNIX commands for file handling and process control	**PSO - 1**	**AP**
CO -5	• combine several simple commands in order to produce more powerful operations.	**PSO -1**	**AP**
CO -6	• utilize system utilities to perform administrative tasks	**PSO - 1**	**AP**
CO -7	analyze the working of the user defined commands and will be able to change the permissions associated with files.	**PSO - 3**	**AN**
CO -8	create and manage simple file processing operations, organize directory structures with appropriate security	**PSO - 3**	**C**

CO -9	create, delete, move and rename files and directories	**PSO – 1**	**C**

Unit I

Getting Started: The Operating System – The UNIX Operating System- A Brief Session. **The UNIX Architecture and Command Usage:** The UNIX Architecture - Features of UNIX - Locating Command - Internal and External Commands – Command Structure - Flexibility of Command Usage – Man Browsing the Manual Pages On-line. **General Purpose Utilities:** cal - date - echo - printf - bc - script – passwd - who – uname – tty - stty.

Unit II

The File System: The File – File Name – The HOME Variable – pwd – cd – mkdir – rmdir - Absolute and Relative Pathnames – ls: Listing Directory Content - The UNIX File System**. Handling Ordinary Files:** cat – cp – rm – mv – more - lp – file – wc – od – cmp – comm – diff – gzip – gunzip. **Basic File Attributes:** ls -l: Listing File Attributes - File Ownership - File Permissions – chmod - Directory Permissions - Changing File Ownership.

Unit III

The VI Editor: vi Basics - Input Mode—Entering and Replacing Text – Saving Text and Quitting—The ex Mode - Navigation - Editing Text - Undoing Last Editing Instructions - Repeating the Last command – Searching for a Pattern - Substitution—Search and Replace. **The Shell:** Shell Offerings - Pattern Matching - Escaping and Quoting – Redirection – Pipes – tee - Shell Variables.

Unit IV

The Process: ps: Process Status – Mechanism of Process Creation - Running Jobs in Background – nice: Job Execution with Low Priority – Killing Processes with Signals - at and batch: Execute Later – cron: Running Jobs Periodically. **Customizing the Environment:** Environment Variables – The Common Environment Variables –Command History. **More File Attributes:** File Systems and Inodes – The Directory - umask: Default File and Directory Permissions – find: Locating Files.

Unit V

Simple Filters: The Sample Database - pr – head – tail – cut – paste – sort. **Filters Using Regular Expressions:** grep. **Essential Shell Programming:** Shell Scripts **–** read: Making Scripts Interactive – Using Command Line Arguments – exit and Exit Status of Command – The Logical Operators && and || -- Conditional Execution – The if Conditional –

The case Conditional – while: Looping – for: Looping with a List – Debugging Shell Scripts with set –x.

Text Book:

Sumitabha Das, (2013). *UNIX Concepts and Applications*. (3rd edition). New Delhi: Tata McGraw Hill Publications.

Reference Books:

1. S.Prata, (2008). *Advanced UNIX: A Programming's Guide*. (2nd edition). New Delhi: BPB Publications.
2. W. Richard Stevens, Bill Fenner, Andrew M. Rudoff, (2014). *Unix Network Programming, The sockets Networking API, Vol. 1*. (3rd edition). New York: Addison Wesley.
3. Graham Glass, King Ables, (2009). *Unix for programmers and users*. (3rd edition). New Delhi: Pearson Education.
4. N.B Venkateswarlu, (2010). *Advanced Unix programming*. (2nd edition). New Delhi: BS Publications.
5. Yashwanth Kanitkar, (2010). *Unix Shell programming*. (1st edition). New Delhi: BPB Publisher.

Semester IV

Major Core VII: Relational Database Management System

Course Code: SC2042

Hours / Week	Credits	Total Hours	Marks
5	5	75	100

Objectives:

1. To describe a sound introduction to the discipline of database management systems.
2. To give a good formal foundation on the relational model of data and study the SQL in detail.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	Describe basic concepts of data base System and Architecture	**PSO – 1**	**R**
CO -2	Define the logical design of database including E-R Model and Normalization approach	**PSO - 1**	**U**
CO -3	Understand and apply the basic of SQL and Authorization methods	**PSO – 3**	**U**
CO -4	Analyze Normal forms and RDBMS methods	**PSO - 3**	**AN**
CO -5	Apply Timestamp and Transaction management	**PSO -4**	**AP**

Unit I

Introduction: Database System Applications-DBMS Vs. File System - View of Data- Data Model Database Languages - Database users and Administrators - Transaction Management - Database System Structure - Application Architecture. Data Models: Basic Concepts - Constraint- Keys- ER Diagram - Weak Entity - Extended ER Features - UML; Relational Model: - Views.

Unit II

SQL: Background-Basic Structure-Set Operation-Aggregate Function-Null Values- Nested Sub Queries - Views - Modification of the Database - Data Definition Language - Embedded SQL - Dynamic SQL.

Unit III

Advance SQL: Integrity and Security: Domain - Constraint - Referential Integrity - assertions - Triggers - Security and Authorization - Authorization in SQL - Encryption and Authentication.

Unit IV

Relational Database Design: First Normal Form - Pitfalls in Relational Database Design-Functional Dependencies (Second Normal Form) - Boyce-Codd Normal Form - Third Normal Form - Fourth Normal Form - Overall Database Design Process.

Unit V

Transaction Management: Transaction concepts - States - Serializability. Lock based concurrency control: Locks - Granting - Timestamps - Timestamp ordering protocol - Dead lock handling.

Text Book:

A Silberschatz, H Korth, S Sudarshan, "Database System and Concepts", 5th Edition McGraw-Hill, 2005. Tamilnadu State Council for Higher Education

Reference Books:

1. Alexix Leon & Mathews Leon, "Essential of DBMS", 2nd reprint, Vijay Nicole Publications, 2009.
2. Alexix Leon & Mathews Leon, "Fundamentals of DBMS", 2nd Edition, Vijay Nicole Publications, 2014.

Semester IV

Elective I: (a) Software Engineering

Course Code: SC2043

Hours / Week	Credits	Total Hours	Marks
5	4	75	100

Objectives:

1. To understand the software engineering concepts.
2. Understand the coding, testing and user interface design
3. Design, develop the software projects and software reliability and quality management

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	Apply software engineering principles and techniques	PSO – 1	AP
CO -2	Develop, maintain and evaluate large-scale software systems.	PSO – 4	C
CO -3	Produce efficient, reliable, robust and cost-effective software solutions.	PSO - 4	C
CO -4	Ability to work as an effective member or leader of software engineering teams.	PSO – 2	AP
CO -5	Ability to manage time, processes and resources effectively by prioritising competing demands to achieve personal and team goals	PSO – 2	U

Unit I

Introduction - Software Engineering Discipline - Evolution and Impact - Programs Vs Software Products. Software Life Cycle Models: Classical Waterfall Model -Iterative Waterfall Model - Prototyping Model - Evolutionary Model - Spiral Model. Software Project Management: Responsibilities of a Software Project Manager - Project Planning - Risk Management.

Unit II

Requirements Analysis and Specification: Requirements Gathering and Analysis - Software Requirements Specification (SRS): Users of SRS Document, Characteristics of a Good SRS Document, Attributes of Bad SRS Documents – Formal System Development Techniques. Software Design: Characteristics of a Good Software Design - Cohesion and Coupling -Layered Arrangement.

Unit III

Function-Oriented Software Design: Overview of SA/SD Methodology - Structured Analysis - Data Flow Diagrams (DFDs). Object Modeling Using UML: Overview of Object-Oriented Concepts - UML Diagrams - Use Case Model: Representation of Use Cases. Why Develop Use Case Diagram, How to identify the Use Cases of a system - Class Diagrams - Interaction Diagrams - State Chart Diagram.

Unit IV

User Interface Design: Characteristics of a Good User Interface - Basic Concepts - Types of User Interfaces - Coding and Testing: Coding – Testing: Basic Concepts and Terminologies, Testing Activities - UNIT Testing - Black-Box Testing - White-Box Testing - Debugging -Integration Testing - System Testing.

Unit V

Software Reliability and Quality Management: Software Reliability - Statistical Testing -Software Quality - Software Quality Management System - ISO 9000: What is ISO 9000 Certification, ISO 9000 for Software Industry-Computer Aided Software Engineering: CASE Environment - CASE support in Software Life Cycle - Characteristics of CASE Tools - Software Maintenance: Characteristics of Software Maintenance - Software Reverse Engineering - Software Maintenance Process Models

Text Book:

Rajib Mall, "Fundamentals of Software Engineering",3rd Edition, Prentice Hall of India Private Limited, 2008.

Reference Books:

1. Rajib Mall, "Fundamentals of Software Engineering", 4thEdition, Prentice Hall of India Private Limited, 2014.
2. Richard Fairley, "Software Engineering Concepts", TMGH Publications, 2004.

Semester IV

Elective I: (b) System Administration and Maintenance

Course Code: SC2044

Hours / Week	Credits	Total Hours	Marks
5	4	75	100

Objectives:

1. To study the basic concepts of computer system and operating system
2. To configure the system installation, maintenance and trouble shooting
3. To understand the basic concepts laptop, portable device and preventive maintenance techniques

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	Know some basic security measures to take in system administration	PSO – 1	U
CO -2	Understand concepts and acquire skills that are essential to the administration of operating systems, networks, software	PSO – 4	U
CO -3	Apply the skills in the administration of an actual computer system with actual users	PSO - 4	AP
CO -4	Implement security measures into the network administration.	PSO – 2	AP

Unit I

Introduction to Personal Computer: Computer System – Purposes & Characteristics of Cases - Power Supplies - Internal Components - Ports - Cables - Input devices - Output devices. Safe Lab Procedures and Tool Use: Safe Working Conditions and Procedures - Tools and Software used with PC components.

Unit II

Computer Assembly: Open Case - Install Power Supply - Attach Components to Motherboard - Installation: Motherboard - Internal Drives - Drives in External Bayes -Adapter Cards. Internal cables connections -Reattach side panels - Connection of external cables - Boot the Computer. Preventive Maintenance and Troubleshooting: Purpose of Preventing Maintenance - Steps of Troubleshooting Process.

Unit III

Fundamental Operating System: Purposes - Characteristics of Modern Operating Systems – Concepts Comparisons, Limitations, and Compatibilities - Determination of Operating System based on Customer Needs - Installation of Operating System -Navigate a GUI (Windows) - Common Preventive Maintenance Techniques- Troubleshoot.

Unit IV

Fundamental Laptops and Portable Devices: Common Uses - Components of Laptop - Comparison of the components of Desktop and Laptops - Configure Laptops - Mobile Phone Standards - Preventive Maintenance Techniques - Troubleshoot Laptop and Portable Devices. Fundamental Printers and Scanners: Types of Printers and Scanners - Installation and Configuration Process of Printers and Scanners - Preventive Maintenance Techniques - Troubleshoot.

Unit V

Fundamental Networks: Principles - Types - Concepts and Technologies - Physical Components - LAN Topologies and Architectures- Standard Organizations - Ethernet Standards - OSI and TCP/IP Models - Configuration of NIC and Modem - Establishing Connectivity - Preventive Maintenance Techniques - Troubleshoot. Fundamental Security: Security Threats - Security Procedures - Preventive Maintenance Techniques - Troubleshoot Security.

Text Book:

David Anfinson & Ken Quamme, "IT Essentials: PC Hardware and Software Companion Guide", 3rd Edition, Pearson Publications, 2008.

Reference Books:

1. Quentin Docter, Emmett Dulaney and Toby Skandier, "CompTIA A+ Complete Review Guide: Exam 220-901, Exam 220 - 902", 3rd Edition, Wiley Publications, 2015.
2. To understand the software engineering concepts.
3. Understand the coding, testing and user interface design
4. Design, develop the software projects and software reliability and quality management

Semester IV

Elective I: (c) Software Testing

Course Code: SC2045

Hours / Week	Credits	Total Hours	Marks
5	4	75	100

Objectives:

1. To study various Software techniques
2. To study fundamental concepts in software testing

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	Apply software testing knowledge and engineering methods to design and conduct a software test process for a software testing project	PSO – 1	AP
CO -2	Identify and select appropriate testing technique to test asoftware.	PSO – 4	C
CO -3	Identify various software testing problems and solve these problems by various software testing methods.	PSO - 4	C
CO -4	Understand the contemporary issues in software testing, such as buddy, agile, extreme, adhoc software testing problems etc	PSO – 2	AP
CO -5	To use software testing methods and modern software testing tools for their testing projects and employ correct testing terminology throughout the testing process.	PSO – 2	U

Unit I

Introduction: Purpose – Productivity and Quality in Software – Testing Vs Debugging – Model for Testing – Bugs – Types of Bugs – Testing and Design Style.

Unit II

Flow / Graphs and Path Testing – Achievable paths – Path instrumentation – Application – Transaction Flow Testing Techniques.

Unit III

Data Flow Testing Strategies - Domain Testing: Domains and Paths – Domains and Interface Testing.

Unit IV

Linguistic –Metrics – Structural Metric – Path Products and Path Expressions. Syntax Testing – Formats – Test Cases.

Unit V

Logic Based Testing – Decision Tables – Transition Testing – States, State Graph, State Testing.

Text Book:

1. B. Beizer, “Software Testing Techniques”, II Edn., Dream Tech India, New Delhi, 2003.
2. K.V.K. Prasad , “Software Testing Tools”, Dream Tech. India, New Delhi, 2005.

Reference Books:

1. I. Burnstein, 2003, “Practical Software Testing”, Springer International Edn.
2. E. Kit, 1995, “Software Testing in the Real World: Improving the Process”, Pearson Education, Delhi.
3. R.Rajani, and P.P.Oak, 2004, “Software Testing”, Tata Mcgraw Hill, New Delhi.

Semester IV

Major Practical V: Shell Programming

Course Code: SC20P5

Hours / Week	Credits	Total Hours	Marks
4	2	60	100

Objectives:

1. Simulate the file commands
2. Write simple shell programming

Learning Outcome

LO	Upon completion of this course the students will be able to:	PSO addressed	CL
LO -1	Run various UNIX commands on a standard UNIX Operating system	PSO – 1	AP
LO -2	Run C / C++ programs on UNIX.	PSO – 3	AP
LO -3	Do shell programming on UNIX OS	PSO - 4	C
LO -4	Employ decision making and looping construct to write a shell script	PSO – 2	AP

Programs:

1. Write a shell script to stimulate the file commands: rm, cp, cat, mv, cmp, wc, split, diff.
2. Write a shell script to show the following system configuration:
    a. currently logged user and his log name.
    b. current shell, home directory, Operating System type, current Path setting, current working directory.
    c. show currently logged number of users, show all available shells
    d. show CPU information like processor type, speed
    e. show memory information.
3. Write a Shell Script to implement the following: pipes, Redirection and tee commands.
4. Write a shell script for displaying current date, user name, file listing and directories by getting user choice.
5. Write a shell script to implement the filter commands.
6. Write a shell script to remove the files which has file size as zero bytes.
7. Write a shell script to find the sum of the individual digits of a given number.
8. Write a shell script to find the greatest among the given set of numbers using command line arguments.
9. Write a shell script for palindrome checking.
10. Write a shell script to print the multiplication table of the given argument using for-loop.

Semester IV

Major Practical VI: SQL and PL/SQL

Course Code: SC20P6

Hours / Week	Credits	Total Hours	Marks
4	2	60	100

Objectives:

1. Study the various DDL, DML commands.
2. Write queries in SQL to retrieve any type of information from a data base.

Learning Outcome

LO	Upon completion of this course the students will be able to:	PSO addressed	CL
LO -1	Understand the logical structure of the RDBMS	**PSO – 1**	**U**
LO -2	Understand How the data will be stored and retrieved	**PSO – 4**	**U**
LO -3	Understand the PL/SQL to do such things as modify your business rule.	**PSO - 4**	**U**

Programs:

Demonstrate the following SQL commands and can take any back end RDBMS system for implementation purpose.

1. Data Definition of Base Tables.
2. DDL with Primary key constraints
3. DDL with constraints and verification by insert command
4. Data Manipulation of Base Tables and Views
5. Demonstrate the Query commands
6. Write a PL/SQL code block that will accept an account number from the user and debit an amount of Rs. 2000 from the account if the account has a minimum balance of 500after the amount is debited. The Process is to fired on the Accounts table.
7. Write a PL/SQL code block to calculate the area of the circle for a value of radius varying from 3 to 7. Store the radius and the corresponding values of calculated area in a table Areas. Areas – radius, area.
8. Write a PL/SQL block of code for reversing a number. (Example: 1234 as 4321).

9. Create a transparent audit system for a table Client_master (client_no, name, address, Bal due). The system must keep track of the records that are being deleted or updated. The functionality being when a record is deleted or modified the original record details and the date of operation are stored in the auditclient (client_no, name, bal_due, operation, userid, opdate) table, then the delete or update is allowed to go through.

Semester IV

Allied IV: Discrete Mathematics

Course Code: SA2041

Hours / Week	Credits	Total Hours	Marks
5	3	75	100

Objectives:

1. To understand the logic, functions and reasoning.
2. To learn relations and probability

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	Learn the basic concepts of sets, permutations, relations, graphs, trees and finite state machines.	PSO – 1	U
CO -2	Represent discrete objects and relationships using abstract mathematical structures.	PSO – 4	AN
CO -3	Apply basic counting techniques to solve combinatorial problems	PSO - 4	AP
CO -4	Understand the basic principles of sets and operations in sets	PSO – 2	U
CO -5	Apply counting principles to determine probabilities.	PSO – 2	AP

Unit I

Logic: propositional logic, logical equivalence, predicates & quantifiers, and logical reasoning. Sets: basics, set operations

Unit II

Functions: one-to-one, onto, inverse, composition, graphs Integers: greatest common divisor, Euclidean algorithm.

Unit III

Sequences and Summations: Mathematical reasoning and induction, Proof strategies, Mathematical Induction, Recursive definitions, Structural Induction.

Unit IV

Counting: basic rules, Pigeonhole principle, Permutations and Combinations, Binomial coefficients and Pascal triangle. Probability: Discrete probability. Expected values and variance.

Unit V

Relations: Properties, Combining relations, Closures, Equivalence, Partial ordering, Graphs: directed, undirected graphs.

Text Book:

Kenneth H. Rosen. *Discrete Mathematics and Its Applications*, 7th Edition, McGraw Hill, 2012

Reference Books:

1. Elements of Discrete Mathematics" by C L Liu
2. Discrete Mathematics" by Norman L Biggs
3. Discrete Mathematics for Computer Science" by Kenneth Bogart and Robert L Drysdale
4. Discrete Mathematics with Applications" by Thomas Koshy

Semester V

Major Core VIII: Web Technology: Theory and Practice

Course Code: SC2051

No. of Hours / Week	Credit	Total Hours	Marks
6	5	90	100

Objectives:

1. To study the various HTML tags and design simple web pages
2. To study the scripting language Java Script.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	develop an ability to design and implement static and dynamic web pages.	PSO – 1	C
CO -2	differentiate web applications using client-side (JavaScript, HTML, XML) and server-side technologies (ASP.NET, ADO.NET).	PSO –1	AN
CO -3	define the fundamental ideas and standards underlying Web Service Technology	PSO – 1	U
CO -4	apply the knowledge of the internet and related internet concepts that are vital in understanding web application development and analyze the insights of internet programming to implement complete application over the web.	PSO –3	AP

Unit I

Structuring Documents for the Web: Introducing HTML and XHTML - Basic Text Formatting - Presentational Elements–Phrase Elements - Lists - Core Elements and Attributes. **Links and Navigation:** Basic Links - Creating Links with the <a> Element. **Images, Audio, and Video:** Adding Images Using the <img> Element - Using Images as Links - Image Maps.

Unit II

Images, Audio, and Video: Adding Flash, Video and Audio to your web pages: Adding videos to your Site, Adding Audio to your Site. **Tables:** Introducing Tables–Basic

Table Elements and Attributes – Adding a <caption> to a Table - Grouping Section of a Table - Nested Tables. **Forms:** Introducing Forms - Form Controls - Sending Form Data to the Server.

Unit III

Frames: Introducing Frameset – The <frameset> Element–The <frame> Element - Creating Links Between Frames - Nested Framesets. **Cascading Style Sheets:** Introducing CSS - Where you can Add CSS Rules - CSS Properties - Controlling Text - Text Formatting - Text Pseudo Classes – Lengths - Introducing the Box Model.

Unit IV

Java Script: How to Add Script to Your Pages – Variables and Data Types–Operators –Control Structures - Conditional Statements – Looping – Functions – Built in Functions. **Working with JavaScript:** Practical Tips for Writing Scripts.

Unit V

JavaScript Objects: Window Object - Document object - Browser Object - Form Object - Navigator object - Screen object – Events - Event Handlers – Forms Validations - Form Enhancements.

Text Book:

Jon Duckett, "Beginning HTML, XHTML, CSS and Java Script", Second Edition, Wiley Publishing, 2010.

Reference Books:

1. Chris Bates, "Web Programming", Third Edition, Wiley Publishing, 2014
2. Srinivasan. M, "Web Technology: Theory and Practice", Pearson Publication

Semester V

Major Core IX: Mobile Computing and its Applications

Sub. Code: SC2052

No. of Hours per Week	Credit	Total No. of Hours	Marks
5	5	75	100

Objectives:

1. To understand mobile computer systems particularly in the context of wireless network systems.
2. To emphasize how to interface hardware to mobile computing devices.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	Understand the basic concepts and principles in mobile computing.	**PSO – 1**	**U**
CO -2	Describe the concepts of FDMA, TDMA, packet delivery and handover management.	**PSO - 1**	**U**
CO -3	Acquire and apply the knowledge of conventional TCP/IP protocols.	**PSO – 4**	**U, AP**
CO -4	Classify the various data delivery mechanisms and data synchronization.	**PSO – 2**	**AN**
CO -5	Understand and apply various routing algorithms for mobile applications	**PSO – 4**	**U, AP**

Unit-I

Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices. GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS.

Unit – II

Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)-Mobile Network Layer IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization,

DHCP.

Unit –III

Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks. Database Issues: Database Hoarding and Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

Unit IV

Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization.

Unit V

Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, Mobile Agents, Service Discovery. Protocols and Platforms for Mobile Computing: WAP, Bluetooth, J2ME, iOS/Windows CE, Android-Security.

Text Books:

1. Jochen Schiller, “Mobile Communications”, Addison-Wesley, Second Edition, 2009.
2. Raj Kamal, “Mobile Computing”, Oxford University Press, 2007, ISBN: 0195686772

E-References:

http://www.nettech.in/e-books/Wireless-networks-and-mobile-computing.pdf
http://ebooks.cambridge.org/ebook.jsf?bid=CBO9780511546969

Semester V

Elective II: (a) Multimedia Systems

Sub. Code: SC2053

No. of Hours per Week	Credit	Total No. of Hours	Marks
5	4	75	100

Objectives

1. To understand the standards available for different audio, video and text applications
2. To learn various multimedia authoring systems in multimedia production team

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	convey multimedia and design fonts used in texts	PSO – 3	C
CO -2	create image and produce audio inserted multimedia projects	PSO –1	AP
CO -3	make animations and video clips	PSO – 3	AP
CO -4	Understand the requirements for multimedia preparation	PSO – 1	U
CO - 5	analyze the process of planning, preparing and owning the multimedia	PSO – 4	AN

Unit I

Multimedia Definition - Use of Multimedia - Delivering Multimedia - **Text:** About Fonts and Faces - Using Text in Multimedia - Computers and Text - Font Editing and Design Tools - Hypermedia and Hypertext.

Unit II

Images: Plan Approach - Organize Tools - Configure Computer Workspace - Making Still Images - Color - Image File Formats. **Sound:** The Power of Sound - Midi Audio - Midi vs. Digital Audio - Multimedia System Sounds - Audio File Formats -Vaughan's Law of Multimedia Minimums - Adding Sound to Multimedia Project.

Unit III

Animation: The Power of Motion - Principles of Animation - Animation by Computer - Making Animations that Work**. Video**: Using Video - Working with Video and Displays - Digital Video Containers - Obtaining Video Clips .

Unit IV

Making Multimedia: The Stage of Multimedia Project - The Intangible Needs - The Hardware Needs - The Software Needs - An Authoring Systems Needs- Multimedia Production Team.

Unit V

Planning and Costing: The Process of Making Multimedia - Scheduling - Estimating - RFPs and Bid Proposals**. Designing and Producing**: Designing- **Content and Talent**: Acquiring Content - Ownership of Content Created for Project - Acquiring Talent.

Text Book

Tay Vaughan, "Multimedia: Making It Work", 8th Edition, Osborne/McGraw-Hill, 2001. State Integrated Board of Studies – Computer Science UG

Reference Book

Ralf Steinmetz & Klara Nahrstedt "Multimedia Computing, Communication & Applications", Pearson Education, 2012.

Semester V

Elective II: (b) Microprocessor & Assembly Language Programming

Sub. Code: SC2054

No. of Hours per Week	Credit	Total No. of Hours	Marks
5	**4**	**75**	**100**

Objectives

1. To study the architecture of 8085 processor.
2. To write simple assembly level programming

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	To understand basic architecture of 8 bit microprocessor	**PSO –9**	**R**
CO -2	Understand and realize the Interfacing of memory & various I/O devices with 8085 micro processor	**PSO – 2**	**U**
CO -3	Understand and classify the instruction set of 8085 microprocessor and distinguish the use of different instructions and apply it in assembly language programming.	**PSO –6**	**AP**
CO -4	Understand the difference between 8085 and advanced microprocessor.	**PSO –12**	**U**

Unit I

Architecture and Operation: Introduction to 8085, Microprocessor organization/ architecture & its operation Microprocessor based system, memory interfacing, basic interfacing concepts, interfacing I/O devices

Unit II

Programming the 8085: Programming model, instruction classification, Instruction format, addressing modes, writing assembly level programs-overview of instruction set, timing diagrams data transfer, Arithmetic, Logic branch operations.

Unit III

Programming techniques- Looping Counting and Indexing, 16-bit arithmetic operations, logic operations Compare and rotate operations. Counters and Time delays, Generation of pulse waveforms. Stacks and subroutines- conditional CALL and RETURN instructions. Advanced subroutine concepts. BCD to Binary and Binary to BCD conversions, BCD to 7 segment conversion, Binary to ASCII and ASCII to Binary code conversion, BCD addition and subtraction, multiplication and division.

Unit IV

Memory Interface: Memory and I/O mapping and interfacing concepts. Interrupts: 8085 vectored interrupts, Restart as Software instructions, additional I/O concepts and processes.

Unit V

Interfacing of peripherals (I/Os) and applications: Interfacing Keyboard (linear and matrix) and 7 segment display including multiplexes, 8279 programmable keyboard /display interface, 8255 PPI, 8259 PIC, DMA and 8257 DMA controller, Serial communication using 8251, D to A converters and interfacing, RS323 serial Page 31 of 38 communication standards.

Text Book

R.S.Gaonkar – Microprocessor Architecture , Programming and Application with 8085. Penram Int., 3rd Edn.

Reference Books

1. Kenneth L.Short - Microprocessor and Programmed Logic ‘’, PHI , 2nd Edn.
2. Aditya P. Mathur- Introduction to Microprocessors, 3RD Edn. TMH
3. Douglas V.Hall- Microprocessors and digital systems, McGraw Hill
4. Antonakos: Introduction to Intel family of Micro prosessors Pearson Education

Semester V

Elective II: (c) Open Source Technology

Sub. Code: SC2055

No. of Hours per Week	Credit	Total No. of Hours	Marks
5	4	75	100

Objectives

1. To introduces Open Source methodologies.
2. To make the students to gain experience using open source tools, languages and frameworks to prepare for careers in software development.

Unit I

Introduction: Open Source, Free Software, Free Software vs. Open Source software, Public Domain Software, FOSS does not mean no cost. History: BSD, The Free Software Foundation and the GNU Project.

Unit II

Open Source History, Initiatives, Principle and methodologies. Philosophy: Software Freedom, Open Source Development Model Licences and Patents: What Is A License, Important FOSS Licenses (Apache, BSD, GPL, LGPL), copyrights and copylefts, Patents Economics of FOSS: Zero Marginal Cost, Income-generation opportunities, Problems with traditional commercial software, Internationalization

Unit III

Community Building: Importance of Communities in Open Source Movement-JBoss Community- Starting and Maintaining an Open Source Project - Open Source Hardware

Unit IV

Apache HTTP Server and its flavors- WAMP server (Windows, Apache, MySQL, PHP)- Apache, MySQL, PHP, JAVA as development platform.

Unit V

Open source vs. closed source Open source government, Open source ethics. Social and Financial impacts of open source technology, Shared software, Shared source.

Text Books

1. Sumitabha Das “Unix Concepts and Applications, Tata McGraw Hill Education 006
3. The Official Ubuntu Book, 8th Edition
4. Kailash Vedera, Bhavyesh Gandhi, “Open Source Technology”, University Science

press, ker

Reference Books

1. Paul Paul Kavanagh, "Open Source Software: Implementation and Management", Elsevier Digital Press
2. The Linux Documentation Project : http://www.tldp.org
3. Docker Docker Project Home : http://www.docker.com

Semester V

Major Practical VII: Web Technology Lab

Course Code: SC20P7

No. of Hours / Week	Credit	Total Hours	Marks
6	3	90	100

Objectives:

1. Design web pages using various HTML tags.
2. Write simple programs in Java Script

Learning Outcome

LO	Upon completion of this course the students will be able to:	PSO addressed	CL
LO-1	build interactive web page using HTML.	PSO –1	C
LO-2	construct and manipulate Java Script applications	PSO - 1	C
LO-3	develop dynamic web pages using client-side programming.	PSO - 1	C
LO-4	identify, formulate and analyze problems as well as identify the computing requirements appropriate to their solutions.	PSO – 2	AN

1. Create a form having number of elements (Textboxes, Radio buttons, Checkboxes etc. Write JavaScript code to count the number of elements in a form.
2. Create a HTML form that has number of Textboxes. When the form runs in the Browser fill the textboxes with data. Write JavaScript code that verifies that all textboxes has been filled. If a textboxes has been left empty, popup an alert indicating which textbox has been left empty.
3. Develop a HTML Form, which accepts any Mathematical expression. Write JavaScript code to Evaluates the expression and Displays the result.
4. Create a page with dynamic effects. Write the code to include layers and basic animation.

5. Write a JavaScript code to find the sum of N natural Numbers. (Use user-defined function).
6. Write a JavaScript code block using arrays and generate the current date in words, this should include the day, month and year.
7. Create a form for Student information. Write JavaScript code to find Total, Average, Result and Grade.
8. Create a form for Employee information. Write JavaScript code to find DA, HRA, PF, TAX, Gross pay, Deduction and Net pay.
9. Create a form consists of a two Multiple choice lists and one single choice list
    a) The first multiple choice list, displays the Major dishes available
    b) The second multiple choice list, displays the Starters available.
    c) The single choice list, displays the Soft drinks available.
10. Create a web page using two image files, which switch between one another as the mouse pointer moves over the image. Use the on MouseOver and on MouseOut event handlers.

Semester VI

Major Core X: Android Programming

Sub. Code: SC2061

No. of Hours per Week	Credit	Total No. of Hours	Marks
5	5	75	100

Objectives:

1. To enable the students to build own Android Apps and to use Android's Communication APIs for SMS, telephony etc.
2. To develop mobile applications with social and ethical responsibilities in a professional working discipline.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	describe the platforms upon which the Android OS will run	**PSO - 1**	**U**
CO -2	apply the fundamental paradigms and technologies to develop mobile applications	**PSO - 2**	**AP**
CO -3	create a simple application that runs under the Android operating system	**PSO - 4**	**C**
CO -4	develop an application that uses multimedia under Android operating system	**PSO - 4**	**C**
CO -5	implement various methods in Android to create mobile applications for communication network	**PSO - 2**	**AP**

Unit I

Fundamentals of Java for Android Application Development: Introduction to Java – Introducing Java Dalvik Virtual Machine - Developing a Simple Java Program - Interfaces-Inheritance. **Getting an Overview of Android:** Introducing Android - Discussing about Android Applications - The Manifest File - Downloading and Installing Android – Exploring the Development Environment - Developing and Executing the First Android Application.

Unit II

Using Activities, Fragments and Intents in Android: Working with Activities: Creating an activity – Starting an activity – Managing the Lifecycle of an activity –Applying Themes and styles to an activity-Hiding the title of the activity. Using Intents: Exploring Intent Objects – Fragments.

Unit III

Working with the User Interface Using Views and View Groups: Working with View Groups: The Linea Layout Layout-The Relative Layout – The Frame Layout-Working with Views – Binding Data with the Adapter View Class -Designing the Auto Text Complete View- Implementing the Screen Orientation – Creating Menus.

Unit IV

Handling Pictures and Menus with Views: Working with Image Views – Designing Context Menu for Image View – Notifying the User. **Storing the Data Persistently:** Introducing the Data Storage Options –Using the Internal Storage-Using the External Storage-**Emailing and Networking in Android:** Building an Application to Send Email.

Unit V

Working with Graphics and Animation: Working with Graphics – Using the Drawable Object – Using the Shape Drawable Object – Working with Animations. **Audio, Video, and Camera:** Role of Media Playback – Using Media Player: Media Formats Supported by Media Player – Preparing Audio for Playback – Preparing Video for Playback.

Text Book:

Pradeep Kothari & Kogent Learning Solutions Inc., (2015). *Android Application Development (with KitKat Support) Black Book*. (1st edition). New Delhi: Dream tech Press Publishers.

Reference Books:

1. Reto Meier, (2009). *Professional Android Application Development*. (2nd edition). New Jersey: Wiley Publishing Inc.
2. Blake Meike, Lombardo John, Zigurd mednieks, Rick Rogers, (2009). *Android Application Development*. (1st edition). New York: O'Reilly Publication.
3. Dimarzio, J. F. (2010). *Android a Programmer Guide*. (1st edition). New Delhi: McGraw Hill Education.
4. Reto Meier, (2010). *Professional Android 2 Application Development*. (1st edition). New Jersey: Wiley India Pvt Ltd.

5. Wallace Jackson, (2013). *Learn Android App Development*. (2nd edition). New Delhi: Apress Publication.
6. James C. Sheusi, (2013). *Android application development for java programmers*. (2nd edition). New Delhi: Cengage Learning.

Semester VI

Major Core XI: Computer Graphics

Course Code: SC2062

No. of Hours / Week	Credit	Total Hours	Marks
5	**5**	**75**	**100**

Objectives:

1. Understand the basic concepts of Computer Graphics
2. Apply geometric transformations, viewing and clipping on graphical objects
3. Understand visible surface detection techniques and illumination models

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	explain the basics of graphics system	**PSO – 1**	**U**
CO -2	use the digital scan and copy systems accordingly	**PSO –1**	**Ap**
CO -3	analyze two dimensional geometric transformations and view it	**PSO – 4**	**An**
CO -4	apply three dimensional concepts for transformation and viewing	**PSO – 4**	**Ap**
CO - 5	apply various visible surface detection methods	**PSO – 4**	**Ap**

Unit - I

Overview of graphics Systems: Video Display Device - Refresh Cathode Ray tubes - Raster Scan Displays - Random Scan Displays - Color CRT Monitors - Direct view Storage tubes -Flat Panel Displays -Three-Dimensional Viewing Devices, Stereoscopic and Virtual Reality Systems.

Unit - II

Raster - Scan Systems: Video Controller - **Random-Scan Systems** - **Input device** – Keyboard- Mouse - Trackball - Space ball and Joysticks - Data Glove – Digitizers - Image Scanners - Touch Panels - Light pens. Voice Systems - Hard-Copy Devices –**Output Primitives**: Line Drawing Algorithms-DDA Algorithms – Bresenham's Line Algorithm-Line Functions-Circle generating Algorithm - Properties of Circles-Curve Functions.

Unit - III

Two-Dimensional Geometric Transformation: Basic Transformations - Translation - Rotation - Scaling - Matrix Representations and Homogeneous Coordinates - Other Transformations: Reflections **Two-Dimensional Viewing:** Windows to view point coordinate Transformations - Clipping Operations - Point Clipping - Line Clipping - Curve Clipping - Text Clipping - Exterior Clipping.

Unit - IV

Three Dimensional Concepts: Three-Dimensional Display method - Parallel projection - Depth cueing -visible line and surface - **Three Dimensional Geometric and modelling Transformations:** Translation - Rotation - **Scaling - Composite Transformations. Three-Dimensional Viewing:** Viewing pipeline - Viewing Coordinates - Projections - Parallel Projections - Perspective Projections.

Unit – V

Visible Surface Detection Methods: Classification Visible Surface Detection Algorithms - Back Face Detection - Depth - Buffer Method - A-Buffer Method - Scan line method - Depth sorting method - BSP tree method - Area Subdivision Method.

Text book:

Donald Hearn and M. Pauline Baker, "Computer Graphics", 2nd Edition, 1996

Reference book:

1. John f. Hughes, Andries Van Dam, Morgan Mcguire, David F. Sklar, James D. Foley, Steven K. Feiner, Kurt Akeley, "Computer Graphics Principles and Practice" 3rd Edition, Pearson Education,2014.

Semester VI

Major Core XII: Operating Systems: Design principles

Sub. Code: SC2063

No. of Hours per Week	Credit	Total No. of Hours	Marks
5	5	75	100

Objectives:

1. To introduce basic concepts and functions of operating systems and understand the concept of process, thread and resource management.
2. To understand various Memory, I/O and File management techniques.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	Understand the basic concepts of an Operating System and the various system calls	**PSO – 1**	**U**
CO -2	Classify the various processes and threads use for interprocess communication	**PSO – 2**	**AN**
CO -3	Describe the various scheduling & memory management techniques and the page replacement techniques used for memory management	**PSO - 4**	**U**
CO -4	Understand the mutual exclusion deadlock detection and recovery for operating systems	**PSO – 1**	**U**
CO -5	Apply the concepts of input/output and file/directory implementation	**PSO – 4**	**AP**

Unit I

Introduction - Different kinds of operating system – Operating system concepts: Processes-Address Spaces-Files-Input/Output-Protection-The Shell. System calls-Operating system structure.

Unit II

Processes and Threads: Processes - threads - inter process communication.

Unit III

Scheduling - Memory Management: Memory Abstraction - Virtual Memory – Page replacement algorithms.

Unit IV

Deadlocks: Resources- introduction to deadlocks - deadlock detection and recovery - deadlocks avoidance - deadlock prevention. Multiple processor system- Multiprocessors.

Unit V

Input / Output: principles of I/O hardware - principles of I/O software. Files systems: Files - directories - files systems implementation

Text Book

Andrew S. Tanenbaum, "Modern Operating Systems", 2nd Edition, PHI private Limited, New Delhi, 2008.

Reference Books:

1. William Stallings, "Operating Systems - Internals & Design Principles",5th Edition,Prentice - Hall of India private Ltd, New Delhi, 2004.
2. Sridhar Vaidyanathan, "Operating System", 1st Edition,Vijay Nicole Publications, 2014.

Semester VI

Elective III: (a) PHP Programming

Course Code: SC2064

No. of Hours / Week	Credit	Total Hours	Marks
5	4	75	100

Objectives:

1. To learn and use open source database management system MySQL
2. To create dynamic web pages and websites.
3. To connect web pages with database.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	analyze PHP scripts and determine their behavior.	**PSO – 2**	**AN**
CO -2	design web pages with the ability to retrieve and present data from a MySQL database.	**PSO –1**	**C**
CO -3	create PHP programs that use various PHP library functions, and that manipulate files and directories.	**PSO – 1**	**C**
CO -4	construct PHP scripts to create dynamic web content.	**PSO –1**	**C**

Unit I

Basic development Concepts – Creating first PHP Scripts – Using Variable and Operators – Storing Data in variable – Understanding Data types – Setting and Checking variables Data types – Using Constants – Manipulating Variables with Operators.

Unit II

Writing Simple Conditional Statements - Writing More Complex Conditional Statements – Repeating Action with Loops – Working with String and Numeric Functions.

Unit III

Storing Data in Arrays – Processing Arrays with Loops and Iterations – Using Arrays with Forms - Working with Array Functions – Working with Dates and Times. **Unit IV**

Creating User-Defined Functions - Creating Classes – Using Advanced OOP Concepts.

Working with Files and Directories: Reading Files- Writing Files-Processing Directories.

Unit V

Introducing Database and SQL- Using MySQL-Adding and modifying Data-Handling Errors – sing SQLite Extension and PDO Extension. Introduction XML - Simple XML and DOM Extension.

Text Book

Vikram Vaswani - PHP A Beginner's Guide, Tata McGraw-Hill

Reference Books:

1. The PHP Complete Reference – Steven Holzner – Tata McGraw-Hill Edition.
2. Spring into PHP5 – Steven Holzer, Tata McCraw Hill Edition

Semester VI

Elective III: (b) Network Security

Course Code: SC2065

No. of Hours / Week	Credit	Total Hours	Marks
5	4	75	100

Objectives:

1. To study the number theory used for network security
2. To understand the design concept of cryptography and authentication
3. To develop experiments on algorithm used for security

Unit I

Model of network security – Security attacks, services and attacks – OSI security architecture – Classical encryption techniques – SDES – Block cipher Principles DES – Strength of DES – Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – RC4 - Differential and linear cryptanalysis – Placement of encryption function – traffic confidentiality.

Unit II

Number Theory – Prime number – Modular arithmetic – Euclid's algorithm - Fermet's and Euler's theorem – Primality – Chinese remainder theorem – Discrete logarithm – Public key cryptography and RSA – Key distribution – Key management – Diffie Hellman key exchange – Elliptic curve cryptography.

Unit III

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – SHA - HMAC – CMAC - Digital signature and authentication protocols – DSS.

Unit IV

Authentication applications – Kerberos – X.509 Authentication services - E-mail security – IP security - Web security

Unit V

Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security

Text Book

William Stallings, “Cryptography & Network Security”, Pearson Education, Fourth Edition 2010.

Reference Books:

1. Charlie Kaufman, Radia Perlman, Mike Speciner, “Network Security, Private communication in public world”, PHI Second Edition, 2002.
2. Bruce Schneier, Neils Ferguson, “Practical Cryptography”, Wiley Dream tech India Pvt Ltd, First Edition, 2003.
3. Douglas R Simson “Cryptography – Theory and practice”, CRC Press, First Edition, 1995.

Semester VI

Elective III: (c) E-Commerce Technologies

Course Code: SC2066

No. of Hours / Week	Credit	Total Hours	Marks
5	4	75	100

Objectives:

1. Understand concept of Ecommerce and its types
2. Study the various online payment and marketing on Web
3. Understand various E-business Strategies.

Unit I

History of E-commerce and Indian Business Context: E-Commerce -Emergence of the Internet - Emergence of the WWW - Advantages of E-Commerce - Transition to E-Commerce in India - The Internet and India - E-transition Challenges for Indian Corporate.

Unit II

Business Models for E-commerce: Business Model - E-business Models Based on the Relationship of Transaction Parties - E-business Models Based on the Relationship of Transaction Types.

Unit III

Enabling Technologies of the World Wide Web: World Wide Web - Internet Client-Server Applications - Networks and Internets - Software Agents - Internet Standards and Specifications - ISP.E-Marketing: Traditional Marketing - Identifying Web Presence Goals - Online Marketing - E-advertising - Ebranding.

Unit IV

E-Payment Systems: Main Concerns in Internet Banking - Digital Payment Requirements - Digital Token-based e-payment Systems - Classification of New Payment Systems - Properties of Electronic Cash - Cheque Payment Systems on the Internet.

Unit V

Information systems for Mobile Commerce: Introduction - Wireless Applications - Cellular Network - Wireless Spectrum - Technologies for Mobile Commerce - Wireless Technologies.

Text Books

1. P.T.Joseph, "E-Commerce - An Indian Perspective", 4th Edition, PHI Learning, 2012.
2. C. Xavier, "World Wide Web Design with HTML", 13th Reprint, Tata McGraw Hill, 2006.
3. A. Leon and M. Leon, "Introduction to Information Technology", 1stEdition, Vijay Nicole Publications, 2013.

Reference Books:

1. David Whiteley, "E-Commerce Strategy, Technologies and Applications", 1st Edition, Tata Mc-Graw-Hill, 2001.
2. Kamalesh K Bajaj and Debjani Nag, "E-Commerce - The cutting edge of Business", 2nd Edition, Tata McGraw-Hill Education, 2005.
3. Alexis Leon and Mathews Leon, "Internet for Everyone", 15th Anniversary Edition, Leon Tech world, UBS Publications, 2012.
4. Retendra Goel, "e-commerce", New Age International Publishers, 2016

Semester VI

Major Practical VIII: Android Programming Lab

Sub. Code: SC20P8

No. of Hours per Week	Credit	Total No. of Hours	Marks
4	2	60	100

Objectives:

1. To implement various methods in Android to create mobile applications for communication network.
2. To create a simple application that runs under the Android Operating System.

Learning Outcome

LO	Upon completion of this course the students will be able to:	PSO addressed	CL
LO -1	Create application workings with the Activities and Intents	**PSO – 1**	**AP**
LO -2	Create application workings with the User Interface using Views	**PSO – 4**	**AP**
LO -3	Create application workings with Graphics	**PSO – 1**	**AP**
LO -4	Create application workings with Pictures and Menus	**PSO – 4**	**AP**

Programs:

1. Create an Application to display greeting message and to change the icon of Android
2. Create an Application that will change the color of the screen based on selected options from the menu.
3. Create an Application that will display Toast(message) when radio button clicked.
4. Create an Application using Edit Text View.
5. Create an Application using Image Button View.
6. Create an Application to Hide the Title of the Activity.
7. Create an Application to convert Text to speech.
8. Create an Application to search a record in a Database.
9. Create an Application to implement the Screen Orientation.
10. Create an Application to draw an oval using ShapeDrawable object.
11. Create an Application to display images using Gallery View.
12. Create an Application to display images using Grid View.
13. Create an Application using Camera for taking pictures.

Semester VI

Major Practical IX: Computer Graphics Lab

Sub. Code: SC20P9

No. of Hours per Week	Credit	Total No. of Hours	Marks
4	2	60	100

Objectives:

1. To acquaint with the basic principles of 2D and 3D computer.
2. To create simple 2D animations.

Learning Outcome

LO	Upon completion of this course the students will be able to:	PSO addressed	CL
LO-1	Draw lines, circles and different shapes using Graphics	PSO –1	C
LO-2	Create simple animations applying graphics	PSO - 4	C
LO-3	design tiled and cascaded display	PSO - 1	C
LO-4	apply two dimensional transformations	PSO – 4	Ap

Programs:

1. Line Drawing using DDA
2. Circle Drawing using Bresenham's Algorithm
3. Different Shapes Using Graphics Function
4. Random Balls
5. Bouncing Ball
6. News Headlines
7. Drop Word By Word
8. Moving a Car
9. Scenery of Rain
10. Tiled and Cascaded Display
11. 2D Transformation
12. Line Drawing using Bresenham's Algorithm

Semester VI

Skill Enhancement Course (SEC): Photoshop CS6

Sub. Code: SSK206

No. of Hours per Week	Credit	Total No. of Hours	Marks
2	2	30	100

Objectives:

1. To enable students to create images for web design, logos, graphics, layouts, image touch-ups and colour enhancement.
2. To develop the skills for manipulating the images creatively.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	Understandretouch and repair a scanned photograph.	**PSO –1**	**AP**
CO -2	Create abilities to use Photoshop that are employable and rewarding.	**PSO – 3**	**C**
CO -3	Understand how to do basic photo repairs and color enhancements techniques.	**PSO –1**	**AP**
CO -4	Define and apply the basic functions of pixel selection, painting and editing tools	**PSO - 4**	**R**
CO -5	Understand file compression, Import and export files and save files in different formats	**PSO –1**	**AN**
CO -6	Utilize retouching features to make pictures perfect	**PSO - 1**	**C**

Unit I

Starting Photoshop CS2: Getting Started with Photoshop CS2 – Opening an Existing File – The Photoshop Program Window – Guidelines for Working with Toolbox – Screen Modes – Creating a New File – Saving Files – Removing Files – Closing File.

Unit II

Working with Images: Vector and Bitmap Images – Opening Recently used Files – Image Size – Image Resolution – Editing Images – Opening Files Created in Illustrator or

Freehand – Color Modes – Setting a Current Foreground and Background Colors – File Formats.

Unit III

Making Selections: Making Selection – The Grow and Similar Commands – Moving a Portion of an Image – Editing Selections – Copying a Selection into another Image – Filling a Selection – Transforming Selections.

Unit IV

Painting, Drawing and Retouching Tools: The painting Tools – The Drawing Tools – The Retouching Tools – **Layers -** Layers Palette – Working with Layers.

Unit V

Filters: The Filter Menu – Filter Gallery – Extract Filter – Liquify Filter – Vanishing Point Filter – Artistic Filters – Blur Filters – Brush Stroke Filters.

Text Book:

Vikas Gupta, (2009). *Comdex DTP Course Kit*. (2nd edition). New Delhi: Dream Tech Press Publications.

Reference Books:

1. Martin Evening, (2012). *Adobe Photoshop CS6 for Photographers*. (2nd edition). New Delhi: Elsevier Pvt. Ltd.
2. Tanya Staples, (2005). *Photoshop CS2 for the Web*. (2nd edition). New Delhi: Peachpit Press.
3. Taz Tally, (2006). *Photoshop CS2 Before and After Makeovers*. (2nd edition). New York: John Wiley & Sons Publisher.
4. Philip Andrews, (2005). *Adobe Photoshop CS2*. (2nd edition). New Delhi: Focal Press.
5. Kogent Learning, (2012). *Photoshop CS2 in Simple Steps*. (3rd edition). New Delhi: Dreamtech Press.

Employability

Entrepreneurship

Skill Development

** All the Courses focused on Skill Development