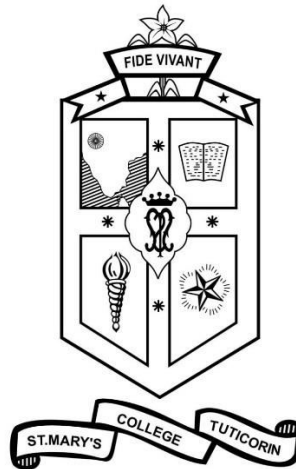


ST. MARY'S COLLEGE (AUTONOMOUS)

Re-accredited with A+ Grade by NAAC

Thoothukudi – 628001, Tamil Nadu

(Affiliated to Manonmaniam Sundaranar University)



Syllabus

B.Sc. Computer Science

School of Computing Sciences

Outcome Based Curriculum

(w.e.f. 2021)

Preamble

B.Sc. Computer Science program helps students to master the basic skills needed to analyze a problem and design, implement, and find a solution to meet the ever-changing demands of the industry and nurture their innovation and creativity.

Vision

Empower girls byte by byte.

Mission

To create computer professionals of immense quality and impeccable manners who can face and survive the computing and communication revolution that lies ahead with great confidence.

Programme Outcome:

PO.No	Upon completion of B.Sc Degree programme, the graduates will be able to
PO- 1	apply the acquired knowledge of fundamental concepts in the field of science and to find solutions to various problems.
PO- 2	inculcate innovative skills and team – work among students to meet societal expectations.
PO -3	perform analysis to assess, interpret, and create innovative ideas through practical experiments.
PO -4	facilitate to enter multidisciplinary path to solve day-to-day scientific problems.
PO -5	carry out fieldworks and projects, both independently and in collaboration with others, and to report in a constructive way.
PO- 6	improve communication ability and knowledge transfer through ICT aided learning integrated with library resources.
PO -7	transfer the knowledge to the other stakeholders through extensive community development programme.
PO -8	attain competency in the job market / entrepreneurship.
PO-9	focus on developing domain specific language skills and knowledge of the students.

Programme Specific Outcome

PSO.No	Upon completion of B.Sc Degree programme, the graduates will be able to	PO
PSO-1	acquire knowledge on core concepts of Computer Science.	1
PSO-2	develop programming skills to solve problems through various computer languages and database concepts	3
PSO-3	possess social and ethical values.	9
PSO-4	empowered with analytical mind and critical thinking and concepts of data communication and networking	4
PSO-5	attain knowledge on efficient information storage and retrieval and concepts of number system	1,8
PSO-6	possess employability and entrepreneurship skills.	4,8
PSO-7	build skills to create web pages with various technologies	8
PSO-8	describe the nature of the software development process, testing and effective document preparation.	5
PSO-9	understand the various techniques and operations of system software.	1
PSO-10	enhance students with communicative skill, soft skill, embrace new computing technologies and encourage self-learning.	2,6,7,9

Department of Computer Science
Course Structure (w.e.f. 2021)
Semester – I

Part	Component	Course Code	Course Title	Contact Hours/ Week	Credits	Max. Marks		
						CIA	ESE	Total
I	Tamil /	21ULTA11/	பொதுத்தமிழ் தாள் - 1 இக்கால இலக்கியம் (செய்யுள், இலக்கணம், இலக்கிய வரலாறு, உரைநடை, சிறுகதை)	6	3	40	60	100
	French	21ULFB11	Preliminary French and Commercial terms					
II	General English	21UGEN11	Poetry, Prose, Extensive Reading and Communicative English – I	6	3	40	60	100
III	Core I	21UCSC11	C Programming	4	4	40	60	100
	Core Practical I	21UCSCR1	C Programming Lab	4	2	40	60	100
	Allied I	21UCSA11	Mathematics for Computer Science	3	3	40	60	100
	Allied Practical I	21UCSAR1	Office Automation Lab	3	2	40	60	100
IV	Skill Enhancement Course - I	21UCSPE1	Professional English for Computer Science - I	2	2	20	30	50
	Ability Enhancement Course - I	21UAVE11	Value Education	2	2	20	30	50
Total				30	21			

Semester II

Part	Component	Course Code	Course Title	Contact Hours/ Week	Credits	Max.Marks		
						CIA	ESE	Total
I	Tamil /	21ULTA21 /	பொதுத்தமிழ் தாள் 2: சமய இலக்கியங்களும், நீதி இலக்கியங்களும் (செய்யுள், இலக்கணம், இலக்கிய வரலாறு, உரைநடை, வாழ்க்கை வரலாறு	6	3	40	60	100
	French	21ULFB21	Progressive French and Commercial Correspondence					
II	General English	21UGEN21	Poetry, Prose, Extensive Reading and Communicative English –II	6	3	40	60	100
III	Core II	21UCSC21	C ++ Programming	4	4	40	60	100
	Core Practical II	21UCSCR2	C ++ Programming Lab	4	2	40	60	100
	Allied II	21UCSA21	Digital Electronics	3	3	40	60	100
	Allied Practical II	21UCSAR2	Open Source Multimedia Lab	3	2	40	60	100
	Skill Enhancement Course - II	21UCSPE2	Professional English for Computer Science –II	2	2	20	30	50
	Ability Enhancement Course - II	21UAEV21	Environmental Studies	2	2	20	30	50
			Total	30	21			

Semester III

Part	Component	Course Code	Course Title	Contact Hours/ Week	Credits	Max.Marks		
						CIA	ESE	Total
III	Core III	21UCSC31	JAVA Programming	5	4	40	60	100
	Core IV	21UCSC32	Computer Architecture	5	4	40	60	100
	Core Practical III	21UCSCR3	JAVA Programming Lab	5	3	40	60	100
	Allied III	21UCSA31	Data Structures	4	3	40	60	100
	Allied Practical III	21UCSAR3	Data Structures Lab	3	2	40	60	100
	Core Skill Based	21UCSS31	Microprocessors	4	3	40	60	100
IV	NME I	21UCSN31	Introduction to Computers	2	2	20	30	50
	Ability Enhancement Course - III	21UAWS31	Women's Synergy	2	2	20	30	50
	Self Study/ On-line Course/ Internship (Compulsory)	21UCSSS1	E-Commerce		2		50	50
Total				30	25			

Semester IV

Part	Component	Course Code	Course Title	Hrs/Week	Credits	Max.Marks		
						CIA	ESE	Total
III	Core V	21UCSC41	Programming with PHP and MySQL	5	4	40	60	100
	Core VI	21UCSC42	RDBMS	5	4	40	60	100
	Core Practical IV	21UCSCR4	PHP & MySQL Lab	5	3	40	60	100
	Allied IV	21UCSA41	Resource Management Techniques	4	3	40	60	100
	Allied Practical IV	21UCSAR4	Web designing Lab	3	2	40	60	100
	Core Skill Based	21UCSS41	Web Technology	4	3	40	60	100
IV	NME II	21UCSN41	Introduction to Internet	2	2	20	30	50
	Ability Enhancement Course - IV	21UAYM41	Yoga & Meditation	2	2	20	30	50
	Self Study Course / On-line Course / Internship (Optional)	21UCSSS2	Cyber Security / MOOC COURSE		+2		50	50
V	NCC, NSS & Sports				1			
	Extension Activity (CDP)				+1			
Total				30	24+3			

Semester V

Part	Component	Course Code	Course Title	Contact Hours/ Week	Credits	Max.Marks		
						CIA	ESE	Total
	CoreVII (Common Core)	21UCMC51	Computer Oriented NumericalMethods	6	5	40	60	100
III	Core VIII	21UCSC51	Operating Systems	4	4	40	60	100
	Core IX	21UCSC52	Python Programming	4	4	40	60	100
	Core Elective- 1	21UCSE51/ 21UCSE52	Data Mining/Introduction to IoT	4	4	40	60	100
	Mini Project	21UCSP51	Mini Project	5	4	40	60	100
	Core Practical V	21UCSCR5	Python Programming Lab	5	3	40	60	100
IV	Common Skill Based	21UCSB51	Computer for Digital Era And Soft Skills	2	2	20	30	50
	Self Study / Online course (optional)	21UCSSS3	Mathematical Reasoning		+2		50	50
Total				30	26+2			

Semester VI

Part	Component	Course Code	Course Title	Contact Hours/Week	Credits	Max.Marks		
						CIA	ESE	Total
III	Core X	21UCSC61	.NET Programming	5	4	40	60	100
	Core XI	21UCSC62	Software Engineering	5	4	40	60	100
	Core XII	21UCSC63	Computer Networks	5	4	40	60	100
	Core Elective-2	21UCSE61/ 21UCSE62	Cloud Computing / Mobile Computing	4	4	40	60	100
	Core practical VI	21UCSCR6	.NET Programming Lab	5	3	40	60	100
IV	Project	21UCSP61	Project	6	4	40	60	100
Total				30	23			
Grand Total				180	140+5			

Semester	Hours	Credits	Extra Credits
I	30	21	---
II	30	21	---
III	30	25	--
IV	30	24	3
V	30	26	2
VI	30	23	--
Total	180	140	5

Courses	Number of Courses	Hours week /	Credits	Extra Credits
Tamil	2	12	6	--
English	2	12	6	--
Core	12T+6P	57T+28P	49T+16P	--
Core Skill Based	2	8	6	--
Core Elective	2	8	8	--
Group Project	2	11	8	--
Allied	4T+4P	14T+12P	12T+8P	--
NME	2	4	4	--
Skill Enhancement Course	2	4	4	--
Ability Enhancement Course	4	8	8	--
Common Skill Based	1	2	2	--
NCC, NSS & Sports		--	1	
Extension Activities		--		1
Self Study Papers (Optional)	2	--		4
Self Study Papers (Compulsory)	1	--	2	--
Total		180	140	5

SEMESTER - 1			
Part – 1 பொதுத்தமிழ் தாள் - 1 இக்கால இலக்கியம் (செய்யுள், இலக்கணம், இலக்கிய வரலாறு, உரைநடை, சிறுகதை)			
Course Code: 21ULTA11	Hrs/Week:6	Hrs/Semester: 90	Credits: 3

Objectives:

- மாணவியருக்கு நல்ல மதிப்பீடுகளைக் கற்பித்து வாழ்வில் அவற்றைப் பின்பற்ற வழிவகுத்தல்.
- இலக்கிய மாந்தரின் வாழ்க்கை அனுபவங்கள் மூலம் வாழ்வில் பிரச்சனைகளை எதிர்கொள்ளும் திறம், தன்னம்பிக்கை, ஆளுமைத்திறம், மொழி-அறிவு இவற்றை உருவாக்குதல்.

Course Outcome:

CO.NO	இப்பாடத்திட்டம் மாணவியருக்கு	அறிவுசார் மதிப்பீடு
CO-1	பெண் சார்ந்த விடுதலை உணர்வை வளர்க்கிறது.	வளர்ச்சி
CO-2	பொதுமைச் சிந்தனையை வளர்க்கிறது	வளர்ச்சி
CO-3	இனம் சாதி குறித்த பாகுபாட்டிலிருந்து விடுதலை பெறும் வழிவகைகளைக் கற்றுக்கொடுக்கிறது.	நடைமுறைப்படுத்துதல்
CO-4	இயற்கையைப் பேணுதற்கும் வாழ்வின் வளர்ச்சி நிலையை மேம்படுத்திக் கொள்ளுதற்கும் உதவுகிறது.	நடைமுறைப்படுத்துதல்
CO-5	சமய நல்லிணக்கம், ஒற்றுமை உணர்வு, இறை நம்பிக்கை இவற்றை உருவாக்குகிறது.	உருவாக்கம்
CO-6	மொழியைப் பிழையின்றி பேசவும் எழுதவும் உதவுகிறது.	புரிதல் திறன் மேம்பாடு
CO-7	எதார்த்த வாழ்வை மேற்கொள்ள உதவுகிறது.	புரிதல் திறன் மேம்பாடு
CO-8	தனிமனித வாழ்க்கைச் சிக்கல்களை எதிர்கொள்ளும் நிலையை உருவாக்குகிறது.	நடைமுறைப்படுத்துதல்
CO-9	சமுதாயப் பிரச்சனைகளை எதிர்கொள்ளும் திறம் கிடைக்கிறது.	நடைமுறைப்படுத்துதல்
CO-10	போட்டித் தேர்வுகளுக்குப் பயன்படும் வகையில் படைப்பாக்கத் திறனை வளர்க்க உதவுகிறது.	படைப்பாற்றல் திறன் மேம்பாடு

SEMESTER - 1			
Part – 1 பொதுத்தமிழ் தாள் - 1 இக்கால இலக்கியம் (செய்யுள், இலக்கணம், இலக்கிய வரலாறு, உரைநடை, சிறுகதை)			
Course Code: 21ULTA11	Hrs/Week:6	Hrs/Semester: 90	Credits: 3

அலகு – 1 செய்யுள் - 2 மணி

1. தமிழ்மொழி வாழ்த்து – பாரதியார்
2. புதுமைப் பெண் - பாரதியார்
3. புதிய உலகு செய்வோம் - பாரதிதாசன்
4. உலகை மாற்றுவோம் - கவியரசு முடியரசன்
5. கண்ணீரின் இரகசியம் - அப்துல் ரகுமான்
6. மரங்கள் - மு.மேத்தா
7. கால வித்தியாசம் - வைரமுத்து
8. வையத்தை வெற்றி கொள்ள - சி.சிவரமணி
9. கவிதைப் பூங்காடு – பா.விஜய்
10. பெண் இனமே – மைத்ரேயி
11. ஹைக்கூ கவிதைகள்
12. நாட்டார் பாடல்கள்
 - அ. தாலாட்டுப் பாடல்
 - ஆ. மீனவர் பாடல்

அலகு - 2 இலக்கணம் - 1 மணி

எழுத்து

1. எழுத்து - விளக்கம்,
2. முதலெழுத்துகள், சார்பெழுத்துகள்
3. சுட்டெழுத்துகள், வினா எழுத்துகள்
4. மொழி முதல் எழுத்துகள், மொழி இறுதி எழுத்துகள்
5. வல்லினம் மிகும் இடங்கள், வல்லினம் மிகா இடங்கள்
6. மொழிப்பயிற்சி : புதுக்கவிதை, சிறுகதை,

பத்திரிகைக்குச் செய்தி அனுப்புதல்

அலகு - 3 இலக்கிய வரலாறு - 1 மணி

1. புதுக்கவிதை தோற்றமும் வளர்ச்சியும்
2. சிறுகதை தோற்றமும் வளர்ச்சியும்

3. உரைநடை தோற்றமும் வளர்ச்சியும்

4. நாட்டுப்புற இயல் அறிமுகம்

அலகு - 4 உரைநடை - 1 மணி

நீயே வெல்வாய் - க.ப.அறவாணன்

அலகு - 5 சிறுகதை - 1 மணி

1. கேதாரியின் தாயார் - கல்கி
2. விடியுமா? - கு.ப.ராஜகோபாலன்
3. காலனும் கிழவியும் - புதுமைப்பித்தன்
4. கருப்பண்ணசாமி யோசிக்கிறார் - அறிஞர் அண்ணா
5. நாற்காலி - கி.ராஜநாராயணன்
6. ராஜா வந்திருக்கிறார் - அழகிரி சாமி
7. ஜோடிப் பொருத்தம் - ஜெயரதி அகஸ்டின்

SEMESTER – I			
PART – I French Paper – I Preliminary French and Commercial terms			
Course Code : 21ULFB11	Hrs/week : 6	Hrs/ Sem : 90	Credits : 3

Objectives

To impart knowledge of the culture of the French and to give training in all four competencies of language learning.

To provide ample knowledge and opportunities to induce and ignite the independent learning capacity. To familiarize with commercial terms.

Course Outcomes

CO	At the end of this course, the students will be able to	CL
1.	read and understand French	Un, Kn
2.	greet and introduce oneself and others	Kn, Ap
3.	ask and say the date and day	Kn, Ap
4.	ask and reply politely	Ap, Cr
5.	describe someone's characteristics	Un, Ap
6.	understand the French and francophonic lifestyle	Kn, Un
7.	understand the commercial and computing terms and use it for translation	Un, Ap, Cr
8.	strengthen her base in French grammar	Kn, Un

SEMESTER – I			
PART – I French Paper – I Preliminary French and Commercial terms			
Course Code : 21ULFB11	Hrs/week : 6	Hrs/ Sem : 90	Credits : 3

Unit 1 – La France et la Francophonie

- 1.1 - La France et la Francophonie
- 1.2 – Un cours de français
- 1.3 – Les couleurs
- 1.4 – L’alphabet
- 1.5 – Lire en Français

Unit 2 - Bonjour ça va ?

- 2.1 –Bonjour ça va ?
- 2.2 – Salut Je m’appelle Agnès
- 2.3 – Entrer en contact
- 2.4 – Se présenter et présenter quelqu’un
- 2.5 – Demander et dire la date

Unit 3 - Qui est-ce ?

- 3.1 – Qui est-ce ?
- 3.2 – Dans mon sac, j’ai...
- 3.3 – Demander et répondre poliment
- 3.4 – Demander des informations personnelles
- 3.5 – Le top des personnalités francophones

Unit 4 - Il est comment ?

- 4.1 – Il est comment ?
- 4.2 – Allo ?
- 4.3 – Décrire l’aspect physique et le caractère
- 4.4 – Parler au téléphone
- 4.5 – Le pays des vacances

Unit 5 – Les termes

- 5.1 – Les termes commerciaux
- 5.2 – Les termes informatiques

Prescribed Textbook :

Cocton Marie-Noëlle. *Génération 1 Niveau A1*. Paris : Didier, 2016.

Books, Journals and Learning Resources

- Cocton Marie-Noëlle. *Génération 1 Le cahier d’activités*. Paris : Didier, 2016.

- J.Girardet&J.Pécheur avec la collaboration de C.Gibble.*Echo A1*. Paris : CLE international, Paris, 2012.
- Carlo Catherine, Causa Mariella.*Civilisation Progressive du Français – I*. Paris : CLEInternational, 2003.
- Dintilhac Anneline, De Oliveira Anouchka, Ripaud Delphine, DupleixDorothee, Cocton Marie-Noëlle.*Saison 1 Niveau 1, Méthode de français et cahier d'exercices*. Paris : Didier, 2015
- www.francaisfacile.com/exercices/
- www.bonjourdefrance.com
- <http://french-linguistics.co.uk/glossaries/commerce>

SEMESTER-I			
Part II GeneralEnglish	Poetry, Prose, Extensive Reading and Communicative English-I		
Course Code 21UGEN11	Hrs/Week: 6	Hrs/Semester:90	Credits:3

Objectives:

- To provide adequate exposure and opportunities for students to imbibe, develop, practise and use LSRW skills
- To help students read and comprehend contents in English

Course Outcome:

CO. No.	Upon completion of this course, students will be able to	Cognitive Level
CO- 1	improve their listening and writing skills.	Un
CO- 2	apply and incorporate basic grammar and mechanics in writing.	Ap
CO- 3	paraphrase main ideas through reading passages.	Ap
CO- 4	communicate in English with confidence.	Ap
CO- 5	appreciate literary pieces.	Ap
CO- 6	label and paraphrase main ideas through reading passages.	Ap
CO- 7	imbibe ethical and moral values through the study of the literary pieces.	Ev
CO- 8	construct simple sentences and short paragraphs in response to reading and writing.	Cr

SEMESTER-I			
Part II General English	Poetry, Prose, Extensive Reading and Communicative English –I		
Course Code 21UGEN11	Hrs/Week: 6	Hrs/Semester:90	Credits:3

Unit I –Poetry

Rabindranath Tagore – Leave This Chanting

W.W. Gibson – The Stone

Ted Hughes – Hawk Roosting

Unit II – Prose

Stephen Leacock – My Lost Dollar

J.B. Priestley – On Doing Nothing

Robin Sharma – Your Commitment to Self- Mastery: Kaizen

Unit III – Short Story

Oscar Wilde – The Model Millionaire

Leo Tolstoy – Three Questions

K.A. Abbas – The Refugee

Unit IV – Grammar

Parts of Speech – Noun, Pronoun, Article, Adjective, Verb - Modals and

Auxiliaries – Types of Sentences - Subject -Verb Agreement

Unit V- Communication Skills

Vocabulary, Listening Comprehension – Speaking – Reading, Filling Forms

(TANSCHÉ – Module I)

Text Books:

Units I-III – To be compiled by the Research Department of English

Unit IV- Joseph, K.V. *A Textbook of English Grammar and Usage*. Chennai: Vijay Nicole Imprints Private Limited, 2006. Print.

Unit – V – CLIL (Content & Language Integrated Learning) – Module I by TANSCHÉ (Tamil Nadu State Council for Higher Education)

Semester I			
Core – I		C Programming	
Course Code:21UCSC11	Hrs / week : 4	Hrs / Semester: 60	Credits : 4

Objectives:

- Understand the concepts of Structured programming language
- To understand the basic programming concepts.
- To develop programming skills using the C language.

Course outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	draw the flow chart for the given problem and algorithm	8	Un
CO-2	describe the various operators and library functions and to define I/O functions	2	Un
CO-3	compare and contrast loops	2	An
CO-4	implement recursion	2	Ap
CO-5	understand the concept of storage classes	2	Un
CO-6	implement different operations on arrays	2	Ap
CO-7	develop an application using pointers and structures	2	Cr
CO-8	describe the file operations	5	Un

SEMESTER- I			
Core – I		C Programming	
Course Code:21UCSC11	Hrs / week : 4	Hrs / Semester: 60	Credits : 4

Unit I:

Algorithms - Flow charts: Developing algorithms and flowcharts for solving simple problems.
Introduction to C

C Fundamentals: The C Character Set - Identifiers and Keywords - Data Types –Constants– Variables and Arrays - Declarations - Expressions - Statements - Symbolic Constants.**Operators and Expressions:** Arithmetic Operators - Unary Operators - Relational and Logical Operators - Assignment Operators - The Conditional Operator - Library Functions

Self- learning: Bitwise Operations

Unit II:

Data Input and Output: Single Character Input-The getchar Function-Single Character Output-The putchar Function-Entering Input Data-More about the scanf function-Writing output data – The printf function- The scanf Function-More about the printf function -The gets and puts Functions.

Control Statements: Branching: The if-else Statement-Looping: The While Statement-More Looping: The do-while Statement-Still More Looping: The for Statement-Nested Control Structures-The switch Statement-The break Statement-The continue Statement-The comma Operator-The go to Statement.

Unit III:

Functions: Defining a Function-Accessing a Function-Function Prototypes- Passing Arguments to a Function- Recursion. Program Structure: Storage Classes- Automatic Variables- External (Global) Variables- Static Variables.

Arrays:Defining an Array-Processing an Array - Passing Arrays to Functions- Multidimensional Arrays - Arrays and Strings.

Self learning:Register Variables

Unit IV:

Pointers: Fundamentals-Pointer Declarations- Passing Pointers to Functions- Pointers and One-Dimensional Arrays-Dynamic Memory Allocation- Operations on Pointers-Pointers and Multidimensional Arrays -Arrays of pointers-Passing Functions to Other Functions

Structures and Unions: Defining a Structure - Processing a Structure - User Defined Data types (typedef) - Structures and Pointers - Passing Structures to Functions -Passing Structures to Functions-Unions.

Self-learning: command-line arguments

Unit V:

Opening and Closing a Data File-Creating a Data File-Processing a Data -Unformatted Data Files.

Self learning: Macros-The CPreprocessor.

Text Book:

1. Byron Gottfried, *Programming with C* .India : McGraw Hill Education Private Limited.ThirdrdEdition 2017 .
Chapters: 2,3,4,6,7,8,9,10,11,12 and 13.

Books for Reference:

1. Ashok N. Kamthane, *Programming with ANSI and Turbo* .New Delhi :Pearson education. Third Edition 2008.
2. Venugopal K R and Sudeep R Prasad .*Mastering C*. India: Tata McGraw Hill. Second Edition, 2017.
3. E. Balagurusamy, ,*Programming in ANSI C*.India:McGraw Hill Education Private Limited, Eighth Edition 2019.
5. computer-fundamental/algorithm-and-flowchart.htm
6. <https://www.geeksforgeeks.org/an-introduction-to-flowcharts>

SEMESTER- I			
Core Practical I		C Programming Lab	
Course Code: 21UCSCR1	Hrs / week :4	Hrs / Semester:60	Credits :2

1. Solve Quadratic Equation- control statements
2. Sum of Digits & reverse the number.
3. Prime number Checking
4. Sine Series evaluation
5. Sorting an Array of numbers
6. Binomial coefficient using function
7. Linear Searching using function
8. Sorting an array of names
9. Counting no. of vowels, consonants, words and white spaces in a line of text.
10. EB Bill using Structure.
11. Matrix multiplication using pointers
12. Create a file to store students details and retrieve the details from the file

SEMESTER- I			
Allied – I		Mathematics for Computer Science	
Course Code: 21UCSA11	Hrs / week :3	Hrs / Semester: 45	Credits :3

Objectives:

- To attain mathematical foundations this is very essential for the study of computer courses.
- To make the students capable of mathematically formulating certain practical problems.
- To understand the concept of central tendencies
- To learn about dispersions and regression
- To provide knowledge about graphs and its applications.

Course Outcomes:

CO.No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO-1	create an argument using logical notation and evaluate if it is valid or not.	1	Cr
CO-2	apply logical reasoning to solve a variety of problems.	4	Ap
CO-3	compute measures of central tendency	4	Ap
CO-4	calculate and compare dispersion , skewness, kurtosis	4	Cr
CO-5	evaluate correlation and regression	4	Ap
CO-6	compute the shortest path	1	Cr
CO-7	model problems in computer science using graphs	1	Ap
CO-8	construct graphs to solve problems	4	Cr

SEMESTER- I			
Allied – I		Mathematics for Computer Science	
Course Code:21UCSA11	Hrs / week :3	Hrs / Semester: 45	Credits :3

Unit I:

Logic And Propositional Calculus– Introduction – propositions and compound propositions – tautologies and contradictions – logical equivalences– algebra of propositions – conditional and bi-conditional statements – arguments – logical implication – propositional functions, Quantifiers – Negation of quantified statements.

Self-Learning: Basic Logical operations and truth tables

Unit II:

Measures of central tendency:

Arithmetic mean, Median, Mode, Geometric mean, Harmonic mean. Partition values: Quartiles, Deciles and percentiles.

Self -Learning: Types of Data, Organizing data

Unit III:

Measures of dispersion:

Mean deviation, Quartile deviation, Standard deviation, Coefficient of variation, measures of skewness, Kurtosis.

Self-Learning: Lorenz Curve

Unit IV:

Correlation and Regression:

Correlation: Karl Pearson coefficient of correlation, Spearman's rank correlation coefficient.**Regression:** Concept of errors, Principles of Least Square, Simple linear regression and its properties.

Self-Learning: Scatter plot, Temporal autocorrelation, spatial autocorrelation

Unit V:

Graph Theory

Introduction, data structures – graphs and multigraphs – subgraphs, Isomorphic and homeomorphic graphs – paths, connectivity – the bridges of konigsberg, traversable multigraphs – labelled and weighted graphs – complete, regular, and bipartite graphs – tree graphs.**Directed Graphs :** Introduction- Directed Graphs- Basic Definitions- Rooted Trees.

Self-Learning: Spanning tree

Text Books:

1. Seymour Lipschutz, Marc Lipson, *Discrete Mathematics*, New Delhi : Tata McGraw Hill, Revised Third Edition, 2017. (Unit I and Unit V)
2. Gupta S.C and Kapoor V.K, *Fundamentals of Mathematical Statistics*, New Delhi : Sultan Chand & Sons, 11th edition, 2014 (Unit II, Unit III, Unit IV)

Books for Reference:

1. B.S. Vatsa, *Discrete Mathematics*, New Delhi: New Age International (P) Ltd., Fourth Edition, 2009.
2. K.D. Joshi, *Foundation of Discrete Mathematics*, New Delhi: New Age International (P) Ltd., 2014
3. 3. Kenneth H. Rosen , “*Discrete mathematics and its application*”, New Delhi : Tata McGraw Hill, 8th Edition, 2021
4. Mukhopadhyay P, *Mathematical Statistics*, Kolkata :Books and Allied (P) Ltd, 2015.
5. Agarwal B.L, *Basic Statistics*, 6th Edition, New Delhi: New Age International (P) Ltd., 2015.

SEMESTER- I			
Allied-Practical I		Office Automation Lab	
Course Code: 21UCSAR1	Hrs / week:3	Hrs / Semester: 45	Credits :2

Word:

- 1.Type a paragraph and use various formatting.
- 2.Design a wedding invitation in Word Document
- 3.Use mail merge in word.
- 4.Prepare a class time table.

Excel:

5. Prepare a semester wise mark statement for a computer class of 20 students.
6. Consider the sample employee worksheet and calculate their salary. Plot it using chart
7. Use any spreadsheet to use mathematical, statistical and logical functions
8. Plot various charts for marks obtained by the students

Access:

9. Create a database named “college.mdb” and perform the following tasks:
 - a. Create a table named “student info”
 - b. Fill at least 5 records.
 - c. Prepare a query to display all records and Name should be in ascending order.
 - d. Prepare a query named “senior” to display records including fields name, class, sec, roll no, status, photo and value of “status” field must be senior.
 - e. Prepare a form of above query “senior”
 - f. Prepare a report of all the fields of the above table.

10. Create a database named “library.mdb” and perform the following tasks:
 - a. Create a table named “Book”
 - b. Add at least 5 records.
 - c. Prepare a query to display only records including book name, writer name and publication name. Save the query as “q_book”.
 - d. Prepare a query to display all records on the basis of price which is more than Rs500.
 - e. Prepare a form on the basis of a table.
 - f. Prepare a report on the basis of a query named "q_book”.

11. Create a database named “Nepal Bank” to store information about its staffs and do the following tasks:
 - a. Create a table named “staffinfo”.
 - b. Create a form on the basis of “staffinfo” table and save as “entryform”.
 - c. Fill at least 5 records using the “entryform”
 - d. Create a query named “depinfo” to display records only including department name, staff name and mobile number.

- e. Create a query named “post” to display staff name, post, department and phone number whose post is “teller “ or “cashier”.
 - f. Prepare a report on the basis of a query named “depinfo”.
12. Create a database named exam.mdb and a table named class8 with the following structure.

Field name	Data type
Roll no	number (primary key)
Name	text
English	number
Science	number
Maths	number

- a. Add any 5 records in the table.
- b. Prepare a query named “total marks” to calculate the sum of all the marks.
- c. Prepare a query named “topper” of query “total marks” to display all records whose total is more than 200.
- d. Prepare a form of your query using form wizard with all the fields.
- e. Prepare a report on the basis of query “Total marks”.

SEMESTER- I			
Skill Enhancement Course-I Professional English for Computer Science –I			
Course Code: 21UCSPE1	Hrs / week :2	Hrs / Semester: 30	Credits :2

Objectives:

- To develop the language skills of students
- To train students in professional contexts.
- To enhance the lexical, grammatical and socio-linguistic skills
- To improve communicative competence of students

Course Outcomes:

CO.No	Upon completion of this course, students will be able to	PSOs addressed	CL
CO-1	recognise their own ability to improve their own competence in using the language	10	Un
CO-2	use language for speaking with confidence in an intelligible and acceptable manner.	3	An
CO-3	understand the importance of reading for life	3	Un
CO-4	read independently any unfamiliar texts with comprehension	10	Un
CO-5	write simple sentences without committing error of spelling or grammar	6	An
CO-6	develop writing skill in academic life	6	Cr
CO-7	develop critical thinking skills and get culturally aware of the target situation	10	Cr
CO-8	develop communicative skill for professional collaboration	10	Cr

NB: All four skills are taught based on texts/passages.

SEMESTER- I			
Skill Enhancement Course-I		Professional English for Computer Science –I	
Course Code: 21UCSPE1	Hrs / week :2	Hrs / Semester: 30	Credits :2

UNIT 1: COMMUNICATION

Listening: Listening to audio text and answering questions- Listening to Instructions

Speaking: Pair work and small group work.

Reading: Comprehension passages –Differentiate between facts and opinion

Writing: Developing a story with pictures.

Vocabulary: Register specific - Incorporated into the LSRW tasks

UNIT 2: DESCRIPTION

Listening: Listening to process description.-Drawing a flow chart.

Speaking: Role play (formal context)

Reading: Skimming/Scanning-Reading passages on products, equipment and gadgets.

Writing: Process Description –Compare and Contrast Paragraph-Sentence Definition and Extended definition- Free Writing.

Vocabulary: Register specific -Incorporated into the LSRW tasks.

UNIT 3: NEGOTIATION STRATEGIES

Listening: Listening to interviews of specialists / Inventors in fields (Subject specific)

Speaking: Brainstorming.(Mind mapping). Small group discussions (Subject- Specific)

Reading: Longer Reading text.

Writing: Essay Writing (250 words)

Vocabulary: Register specific - Incorporated into the LSRW tasks

UNIT 4: PRESENTATION SKILLS

Listening: Listening to lectures.

Speaking: Short talks.

Reading: Reading Comprehension passages

Writing: Writing Recommendations Interpreting Visuals inputs

Vocabulary: Register specific -Incorporated into the LSRW tasks

UNIT 5: CRITICAL THINKING SKILLS

Listening: Listening comprehension- Listening for information.

Speaking: Making presentations (with PPT- practice).

Reading: Comprehension passages –Note making.

Comprehension: Motivational article on Professional Competence, Professional Ethics and Life Skills)

Writing: Problem and Solution essay– Creative writing –Summary writing

Vocabulary: Register specific - Incorporated into the LSRW tasks

References:

<https://www.myindiamyglory.com/2018/07/12/raman-effect-how-indian-scientist-cv-raman-discovered-why-sea-is-blue/>

<https://opensource.com/resources/internet-of-things>

Britannica, T. E. (Ed.). (2020, April 16). *Marie Curie*. Retrieved June 18, 2020, from Encyclopædia Britannica.

Wikipedia, T. E. (Ed.). (16, June 2020). *Marie Curie*. Retrieved June 18, 2020, from Wikipedia.

<https://physicsabout.com/difference-between-ac-and-dc/>

<http://warofcurrents.newtfire.org/>

<https://www.youtube.com/watch?v=ubpsosv7mHM>

<https://www.englishclub.com/reading/health/cell-phone.htm>

<https://www.britannica.com/biography/Isaac-Asimov>

<https://www.softschools.com/>

<https://www.space.com/17056-kalpana-chawla-biography.html>

<https://labour.gov.in/childlabour/census-data-child-labour>

https://www.bu.edu/csp/Conferences/Space_Exploration/Day1/Presentations/Kalam_Space%20Exploration%20and%20Human%20Life.pdf

<https://www.youtube.com/watch?v=WEKzNH09Vqs>

<https://www.bbc.com/news/world-europe-48616174>

<https://semiengineering.com/how-5g-differs-from-previous-network-technologies/>

<https://www.thehindubusinessline.com/info-tech/scientists-caution-government-to-go-slow-on-5g-roll-out/article28737197.ece>

<https://www.downtoearth.org.in/interviews/science-and-technology/-5g-is-unlikely-to-cause-health-concerns--63698>

<https://www.intel.com/content/www/us/en/wireless-network/5g-benefits-features.html>

SEMESTER - I			
Ability Enhancement Course -Value Education			
Code : 21UAVE11	Hrs/Week : 2	Hrs / Semester: 30	Credits : 2

Unit I: Introduction to Value Education

Concept of Values -Types of Values- Approaches to values - Benefits of Value Education- Characteristics of Values

Unit II: Human Values

Human Values -Sources of Human Values - Love -Compassion - Gratitude - Courage - Optimism - Forgiveness- the need and urgency to reinforce Human Values

Unit III: Social Values

Role of family and society in teaching values - Role of educational institutions in inculcating values-Three general functions of education for society-Self-Reflection- Our society's needs - Social Responsibilities of a student

Unit IV: Spiritual Values

Spiritual Values - Spiritual Development -Moral Development - Importance of Spiritual Values - Cultivation of Spiritual Values -Five most common spiritual values -Spiritual Resources

Unit V: Values for Life Enrichment

Goal Setting - Building relationship - Friendship - Love relationship - Family relationship - Professional relationship Interpersonal Relationship -Essential Life Skills that Help in Students Future Development-Life Enrichment Skills Domain

Books for Reference:

1. Sneha M. & K. Pushpanadham Joshi. *Value Based Leadership in Education Perspective and Approaches*, Anmol Publications Pvt. Limited, 2002.
2. Venkataiah.N. *Value Education*, APH Publishing, 1998
3. Pramod KumarM.*A Handbook on Value Education*, Ramakrishna Mission Institute of Culture (RMIC) 2007
4. Jagdosh Chand.*Value Education*. Shipra Publication 2007
5. Indrani Majhi (Shit)Ganesh Das, *Value Education*, Laxmi Publication Pvt. Ltd., 2017
6. Arumugam, N. S. Mohana, Lr.Palkani, *Value Based Education*, Saras Publication 2014

SEMESTER - II			
Part -1 பொதுத்தமிழ் - தாள் 2 சமய இலக்கியங்களும் நீதி இலக்கியங்களும் (செய்யுள், இலக்கணம், இலக்கிய வரலாறு, உரைநடை, வாழ்க்கை வரலாறு)			
Course Code: 21ULTA21	Hrs/Week:6	Hrs/ Semester : 90	Credits :3

Objectives:

- வாழ்வியல் நன்னெறிகளான மனிதநேயம், சமத்துவம் போன்றவற்றை வளர்த்துக் கொள்ளக் கற்றுக் கொடுத்தல்
- அறநெறியைக் கடைப்பிடிப்பதே நிலையானதும் நீடித்ததுமான நன்மையைத் தருவது என்பதைச் சான்றோரின் வாழ்க்கை நெறிகள் மூலம் உணரச்செய்தல், மொழி அறிவு, இலக்கிய அறிவு இவற்றை வளர்த்துக் கொள்ளக் கற்றுக் கொடுத்தல்

Course Outcome

Co.No.	இப்பாடத்திட்டம் மாணவியருக்கு	அறிவுசார் மதிப்பீடு
CO-1	இறை ஆற்றலை உணர்ந்துகொள்ள உதவுகிறது	மதிப்பீடு
CO-2	நல்ல நண்பர்களையும் நல்ல மனிதர்களையும் இனம் கண்டுகொள்ள வழி வகுக்கிறது.	நடைமுறைப்படுத்துதல்
CO-3	அன்பு, இரக்கம், நற்சொல், நற்செயல் போன்ற நற்பண்புகளோடு வாழ வழி வகுக்கிறது.	மதிப்பீடு
CO-4	மனித நேய பண்புகளோடு வாழ்ந்த சான்றோரின் அனுபவங்களைப் பெற்றுக்கொள்ள உதவுகிறது	நடைமுறைப்படுத்துதல்
CO-5	மொழியைப் பிழையின்றி பேசவும் எழுதவும் பயன்படுகிறது	புரிதல், திறன் மேம்பாடு
CO-6	தனிமனித வாழ்க்கைச் சிக்கல்களையும் பிரச்சனைகளையும் எதிர்கொள்ளும் ஆற்றலை உருவாக்குகிறது.	நடைமுறைப்படுத்துதல், திறன் மேம்பாடு
CO-7	இறைவன் முன் அனைவரும் சமம் என்ற சிந்தனையை உருவாக்குகிறது.	மதிப்பீடு
CO-8	போட்டித்தேர்வுகளுக்குப் பயன்படும் வகையில் படைப்பாக்கத் திறனை வளர்க்க உதவுகிறது.	படைப்பாற்றல்

SEMESTER - II

Part -1 பொதுத்தமிழ் - தாள் 2 சமய இலக்கியங்களும் நீதி இலக்கியங்களும்
(செய்யுள், இலக்கணம், இலக்கிய வரலாறு, உரைநடை, வாழ்க்கை வரலாறு)

Course Code: 21ULTA21

Hrs/Week:6

Hrs/ Semester : 90

Credits :3

அலகு - 1 செய்யுள் - 2 மணி

சமய இலக்கியங்கள்

இறைவணக்கம் - திருநாவுக்கரசர்

சைவம் 1. தேவாரம் - திருஞான சம்பந்தர், திருநாவுக்கரசர், சுந்தரர்

2. திருவாசகம் - மாணிக்கவாசகர்

3. திருமந்திரம் - திருமூலர்

4. திருப்புகழ் - அருணகிரி நாதர்

வைணவம்: 1. திருப்பாவை - ஆண்டாள்

2. திருவாய்மொழி- நம்மாழ்வார்

பௌத்தம்: மணிமேகலை - சீத்தலைச் சாத்தனார்

கிறித்தவம்: 1. தேம்பாவணி - வீரமாமுனிவர்

2. இயேசு காவியம் - கவிஞர் கண்ணதாசன்

இசுலாமியம்: பேட்டை ஆம்பூர் அப்துல் காதிர் சாகிபு பாடல் - சக்கநாத்து நாமா

நீதி இலக்கியங்கள்

1. திருக்குறள் - ஊக்கமுடைமை

2. நாலடியார் - 1. நன்னிலைக் கண்

2. உறங்கும் துணையது

3. பழமொழி நானூறு- 1. பொல்லாத சொல்லி

2. வருவாய் சிறிதெனினும்

அலகு - 2 இலக்கணம் - 1 மணி

1. சொல்லின் பொது இலக்கணம்

2. ஓரெழுத்து ஒருமொழி, சொல்லின் வகைகள்

3. பெயர்ச்சொல் - அறுவகைப் பெயர்கள்

4. வினைச்சொல் - வகைகள்- முற்று, எச்சம், ஏவல், வியங்கோள், செய்வினை,

செய்ப்பாட்டுவினை, தன்வினை, பிறவினை

5. இடைச்சொல் - ஏகார, ஓகார, உம்மை இடைச்சொற்கள்

6. உரிச்சொல் - இலக்கணம், வகைகள்

மொழிப்பயிற்சி – ஒலி வேறுபாடு அறிதல்

அலகு - 3 இலக்கிய வரலாறு – 1 மணி

1. சைவ இலக்கியங்கள்
2. வைணவ இலக்கியங்கள்
3. கிறித்தவம் தமிழுக்குச் செய்த தொண்டு
4. இசுலாமியம் தமிழுக்குச் செய்த தொண்டு
5. பதினெண் கீழ்க்கணக்கு நூல்களில் 11 அறநூல்கள்

அலகு - 4 உரைநடை - 1 மணி

நிறைவான வாழ்க்கைக்கு நேரம் ஒதுக்குங்கள் - ஜே.மௌரஸ்

(10 முதல் 19 வரை உள்ள கட்டுரைகள்)

அலகு – 5 வாழ்க்கை வரலாறு - 1 மணி

மனிதமே புனிதம் - சுடர்ந்தெழு - முனைவர் அருட்சகோதரி ஆ.மரிய சாந்தி

SEMESTER – II			
PART – I French Paper – II Progressive French and Commercial correspondence			
Course Code : 21ULFB21	Hrs/week : 6	Hrs/ Sem : 90	Credits : 3

Objectives

To build upon the language skills acquired to reach a standard level of speaking and writing French.

To give thrust on the actional approach to motivate the autonomy of the learner.

Course Outcomes

CO	At the end of this course, the students will be able to	CL
1.	talk about hobbies and routine	Kn
2.	express her taste and preferences	Kn
3.	place an order in a restaurant	Un, Ap
4.	invite and reply to an invitation	Ap, Cr
5.	describe an outfit	Kn, Ap
6.	write a friendly message	Ap, Cr
7.	get a gist of the French literature	Ap, Un
8.	write formal business letters	Ap, Cr

SEMESTER – II			
PART – I French Paper – II Progressive French and Commercial correspondence			
Course Code : 21ULFB21	Hrs/week : 6	Hrs/ Sem : 90	Credits : 3

Unit 1 – Les loisirs

- 1.1 – Les loisirs
- 1.2 – La routine
- 1.3 – Parler de ses goûts et de ses préférences
- 1.4 – Décrire sa journée
- 1.5 – Le roman-photo de ma journée

Unit 2- Où faire ses courses ?

- 2.1 – Où faire ses courses ?
- 2.2 – Découvrez et dégustez !
- 2.3 – Au restaurant : commander et commenter
- 2.4 – Inviter et répondre à une invitation
- 2.5 – Le pays des gourmands

Unit 3 - Tout le monde s’amuse

- 3.1 – Tout le monde s’amuse
- 3.2 – Les ados au quotidien
- 3.3 – Décrire une tenue
- 3.4 – Ecrire un message amical
- 3.5 – L’école des chefs

Unit 4 - Le texte littéraire

- 4.1. Le Petit Prince (Chapitre 1) - Antoine de Saint Exupéry
- 4.2. La colombe poignardée et le jet d’eau – Calligramme - Guillaume Apollinaire

Unit 5 – Les lettres et les termes

- 5.1 – Les lettres formelles
- 5.2 – Les termes informatiques

Prescribed Textbook :

Cocton Marie-Noëlle. *Génération 1 Niveau A1*. Paris : Didier, 2016.

Books, Journals and Learning Resources

- Cocton Marie-Noëlle. *Génération 1 Le cahier d'activités*. Paris : Didier, 2016.
- J.Girardet&J.Pêcheur avec la collaboration de C.Gibble, Echo A1, CLE international, Paris, 2012.
- Carlo Catherine, Causa Mariella. *Civilisation Progressive du Français – I*. Paris : CLEInternational, 2003.
- Dintilhac Anneline, De Oliveira Anouchka, Ripaud Delphine, DupleixDorothee, Cocton Marie-Noëlle. *Saison 1 Niveau 1, Méthode de français et cahier d'exercices*. Paris : Didier, 2015
- Apollinaire Guillaume. *Calligrammes : Poèmes de la paix et de la guerre 1913-1916*. Paris: Gallimard, 1966
- Antoine de Saint-Exupéry. *Le Petit Prince*. Paris : Gallimard, 2007.
- www.francaisfacile.com/exercices/
- www.bonjourdefrance.com
- <http://french-linguistics.co.uk/glossaries/commerce>

SEMESTER-II			
Part II General English	Poetry, Prose, Extensive Reading and Communicative English –II		
Course Code 21UGEN21	Hrs/Week: 6	Hrs/Semester:90	Credits:3

Objectives

- To help students realise how life, literature and language are closely connected
- To expose students to language skills through the core subjects

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	Cognitive Level
CO-1	comprehend passages.	Un
CO- 2	build effective communication skills.	Un
CO- 3	demonstrate improved oral fluency.	Un
CO- 4	use vocabulary through the study of word parts.	Ap
CO- 5	construct paragraphs and essays through prose writings.	An
CO- 6	develop the skills of interpretation, critical thinking, and clear writing.	An
CO- 7	make use of context clues and analyse poetic content and correlate to experiences.	An
CO- 8	support future academic study by developing a high social, aesthetic and cultural literacy.	Cr

SEMESTER-II			
Part II General English	Poetry, Prose, Extensive Reading and Communicative English–II		
Course Code: 21UGEN21	Hrs/Week: 6	Hrs/Semester:90	Credits:3

Unit I –Poetry

William Wordsworth	– Resolution and Independence
Henry W. Longfellow	– Psalm of Life
Toru Dutt	– The Lotus

Unit II – Prose

A.G. Gardiner	– On Courage
Desmond Morris	– A Little Bit of What You Fancy
Kalpana Chawla	– The Sky is the Limit

Unit III – Short Story

Saki	– Mrs. Packletide’s Tiger
Liam O’Flaherty	– The Sniper
Langston Hughes	– Thank You Ma’am

Unit IV – Grammar

Tenses: Present, Past and Future

Unit V- Communication Skills

Listening, Reading, Pronunciation, Key Functions, Speaking (TANSCHE - Module - II)

Text Books:

Units I-III – To be compiled by the Research Department of English

Unit – IV - Joseph, K.V. *A Textbook of English Grammar and Usage*. Chennai: Vijay Nicole Imprints Private Limited, 2006.

Unit - V – CLIL (Content & Language Integrated Learning) – Module II by TANSCHE (Tamil Nadu State Council for Higher Education)

SEMESTER- II			
Core II		C++ Programming	
Course Code: 21UCSC21	Hrs / week : 4	Hrs / Semester: 60	Credits : 4

Objectives:

- Understand the basic concepts of object oriented programming language
- To develop programming skills using the C++ Programming language.

Course outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	know about object-oriented features.	1,8	Un
CO-2	understand the various operators and i/o functions	2	Re
CO-3	write a program using inline and friend function and to implement overloading constructor	2	Ap
CO-4	understand the array of objects and demonstrate operator overloading	2	Un
CO-5	compare different inheritance methods	2	An
CO-6	develop linked list	2	Cr
CO-7	understand virtual function	2	Un
CO-8	create an application using file operations	5	Cr

SEMESTER- II			
Core II		C++ Programming	
Course Code: 21UCSC21	Hrs / week : 4	Hrs / Semester: 60	Credits : 4

Unit I

The Big Picture: Why Do Need Object-Oriented Programming- Characteristics of Object-Oriented Languages - C++ and C-Laying the Groundwork.C++ Programming Basics: Basic Program Construction - Output Using cout - Preprocessor Directives – Comments - Integer Variables- Character Variables - Input with cin- Type float- Manipulators-Variable type Summary-Type conversion-Arithmetic Operators-Library Functions.

Unit II

Function: Simple Functions - Passing Arguments to Functions -Returning Values from Functions - Reference Arguments - Overloaded Functions - Recursion-Inline Functions - Default Arguments- Variables and Storage Classes - Returning by Reference.

Objects and Classes: A Simple Class - C++ Objects as Physical Objects - C++ Objects as Data Types-Constructors - Objects as Function Arguments -Returning Objects from unction- Structures and Classes-Classes, Object, and Memory-Static Class Data

Unit III

Arrays: Array Fundamentals - Array as Class Member Data - Array of Objects - String. Operator Overloading: Overloading Unary Operators - Overloading Binary Operators- Data Conversion- Pitfalls of Operator Overloading and Conversion.

Unit IV

Inheritance Derived Class and Base Class - Derived Class Constructors - Overriding Member Functions-Inheritance in the English Distance Class - Class Hierarchies-Public and Private Inheritance-Levels of Inheritance-Multiple Inheritance-Ambiguity in Multiple Inheritance - Containership: Classes with Classes - inheritance and Program Development.

Pointers: Addresses and Pointers - Pointer Variables - Pointers and Array - Pointers and Functions - Pointers and Strings - Memory Management: new and delete - Pointers to Objects - A Linked List Example - Pointers to Pointers - Debugging Pointers.

Unit V:

Virtual Functions: Virtual Functions - Friend Functions - Static Functions - assignment and Copy Initialization -The this Pointer.

Streams and Files: Streams -String I/O -Character I/O - Object I/O -I/O with Multiple Objects- File Pointers - Disk I/O with Member Functions -File Pointers -Error Handling - Redirection - - Printer Output - Overloading the Extraction And Insertion Operators.

Self Learning: Command Line Arguments

Text Book:

1. Robert Lafore. *Object-Oriented Programming in C++*. New Delhi : Pearson and Dorling Kindersley Publications. FourththEdition 2011

Books for Reference:

1. E.Balagurusamy, *Object-Oriented Programming with C++* India: Tata McGraw Hill. 8th Edition 2020.
2. D.Ravichandran, *Programming with C++*.India: Tata McGraw-Hill. Second^dEdition. 2010.
3. K.R. Venugopal Rajkumar Ravishankar. *Mastering C++*. India: Tata McGraw Hill. Second Edition 2017.

SEMESTER- II			
Core Practical II		C++ Programming Lab	
Course Code: 21UCSCR2	Hrs / week : 4	Hrs / Semester: 60	Credits : 2

1. Area calculation using Function overloading (Minimum three functions).
2. Implement constructor overloading
3. Swap two values between two class objects using friend function.
4. Display the details of employees using array of objects.
5. Overload Binary + operator which adds two complex numbers.
6. Overload Relational operator == to compare two strings.
7. Row and column total of a matrix using class and objects
8. Using class and objects, find the sum of two matrices using pointers.
9. Process students mark list using multiple inheritances.
10. Process telephone billing using multi level inheritance.
11. Program in C++ using virtual function.
12. Process mark list using binary file.
13. Open a file in output and input mode. Accept data and write to the file. Display the contents of the file.

SEMESTER II			
Allied II		Digital Electronics	
Course Code: 21UCSA21	Hrs / week : 3	Hrs /Semester:45	Credits : 3

Objectives:

- To Understand the basic concepts used in the design and analysis of digital systems
- To study various Boolean Functions
- To study about number systems
- To Construct digital circuits
- Acquire knowledge in Boolean functions and MSI and LSI logic circuits.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand various number systems and boolean functions.	1	Un
CO-2	apply various methods to simplify boolean function.	4	Cr
CO-3	construct digital circuits for boolean functions with logic gates.	6	Cr
CO-4	design combinational circuits with logic gates.	6	Cr
CO-5	apply classical techniques for the logical design of combinational and sequential circuits	4	Ap
CO-6	define sequential logic circuits.	1	Re
CO-7	understand the basic operation of flip-flops.	1	Re
CO-8	understand the various registers-transfer methods .	1	Re

SEMESTER- II			
Allied II	Digital Electronics		
Course Code: 21UCSA21	Hrs / week : 3	Hrs / Semester: 45	Credits : 3

Unit I

Binary Systems : Digital Computers and Digital Systems – Binary numbers – Number base conversion – Octal and Hexadecimal numbers – Complements– Binary Codes –Basic theorems and properties of boolean algebra– Boolean functions– Canonical and Standard forms .

Self Learning : Digital Logic Gates .

Unit II

Simplification of Boolean Functions : The Map method – Two and Three variable Maps – Four Variable Map– Five and Six Variable Maps – Product of Sums Simplification – NAND and NOR Implementation– Don't care conditions – The Tabulation method – Determination of Prime – Implicants – Selection of Prime – Implicants

Unit III

Combinational Logic : Introduction– Design Procedure – Adders – Subtractors – Code Conversion– Multilevel NAND Circuits – Multilevel NOR Circuits – Exclusive-OR and Equivalence Functions.

Unit IV

Combinational Logic with MSI and LSI : Introduction– Binary Parallel Adder – Decimal Adder– Magnitude Comparator– Decoders – Multiplexers

Unit V

Registers and Counters: Sequential logic -Introduction – Flip-Flops -Basic Flip-Flop Circuit- Clocked RS Flip-Flop-D-Flip-Flop-JK Flip-Flop- T-Flip-Flop- Registers – Shift Registers

Self-Learning: Counters

Text Book :

1. M. Morris Mano, *Digital Logic and Computer Design*, Noida: Pearson education India, First Edition, 2016

Chapters : 1.2-1.6, 2.3-2.5, 2.7, 3.1-3.11, 4.1-4.5, 4.7-4.9, 5.1-5.6, 6.1, 6.2, 7.1-7.3

Books for Reference:

1. Charles H. Roth, Jr. *Fundamentals of Logic Design*, New Delhi: Cengage Learning India Private Limited, 7th Edition, 2015
2. Donald D. Givone, *Digital Principles and Design*, New Delhi: Tata McGraw-Hill, First Edition, 2012.
3. Donald P. Leach and Albert Paul Malvino, *Digital Principles and Applications*, New Delhi: Tata McGraw Hill, 8th Edition, 2014.

SEMESTER- II			
Allied-Practical II		Open Source Multimedia Lab	
Course Code: 21UCSAR2	Hrs / week :3	Hrs / Semester: 45	Credits :2

(GIMP)

1. Design a brochure.
2. Design greeting card.
3. Design a Textbook cover page.
4. Filters in GIMP
5. Design a homepage for a website
6. Design a visiting card.
7. Design a Bio data form
8. Design a CD label.
9. Create 2D logos.
10. Animate a candle flame using Liquefy filter.

SEMESTER- II			
Skill Enhancement Course-II		Professional English for Computer Science –II	
Course Code: 21UCSPE2	Hrs / week :2	Hrs / Semester: 30	Credits :2

Objectives:

- To improve the communicative skill of students by refining their speaking, writing, reading, and listening skills.
- To make students competent in professional communication.
- To attain necessary skills to face interviews.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the basic objective of the course and obtain strong professional vocabulary for its application at different platforms	6	Un
CO-2	apply the knowledge for writing purposes such as presentation, drafting and project report etc.	8	Ap
CO-3	evaluate the correct and error-free writing by being well-versed in rules of english grammar and cultivate relevant technical style of communication and presentation.	10	Ev
CO-4	apply techniques for developing inter-personal communication and to respond questions at a formal interview	3	Ap
CO-5	apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics	3, 10	Ap
CO-6	use critical thinking skills to face everyday life situations.	10	Cr
CO-7	develop strategic competence that will help in efficient communication	3, 6	Ap
CO-8	apply the acquired knowledge and ideas in giving opinions during the meeting and making concluding remarks.	4, 10	Ap

SEMESTER- II			
Skill Enhancement Course-II		Professional English for Computer Science –II	
Course Code: 21UCSPE2	Hrs / week :2	Hrs / Semester: 30	Credits :2

UNIT 1: COMMUNICATIVE COMPETENCE

Listening and Speaking:

- Listening and responding to complaints (formal situation)
- Listening to problems and offering solutions (informal)

Reading and writing:

- Reading aloud (brief motivational anecdotes)
- Writing a paragraph on a proverbial expression/motivational idea.

Word Power/Vocabulary:

- Synonyms & Antonyms

Grammar in Context:

- Adverbs, Prepositions.

UNIT 2: PERSUASIVE COMMUNICATION

Listening and Speaking:

- Listening to famous speeches and poems
- Making short speeches- Formal: welcome speech and vote of thanks.
- Informal occasions- Farewell party, graduation speech

Reading and Writing:

- Writing opinion pieces (could be on travel, food, film / book reviews or on any contemporary topic)
- Reading poetry
- Reading aloud: (Intonation and Voice Modulation)
- Identifying and using figures of speech - simile, metaphor, personification etc.

Word Power/Vocabulary:

- Idioms & Phrases

Grammar in Context

- Conjunctions and Interjections.

UNIT 3: DIGITAL COMPETENCE

Listening and Speaking:

- Listening to Ted talks
- Making short presentations – Formal presentation with PPT, analytical presentation of graphs and reports of multiple kinds Interactions during and after the presentations

Reading and writing:

- Writing emails of complaint
- Reading aloud famous speeches

Word Power/Vocabulary:

- One Word Substitution

Grammar in Context:

- Sentence Patterns

UNIT 4: CREATIVITY AND IMAGINATION

Listening and Speaking

Participating in a meeting: face to face and online

Listening with courtesy and adding ideas and giving opinions during the meeting and making concluding remarks.

Reading and Writing

Reading visual texts – advertisements

Writing a Brochure

Word Power/Vocabulary:

Denotation and Connotation

Grammar in Context:

SentenceTypes.

UNIT 5: WORKPLACE COMMUNICATION & BASICS OF ACADEMIC WRITING

Listening and Speaking:

Informal interview for feature writing

Listening and responding to questions at a formal interview

Reading and Writing

Writing letters of application

Readers' Theatre (Script Reading)

Dramatizing everyday situations/social issues through skits. (Writing scripts and performing)

Word Power/Vocabulary:

Collocation

Grammar in Context:

Working With Clauses.

References:

English for Physical sciences, Tamilnadu state council for Higher Education(TANSCHE)

<https://www.collinsdictionary.com>

https://youtu.be/moJjKqkn_Xs

<https://www.theguardian.com/commentisfree/2020/sep/08/robot-wrote-this-article-gpt-3>

https://owl.purdue.edu/owl/general_writing/academic_writing/essay_writing/argumentative_essays

<https://youtu.be/5ctbvkAMQO4>

<https://www.wearable.com/fitness-trackers/how-your-fitness-tracker-works-1449>

<https://www.hfe.co.uk/blog/a-study-of-fitness-trackers-and-wearables/>

https://youtu.be/o_f7mp_tTqw

<https://www.youtube.com/watch?v=IOluK9ilyiw&feature=youtu.be>

<https://www.sciencehistory.org/historical-profile/antoine-laurent-lavoisier>

<https://youtu.be/AE0kuHKoitE>

<https://science.howstuffworks.com/math-concepts/fibonacci-nature.html>

<https://youtu.be/nt2OIMAJj6o>

<https://youtu.be/dpSK7BMWt74>

<https://www.everythingrf.com/community/what-is-electronic-warfare>

<https://www.youtube.com/watch?v=Rsa1zsOx5Mw>

<http://www.bhopal.com/>

<https://www.youtube.com/watch?v=4WZTzKu3CsY>

<https://www.youtube.com/watch?v=32vJxDUr-nE>

<https://www.youtube.com/watch?v=BLhwNhtYU5E>

<https://www.bbc.com/news/science-environment-55365434>

https://www.ted.com/talks/ray_kurzweil_get_ready_for_hybrid_thinking?referrer=playlist-talks_on_artificial_intelligen#t-146994

<https://futureoflife.org/2016/09/30/artificial-photosynthesis/>

<https://celebratepicturebooks.com/tag/writing-resources-for-kids/>

<http://guidetogrammar.org/grammar/marks/marks.htm>

<https://www.englishclub.com/writing/punctuation.htm>

https://www.grammarbook.com/english_rules.asp

Semester – II			
Environmental Studies			
Course Code : 21UAEV21	Hrs/ Week : 2	Hrs/Sem:30	Credits : 2

Course Outcomes:

Upon completion of this course, the students will be able to

- 1 Recognize the biotic and abiotic components of ecosystem and how they function.
- 2 Use natural resources more efficiently and know more sustainable ways of living.
3. Acquire an attitude of concern for the environment.
4. Participate in improvement and protection of environment.
5. Manage unpredictable disasters.
- 6 Create awareness about environmental issues to the public.

Unit I Environment and Ecosystem

Aim and need for Environmental Awareness - Components of Environment Ecosystem - Components of Ecosystem: Abiotic and biotic factors (Producer, Consumer and Decomposer) – Food Chain, Tropic Levels - Food Web, Energy flow and Ecological pyramids

Unit II Natural Resources:

Renewable and non-renewable resources – Water Resources: Uses and Conservation of Water – Rain Water Harvesting – Forest Resources: Importance of Forests - Major and Minor forest produces - Conservation of Forest Energy Resources: Solar Fossil Fuel – Wind – Role of individuals in the conservation of natural resources

Unit III Environmental Pollution

Pollutants – Types of pollution: Air, Water, Noise and Plastic Pollution – Causes, effects and Control measures – Global warming and Climate Change

Unit IV Human Population and Environment

Effect of human population on environment – Population Explosion problems related to population explosion – Involvement of population in conservation of environment – Measures adopted by the Government to control population growth – Environment and human health

Unit V Disaster Management

Floods–Drought–Earthquakes– Cyclones – Landslide–Tsunami–Control measures

SEMESTER- III			
Core – III		Java Programming	
Course Code: 21UCSC31	Hrs / week : 5	Hrs / Semester: 75	Credits : 4

Objectives:

- To understand the basic concepts and fundamentals of platform independent Object Oriented Language.
- To demonstrate skills in writing programs using exception handling techniques and Multithreading
- To understand streams and efficient user interface design techniques.
- To understand the concept Applets, AWT, RMI and Database.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	know the various operators , Class and Methods of Java	1	Re
CO-2	analyze the concept of Exception -Handling	2	An
CO-3	describe multi threading	4	Un
CO-4	discuss the Basics of Applet Concept	1	Re
CO-5	apply Event Handling Mechanisms	4	Ap
CO-6	implement AWT Controls	4	Ap
CO-7	design JDBC Package	4	Cr
CO-8	create an application using RMI	10	Cr

SEMESTER-III			
Core – III		Java Programming	
Course Code: 21UCSC31	Hrs / week :5	Hrs / Semester: 75	Credits :4

Unit I:

The History and Evolution of Java:

Creation of java - Operators – Control statements – Class , Methods , Inheritance

Packages and Interfaces:

Packages - Access Protection – Importing Packages- Interfaces.

Self Learning: Data Types, Variables and Arrays.

Unit II:

Exception Handling:

Exception-Handling Fundamentals-Exception Types-Uncaught Exceptions-Using try and catch- Multiple catch clauses-Nested try Statements-throw-throws-finally-Java’s Built-in Exceptions.

I/O Basics-Reading Console Input-Writing Console Output-The PrintWriter Class-Reading and Writing Files

Multithreaded Programming:

Java Thread Model-Main Thread-Creating a Thread-Creating Multiple Threads- Using is Alive() and join ()-Thread Priorities-Synchronization - Interthread Communication-Suspending, Resuming, and Stopping Threads.

Unit III:

The Applet Class: Applet Basics -Applet Architecture - Applet Skeleton - Simple Applet Display Methods - Requesting Repainting - HTML APPLETTAG tag - Passing Parameters to Applet. **Event Handling:**

Event Handling Mechanisms - Delegation Event Model - Event Classes(The Action Event, Item Event, Key Event , Mouse Event) - Sources of Events - Event Listener Interfaces(Action Listener ,Item Listener, Key Listener, Mouse Listener).

Introducing the AWT:

AWT Classes-Window fundamentals -working with Frame Windows -Working with Graphics.

Self Learning: Adapter Classes

Unit IV:

Using AWT Controls:

Controls Fundamentals -Labels-Using Buttons-Applying Check Boxes-Check Box Group-Choice Controls-Using a Text Field-Using a Textarea-Understanding Layout Managers-[Flow Layout Only]-Menu Bars and Menus.

Unit V:

RMI:

Remote Method Invocation – Text Formatting

JDBC:

JDBC – JDBC versus ODBC – Types of JDBC drivers – Connection – Statement – PreparedStatement.- Fields of ResultSet – Methods of ResultSet – Executing a query - ResultSetMetaData – DatabaseMetaData.

Self Learning: Basic data types in JDBC

Text Books:

1. Herbert Schildt. *The Complete Reference Java™*. New Delhi:Tata Mc Graw Hill. 8thEdition 2011. Chapters: 1, 9, 10, 11,21,22,23,24,29,30,31(Unit I,II,III,IV)
2. S. Horstmenn and Gary Cornell, *Core Java2 Volume II Advanced Features*. The Sun Microsystems press Java Series. 2002. Chapter: 4.(Unit V)

Books for Reference:

1. Steven Holzner.*Java 2 Programming Black Book*. New Delhi: Dream Tech Press.2005.
2. Joseph O'Neil.*JavaBeans Programming from the GroundUp*. New Delhi : TMGH. 1998
3. KathyWalrath.*The J2EE Tutorial*.New Delhi:Pearson. Education Asia 2003.

SEMESTER- III			
Core – IV		Computer Architecture	
Course Code:21UCSC32	Hrs / week : 5	Hrs / Semester: 75	Credits : 4

Objectives:

- To study basic computer organization.
- To understand the basic Arithmetic operations algorithms.
- To understand the memory organization.

Course Outcome:

CO No.	Upon completion of this course, students will be able To	PSO addressed	CL
CO-1	discuss the organization of basic computer	1	Un
CO-2	explain various types of instructions.	1	Un
CO-3	define interrupts.	9	Un
CO-4	explain general register organization and stack organization.	1	Un
CO-5	discuss various addressing modes.	1	Ap
CO-6	discuss various types of instructions depends on the operation performed and parallel processing.	9	Un
CO-7	explain algorithms for arithmetic operations of various number systems , input /output organization and DMA	2	An
CO-8	discuss memory hierarchy with different types of memories.	1	Un

SEMESTER- III			
Core – IV		Computer Architecture	
Course Code:21UCSC32	Hrs / week : 5	Hrs / Semester: 75	Credits : 4

Unit I:

Basic computer organization and design :

Instruction codes –computer registers –computer instructions –timing and control – instruction cycle-memory reference instructions-input/output and interrupt

Unit II:

Central processing Unit:

General register organization –stack organization-instruction formats –addressing modes- data transfer and manipulation-program control-Reduced Instruction Set Computer.

Pipe and Vector Processing: Parallel Processing – Pipelining.

Unit III:

Computer Arithmetic:

Addition and subtraction – multiplication algorithms-division algorithms-floating point arithmetic operations- Decimal Arithmetic unit- Decimal Arithmetic operations

Unit IV:

Input output organization:

Peripheral Devices –Input output interface – Asynchronous Data Transfer – modes of transfer – Priority Interrupt – direct memory access.

Unit V:

Memory organization:

Memory hierarchy –main memory –auxiliary memory-associative memory – cache memory – virtual memory

Text Book :

1. M. Morris Mano .*Computer System Architecture*. New Delhi:Pearson Education. Third Edition 2017 .
Unit I: Chapter 5.1-5.7
Unit II: Chapter 8.1-8.8, 9.1,9.2 Unit III : Chapter 10,1-10.7 Unit IV : Chapter 11.1 -11.6
Unit V: Chapter 12.1 -12.6

Books for Reference:

- 1.P.V.S. Rao .*Computer system Architecture* .New Delhi: PHI Learnings.Second Printing. 2011
2. John P.Hayes .*Computer Organization and Architecture*. India: Tata McGraw Hill. Third Edition 2002
- 3.John D. Carpinelli*Computer Systems Organization & Architecture*. India: Tata McGraw Hill. First edition 2002.

SEMESTER- III			
Core – Practical III		Java Programming Lab	
Course Code: 21UCSCR3	Hrs / week : 5	Hrs / Semester: 75	Credits : 3

1. Implement Overloading Constructor and Overloading Method
2. Writing a Program to apply method Overriding concept.
3. Development of Java Packages
4. To create and implement an interface.
5. To create a thread i. Using Thread class ii. Using runnable interface
6. To design a calculator arithmetic operations.
7. To create an applet with four Checkboxes with labels and a Text area object.
8. To create a window with a checkbox group with boxes for the colors, Violet, Indigo, Yellow, Orange, Red, Blue and Green. When the button is selected the background color must change accordingly.
9. To demonstrate the use of choice box.
10. To throw the following exception, i. Negative Array Size ii. Array Index out of bounds
11. To illustrate mouse event handling.
12. To create a File menu with options new, save, and close, edit menu with options cut, copy and paste.

SEMESTER- III			
Allied III		Data Structures	
Course Code: 21UCSA31	Hrs / week : 4	Hrs / Semester: 60	Credits : 3

Objectives:

- To understand the concepts of basic data structures such as stack, Queues and Linked list.
- To have general understanding of the network structures through graphs.
- To make the students understand the basic algorithms for searching and sorting.
- To represent real world problems using different data structures and solve them using best algorithms

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	analyze efficiency of algorithms	2	An
CO-2	compare various search methods	4	An
CO-3	choose the appropriate data structure needed to solve the problem.	4	Ap
CO-4	design stacks and queues	4	Cr
CO-5	discuss applications of stack and queue	8	Un
CO-6	create an expression tree for an expression and evaluate it.	3	Cr
CO-7	implement graph traversals	4	Ap
CO-8	compare and contrast sorting methods	4	An

SEMESTER- III			
Allied III	Data Structures		
Course Code: 21UCSA31	Hrs / week : 4	Hrs / Semester: 60	Credits : 3

Unit I:

Introduction: Pseudo code – The Abstract Data Type – A Model for an Abstract Data Type Algorithms Efficiency.

Searching: List Searches – Hashed List Searches – Collision Resolution

Unit II:

Linked Lists: Linear List Concepts – Linked List Concepts – Linked List Algorithms – Processing a Linked List – Complex Linked List Structures

Unit III:

Stacks and Queues: Basic Stack operations – Stack Linked List Implementation – Stack Applications – Queue operations – Queue Linked List Design

Unit IV:

Trees: Basic Tree Concepts – Binary Trees – Binary Tree Traversals – Application of Binary tree – General Trees – Binary search Trees – Insertion ,Deletion - Heap Definition-Heap Structure – Basic Heap Algorithms. – Heap Data Structures – Heap Algorithms

Unit V:

Sorting and Graphs: General sort concepts – Quick sort – External sorts. Graphs– Terminology – Operations –Graph storage structure- Graph Algorithms – Vertex and Arc insertion – Vertex and Arc deletion – Traversal – BFS and DFS – Networks – Minimum Spanning Tree – Shortest Path Algorithm.

Text Book:

1. RichardF.Gilberg&Behrouz A. Forouzan. *.Data Structures A Pseudo code Approach with C++*. Thomson Brooks /Cole. 4thReprint, 4thedition 2006.

Chapters 11,2.1,2.3,2.4,3.1- 3.,3.6, 4.1-4.3 ,5.1 ,5.2,7.1 -7.5 ,8.1,9.1 -9.5,11.1,11.4(Quick sort only),11.5 , 12.1 -12.5

Books for Reference:

1. Ellis Horowitz &SartajSahni.*Fundamentals of Data Structures*.GalGotia publications. 2006.
2. Adam Drozdek.*Data Structures & Algorithm in Java* .Ingram .third edition2008.
3. Alfred V.Aho,JohnE.Hopcroft,Jeffrey D Ullman *.Data Structures & Algorithms*. New Delhi : Pearson Education India. 1st edition2002.
4. SeymourLipschutz. *Data Structures*. New Delhi: McGraw Hill .Schaum's Outline Series .Revised First Edition 2014.

SEMESTER- III			
Allied-Practical III		Data Structures Lab	
Course Code: 21UCSAR3	Hrs / week : 3	Hrs / Semester: 45	Credits : 2

1. Searching (Sequential and Binary)
2. Implement linked list and perform the following operations
 - i. Add a node as first node ii. Add a node as last node iii. Add a node as middle node
3. Implement Linked list and perform the following operations.
 - i. Delete the first node ii. Delete the last node iii Delete the middle node
4. Implement a stack using Linked List and perform the push and pop operations.
5. Implement a queue using Circular list and perform enqueue and dequeue operations.
6. Implement binary tree using Linked and perform the following traversal.
 - i. Inorder Traversal ii. Preorder Traversal iii. Post order Traversal
7. Implement Graph using Adjacency matrix and perform the DFS & BFS Traversal
8. Merge sort.
9. Quick sort.

SEMESTER- III			
Core Skill Based		Microprocessors	
Course Code: 21UCSS31	Hrs / week : 4	Hrs / Semester: 60	Credits : 3

Objectives:

- To acquire fundamental knowledge on hardware and software concepts of microcomputer and microprocessors architecture and design.
- To provide assembly language programming Techniques.
- To understand the concepts of interrupts.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO Mapped	CL
CO-1	explain basic components and structure of microprocessor and microcomputers	1	Un
CO-2	describe 8085 microprocessor and memory interfacing.	1	Un
CO-3	explain the 8085 microprocessor programming model.	1	Un
CO-4	explain various categories of the 8085 microprocessor instruction set.	2	Un
CO-5	execute simple assembly language programs.	2	Ap
CO-6	explain various assembly language programming techniques.	2	Un
CO-7	develop assembly language programs.	2	Cr
CO-8	explain interrupts in 8085 microprocessor and high-performance processors.	1	Un

SEMESTER- III			
Core Skill Based		Microprocessors	
Course Code: 21UCSS31	Hrs / week : 4	Hrs / Semester: 60	Credits : 3

Unit I:

Microprocessor, Microcomputers, and Assembly Language:

Microprocessors-Microprocessor Instruction Set and Computer Languages-From Large Computers to Single Chip Micro Controllers.

Introduction to 8085 Assembly Language Programming:

The 8085 Programming Model-Instruction Classification – Instruction Format -How to Write, Assemble and Execute a Simple Program-Overview of the 8085 Instruction Set.

Unit II:

8085 Microprocessor Architecture And Memory Interfacing: The 8085 MPU- Memory Interfacing – Interfacing the 8155 memory section.

Introduction to 8085 Instructions:

Data transfer operations-Arithmetic Operations-Logic Operation – Branch Operations – Writing Assembly Language Programs-Debugging a Program- I/O interfacing

Unit III:

Programming Techniques With Additional Instructions:

Programming Techniques: Looping, Counting, and Indexing- Additional Data Transfer and 16bit Arithmetic Instruction- Arithmetic Operations Related to Memory-Logic Operations: Rotate, Compare-Dynamic Debugging.

Counters And Time Delays:

Counters and Time Delays-Hexadecimal Counter-Modulo ten Counter-Generating Pulse Waveforms-Debugging Counter and Time Delay Programs.

Unit IV:

Stacks And Subroutines:

Stack-Subroutine-Restart, Conditional Call and Return Instruction-Advanced Subroutine Concepts.

Code Conversion, BCD Arithmetic, And 16bit Data Operations:

BCD to Binary Conversion-Binary to BCD Conversion-BCD Addition and Subtraction-Multiplication-Subtraction with carry.

Unit V:

Interrupts : The 8085 Interrupts-Vectored Interrupts-Restart as Software Instruction.

16-bit processors High- End- High-performance processors: Intel 80386/80486, Intel Pentium, RISC.

self-learning: 8086 Microprocessor.

Text Book:

1. Ramesh Gaonkar. *Microprocessor Architecture. Programming, And Applications With The 8085*. Bangalore. Shree Hari publications .6th edition. 2020 .(chapters 1.1-1.3, 2.1-2.5, 4.1,4.3, 4.4, 5.1 - 5.4, 6.1-6.6, 7.1-7.6, 8.1-8.5 , 9.1-9.4 ,10.1, 10.2 , 10.5, 10.6,10.8,10.9, 12.1 , 12.2, 12.3 ,18.4)

Books for Reference:

1. P Mathur. *Introduction to Microprocessors*. India:Tata McGraw Hill. Third edition 2018.
2. Walter A.Triebel,AvtarSing.*The 8088 and 8086 microprocessors (programming, interfacing, software, hardware and Applications*. New Delhi:Pearson 2002 .
3. Kumar K. Udaya.*The 8085 Microprocessor* .India:Pearson Education. 1st Edition 2008.

SEMESTER –III			
Part –IV Non Major Elective - Introduction to Computers			
Course Code: 21UCSN31	Hrs/week: 2	Hrs/Sem. : 30	Credits: 2

Objectives

- Acquire knowledge on basic concepts, functions of computer system.
- Understand the various software and networking concepts.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO-1	know about generations of Computer	1	Un
CO-2	understand the various type of computers	1	Un
CO-3	practicing with the concept number system	5	Ap
CO-4	understand the input and output devices of computer and there uses	1	Un
CO-5	explain basic concepts of computer software and the various types of software	9	Un
CO-6	classify operating system software and their functions	9	Un
CO-7	outline the concepts of computer networking and the devices used in computer networking	4	Un
CO-8	discuss different type of computer networks	4	Ev

SEMESTER –III			
Part –IV Non Major Elective - Introduction To Computers			
Course Code: 21UCSN31	Hrs/week: 2	Hrs/Sem. : 30	Credits: 2

Unit I:

Introduction To Computers – Types Of Computers – Characteristics of Computers – Word Length – Speed – Storage – Accuracy – Automation – Diligence. –

Five Generations Of Modern Computers – Introduction – First Generation(1945-1956) – Second Generation Computers(1956-1963) Third Generation Computers(1964-1971) - Fourth Generation Computers(1971-Present) - Fifth Generation Computers(Present and Beyond) – Conclusion.

Unit II:

Classification Of Computer System – Introduction – Microcomputers– Personal Computers(PCs) – Workstations – Portable Computers – Minicomputers – Mainframes – Supercomputers – Network Computers. –

Number System – Introduction – Decimal Number System – Binary Number System – Binary-Decimal Conversion – Decimal-Binary Conversion – Binary Addition\Subtraction – Gray Code – Excess-3 Code – ASCII Code – Hard Disk – Floppy Disk.

Unit III:

Input Devices – Keyboard – Mouse – Scanners – Joystick – Trackball – Light pen – graphic tablet – Barcode reader – Pointing stick – Webcam – Touchpad – Stylus .

Output Devices – Monitor – Printer – Headphones – Sound Card – GPS – Inkjet printing – Cathode-ray tube – Plotter – Projector.

Unit IV:

Introduction To Computer Software – Introduction – Operating System – Compilers & Interpreters – Word Processors – Database Management System(DBMS) – Image Processors –

Operating System – Introduction – Functions of an Operating System – Classification Of Operating Systems – Introduction to UNIX , Windows NT, Mac OS , DOS , And Linux.

UNIT V:

Computer Networks – Introduction – Telecommunication Processors – Communication Processors -

Types of Networks - Telecommunication Software – Network Protocols – Network Architecture – Communication Media.

Text Books:

- 1.Peter Norton's. *Introduction to computers* .India: New Delhi: Tata McGraw-Hill. Edition 2004
- 2.Alexis Leon & Mathews Leon. *Introduction To Computers*. India: McGraw Hill Education Private Limited. Fifth Reprint, Edition 2008.

Books for Reference :

1. Dr.P.Velmani.,(Assistant Professor),M.C.A.,M.Phil.,Ph.D.*Computers Bascis to Advancements*.India: Chess Educational Publishers. First Edition.

SEMESTER-III	
Self Study I	E- Commerce
Course Code: 21UCSSS1 (Compulsory)	Credits: 2

Objectives:

- To understand and ascertain the importance E-Commerce
- Acquire knowledge about E-marketing and E-advertising
- To Identify the key security threats in the E-commerce environment.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	explain what is e-commerce	6	Un
CO-2	asses the scope, opportunities and challenges of e-commerce	4	An
CO-3	compare different business models of e-commerce	3	An
CO-4	differentiate e-marketing versus traditional marketing	4	Ap
CO-5	facilitate online marketing	10	Ap
CO-6	implement e-advertising	10	Cr
CO-7	explore the e-commerce legal framework	3	Cr
CO-8	devise security for e-commerce	3, 10	Cr

SEMESTER-III	
Self Study I	E- Commerce
Course Code: 21UCSSS1 (Compulsory)	Credits: 2

Unit -I

E – Commerce: Meaning, definition, features, functions of E-Commerce, Scope, Benefits and limitations of E-Commerce — E-commerce opportunities and challenges for Industries.

Unit –II

Business Models for E-commerce: The Birth of Portals – E-Business Models – Business-to Consumer (B2C) – Business-to-Business (B2B) – Consumer-to Consumer (C2C) – Consumer to-Business (C2B) – Brokerage Model – Value Chain Model – Advertising Model.

Unit –III

E-marketing – Traditional Marketing Vs. E-Marketing – Impact of E-commerce on markets – Marketing issues in E-Marketing – Online Marketing

Unit –IV

E-advertising – Internet Marketing Trends – E-Branding – Marketing Strategies.
E-Commerce Legal Framework – Rights and Obligations in the World of E-commerce

Unit –V

E-Security: Security for E-commerce – Security Design – Analysing risk – E-Banks and Security

Text book:

1. P.T. Joseph, SJ, *E-Commerce - An Indian Perspective*. New Delhi: PHI Publishing Co. Ltd. Third edition.

Books for Reference:

1. Kamlesh K. Bajaj and Debjani Nay. *E-Commerce - The Cutting Edge of Business*. New Delhi: Tata McGraw Hill Publishing Co. Ltd. 2000.
2. Turban, Efraim, and David King. *Electronic Commerce: A Managerial Perspective*. Delhi: Pearson Education Asia. 2010.
3. Smantha Shurety. *E-Business with Net. Commerce*. Singapore: Addison – Wesley.

Websites:

<https://forms.iimk.ac.in/libportal/ebook/EB8.pdf>

https://backup.pondiuni.edu.in/storage/dde/dde_ug_pg_books/E-%20Commerce.pdf

Semester – III			
Women’s Synergy			
Code : 21UAWS31	Hrs/ Week : 2	Hrs/Sem:30	Credits : 2

Unit I - Physical Health

Woman’s Structural Organisation – Levels of organisation – Body image - Reproductive health – Hormonal Cycle and its Psycho-somatic implications – Child birth – lactation – Nutritional status of women.

Unit II – Psychological Health

Examining factors determining psychological conditions of women – Depression, anxiety, stress, hysteria – Socio – cultural and familial conditioning of women’s minds – Self Image, Discrimination against women.

Unit III – Women and Legal Awareness

Women specific – centered legislations – legal issues – laws to prevent gender based violence National / State Pro-women schemes – educational and Employment schemes. Laws for protection of Women – Women’s rights to property – Women’s Rights in the Indian Constitution – Maternity benefit act.

Unit IV – Women and Finance

Manager of domestic finance – Budgeting basics – Create a family budget - Set financial goals – Plan for financial emergencies – Budget for travel – Saving strategies – Investment options

Unit V – Women’s Empowerment in Various Domain

Introduction - Women created history in sports and music – P. T. Usha, M. S. Subbulakshmi - Women who crossed hurdles in Social Service – Mother Theresa, Muthulakshmi Reddy, Medha Patkar - Role of Women in Indian independence movement and Politics – Indira Gandhi, Aruna Asaf Ali.

SEMESTER- IV			
Core – V		Programming With PHP and MySQL	
Course Code: 21UCSC41	Hrs / week :5	Hrs / Semester:75	Credits :4

Objectives:

- To understand the concepts of open sources.
- To learn and use open source database management system MySQL
- To create dynamic web pages and websites.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	explain what is PHP	2	Un
CO-2	compare the different operators available in PHP	4	An
CO-3	problem solving using Arrays	2	Ap
CO-4	create User defined functions	4	Cr
CO-5	explore Various controls used with web pages	7	Ap
CO-6	implement data validation	7	Ap
CO-7	demonstrate using MySQL database	5	Ap
CO-8	develop PHP program with database connectivity .	7	Cr

SEMESTER- IV			
Core – V		Programming With PHP and MySQL	
Course Code: 21UCSC41	Hrs / week :5	Hrs / Semester: 75	Credits :4

Unit I :

Introduction: Introduction- Getting PHP – Creating a PHP page Adding Comments to PHP code - Operators and flow control PHP math operators -PHP String operators The Bitwise operators PHP operator precedence - Using the if statement. PHP comparison operators PHP logical operators- conditional statements-if-switch-nesting conditions-merging forms with conditional statements- Using for loops-Using while loops - Using the foreach

Self Learning: OOPs Concepts in PHP.

Unit II:

Strings and Arrays , Creating Functions:

The String functions -converting to and from Strings - Formatting Text strings- Handling Array with Loops - The PHP array functions - Creating functions in PHP Passing functions some data - Passing arrays to functions Passing by references - using default arguments - Returning data from functions - PHP conditional functions

Self Learning: Creating sample applications using PHP.

Unit III:

Reading Data in Web pages Setting up web pages to communicate with PHP Handling Text fields Handling Text Areas Handling Check Boxes Handling Radio Buttons Handling List boxes Handling Password controls Handling hidden controls Handling Image Maps Handling file uploads Handling Buttons PHP browser handling Power Using PHP server variable Using HTTPs headers Performing data validation Client side data validation

Unit IV:

File Handling:

Opening files using fopen - looping over a files content with feof- reading text from a file using fgets - closing a file- reading character with fgetc- reading whole file with file_get_contents-reading a file into an array with file-checking if a file exists-fscanf-parse_ini_file- Getting file information with stat-fseek- copying files with copy- deleting files-writing to a file-reading and writing binary files –locking files

Unit V:

Some essential SQL Creating a MySQL database Creating a new table Accessing the database in PHP Updating database Deleting Records Creating New tables Creating a New Database

Self Learning: PHP - AJAX

Text Books:

1. Steven Holzner. *The Complete referencePHP*. New Delhi :Tata McGraw Hill. 2008

Books for Reference:

1. Tim Converse, Joyce Park and Clark Morgan. *”PHP 5 and MySQL”*. New Delhi: Wiley India. reprint 2008.
2. Robert Sheldon, Geoff Moes. *”Beginning MySQL”*. New Delhi: Wrox. 2005.
3. Vikram Vaswani. *“PHP and MySQL”*. New Delhi: Tata McGraw-Hill. 2005
4. Ben Forta. *”MySQL Crash course “*. Chennai: SAMS. 2006

SEMESTER- IV			
Core – VI		RDBMS	
Course Code: 21UCSC42	Hrs / week :5	Hrs / Semester: 75	Credits :4

Objectives:

- To efficiently organize data and effectively retrieve data
- To Apply E-R diagrams and normalization procedures to avoid redundancy in storing data
- To familiarize issues of concurrency control and transaction management.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand database concepts and database management system software	5	Un
CO-2	apply Formal Relational Query Languages	5	Ap
CO-3	demonstrate an application's data requirements using conceptual modeling tools like ER diagrams and Database Design	5	An
CO-4	implement normalization techniques	6	Ap
CO-5	compare the various storage media and Implement the file structures	6	Ap
CO-6	apply transaction and concurrency control	6	Ap
CO-7	implement Database System Architectures	10	Ap
CO-8	design databases for different databases	10	Cr

SEMESTER- IV			
Core – VI		RDBMS	
Course Code: 21UCSC42	Hrs / week :5	Hrs / Semester: 75	Credits :4

Unit I:

Introduction:

Database System Applications-Purpose of Database Systems-View of Data-Database Languages-Relational Databases-Database Design-Data Storage and Querying-Transaction Management-Database Architecture-Data Mining and Information Retrieval-Specialty Databases-Database Users and Administrations-History of database Systems

Introduction to Relational Model:

Structure of Relational Databases-Database Schema-Keys-Schema Diagrams-Relational Query Language Formal Relational Query Language-Relational Operations

Unit II:

Formal Relational Query Languages:

The Relational Algebra-The Tuple Relational Calculus-The Domain Relational Calculus

Database Design And The E-R Model:

Overview of the Design process-The entity Relationship Model-Constraints-Removing Redundant Attributes-Entity Sets-Entity Relationship Diagrams-Reduction to Relational Schemas-Entity Relationship Issues-Extended E-R Features-Alternative Notations for Modelingdata-Other Aspects of Database Design

Unit III:

Relational Database Design:

Features of Good Relational-Designs-Atomic Domains and First Normal Form-Decomposition using Functional dependencies-Functional-Dependency Theory-Algorithms for Decomposition-Decomposition Using Multivalued Dependencies-More Normal Forms-Database Design Process-Modelling Temporal Data

Storage and File Structure:

Overview of Physical Storage Media-Magnetic Disk and Flash Storage-RAID-Tertiary Storage-File Organization-Organization of Records in Files-Data Dictionary Storage-Database Buffer

Unit IV:

Transactions:

Transaction Concept-A Simple Transaction Model-Storage Structure-Transaction Atomicity and Durability-Transaction Isolation-Serializability Concurrency Control:

Lock base Protocols-Deadlocks Handling-Multiple Granularity-Timestamp Based protocols- Validation Based Protocols-Multiversion Schemas-Shapshot Isolation

Unit-V:**Database System Architectures:**

Centralized and Client-Server Architectures-Server System Architecture-Parallel Systems-Distributed Systems

Distributed Databases:

Homogeneous and Heterogeneous databases-Distributed Data Storage-Distributed Transactions

Text Books:

1. Abraham Silberschatz Henry F.KorthS.Sudharshan.*Database System Concepts*.NewYork:Tata McGraw Hill.Sixth Edition 2011.
2. Ramez ElmasriShamkant B. Navatha.*Fundamentals of database System*.India :PearsonEducation.Sixth Edition 2011.

Books for Reference:

1. C.J.DataA.KannanS.Swamynathan.*An Introduction to Database*.India:PearsonEducation.Eighth Edition 2006.
2. Raghu Ramakrishna.*Database Management System*.India:McGraw Hill College Publication.Fourth Edition 2015.
3. G.K. Gupta.*Database Management System*.NewDelhi:Tata Mc Graw HillEducationPrivate Limited.2011.

SEMESTER IV			
Core – Practical IV		PHP& MySQL Lab	
Course Code: 21UCSCR4	Hrs / week :5	Hrs / Semester: 75	Credits :3

1. Creating a simple webpage using PHP.
2. Write programs using conditional-looping statements in PHP.
3. Use of looping statements in PHP
4. Creating programs using arrays.
5. Creating user defined functions.
6. File manipulation using PHP.
7. Creating a simple table with constraints.
8. Insertion, Updation and Deletion of rows in MYSQL tables.
9. Searching for data by different criteria.
10. Sorting of data.
11. Demonstration of joining tables.
12. Usage of subqueries.
13. Validating Input.

SEMESTER- IV			
Allied – IV		Resource Management Techniques	
Course Code: 21UCSA41	Hrs / week :4	Hrs / Semester: 60	Credits :3

Objectives

- To enable the students to utilize the resources and optimize the result or output.
- To provide knowledge about project scheduling, inventory models and sequencing.
- To give an overall idea about the various Optimization techniques and their usages.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	define operation research	4	Re
CO-2	formulate optimization problems	4	Cr
CO-3	identify the best technique to solve a game	3	An
CO-4	estimate the replacement age of a machine	6	Ap
CO-5	describe the functions and costs of an inventory	3	Un
CO-6	draw the network diagram and estimate completion time for a project	3	Cr
CO-7	describe project scheduling	3	Un
CO-8	implement various disciplines of queue	3	Ap

SEMESTER- IV			
Allied – IV		Resource Management Techniques	
Course Code: 21UCSA41	Hrs / week :4	Hrs / Semester: 60	Credits :3

Unit I:

Operation Research: Definition of operations research – Features of operations research – Phases of operations research — Advantages , Features and Applications of Operation Research

Linear Programming: General structure of an LP problem – Advantages –Disadvantages – Application of LP Problem –Graphical solution methods of LP problem
– canonical and standard form of LP problem – Simplex algorithm (Maximization case)

Unit II:

Game Theory : Definition – Two person zero sum games – Pure strategies (Minimax and Maximin Principles) : Games with saddle point – Mixed Strategies : Game without saddle point – Rules of dominance –Solution methods games without saddle point (Algebraic method , Arithmetic method , Matrix method , Graphical method)

Replacement Problem :Replacement of items that deteriorates with time : Model I - Model II except general cost function

Self Learning: Replacement of items that completely fail

Unit III:

Inventory models : Meaning of Inventory control – Reasons for carrying inventory – Factors involved in inventory problem analysis – Inventory cost components – classification of EOQ models – Single item inventory control models without shortages : EOQ model with constant rate of demand - Single item inventory control models with shortages : EOQ model with constant demand and variable order cycle time , EOQ model with constant demand and fixed reorder cycle time – Probabilistic Models: Single period EOQ model for uncertain demand(Newsboy problem)

Unit IV:

Project scheduling: What is PERT and CPM ? – Phases of project management – Network components and precedence relationships – Activity on node network – Rules for AOA network construction – Critical path analysis - Forward pass method – Backward pass method – Float(Slack) of an activity and event – Critical path – PERT calculations – Estimation of project completion time.

Unit V:

Queuing theory : **Structure of a queuing system**-Characteristics of queuing models – Queue Discipline – Service Process – Performance Measures of a queuing system – Probability distribution in queuing systems – classification of queuing models – solution of queuing Model I $\{(M/M/1) (\infty / FCFS)\}$

Text Books:

- 1.P.K.Gupta.*Operation Research*. New Delhi: S.Chand& Company. 2010
- 2.J.K.Sharma. *Operations Research*. New Delhi :MacmillanPublishers.Fourth Reprint, fourth Edition2009.

Books for Reference:

1. Hamdy A. Taha. *Operations Research*. New Delhi: Prentice Hall. 7th Edition 2002.
2. D.S Hira Gupta *Operations Research*.New Delhi: Sultan Chand2015.

3. KantiSwarup, P. K. Gupta , Man Mohan. *Operations Research*. New Delhi:SultanChand&Sons 2010.

SEMESTER- IV			
Allied - Practical– IV		Web designing Lab	
Course Code: 21UCSAR4	Hrs / week :3	Hrs / Semester: 45	Credits :2

HTML

1. Web Page with Headings and Formatting Tags
2. Web Page with Ordered and Unordered Lists
3. Demonstrate Tables
4. Demonstrate Forms
5. Demonstrate Frames

CSS

6. CSS Background and Text Styles
7. CSS Id and Class

Java Script

8. Loops
9. Functions
10. Form Validation

SEMESTER IV			
Core Skill Based		Web Technology	
Course Code: 21UCSS41	Hrs / week :4	Hrs / Semester: 60	Credits :4

Objectives:

- Understand the principles of creating an effective web page.
- Learn the language of the web: HTML and CSS.
- Develop basic programming skills using JavaScript.
- Be able to embed social media content into web pages.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	discuss the basics of HTML:	5	Un
CO-2	design web pages using HTML	2	Cr
CO-3	explain Cascading Style Sheets:	7	Un
CO-4	develop web pages with CSS	2	Cr
CO-5	describe JavaScript	6	Un
CO-6	acquire skill to implement JavaScript Programming within web pages	10	Ap
CO-7	describe JavaScript DOM	7	Cr
CO-8	embed social media content into web pages. develop dynamic web pages using JavaScript (client side programming)	7	Cr

SEMESTER IV			
Core Skill Based		Web Technology	
Course Code: 21UCSS41	Hrs / week :4	Hrs / Semester: 60	Credits :3

Unit-I

Introduction to HTML: HTML Tags - Structure of an HTML Program - Text Formatting- Emphasizing material - Text-Styles

Unit-II

HTML: Tables – Linking documents – Frames – Form and its elements.

Self Learning: Working with Fonts

Unit-III

Introduction to Cascading Style Sheets: CSS Basics-Style Inclusion Methods – CSS Strings and Keywords – CSS Selectors – Miscellaneous CSS Constructs.

Self Learning: Filters

Unit-IV

JavaScript: Introduction to JavaScript – JavaScript in web pages–writing JavaScript with HTML – Basic programming techniques – operators and expressions – conditional checking – loops – functions – user defined functions – dialog boxes.

Self Learning: Generate Random Numbers- Sort Words in Alphabetical Order

Unit-V

JavaScript: JavaScript DOM: Understanding objects in HTML – browser objects – web page object hierarchy – Handling events – The form object – Built-in objects - JSON

Self Learning:

- i. Remove a Property From an Object
- ii. Real Life Objects, Properties, and Methods- https://www.w3schools.com/js/js_objects.asp

Text Books:

1. Wendy G.Lehnert, *Internet 101 - a beginners guide to the internet and the world wide web*. New Delhi: Addition Wesley. 1999.Unit 1- Chapter 2, Chapter 3
Unit 2- Chapter 5, Chapter 6, Chapter 7, Chapter 10
2. Powell and Thomas, *HTML & CSS: The Complete Reference* . New Delhi: McGraw Hill 2010.
Unit 3- Chapter 4 (Sec.4.1.1)
3. Ivan N. Bayross. *Web enabled Commercial Application Development using HTML, JavaScript, DHTML and PHP*. New Delhi: BPB Publications. 4th Revised Edition2010.
Unit 4- Chapter 8Unit 5- Chapter 9, Chapter 10, Chapter 11

Books for Reference:

1. Chuck Musciano& Bill Kennedy *.HTML - The Definitive Guide*. Calcutta : Shroff Publishers &
2. Distributors Pvt. Ltd. 1999.
3. Raj Kamal. *Internet and Web Technologies*. New Delhi: TMH 2017.
Jon Duckett. *Beginning Web Programming*. WROX.

SEMESTER-IV			
Part IV Non Major Elective		Introduction To Internet	
Course Code:21UCSN41	Hrs/week:2	Hrs/sem:30	Credits: 2

Objectives:

- Introduction about internet and applications.
- Awareness on Social Networks.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO-1	outline the History of Internet	1	Un
CO-2	know about basics of internet	8	Un
CO-3	develop Web pages and understand the www concept	8	Cr
CO-4	understand about E-mail and how it works	8	Un
CO-5	compare different types of browser and its tools	8	Ev
CO-6	explain Blogging and it's functions	9	Ev
CO-7	describe Electronic Publishing and applications	1	Un
CO-8	explain Social Networking and awareness on Social Networking	9	Ev

SEMESTER-IV			
Part IV Non Major Elective		Introduction To Internet	
Course Code: 21UCSN41	Hrs/week:2	Hrs/sem:30	Credits: 2

Unit I:

Introduction to Internet –A brief History of Internet – How does Internet Work – What is special about the Internet . **How Internet works** – Introduction – People and Organizations – Hardware .

Unit II:

Introduction- Dial-up Connection- Dedicated Lines- ISDN-DSL-Cable Modem-Satellite Internet- Cellular broadband-Wireless Broadband- Wired and Wireless Broadband Internet Access-Choosing the best Internet Connection.

Unit III:

World Wide Web – Introduction-Internet and Web- How the Web Works- A Brief History of WWW. **Web Browsers and Web Browsing** – Types of Browser – Web Browsing.

Unit IV:

Websites and Web pages - Introduction-Web Design-Creating a website-Web Hosting-Website Promotion-**Blogging**-Introduction-What is a Blog-Why Blog-History of Blogs-State of the Blogosphere-Why is Blogging so popular-Blog Search Engines and Communities-Authors, Books and Blogs-Blogs and Employment-Pitfalls to avoid while Blogging-Is Blogging Good or Bad.

Unit V:

Electronic Publishing - Introduction- Electronic Publishing(E-Publishing) - E-book Readers-Economics of E-Publishing-Application of E-publishing- E-publishing--Advantages and Disadvantages.

Social Networking-Introduction-Social Networking Timeline-Why Social Networking-Dangers of Social Networking-Getting Connection.

Text Book:

1. Alexis Leon & Mathews Leon. *Internet for Everyone*. India: Leon Press.15th Anniversary Edition.

Books for Reference:

- 1.*Computer Literacy*, Department of Foundation Courses in collaboration with School of Computing Sciences
- 2.Vikas Gupta. *Internet and Web design*, India: Rematch Press I. Edition 2003.
- 3.Rajeev Gupta B.Tech. *Internet Guide*, India: Copyright reserved Nipun Publications. First Edition November 2000.

SEMESTER –IV	
Self Study Course II	Cyber Security
Course Code: 21UCSSS2 (Optional)	Credits: 2

Objectives:

- To understand the basic concepts of Cyber Ethics, Virtues and Values
- To design and develop a security architecture for society.
- To learn about how to maintain the Confidentiality, Integrity and Availability of a data

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the basic concepts of Cyber Ethics, Virtues and Values	3	Un
CO-2	identify how security issues in cyberspace raise ethical concerns	3	Un
CO-3	adapting Artificial Intelligence Ethics	3	Cr
CO-4	acquire the knowledge of Cyber laws, regulations in information Society	6	Un
CO-5	identify and explore the different types of Cyber Crimes	10	Un
CO-6	appraise the Cyber offences	4	Ev
CO-7	state and defend a position on the regulation of cyberspace	3	Ev
CO-8	assess Cyber Bullying and digital literacy for protecting children from bullying.	4	Ap

SEMESTER –IV	
Self Study Course II	Cyber Security
Course Code: 21UCSSS2 (Optional)	Credits: 2

Unit-I:

Cyber Ethics: Ethics in Cyber Society: Core Values and Virtues: Definitions, Specificities of Cyberspace, Dimensions of Cyber Ethics in Cyber Society, Core Values and Virtues, Cyber Ethics by norms, Laws and Relations.

Unit-II:

Artificial Intelligence Ethics: “AI for Good”. Cyber Ethics as Business Ethics. Cyber Law and Cyber Ethics: Importance of Cyber Law, The Significance of Cyber Ethics, and Cyber Crime is Unethical and Illegal, The need for Cyber Regulation.

Unit-III:

Ethics in the Information Society, Technologies Need Standards, Rules and Regulations, Technology Ethics, Legal Ethics, the Nine P’s of Ethics in Information Society.

Unit-IV:

Cyber Crime: Cybercrime offences, Computer Related Offences, Content Related offences, Government Efforts in Cyber security, Cyber security in the Academic world. Critical Thinking of Citizens: Ethics in Digital Age, Acting Responsibly in the Digital World, Three Dilemmas: Ethical Intelligence in Practice.

Unit-V:

Cyber Bullying: Introduction – Cyber Bullying, Peoples in Cyber Bullying, Signs of Cyber Bullying, Suicidal Tendencies, Role of Children and Duty of parents, Limiting Access of Technology, Child Bullying. Child Protection Online: Prevention through Education for Digital Literacy and Safety.

Text Book:

1. ChristophStuckelberger, PavanDuggal. *Cyber Ethics 4.0, Serving Humanity with Values.* Globethics.net Global series no 17, 2018.

Books for Reference:

1. Diane Bailey. *Cyber Citizenship and Cyber Safety: Cyber Ethics.* USA: The Rosen Publishing group 2008.
2. Kizza, Joseph Migga, *Ethical and Social Issues in the Information Age*, 5th edition, Springer, 2015.
3. Bynum, Terrel Ward & Rogerson, Simon, eds: *Computer Ethics & Professional Responsibility: Introductory Text & Readings.* Blackwell 2004.

SEMESTER- IV			
Ability Enhancement Course: Yoga and Meditation			
Code: 21UAYM41	Hrs/Week : 2	Hrs/Semester : 30	Credits: 2

Course Outcome:

- To learn and practice various meditation, yoga methods to transform the ordinary life into a healthy, harmonious life leading to holistic wellbeing,
- To create an eco-friendly, loving and compassionate world.
- Acquire knowledge and skill in yoga for youth empowerment.
- Increase their power of concentration
- Learn the causes and ways to overcome fear and sadness.
- Create a ecofriendly, loving and compassionate world.

Unit I: Meditation

(6 Hrs)

Meditation – Purposes of meditation– Major types of meditations: Zazen, Mindfulness, Vipasana, Yoga, Self-inquiry, Listening, Qi Gong, Taoist, Tantra– Health benefits of meditation: physical, psychological, spiritual–Meditation and Silence:Silence of the body, mind, heart,and beyond – General methodology of meditation – Tips for better meditation

Exercises: Practicing Zazen meditation – Self-enquiry meditation exercises

Unit II: Self-Awareness

(6 Hrs)

Awareness – Self-awareness – Importance of self-awareness – Shades of self-awareness – Difference between Awareness and Concentration – Power of concentration – Levels of concentration – How to increase concentration? – Beauty of living here and now – Ways to develop your presence – Self-awareness and Ecology: interconnectedness

Exercises: Body Scan exercise – Self-Witnessing exercise – Eating Raisin with full awareness

Unit III: Yoga

(6 Hrs)

Meaning and importance of yoga – Yoga and human physical system – Principles of Yoga – Different types of yoga – Yoga and balanced diet – Yoga and energy balance – Pranayama – Surya namaskaram– Basic asanas for healthy life – Therapeutic benefits of simple yogasanas – Naturopathy for common ailments.

Exercises:Practicing basic Asanas – Doing Sun Salutation

Unit IV: Mindfulness

(6 Hrs)

Definition of mindfulness – Three components of mindfulness– Benefits of mindfulness – Mindfulness and Brainwave patterns – Myths about mindfulness – Scientific Facts about mindfulness – Formal method to practice mindfulness – Qualities of Mindfulness – Obstacles for mindfulness – informal ways of practicing mindfulness – Mindfulness to get rid of addictions

Exercises: Practice Mindful Walking –Practice Mindful Talking

Unit V: Heartfulness

(6 Hrs)

Attitude to life – Power of positive attitude – Techniques to develop positive attitude – Positive vs negative people – Forms of negative attitude – Heartfulness – Managing fear: Basic 5 fears, Ways to overcome fear–Handling anger: Anger styles, Tips to tame anger – Coping with sadness: Causes and ways to overcome sadness, dealing with depression – Ultimacy of compassion: Compassion to oneself, towards others: Forgiveness, to nature: Seeing God in all

Exercises: Practice Loving-Kindness meditation– Doing compassionate actions

Text Book:

- 1) Thamburaj Francis. *Meditation and Yoga for Holistic Wellbeing*. Trichy:Grace Publication. 2019.

Books References:

- 1) Osho. *Meditation the Only Way*. New Delhi: Full Circle Publication, 2009.
- 2) Thamburaj Francis. *Journey from Excellence to Godliness: Zen Meditation for Transformation*. Grace Publication, Trichy, 2017.
- 3) Osho. *Awareness: The Key to Living in Balance*. New York: St.Martin’s Griffin Publication, 2001.
- 4) Tolle Eckart. *The Power of Now: A Guide to Spiritual enlightenment*. New World Library, 2004.
- 5) Swami Gnaneswarananda. *Yoga for Beginners*. Calcutta: Sri Ramakrishna Math, 2010.
- 6) HanhThichNhat. *The Miracle of Mindfulness: An Introduction to the Practice of Meditation*. Beacon Press, 2016.
- 7) Kamlesh D. Patel and Joshua Pollock. *The Heartfulness Way: Heart-Based Meditations for Spiritual Transformation*. Westland Publications, 2018.

Semester -V			
Common Core		Computer Oriented Numerical Methods	
Course Code: 21UCMC51	Hrs/Week: 6	Hrs/Sem: 90	Credits : 5

Objectives:

- To understand different methods of solution of the equations and compare them.
- To understand and apply different methods to find the value of definite integrals.
- To Understand the MATLAB environment.
- To introduce students to the use of a high-level programming language, MATLAB.
- Being able to do simple calculations using MATLAB

Course Outcome:

CO. No.	Upon completion of this course, students will be able to	PSO Addressed	CL
CO-1	find numerical solution of a problem in all aspects and apply these methods to practical implementation as reliable and efficient.	3	Re
CO-2	recognize and apply appropriate principles and concepts relevant to Numerical Analysis.	3	Ap
CO-3	discover the most appropriate estimate for the missing data.	3	Cr
CO-4	analyze the errors obtained in the numerical solutions of problems.	3	An
CO-5	use appropriate numerical methods, determine the solutions to given problems.	3	Ap
CO-6	demonstrate the method of interpolation and find the solution for the data.	3	Un
CO-7	develop their calculation skills.	3	Cr
CO-8	differentiate Gauss Jacobi iteration and Gauss Seidal Iteration method.	3	An

Semester -V			
Common Core	Computer Oriented Numerical Methods		
Course Code: 21UCMC51	Hrs/Week: 6	Hrs/Sem: 90	Credits : 5

Unit I:

Difference operators-Other difference operators-Newton's interpolation formula-Lagrange's interpolation formulae-Divided difference-Divided difference formula-Inverse interpolation. (Textbook: 1, Chapter 3, Sec 3.1, 3.2, Chapter 4, Sec 4.1,4.3,4.4,4.5,4.6, pages 3.1 – 3.45, 4.1- 4.16, 4.31- 4.54)

Unit II:

Derivatives using Newton's forward difference formula-Derivatives using Newton's backward difference formula-Derivatives using Newton's central difference formula-Maxima and minima of the interpolating Polynomial-Numerical Integration-Newton – Cote's quadrature formula- Trapezoidal Rule-Simpson's one third rule-Simpson's three eighth rule-Wedley's rule. (Textbook: 1, Chapter 5, Sec 5.1 – 5.4, Chapter 6, Sec 6.1 – 6.4, pages 5.1 – 5. 24, 6.1 – 6.26)

Unit III:

Taylor series method-Picard's method- Runge-Kutta method. (Textbook: 1, Chapter 7, Sec 7.1,7.2,7.4, pages 7.1-7.15, 7.25-7.40)

Unit IV:

Introduction to MATLAB: MATLAB environment – Types of files _ platform – search path – Constants, variables and expressions – Vectors and Matrices – Polynomials – Input Output statements – MATLAB Graphics.

Self Learning: Create MATLAB program i.Create a menu ii. copy the data from one file to another file.

Unit V:

Control Structures- writing programs and functions – ordinary differential equation and symbolic mathematics.

Self Learning: Taylor Series - <https://tutorial.math.lamar.edu/classes/calci/taylorseries.aspx>

Text Books:

1. Arumugam S and Thangapandi Isaac A, *Numerical Analysis with Programming in C*.Palayamkottai: New Gamma Publishing House 2006.
2. Raj Kumar Bansal, Ashok Kumar Goel, Manoj Kumar Sharma, *MATLAB and its Applications in engineering*,India:Pearsons Publications 2009.Chapters:1-9)

Books for Reference:

1. Stormy Attaway, *MATLAB- A Practical Introduction to Programming and Problem Solving*: Bostan University: 5th Edition 2018
2. Stephen J. Chapman, *Essentials of MATLAB Programming*.United States of America: Thomson Learning. 2nd Edition 2007

SEMESTER- V			
Core VIII		Python Programming	
Course Code:21UCSC51	Hrs / week :4	Hrs / Semester: 60	Credits :4

Objectives

- To understand about python
- To learn about various objects list, tuples and dictionaries
- To obtain knowledge about pattern matching
- To use recursion to solve problems
- To understand files and use them for reading and writing.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	explain what is python and how to execute python programs	2	Un
CO-2	distinguish various python objects	1	An
CO-3	apply decision and repetition structures in program design.	2	An
CO-4	demonstrate the use of Python lists and dictionaries	1	Ap
CO-5	demonstrate how to read and write files Programs in Python	2	Ap
CO-6	develop Python programs using files.	5	Cr
CO-7	identify when to apply recursive techniques	4	Ap
CO-8	write python programs to solve problems	10	Cr

SEMESTER- V			
Core VIII		Python Programming	
Course Code: 21UCSC51	Hrs / week :4	Hrs / Semester: 60	Credits :4

Unit I: Fundamentals of Python.

IDLE - Relational operators - Logical operators - bitwise operators – Variables- Assignment statements – Keywords - Script mode.

Functions : Built in functions - Function definition and call – Importing user defined module – Assert statement – Command line arguments.

Unit II: Control and Iteration structure.

If statement – If else - Chained conditional - For loops -While loops break continue Pass - scope of objects - Object ID local. Global variable – namespaces- scope Scoop- LEGB rule.

Unit III: Strings and Recursion

Strings – slicing – membership functions – built in functions on strings – string processing – pattern matching

Recursion – recursive solution to problems on numeric data – recursive solution to problems on strings - recursive solution to problems on list

Self study : Towers of Hanoi problem

Unit IV: Mutable and immutable objects

Lists - Operators, Built-in Functions, List comprehension - list as argument copying list objects-sets- set functions- Tuples, Tuple Operators and Built-in Functions on Tuples. Dictionary – dictionary operations – functions on dictionary.

Self study: Implement data structures stacks and Queues using python

Unit V: Files and Exceptions

File Objects, File Built-in Function, File Built-in Methods, reading and writing files - Exceptions – handling exceptions – using Try Except – File processing

Text Book:

1. Sheetal Taneja and Naveen Kumar. *Python Programming: A modular approach*. Noida: Pearson education India, First Edition, 2017

Books for Reference:

1. Chun, J Wesley, *Core Python Programming*, Noida: Pearson education India, 2nd Edition 2007 Reprint 2010.
2. Barry, Paul, *Head First Python*. Kolkatta: Shroff Publishers & Distributions pvt. Ltd. O' Reilly. 2nd Edition, 2010
3. Lutz, Mark. *Learning Python*. Kolkatta: Shroff Publishers & Distributions pvt. Ltd. O Reilly, 4th Edition, , 2009.

Websites:

1. <https://www.learnpython.org>
2. <https://www.python.org>

SEMESTER- V			
Core – IX		Operating Systems	
Course Code: 21UCSC52	Hrs / week :4	Hrs / Semester: 60	Credits :4

Objectives:

- To acquire the fundamental knowledge of the operating system architecture and components and to know the various operations performed by the operating system.
- Understand the basic working process of an operating system.
- Understand the importance of process and scheduling.
- Understand the issues in synchronization and memory management.
- Know about open source operating system Linux

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	define Operating System Structure and the various operations, process of operating system	1	Re
CO-2	analyze the Various Scheduling Algorithms of Process Management	4	An
CO-3	explain the concept of Deadlock.	4	Re
CO-4	implement the various allocation methods of MemoryManagement	5	Ap
CO-5	access Methods and File allocation Methods	5	Re
CO-6	compare the scheduling algorithms of disk	8	An
CO-7	discuss about open source software	9	Un
CO-8	compare Linux with other operating systems	6	An

SEMESTER- V			
Core – IX		Operating Systems	
Course Code: 21UCSC52	Hrs / week :4	Hrs / Semester: 60	Credits :4

Unit I:

Introduction and System Structures: Operating system definition, computer system organization, and architecture, structure and operations, process, memory and storage management.

Unit II:

Process Management: Process concepts, scheduling and operations on processes. Process Scheduling: Basic concepts, scheduling criteria, scheduling algorithms, Synchronization: Background, critical section problems, Peterson’s Solution, Synchronization Hardware, Classic problem of synchronization.

Self Learning : Multithreaded Programming

Unit III:

Deadlock: Deadlock: System model, deadlock characterization, methods for handling deadlock, deadlock prevention, avoidance and detection, Recovery from deadlock.

Memory Management: Memory Management Strategies: Background, swapping, Memory allocation, Paging, Structure of the page table.

Self Learning: Virtual Memory Management

Unit IV:

File system: File system: File concept, Access methods, File system structure, allocation methods and free-space management. Disk structure, disk scheduling algorithms and management RAID structure.

Unit V:

Open Source

Introduction to Linux: What is Linux? – A Brief History of Linux – System features – Differences between Linux and other Operating Systems .

Some Basic Linux Commands: Directory oriented commands, file oriented commands, Process oriented commands, General Purpose Commands.

Text Books:

1.A. Silberschatz, P.B. Galvin and G. Gagne.*Operating System Concepts*. New Delhi: Wiley IndiaPrivateLtd.. 8th Edition 2011.

2.Grant Taylor,*Linux complete*, New Delhi: John Wiley & Sons; 2nd edition,2002 (Chapter 1).

Books for Reference:

1. Stalling William, *Operating Systems: Internals and Design Principle*. New Delhi : PrenticeHall India.7th Edition 2011.

2. Dietel, *Operating Systems*. New Delhi :Pearson Education.3rdEdition 2007.

3. A.S. Tanenbaum. *Modern Operating Systems*. New Delhi : Prentice Hall India. 3rd Edition 2007

Websites:

1.<http://cc.iiti.ac.in/docs/linuxcommands.pdf>

2.<https://www.usm.uni-3>.

3.[muenchen.de/people/puls/lessons/intro_general/Linux/Linux_for_beginners.pdf](https://www.usm.uni-muenchen.de/people/puls/lessons/intro_general/Linux/Linux_for_beginners.pdf)

SEMESTER- V			
Core – Elective I		Data Mining	
Course Code: 21UCSE51	Hrs / week : 4	Hrs / Semester: 60	Credits :4

Objectives:

- To understand the basic techniques of data Mining
- To introduce research applications of data mining
- To develop skills of web data mining

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	define data mining process and the various data mining techniques	4	Re
CO-2	apply market basket analysis	4	Ap
CO-3	compare different classification methods	7	An
CO-4	implement cluster analysis	7	Ap
CO-5	describe various search engines	10	Un
CO-6	create an ODS	7	Cr
CO-7	discuss about data warehousing	6	Re
CO-8	compare and contrast OLAP AND OLTP	10	An

SEMESTER- V			
Core – Elective I		Data Mining	
Course Code: 21UCSE51	Hrs / week :4	Hrs / Semester: 60	Credits :4

Unit I:

Introduction: What is Data Mining?-Why Data Mining now!-The Data Mining Process-Data Mining Applications-Data Mining Techniques.

Association Rules: Introduction-basics-The Task and a Naïve Algorithm-The Apriori Algorithm-Improve the efficiency of the Apriori Algorithm.

Self Learning :Case Study 1 and 2

Unit II:

Classification: Introduction-Decision tree-Building a Decision Tree-Overfitting and pruning-Decision Tree Rules- Naïve Bayes Method-Estimating Predictive Accuracy of

Classification Methods-Improve Accuracy of classification methods-other evaluation criteria for classification methods.

Unit III:

Cluster Analysis: What is Cluster Analysis?- Desired features of Cluster Analysis-Types of Data –Computing Distance- Types of Cluster Analysis Methods-Partition Methods-Hierarchical Methods-Density based methods- Quality and validity of cluster analysis methods.

Unit IV:

Web Data Mining: Introduction-Web Terminology and characteristics- Locality and Hierarchy in the web-Web Content mining- Web usage mining.

Search Engine: Introduction-Search Engine Functionality- Search Engine Architecture.

Self Learning :Search engines and browsers

Unit V:

Data Warehousing: Introduction-Operational Data Stores-Data Warehouses-Data Warehouse Design-Guidelines for Data Warehouse Implementation-Data Warehouse Metadata.

Online Analytical Processing (OLAP): Introduction- OLAP- Characteristics of OLAP Systems-Multi Dimensional View and Data Cube-Data Cube Implementation- Data Cube Operations.

Text Book:

1. G.K.Gupta.*Introduction to Data Mining with Case Studies*. New Delhi: Prentice Hall of India 2015.

Books for Reference:

1. Margaret H.Dunham; S.Sridhar, *Data Mining Introductory and Advanced Topics*. New Delhi: Pearson Education. 2007.
2. Alex Berson and Stephen J. Smith.*Data Warehousing, Data Mining, OLAP*. New Delhi: TMH Publication.1997.
3. Dunham. *Data Mining: Introductory and Advanced Topics*.NewDelhi: Pearson Education 2006.
4. Jiawei Han, MichelineKamber and Jain Pei. *Data Mining: Concepts and Techniques*.Elsevier Science. 3rd Edition 2011

SEMESTER- V			
Core – Elective I		Introduction to IoT	
Course Code: 21UCSE52	Hrs / week : 4	Hrs / Semester: 60	Credits :4

Objectives:

- To understand the building blocks of the Internet of Things and characteristics.
- To understand the application areas of IoT ·
- To realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks ·
- To design some IoT based prototypes

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand and recall the characteristics and enabling technologies of IoT	10	Re
CO-2	use sensors and other necessary hardware for deploying IoT applications	4	Ap
CO-3	analyse the appropriate transport protocols, addressing and identification techniques suitable for IoT Domain	4	An
CO-4	explore the apt cloud services and cloud service providers for IoT based Smart services	10	Ap
CO-5	design and develop new IoT based Applications	6	Cr
CO-6	discuss about challenges and obstacles of IoT	10	An
CO-7	compare and contrast fog and cloud computing	4	An
CO-8	describe IoT based Application to Monitor Water Quality	3	Un

SEMESTER- V			
Core – Elective I		Introduction to IoT	
Course Code: 21UCSE52	Hrs / week : 4	Hrs / Semester: 60	Credits :4

UNIT-I

Introduction to Internet of Things: Definition of Internet of Things – Application Areas of IoT – Characteristics of IoT – Things in IoT – IoT Stack – Enabling Technologies – IoT Challenges.

UNIT-II

Sensors, Microcontrollers and their interfacing: Introduction to sensor interfacing – Types of Sensors – Controlling sensors through Webpage – Microcontrollers: a quick walkthrough.

UNIT-III

Protocols for IoT: Introduction- Messaging Protocols – XMPP and DDS Protocols – Transport Protocols – Addressing and Identification: Internet Protocol Version 4 – Internet Protocol Version 4 – IPv6 vs IPv4 – Legacy of IPv4 devices – Switching over to IPv6.

UNIT-IV

Cloud for IoT: Introduction – IoT with Cloud – challenges – Selection of cloud service provider – Introduction to Fog computing – Cloud computing: Security aspects. Data Analytics: Introduction – Data Analysis.

UNIT-V

Application Building with IoT: Introduction – Smart Perishable tracking with IoT and Sensors – Smart Healthcare – IoT based Application to Monitor Water Quality – Smart Warehouse Monitoring – Smart Retail – IoT based Smart Driver Assistance System – System to measure Collision impact in an accident with IoT – Integrated Vehicle Health Management.

Text Book:

1. Shriram K Vasudevan, Abhishek S. Nagarajan, R.M.D., Sundaran. *Internet of Things*. Wiley Publication. 2nd Edition 2020.
Unit I – Chapter 1 Unit II - Chapter 2 Unit III –Chapter 3, 4 Unit IV -Chapters5, 6 Unit - Chapter 7

Books for Reference:

1. ArshdeepBahga and Vijay Madiseti. *Internet of Things- A Hands-on Approach*. India:Universities Press Private Limited. 2015
2. Hanes, David, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton and Jerome Henry. *IoT fundamentals: Networking technologies, protocols, and use cases for the Internet of Things*. Cisco Press. 2017.
3. Qusay F. Hassan. *Internet of Things A to Z: Technologies and Applications*. Wiley Publication IEEE Press. 2018.

SEMESTER- V			
Core – Practical V		Python Programming Lab	
Course Code: 21UCSCR5	Hrs / week :5	Hrs / Semester: 75	Credits :3

1. Develop Python programs using user defined functions.
2. Write Python Programs using conditional statements.
3. Create Python Programs using for loops.
4. Solve problems using while loops in Python Programs
5. Write Python Programs to manipulate strings.
6. Develop Python Programs for pattern matching.
7. Write Python programs using String functions.
8. Write Python programs to solve problems using recursion.
9. Write Python programs using List object.
10. Create Python programs using Tuples.
11. Write Python programs using files for input and output.
12. Write Python programs for exception handling.
13. Create Python programs with command line arguments.

SEMESTER –V	
Self Study Course III	Mathematical Reasoning
Course Code: 21UCSSS3 (Optional)	Credits: 2

Objectives:

- Learn to build new mathematical knowledge through problem solving.
- Learn to use a combination of appropriate algebraic, graphical, and numerical methods to form conjectures about, and to solve, problems.
- Gain the ability to recognize inappropriate assumptions and solutions.

Course Outcome:

CONo.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	simplify various expressions	4	Ev
CO-2	determine Averages of various calculations	6	Ap
CO-3	compare and Proportion	4	An
CO-4	evaluate Partnership in enterprises	3	Ev
CO-5	analyse Percentage computation	6	An
CO-6	evaluate profit and loss.	6	Ev
CO-7	apply Simple interest and Compound interest Calculation	4	Ap
CO-8	apply Time and work , Time and distance evaluation in real world problems	10	Ap

SEMESTER – V	
Self Study Course III	Mathematical Reasoning
Course Code: 18UCSS3 (Optional)	Credits: 2

Unit I:

Simplification, Averages.

Unit II:

Ratio and Proportion, Partnership.

Unit III:

Percentage, profit and loss.

Unit IV:

Simple interest, Compound interest.

Unit V:

Time and work, Time and distance.

TextBook :

1. Aggarwal R.S. *Objective Arithmetic*. New Delhi: S.Chand and Company Ltd. Edition 2004. (Chapters 4,6,12,13,10,11,21,22,15,17)

Books for Reference :

1. Aggarwal R.S. *Arithmetic Subjective and Objective for Competitive Examinations* .New Delhi: S.Chand and Company Ltd. Revised Edition 2011.
2. Abhijit Guha. *Quantitative Aptitude for Competitive Examinations*. New Delhi: Tata McGraw-Hill Publishing Company Ltd.

Semester - V			
Common Skill Based Core		Computer for Digital Era and Soft Skills	
Code : 21UCSB51	Hrs / Week : 2	Hrs / Sem : 30	Credits : 2

Course Outcome

- Identify different types of computer systems.
- Classify various types of software being used.
- Compare various digital payments and use them in day to day life.
- Recognise the innovative technologies IoT and integrate it in various fields.
- Analyze various social networking platforms and use them efficiently.
- Distinguish various cyber attacks and apply preventive measures.
- Understand the various soft skills needed to become successful.
- Analyze self and adapt oneself to work in a team.

Unit I: Fundamentals of Computers:

Introduction to computers- Components of computers-Working principle-Types of computers-Tablet-Notebook-Smart phone-PDA-Impact of computers on society-Types of software.

Unit II: Recent Trends in Computer Science and e-Governance:

IoT - applications- Mobile applications - E-Learning- E-Commerce - digital payments

Unit III: Social Media:

Face book-Twitter-Linked In-Instagram-Advantages of Social Networking-Issues/Risks of Social Networking-Protecting ourselves from social Networking problems-Cybercrimes-Hacking-Phishing- Cyber Security

Unit IV: Introduction to Soft Skills:

Learning objectives – What are soft skills?-Categories of Soft Skills-Integral Parts of Soft Skills.

Unit V: Understanding Self and Team Building:

Transactional Analysis (TA) - Structural analysis of Ego states- The functional model of Ego states - Egogram-Storkes - Life Position - Egogram and Life Positions Questionnaire- Team and Team Building- Features of effective creative teams

Books for Reference:

1. Peter Norton, Introduction to Computers 6th Edition
2. Charles P Pfleeger, Shari Lawrence Pfleeger, Security in Computing, I Edition, Pearson Education, 2003.
3. E.Balagurusamy, Fundamentals of Computers, McGraw Hill
4. Henry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang , E-Commerce fundamentals and applications, Wiley Student edition
5. Benita Bhatia Dua, DeepaJeyaraman, Profit with Social Media, CNBC
6. Dr.K.Alex, Soft Skills, S.Chand & Co
7. <http://www.digitalindia.gov.in/content/social-media-analytics>
8. https://www.researchgate.net/publication/307878962_Introduction_to_E-Governance
9. <http://www.ijqr.net/journal/v10>
10. https://www.researchgate.net/publication/258339295_FUNDAMENTALS_OF_COMPUTER_STUDIES

SEMESTER VI			
Core – X		.NET Programming	
Course Code: 21UCSC61	Hrs / week :5	Hrs / Semester: 75	Credits :4

Objectives:

- To understand .NET framework.
- To learn C# programming.
- To attain Knowledge about web server controls.
- To learn about validation techniques and apply it.
- To know about ADO.NET.

Course Outcome:

CONo.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand .NET framework	1	Re
CO-2	develop console applications with c#	2	Cr
CO-3	use object orientation in C# to solve problems	5	Ap
CO-4	create web server applications using ASP.NET	8	Cr
CO-5	implement validation controls	4	Ap
CO-6	design applications with server controls	7	Cr
CO-7	define ADO.NET	7	Un
CO-8	develop databases using ADO.NET	4, 10	Ap

SEMESTER VI			
Core – X		.NET Programming	
Course Code: 21UCSC61	Hrs / week :5	Hrs / Semester: 75	Credits :4

Unit I:

Getting started with .NET Framework 4.5 and C#

Understanding Previous Technologies, Benefits of .NET Framework, Architecture of .NET framework 4.5,.NET Execution Engine, Components of .NET framework 4.5: CLR, CTS, Metadata and Assemblies, .NET Framework Class Library, Windows Forms, ASP .NET and ASP .NET AJAX, ADO .NET, Windows workflow Foundation, Windows Presentation Foundation, Windows Communication Foundation, Widows Card Space and LINQ.

Introducing C#

Creating a Simple C# Console Application, Identifiers and Keywords. System Data Types, Variables and Constants: Value Types, Reference Types, Understanding Type Conversions, Boxing and UnBoxing. Namespaces, The System namespace, .NET Array Types

Unit II :

Classes, Objects and Object Oriented Programming

Classes and Objects: Creating a Class, Creating an Object, Using this Keyword, Creating an Array of Objects, Using the Nested Classes, Defining Partial Classes and Method, Returning a Value from a Method and Describing Access Modifiers. Static Classes and Static Members, Properties: Read-only Property, Static Property, Indexers, Structs: Syntax of a struct and Access Modifiers for structs, System.Object Class.

Self Learning: Encapsulation and Polymorphism in c#

UNIT III:

Introducing ASP.Net – Gainting started with ASP.Net applications: Web forms - creating ASP.Net Webform applications – Using ASP.Net Webforms for server controls: Beginning with server controls – Talking a closer look at web controls – Illustrating Basic web controls – Working with Validation Controls: The compare Validator – The Range Validator – Regular Expression Validator – Custom validator – Validation Summery control – Multiple validation control.

UNIT IV:

Developing ASP.Net Server controls: Developing ASP.Net server controls – Creating and using Web User Control – Creating ASP.Net Pages to web user control–Composite controls using Rich controls- Web controls: Adrotator web server control – Calendar web server control.

UNIT V: Using ADO.Net with ASP.Net:ADO.Net – ADO.Net Object model – Creating a Database application.

Self Learning: Creating a Deployment project.

Text Book:

1. Christian Nagel, Bill Evjen, Jay Glynn, Karli Watson, Morgan Skinner. *Professional C# 2012 and .NET 4.5*. New Delhi: Wiley India Private Ltd. First Edition 2012

Books for Reference:

1. Harsh Bhasin. *Programming in C#*, New Delhi: Oxford University Press. First Edition 2014.
2. MridulaParihar, YeshSingal and Nitin Pandey. "*Visual Studio .Net Programming*". New Delhi: Prentice Hall India. First Edition 2002
3. Black Book. Kogent Learning Solutions Inc, *.NET 4.0 Programming (6-in-1)*. New Delhi : Dream Tech Press.
4. Paul Deitel and Harvey Deitel, *C# 2010 for Programmers*, New Delhi: Pearson Education 4th Edition
5. G. Andrew Duthie. *Microsoft ASP.NET Step by step*. Microsoft Press, 2003

Website :

<https://www.hesab.net/book/asp.net/ASP.NET%20Bible.pdf>

SEMESTER VI			
Core – XI		Software Engineering	
Course Code: 21UCSC62	Hrs / week :5	Hrs / Semester: 75	Credits :4

Objectives:

- Understand the concept of Software Engineering and its importance.
- Elicit and validate different types of requirements.
- Do different testing and enforce safety and security
- Understand component models and architectural patterns for distributed and embedded systems.
- Apply engineering principles and techniques in software development.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO Mapped	CL
CO-1	define the concepts of software engineering ethics	3	Re
CO-2	describe software development process	8	Un
CO-3	discuss agile software development	8	Un
CO-4	discuss software requirements and architectural design	4	Un
CO-5	explain reliability and safety engineering	8	Un
CO-6	understand component models and architectural patterns for distributed and embedded systems.	8	Un
CO-7	apply engineering principles and techniques in software development.	4	Ap
CO-8	discuss software quality management system	8	Un

SEMESTER VI			
Core – XI		Software Engineering	
Course Code: 21UCSC62	Hrs / week :5	Hrs / Semester: 75	Credits :4

UNIT I

Introduction: Professional Software Development-Software Engineering Ethics. **Software Process:** Software Process Models-Process Activities - Copying with change. **Agile Software Development:** Agile methods - Agile development techniques-Agile project management.

UNIT II

Requirement Engineering: Functional and Nonfunctional Requirements - Requirement Engineering Processes Elicitation-Specification-Validation- Change. **System Modelling:** Context Models-Interaction Models. **Architectural Design:**Architectural Patterns-Application Architectures. **Software Testing:** Development Testing-Test Driven Development - Release Testing-User Testing.

UNIT III

Dependable System: Dependability Properties-Dependable processes - Formal methods and system dependability. **Reliability Engineering:** Reliability and availability-Reliability Requirements- Reliability testing -**Safety Engineering:** Safety-critical Systems- Safety requirements - Safety engineering processes. **Security Engineering:** security and dependability - Security and organizations - Security requirements- Security testing and assurance

UNIT V

Component-Based Software Engineering: Component and Component Model CBS Processes - Component Composition. **Distributed Software Engineering:** Distributed Systems - Client Server Computing - Architectural Patterns for Distributed Systems **Real time Software Engineering:** Embedded Systems Design-Architectural Patterns for real time systems - Real-time operating systems.

UNIT V

Project Management: Risk Management - Managing People. **Project Planning:** Software Pricing -Project Scheduling - Estimation Techniques. **Quality management:** Software quality - Software standards - Reviews and inspections. **Configuration Management:** Version management-System building - Change management - Release management

Text Book:

1. Ian Somerville.*SoftwareEngineering*.Unitedkingdom:Tata McGraw Hill Publication.Tenth Edition 2015.

Books for Reference:

1. Richard Fairly.*SoftwareEngineering*.India:Tata McGraw Hill Publication.Indian Edition 2017.
2. RajibMall.*Fundamentals of Software Engineering*.NewDelhi:PHILearning Private Limited.FourthEdition 2015.
3. R.S.Pressman.*SoftwareEngineeringA practitioners Approach*.India:McGraw.Seventh Edition 2009.

SEMESTER VI			
Core – XII		Computer Networks	
Course Code: 21UCSC63	Hrs / week :5	Hrs / Semester:75	Credits :4

Objectives:

- To understand the concepts of data communication.
- To understand the different network topologies.
- To study the function of different layers.
- To get familiarized with different protocols and network components.

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	define Network and the various types of Network	1	Re
CO-2	demonstrate the model of Network	1	An
CO-3	analyze the structure of Switch and the Protocols.	4	An
CO-4	discuss Connection devices by using Wired LANs	1	Ap
CO-5	discuss the Network layer and Transport Layer in routing and TELNET	1	Re
CO-6	describe the various routing algorithms in network layer	4	Un
CO-7	define Network Security and other aspects of Security	1	Re
CO-8	acquire the basic knowledge of layers of OSI model	1	Re

SEMESTER VI			
Core – XII		Computer Networks	
Course Code: 21UCSC63	Hrs / week :5	Hrs / Semester:75	Credits :4

Unit I :

Introduction: Data communications-Networks- Network Types- Internet History- Standards and Administration.

Network Models : Protocol Layering- TCP/IP Protocol suite- The OSI Model.

Transmission Media: Guided Media- Unguided Media: Wireless

Unit II:

Switching: Introduction- Packet switching – Structure of a switch. **Data Link control :DLC** Services- Data Link Layer Protocols –HDLC. **Media Access Control :Random Access-Controlled Access.**

Unit III:

Wired LANs: Ethernet -: Ethernet Protocol – Standard Ethernet- Fast Ethernet- Gigabit Ethernet - 10Gigabit Ethernet.

Wireless LANS: Bluetooth.

Connecting Devices and Virtual LANs: Connecting Devices – Virtual LANs.

Self learning: Cellular Telephony and Satellite Networks.

Unit IV:

Network layer: Unicast Routing: Introduction – Routing Algorithms- Unicast Routing Protocols.

Introduction to Transport Layer: - Introduction – Transport-Layer Protocols.

Self learning: Next Generation IP:Ipv6 Addressing

Unit V:

Application Layer : Standard Client – Server Protocols: FTP- Electronic mail-TELNET Secure Shell –Domain Name System.

Cryptography and Network Security: Introduction – Confidentiality-Other aspects of Security

Self learning: World wide Web and HTTP

Text Book:

- Behrouz A. Forouzan. *Data Communications and Networking*. New Delhi: McGraw Hill Education Private Ltd. Fifth Edition 2013.
Unit I: Chapter 1.1-1.5, 2.1-2.3,7.1,7.3
Unit II: Chapter 8.1-8.4, 11.1-11.3, 12.1-12.2
Unit III: Chapter 13.1-13.5, 15.3, 17.1-17.2
Unit IV : Chapter 20.1-20.3, 23.1-23.2,
Unit V : Chapter 26.2-26.6, 30.1-30.3

Books for Reference:

1. Andrew S. Tanenbaum David J. Wetherall. *Computer Networks* .New Delhi: Pearson. 5th Edition 2010.
2. Stallings W. *Data and Computer Communications*.New Delhi: Prentice Hall. Ninth Edition 2010.
3. Peterson. L.L. and Davie. S.B. *Computer Networks*. San Fransisco: Morgan Kaufmann Publishers. Fifth Edition 2011.

SEMESTER VI			
Core – Elective II		Cloud Computing	
Course Code: 21UCSE61	Hrs / week :4	Hrs / Semester: 60	Credits :4

Objectives:

- To impart knowledge on the concepts of cloud computing, monitoring, management and applications of clouds .
- To analyse various cloud programming models and apply them to solve problems on the cloud.
- To study the available cloud services and open source solutions

Course Outcome:

CONo.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	define cloud computing	3	Re
CO-2	describe the characteristics of cloud	3	Un
CO-3	identify the technical foundations of cloud system architecture	3	An
CO-4	characterize the distinction between infrastructure , platform, software and service	7	An
CO-5	illustrate the use of load balancing techniques	5	Ap
CO-6	attempt to generate new ideas and innovations in cloud computing	7	Cr
CO-7	compare and contrast the various web services	10	An
CO-8	demonstrate the usage of mail services	10	An

SEMESTER VI			
Core – Elective II		Cloud Computing	
Course Code: 21UCSE61	Hrs / week :4	Hrs / Semester: 60	Credits :4

Unit I:

Understanding cloud computing: Cloud computing - cloud types- the cloud cube model- deployment models-service models- characteristics of cloud computing-assessing the role of open standards.

Assessing the value proposition:Measuring the cloud’s value – the laws of cloudonomics –cloud computing obstacles – measuring cloud cost – avoiding capital expenditures

Unit II:

Cloud Architecture: The cloud computing stack – composability – infrastructure – platforms – virtual appliances – communication protocols – Connecting to the cloud: The Jolicloud net book OS – Chromium OS the browser as an operating system.

Developing Cloud Services:Infrastructure as a service (IaaS) – IaaS workloads- Platform as a service (PaaS) – Software as a service (SaaS)– Identity as a service (IDaaS) – Compliance as a service(CaaS).

Unit III:

Virtualization and CloudApplications:Virtualization technologies – load balancing and virtualization – advanced load balancing– the Google cloud

Cloud Security:Securing the cloud –security service boundary –security mapping- securing data –brokered cloud storage access-encryption-auditing and compliance

Unit IV:

Google Web Services: Google Analytics – Google translate- Google Toolkit –Google APIs

Amazon Web Services: Working with Amazon Elastic compute cloud(EC2)- Amazon simple storage system(S3) – Amazon Elastic block store(EBS)- Cloud front.

Microsoft Web Services: Windows azure platform – windows Azure App fabric.

Unit V:

Cloud Storage: Cloud storage definition – unmanaged cloud storage – managed cloud storage – creating cloud storage systems –Exploring Cloud Backup Solutions - Backup types - Cloud Backup features

Webmail Services: Cloud mail services -Introduction- functions

Self Learning: Google Gmail- Mail2Web – Windows Live Hotmail- Yahoo Mail

Textbook:

1. Barrie Sosinsky.*Cloud Computing Bible*.New Delhi: Wiley India Pvt. Ltd. 2012.

Books for Reference:

1. Michael Miller. *Cloud Computing: Web-Based Applications That Change the Way You*
2. *Work and Collaborate Online*. Que Publishing. Second Edition 2008.
3. AleyBeard. *Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs*. Emereo Pvt. Limited. July 2008.
4. Sandeep Bhowmik *Cloud Computing*. New Delhi: Cambridge University Press. July 2017
5. Kailash Jayaswal , Jagannath Kallakurchi , Donald J. Houde, Deven Shah. *Cloud Computing Black Book*. New Delhi: Dreamtech Press 2014.

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SEMESTER VI			
Core – Elective II		Mobile Computing	
Course Code: 21UCSE62	Hrs / week :4	Hrs / Semester: 60	Credits :4

Objectives:

- Learn and build Android Applications using the Android SDK.
- Learn about packages and deploying Applications.
- Learnto deploy software to mobile devices.

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO Mapped	CL
CO-1	distinguish different mobile techniques	2	Re
CO-2	install Android SDK	5	Ap
CO-3	design User Interface	5	Cr
CO-4	modify app to include multimedia content	10	An
CO-5	create app with Google Maps	10	Cr
CO-6	design app with SQLite database	10	Cr
CO-7	design messaging app	10	Cr
CO-8	deploy Mobile app	10	Ap

SEMESTER VI			
Core – Elective II		Mobile Computing	
Course Code: 21UCSE62	Hrs / week :4	Hrs / Semester: 60	Credits :4

Unit I:

Getting started with Android Programming: What is Android?– Android versions– Features and architecture of Android– Android Devices in the market– Obtaining the required tools– Android Studio– Android SDK– Creating Android Virtual Devices (Avds)– Android Developer Community– Launching Android Application.

for Android : Exploring IDE– Using Code Completion– Debugging Application –Setting Break points– Publishing Application– Generating a Signed APK

Unit II:

Activities, Fragments and Intents: Understanding activities – applying styles and themes to an activity– Hiding the activity title– Displaying a dialog Window and a Progress dialog– Linking activities using intents– returning results from an Intent– Passing data using an Intent Object– Fragments – adding Fragments dynamically – life Cycle of a Fragment– interactions between Fragments– Understanding the Intent Object– Using Intent Filters– Displaying notifications.

Getting to know the Android User Interface: Understanding The Components of a Screen– Views and View groups – Frame layout – Linear layout (Horizontal) and linear layout(Vertical)– Table layout– Relative layout – Frame layout– Scroll view– Adapting to Display Orientation– Anchoring Views – Managing Changes to Screen Orientation – Persisting State information during changes in configuration– detecting orientation changes– Controlling the orientation of activity– Utilizing the Action Bar– adding action Items to Action Bar– Creating the User Interface programmatically– listening for UI Notifications

Unit III:

Designing user Interface with views: Using basic views – Text view -Button, Image button, Edit text, Checkbox, Toggle button, Radio button, and Radio group Views– Progress bar View– Auto complete text view View– Using Picker Views– Time picker View– Date picker View– using List Views To Display Long Lists– List view View– Using The Spinner View– understanding Specialized Fragments– using List fragment– Dialog fragment– Preference fragment

Displaying Pictures and Menus With Views: Using Image Views to Display Pictures– Image view – Image switcher- Grid view– Using Menus With Views– Creating the helper Methods– Options Menu– Context, Web view

Unit IV:

Data persistence: Saving And Loading User Preferences– Accessing Preferences Using An Activity– Programmatically Retrieving And Modifying the Preferences Values– Persisting Data to Files– Saving To Internal Storage– Saving To External Storage (SD Card)–Choosing the Best Storage option– Creating and using Databases– Creating Dbadapter Helper Class– Using the Database Programmatically

Content Providers: Sharing Data In Android— Using a Content Provider— Predefined Query String Constants— Projections— Filtering— Sorting— Creating Your Own Content Providers— Using The Content Provider

Unit V:

Messaging: SMS Messaging— Sending SMS Messages Programmatically— Sending SMS Messages using Intent— Receiving SMS messages— Caveats and warnings— Sending Email

Location-Based Services: Displaying Maps— Creating the Project— obtaining the Maps API Key— Displaying Map— Zoom Control— Changing Views— navigating to a specific location— Getting the location that was touched— Geo coding and reverse Geo coding— Getting location data— Monitoring location

Text Book:

1. J. F.DiMarzio. *Beginning Android Programming with Android Studio*.John Wiley & sons, Inc, Fourth Edition

Books for Reference:

1. Ed Burnette, *HelloAndroid: Introducing Google's Mobile Development Platform*. Pragmatic Fourth Edition 2015.
2. Jerome (J.F) DiMarzio.*Android - A programmer's Guide*. New Delhi: Tata Mcgraw Hill 2010.
3. JhonHarton. *Android Programming for Beginners* .Packt Publishing. 2015

SEMESTER VI			
Core – Practical VI		. NET Programming Lab	
Course Code: 21UCSCR6	Hrs / week :5	Hrs / Semester: 75	Credits :3

1. Create Asp.Net projects with HTML server controls.
2. Create Asp.Net projects with basic Web server controls.
3. Create Asp.Net projects with validation controls.
4. Create Asp.Net projects with calendar controls.
5. Create Asp.Net projects with Ad rotator controls.
6. Create a simple website with ASP.NET using web user controls.
7. Create ASP.NET projects with Databases.
8. Create a website with ASP.NET.