Department of Computer Science

RATHINAM COLLEGE OF ARTS AND SCIENCE

(AUTONOMOUS)

RATHINAM TECHZONE CAMPUS, POLLACHI ROAD, EACHANARI, COIMBATORE – 21.

Syllabus for

B.Sc. Information Technology

2021-2022 Batch onwards

Vision and Mission of the Institution:

VISION

To emerge as a world renowned Institution that is integrated with Industry to impart Knowledge, Skills, Research Culture and Values in youth who can accelerate the overall development of India.

MISSION

To impart superior quality education at affordable cost, nurture academic and research excellence, maintain eco-friendly and future-ready infrastructure, and create a team of well qualified teaching professionals who can build global competency and employability.

MOTTO

Transform the youth into National Asset.

Vision and Mission of the Department:

VISION

Build a strong research and teaching environment aimed towards betterment of society and industrial needs

MISSION

To provide quality undergraduate and post graduate education in both the theoretical and applied foundations of computer science and prepare the students for a globalised technological trends, knowledge in research towards serving the society.

Program Educational Objectives (PEO)

PEO1	:	To apply hardware and software technologies that provide computing solutions for successful careers in industry/higher education/research.
PEO2	:	To set the foundation of mathematics, computer science, and problem-solving methodology for effective implementation in the area of software services and developments.
PEO3	:	To become entrepreneurs/innovators to apply the principles of system analysis, design, development, and project management to address social, technical, and business challenges.
PEO4	:	To promote awareness and to acquire leadership qualities with strong communication skills along with professional and ethical values.

Mapping of Institute Mission to PEO

Institute Mission	PEO's
To impart superior quality education at affordable cost, nurture academic and research excellence, maintain eco-friendly and future-ready infrastructure, and create a team of well qualified teaching professionals who can build global competency and employability.	PE02, PE04, PE05, PEO3

Mapping of Department Mission to PEO

Department Mission	PEO's
To provide quality undergraduate and post graduate education in both the theoretical and applied foundations of computer science and prepare the students for a globalised technological trends, knowledge in research towards serving the society.	PE02, PE04, PE05, PEO3

Program Outcomes (PO):

PO1	:	To apply fundamental knowledge of computing, mathematics, and science relevance to the discipline.
PO2	:	To design, implement, and evaluate a computer-based system, process, component, or program for various applications.
PO3	:	To use current techniques, skills, and modern tools necessary for research-based knowledge and research methods for the cultural, societal, environmental considerations and demonstrate the knowledge of and need for sustainable development.
PO4	:	To formulate models, design, and conduct experiments for interpreting data and critical thinking.
PO5	:	To apply ethical principles, commit to professional ethics and responsibilities of the computing practice and its solutions.
PO6	:	Development of emphatic written and verbal communication skills. Continuous professional development through long-term learning.
PO7	:	To function individually and on teams, including diverse and multidisciplinary, to accomplish a common goal.
PO8	:	To solidify the computing principles to apply for one's own work, as a member and leader in a team, to manage projects.

Correlation between the POs and the PEOs

Program Outcomes		**PEO1**	**PEO2**	**PEO3**	**PEO4**	**PEO5**
PO1	:		√			√
PO2	:	√		√		
PO3	:	√	√		√	√
PO4	:		√	√		√
PO5	:			√	√	√
PO6	:		√		√	√
PO7	:			√	√	
PO8	:	√		√	√	

Components considered for Course Delivery is listed below:

1. Class room Lecture
2. Laboratory class and demo
3. Assignments
4. Mini Project
5. Project
6. Online Course
7. External Participation
8. Seminar
9. Internship

Mapping of POs with Course Delivery:

Program Outcomes	Course Delivery							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
PO1	√	√	√	√	√			
PO2	√					√	√	√
PO3	√	√		√	√			
PO4	√	√		√	√			
PO5		√		√	√			
PO6	√	√					√	
PO7			√				√	√
PO8		√					√	√

RATHINAM COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

Scheme of curriculum for B.Sc. Information Technology

for the students admitted in the Batch during 2021 - 2022

Board of Studies – Computer Science (UG)

S.No.	Sem	Part	Sub Type	Sub Code	Subject	Credit	Hours	INT	EXT	Total
1	1	1	L1		Language – I	4	4	50	50	100
2	1	2	L2		English for Communication – I	4	4	50	50	100
3	1	3	Core		Core - I Problem Solving Using C	4	4	50	50	100
4	1	3	Core Practical		Core - I Practical - Programming in C Lab	2	4	20	30	50
5	1	3	DSC	DSC	DSC 1C	4	4	50	50	100
6	1	3	DSC Practical		DSC Practical - 1C	2	4	20	30	50
7	1	3	Allied-I	DSA	DSA 1A	4	4	50	50	100
8	1	4	AEC		Ability Enhancement Course I	2	2	50		50
9	1	6	VAC		Value Added Course - I%	2	-	50		50
						28	**30**			
1	2	1	L1		Language – II	4	4	50	50	100
2	2	2	L2		English for Communication – II	4	4	50	50	100
3	2	3	Core		Core - II Python Programming	4	4	50	50	100
4	2	3	Core Practical		Core Practical II – Python Programming Lab	2	4	20	30	50
5	2	3	DSC	DSC	DSC 2C	4	4	50	50	100
6	2	3	DSC Practical		DSC Practical - 2C	2	4	20	30	50
7	2	3	Allied-II	DSA	DSA 2A	4	4	50	50	100
8	2	4	AEC		Ability Enhancement Course II	2	2	50		50

9	2	6	VAC		Value Added Course - II %	2	-	50		50
						28	**30**			
1	3	3	Core		Core III – Web Technology	4	5	50	50	100
2	3	3	Core Practical		Core Practical III - Web Technology	2	4	20	30	50
3	3	3	DSC		DSC 3C	4	5	50	50	100
4	3	3	DSC Practical		DSC Practical - 3C	2	4	20	30	50
5	3	3	Allied-III	DSA	DSA 3A	4	5	50	50	100
6	3	4	SEC	SEC-I	Skill Enhancement Courses – I	2	4	20	30	50
7	3	4	AEC		Ability Enhancement Course III	2	2	50		50
8	3	6	VAC		Value Added Course - III %	2	-	50		50
9	3	6	IDL		Inter Department Learning – I#	2	-	50		50
						24	**30**			
1	4	3	Core		Core IV – Android App Development	4	5	50	50	100
2	4	3	Core Practical		Core Practical IV - Android App Development Lab	2	4	20	30	50
3	4	3	DSC	DSC	DSC 4C	4	5	50	50	100
4	4	3	DSC Practical		DSC Practical - 4C	2	4	20	30	50
5	4	3	Allied-IV	DSA	DSA 4A	4	5	50	50	100
6	4	4	SEC	SEC-II	Skill Enhancement Courses – II	2	4	20	30	50
7	4	4	AEC		Ability Enhancement Course IV	2	2	50		50
8	4	6	VAC		Value Added Course - IV %	2	-	50		50
9	4	6	IDL		Inter Department Learning – II#	2	-	50		50
						24	**30**			

1	5	3	Core		Core V – Machine Learning	4	4	50	50	100
2	5	3	Core Practical		Core Practical V - Machine Learning Lab	2	4	20	30	50
3	5	3	DSC	DSC	DSC 5C	4	4	50	50	100
4	5	3	DSC Practical		DSC Practical - 5C	2	4	20	30	50
5	5	3	DSE	DSE – I	Elective - I – DSE 1E	4	5	50	50	100
6	5	3	DSE	DSE - II	Elective - II – DSE 2E	4	5	50	50	100
7	5	4	SEC	SEC-III	Skill Enhancement Courses – III	2	4	20	30	50
8	5	6	VAC		Value Added Course - V%	2	-	50		50
						24	**30**			
1	6	3	Core		Core VI – Server Side Scripting	4	6	50	50	100
2	6	3	Core Practical		Core Practical VI - Server Side Scripting Lab	2	4	20	30	50
3	6	3	DSE	DSE – III	Elective – III – DSE 3E	4	6	50	50	100
4	6	3	DSE	DSE – IV	Elective – IV – DSE 4E	4	6	50	50	100
5	6	3	Core Course - XI	DSC	Core Project	8	4	80	120	200
6	6	4	SEC	SEC-IV	Skill Enhancement Courses – IV	2	4	20	30	50
7	6	5	EX		Extension Activity- EX %	2	-	50		50
						26	**30**	**1900**	**1950**	**3850**
					Total credit	**154**				

Note :

@ - No End Semester Examination, only Internal Exam.

\# - No Internal Examination, only End Semester Exam.

Discipline Specific Core					
S. No	**Course Code**	**Course**	**Pre-requisite**	**Offering Department**	**Mandatory**
1		Data Structures & Algorithms			
2		Operating Systems			
3		RDBMS			
4		Linux & Shell Programming			
5		PHP & Mysql			
6		Big Data Analytics			
7		Network Security			
8		Ethical Hacking			
9		Natural Language Processing			
10		Devops			

Allied					
S. No	**Course Code**	**Course**	**Pre-requisite**	**Offering Department**	**Mandatory**
1		Introduction to Networking		CS	
2		Principles of Multimedia		CS	
3		Principles of Information Security		CS	
4		Enterprise Resource Planning		CS	
5		Mathematics for Computer Science		Maths	
6		Statistics of Computer Science		Maths	
7		Quantitative Techniques		Maths	
8		Quantitative Aptitude		Maths	
9		Research Methodology		Maths	
10		Principles of Accountancy		Commerce	

11		Principles of Management		Management	
12		Entrepreneurial Development		Commerce	

Skill Based Subject					
S. No	**Course Code**	**Course**	**Pre-requesite**	**Offering Department**	**Mandatory**
1		Design and Analysis of Algorithm			
2		Information and Cyber Security			
3		Storage Management and Security			
4		Internet of Things			
5		Block Chain Fundamentals			
6		Software Engineering			

Specialization	**Elective I**	**Elective II**	**Elective III**	**Elective IV**
Networking	Cryptography and Network Security	Wireless Sensor Network	Information and Storage Management	Cyber Security Incident Response Management
Data Analytics	Hadoop Programming	R Programming	Database Security	Introduction To RPA Tools
Animation	Computer Graphics	Learning Maya	Digital Image Processing	3-D Animation
Testing	Software Architecture	Software Project Management	Software Testing	Agile Software Process
Cloud	Cloud Infrastructure and services	Cloud Web Services	Open Stack cloud	Virtualization and Cloud Security
Artificial Intelligence	Neural Networks and Fuzzy Logic	Introduction To Robotics	Deep Learning	Reinforcement Learning

Ability Enhancement Course					
S.No	**Course Code**	**Course**	**Pre-requesite**	**Offering Department**	**Mandator**
1		Environmental Studies	-	General	Yes
2		Women Studies	-	Commerce II	Yes
3		Constitution of India	-	Commerce I	Yes
4		Human Rights	-	General	Yes
5		Yoga	-	Tamil	Yes
6		NCC	-	Viscom	Yes
7		Communicative English	-	English	Yes
8		Quantitative Apptitude	-	Mathematics	Yes

முதற்பருவம்

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
17BGE11T	Part I Tamil	3	6	1	0	Theory

Introduction: பகுதி முதல் பாடமாக அமையும், தமிழ்ப்பாடம் கவிதைகள், இலக்கணம், இலக்கியவரலாறு ஆகியவைகள் கொண்டு அமைந்து உள்ளது. ஐந்து அலகுகளாக பகுக்கப்பட்டுள்ளது.

Course Outcome:

CO1 : பாரதியார், பாரதிதாசன், சிற்பி, சுரதா ஆகிய கவிதைகளின் விளக்கத்தை மாணவர்கள் அறிந்து கொள்ளுவதால், தன்னம்பிக்கையை வெளிக்கொணரும் வகையில் உள்ளது.

CO2 : பெண் கவிஞர்களின் படைப்பு கவிதையை அறிவதன் மூலம் வாழ்வியல் செய்திகளையும், யதார்த்த நிலையும் அறிய உதவுகிறது.

CO3 : திரு.வி க. மற்றும் மு.வா கட்டுரைகளை அறிவது படைப்பையும், படைப்பின் சிறப்பையும் சங்க கால இலக்கிய செய்திகளையும் அறிய முடிகிறது.

CO4 : படைப்புத்திறனை வெளிப்படும் விதமாகவும், இலக்கணத்தை அறிய பயனுள்ளதாக அமைகிறது.

CO5 : இலக்கியவரலாறு பற்றியச் செய்திகளை கொண்டு அதன் வளர்ச்சி நிலையை அறிவும் வகையில் உள்ளது.

Unit I: [12 Periods]

பாரதியார் - பெண் விடுதலை, பாரதிதாசன் • வீரத் தமிழன், சிற்பி • நிலவுப்பூ சுரதா • நாடு ஆகியவற்றின் விளக்கம் தருதல்.

Unit II: [12 Periods]

பூ.அ இரவிந்திரன் • தாகம் தீர்க்காத தண்ணீர், அ. வெண்ணிலா • நீரிலலையும் முகம் மாலதி மைத்ரி - கன்னியாகுமரி, க்ருஷாங்கினி • புன்னை மரம் ஆகிய கவிதைகளின் செய்திகளை அறிவதால் வாழ்வியல் சூழலையும், யாதர்த்த நிலையையும் விளக்குதல்.

Unit III: [12 Periods]

திரு.வி.கா •பெண்ணின் பெருமை மு.வ • கற்பனை முனைவர் சித்ரா–தமிழ் தரமுயர்த்தலும், நிலைப்படுத்தலும், இரணியன் நா.கு பொன்னுசாமி – சங்க இலக்கியத்தில் சமூக அறம் ஆகியவற்றின் கட்டுரைகளின் செய்திகளை விளக்கம் தருதல்.

Unit IV: [12 Periods]

பெயர் சொல், வினைச்சொல், இடைச்சொல், உரிச்சொல், எச்சம் •இலக்கணத்திற்கு விளக்கம் அளித்தல்• படைப்பிலக்கியப் பயிற்சி, கவிதை எழுதல் வானொலித் தமிழ், தொலைக்காட்சித் தமிழ் பயன்பாட்டுத்தமிழ், இலக்கண நோக்கில் பயிற்றுவித்தல் எழுதுதல் கவிதை+வானொலி பேச்சுத்திறன் வளர்த்தல். ஆகியவைகள் கொண்டு திறன் வளர்க்க உதவுதல்.

[12 Periods]

Unit V:

நவீனக் கவிதை இலக்கிய வடிவங்களான ஹைக்கூ, குக்கூ, சென்ட்ரியூ, கஜல், கணினித் தமிழ் • கலைச்சொற்கள் ஆகியவைகளின் வளர்ச்சி நிலைகளை அறிய உதவுதல்.

Textbook:

பாடநூல்கள்

1. பாரதியார் கவிதைகள்
2. பாரதிதாசன் கவிதைகள்
3. சுரதா கவிதைகள்
4. சிற்பி கவிதைகள்
5. அ. வெண்ணிலா

பார்வை நூல்கள் :

1. இலக்கியவரலாறு – பாக்கியமேரி,
2. இலக்கண நூல்,
3. மு.வ. •தமிழ் இலக்கிய வரலாறு

முதற்பருவம்

(கவிதை, கட்டுரை, இலக்கணம், படைப்பிலக்கியம், இலக்கியவரலாறு)

அலகு 1

1. பாரதியார் - பெண் விடுதலை
2. பாரதிதாசன் - வீரத் தமிழன்
3. சிற்பி - நிலவுப்பூ
4. சுரதா - நாடு

அலகு 2

1. பூ.அ இரவிந்திரன் - தாகம் தீர்க்காத தண்ணீர்
2. அ. வெண்ணிலா - நீரிலையும் முகம்
3. மாலதி மைத்ரி - கன்னியாகுமரி
4. க்ருஷாங்கினி - புன்னை மரம்

அலகு 3 உரைநடை

1. திரு.வி.கா -பெண்ணின் பெருமை
2. மு.வ - கற்பனை
3. முனைவர் சித்ரா – தமிழ் தரமுயர்த்தலும், நிலைப்படுத்தலும்
4. இரணியன் நா.கு.பொன்னுசாமி – சங்க இலக்கியத்தில் சமூக அறம்

அலகு 4

I பெயர் சொல், வினைச்சொல், இடைச்சொல், உரிச்சொல், எச்சம்

படைப்பிலக்கியப் பயிற்சி - 1. கவிதை எழுதல்
2. வானொலித் தமிழ்
3. தொலைக்காட்சித் தமிழ்

பயன்பாட்டுத்தமிழ் - இலக்கண நோக்கில் பயிற்றுவித்தல்
1. எழுதுதல்- கவிதை+வானொலி
2. பேச்சுத்திறன் வளர்த்தல்

அலகு 5 இலக்கிய வரலாறு

நவீனக் கவிதை இலக்கிய வடிவங்கள்

1. ஹைக்கூ 2. குக்கூ 3. சென்ட்ரியூ 4. கஜல்..
2. கணினித் தமிழ் - கலைச்சொற்கள்

பயிற்சிக்குரியன

பாடநூல்கள்

1. பாரதியார் கவிதைகள்
2. பாரதிதாசன் கவிதைகள்
3. சுரதா கவிதைகள்
4. சிற்பி கவிதைகள்
5. அ. வெண்ணிலா

பார்வை நூல்கள் : 1. இலக்கியவரலாறு – பாக்கியமேரி,
2. இலக்கண நூல்,
3. மு.வ. -தமிழ் இலக்கிய வரலாறு

SEMESTER I

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
17BGE11F	PART I French	3	6	1	0	Theory

Prescribed Text: **LATITUDES I**

Units: 1 – 4

Authors: Régine Mérieux

Yves Loiseau

Available at: Goyal Publishers Pvt Ltd 86,

University Block Jawahar Nagar (Kamla Nagar)

New Delhi – 110007

Tel : 011 – 23852986 / 9650597000

SEMESTER I

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
17BGE11H	PART I Hindi	3	6	1	0	Theory

(Prose, Non-detailed, Grammar & Translation, Comprehension)

1.PROSE : NUTHAN GADYA SANGRAH
Editor : Jayaprakash
(Prescribed Lessons – only 6)
Lesson 1 – Bharathiya Sanskurthi
Lesson 3 – Razia
Lesson 4 – Makreal
Lesson 5 – Bahtha Pani Nirmala.
Lesson 6 – Rashtrapitha Mahathma Gandhi
Lesson 9 – Ninda Ras.

Publisher : Sumitra Prakashan Sumitravas,
16/4, Hastings Road,
Allahabad – 211 001.

2. NON DETAILED TEXT : KAHANI KUNJ
Editor : Dr. V.P. Amithab.
(Stories 1-6 only)

Publisher : Govind Prakashan Sadhar Bagaar,
Mathura,
Uttar Pradesh – 281 001.

3. GRAMMAR : SHABDHA VICHAR ONLY

(NOUN, PRONOUN, ADJECTIVE, VERB, TENSE, CASE ENDINGS)
Theoretical & Applied.
Book for Reference : Vyakaran Pradeep by Ramdev
Publisher : Hindi Bhavan, 36,
Tagore Town Allahabad – 211 002.

4. TRANSLATION : English – Hindi only.
ANUVADH ABHYAS – III
(1-15 lessons only)
Publisher : DAKSHIN BHARAT HINDI PRACHAR SABHA
CHENNAI – 17.

5. COMPREHENSION : 1 Passage from ANUVADH ABHYAS – III (16-30)
DAKSHIN BHARATH HINDI PRACHAR
SABHA CHENNAI-17.

SEMESTER I

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
17BGE11M	**PART I Malayalam**	**3**	**6**	**1**	**0**	**Theory**

(Paper I Prose, Composition & Translation)

This paper will have the following five units:

Unit I & II Novel

Unit III & IV Short story

Unit V Composition & Translation

Text books prescribed:

Unit I & II Pathummayude Aadu - Vaikam Muhammed Basheerr
(D.C.Books, Kottayam, Kerala)

Unit III & IV Ente Priyappeta Kadhakal – Akbar Kakkattil)
(D.C. Books, Kottayam, Kerala)

Unit V Expansion of ideas, General Eassay and Translation.

(A simple passage from English about 100 works to Malayalam)

Reference Books: 1.Malayala Novel Sahithya Charitram-K.M.Tharakan
(N.B.S.Kottayam)
2. Cherukatha Innale Innu-M.Achuyuthan (D.C Books, Kottayam)

4. Sahithya Charitram Prasthanangalilude- Dr.K.M George, (D.C.Books Kottayam)

5.Malayala Sahithya vimarsam-Sukumar Azhee kode (D.C.books)

SEMESTER I

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
17BGE11A	PART I Arabic	3	6	1	0	Theory

PAPER-I: PROSE AND GRAMMAR–I

Books Prescribed: 1. Duroos Al-Lugha Al-Arabiyya Part-I (Lesson 1 to 12)
By Dr. V. Abdur Rahim, IFT, Perambur, Chennai-12.

2. An-Nahwu Al-Wadeh Part-I (Al-Ibtidaiyyah - Selected Lessons) By Ali Alijarim and Mustafa Ameen, Al-Huda Book Stall, Calicut, Kerala

(Lessons: Al-Jumlah Al-Mufeedha, Ajza Al-Jumlah, Al-Fi'l al-Madhi, Al-Fi'l-al-Mudhari', Fi'l al-Amr, Al-Fa'il, Al-Maf'uool, Al-Mubthdha Wal- Khabar)

SEMESTER I

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
17BGE11U	PART I Urudu	3	6	1	0	Theory

(PROSE, GRAMMER & TRANSLATION)

Book Prescribed: **Faizan-e-Adab** - Edited by Dr.K.Habeeb Ahmed
[Published by Ansaar Educational & Welfare Society,
Melvisharam- Contact No.9994965700,9443818785]

[a] Prose:
The following lessons only
1. SAIR PAHLAY DARWESH KI - Meer Amman Dehalvi
2. UMEED KI KHUSHI – Sir Syed
3. MIRZA GHALIB KE AKHLAQ WA ADAT – Moulana hali
4. ZUBAIDA KHATOON – Abdul Haleem Sharar
5. NOOR JHAN – Mohamed Hussain Azad
6. MARHOOM DI YAAD MEIN – PATRAS BUKHARI
7. SIR SYED MARHOOM AUR URDU LITERATURE – Shibi
8. KHAJA MOHINUDEEN SHITHI- Shabaz Hussain

[b] Grammar: 1. ISM AUR USKI KHISMEIN
2. ZAMEER AUR USKI KHISMIEN
3. SIFAT AUR USKI KHIMEIN
4. FE'L AUR USKI KHIMEIN
5. LAWAZIM-E-ISM
6. ALAMAT-E-FAEL "NAY" AUR ALAMAT-E-MAFO'OL "KO" KE QUAIDE BOOK FOR REFERENCE Urdu Grammar by Yaqoob Aslam
[c] TRANSLATION: A GENERAL PASSAGE FOR TRANSLATION FROM ENGLISH TO URDU

Semester I:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core - I – Problem Solving Using C	**4**	**6**	**0**	**0**	**Theory**

Introduction:

This subject covers in detail all aspects of the C language, including its foundation: C. To provide a plat form for the students in C programming.

Course Outcome:

CO1 : Demonstrate the flowchart and design an algorithm for a given problem and to c programs using operators

CO2 : Develop conditional and iterative statements to write C programs

CO3 : Exercise user defined functions to solve real time problems

CO4 : Inscribe C programs that use Pointers to access arrays, strings and functions.

CO5 : Exercise user defined data types including structures and unions to solve problem

Unit I **[12 periods]**

Overview of computers and Programming - Computers Hardware - Computer Software - The Software Development Method - Applying the software development method - Professional Ethics for Computer Programmers - C Language Elements - Variable Declarations and Data Types - General form of a C Program - Arithmetic Expressions - Common Programming Errors.

Unit II **[12 periods]**

Building Programs from Existing information - Library Functions - Top-Down Design and Structure charts - Functions without Arguments - Functions with Input Arguments - Control Structures - Conditions - The if Statement - If statements with Compound Statements - Nested if statements and Multiple-Alternative decisions- The Switch Statement - Counting Loops and the While statement - Computing a sum or a product in a loop - The For statement - Conditional Loops - Loop Design - Nested Loops - the do-while statement and flag-controlled loops .

Unit III : **[12 periods]**

Pointers and the Indirection Operator - functions with output parameters - Multiple calls to function with Input / Output parameters - Arrays - Declaring and Referencing Arrays - Array subscripts - Using array elements as function arguments- Array arguments - Searching and sorting an Array - Multidimensional Arrays - Strings - String Basics - String Library functions - String Comparison - Arrays of pointers .

Unit IV: **[12 periods]**

Recursion - Problem solving with recursion - CPE - Structure and Union types : User-defined Structure types - Structure type data as input and output parameters - Functions whose result values are structured - Problem solving with structure types - Parallel arrays and Arrays of structures - Union Types.

Unit V: **[12 periods]**

Text and Binary File Processing - Input/ Output files:Review and Further Study - Binary Files - Searching a Database - CPE - Using Abstraction to Manage Complexity - Header files - implementation files - Conditional compilation - Defining Macros with parameters.

Text books:

1. Problem Solving and Program Design in C, Jeri R. Hanly and Elliot B. Koffman, Pearson Publication, Seventh Edition, 2012.

Reference Books :

1. Ansi C, E Balagurusamy, Fifth Edition, 2008
2. L.Kathirvelkumaran and R. Muralidharan , "Basic Concepts in C Programming",Coimbatore Institute of Information Technology ,First Edition 2016.
3. Let Us C, Fifth Edition, Yashavant P. Kanetkar, 2004

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**1**	**3**	**1**		**2**		**3**				**2**		**3**
CO2		**2**		**3**		**2**		**3**		**2**			**1**
CO3	**3**		**3**	**2**	**3**		**1**	**2**		**1**		**3**	
CO4	**3**		**2**		**1**	**3**			**3**		**3**		**2**
CO5	**2**	**3**		**1**			**3**		**1**			**3**	

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core - Practical - I – Programming in C Lab	**4**			**5**	**Practical**

Course Outcome:

CO1 : Understand basic Structure of the C-PROGRAMMING, declaration and usage of variables

CO2 : Understand C programs using operators

CO3 : Exercise conditional and iterative statements to Write C programs

CO4 : Understand for C programs using Pointers to access arrays, strings and functions

CO5 : Understand C programs using pointers and allocate memory using dynamic memory management functions.

1. Write a program for find the max and min from the three numbers.
2. Write the program for the simple, compound interest.
3. Write program for students marks grading.
4. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
5. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
6. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
7. Write a C program to find the roots of a Quadratic equation.
8. Write a C program that uses functions to perform the following:
   a) Addition of Two Matrices b) Subtraction of Two Matrices.
9. Write a C program to determine if the given string is a palindrome or not using pointer.
10. Write a C program to count the lines, words and characters in a given text.
11. Write a C program which copies one file to another.
12. Write a C program to reverse the first n characters in a file. (Note: The file name and n are specified on the command line.)

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
20BGE21T	Part I Tamil	**3**	**6**	**1**	**0**	**Theory / Practical**

Introduction: இரண்டாம் பருவ பாடத்திட்டம் அற ,லக்கியம், சிற்றிலக்கியம், சிறுகதைகள், ,இலக்கணம், ,இலக்கிய வரலாறு ஆகியவைகள் கொண்டு உருவாகியுள்ளது.

Course Outcome:

CO1 : நீதிநெறி கருத்துக்களை அறிந்து கொள்ளுவதால், வாழ்க்கையில் பண்புகளை பின்பற்றவும், அறாறிவோடு வாழவும் பயனுள்ளதாக அமையும்.

CO2 : சிற்றிலக்கியத்தின் செய்திகள் மாணவர்கள் தெளிவாக அறிந்துகொள்ளுவது, அன்பின் மேன்மை, பண்பு ஆகியவைகள் அறிந்து கொள்ள முடிகிறது.

CO3 : அணி ,லக்கணம் அறிவதால் ,லக்கணத்தின் சிறப்பு முக்கியம் என்பதை அறியலாம்.

CO4 : சிறுகதைகளில் உள்ள கதைகளில் உள்ள மையக்கருத்துகளைத் தெரிந்து கொள்ளுவது சமுதாயச் சிந்தளையையும், விழிப்புணர்வும் உருவாக்க உதவுகிறது.

CO5 : நீதி சிற்றிலக்கியங்கள் ஆகியவற்றின் செய்திகளை அறிவது தமிழின் வரலாற்றையும், படிநிலைகளையும் அறிய பயன் உள்ளது. களப்பணிகளை அறியலாம்.

Unit I:	[12 Periods]
அற ,லக்கியம் திருக்குறள், அன்புடைமை,அறிவுடைமை, நாலடியார், பழமொழி நானூறு-ஆகியவைகள் நீதியின் கருத்துக்கள் கொண்டு பாடமாக உள்ளது.	

Unit II:	[12 Periods]
நந்திக்கலம்பகம், சிற்றிலக்கிய உறுப்புகள்- குற்றலாக் குறவஞ்சி – மலைவளம், கலிங்கத்துப்பரணி, காடு பாடியது, அழகர் கிள்ளை விடு தூது, கலிங்கத்துப்பரணி– கோயில் பாடியது, கிள்ளை விடு தூது ஆகிய சிற்றிலக்கியங்களின் கருத்துக்களை	

தெளிவாக எடுத்துரைத்தல்.	
Unit III:	[12 Periods]
சிலேடை அணி, பரியாய அணி, விபாவனை அணி, அதிசய அணி, ,லக்கணம் - விளக்கத்துடன் கற்பிக்கப்படும்.	
Unit IV:.	[12 Periods]
தேர்ந்தெடுக்கப்பட்ட 4 -சிறுகதைகள் - மாணவர்களின் தனித்திறனை வளர்க்கும் பொருட்டு எடுக்கப்படும். சமுதாய செய்திகளை பற்றி விளக்கம் தருதல்.	
Unit V:	[12 Periods]
நீதி ,லக்கியம், சிற்றிலக்கியம், ஆகியவைகளின் தோற்றத்தையும், வளர்ச்சியும் எடுத்துரைக்கப்படும். தொல்லியல் அகழாய்வு அண்மைப் பதிவுகள் - திட்டக்கட்டுரை ஒப்படைப்பு, களப்பணிகளைப் பார்வையிடல், தரவுகளைப் பட்டியலிடல். விளக்கத்துடன் கூறுதல்.	

பாடநூல்கள் ;

1. பதினெண்கீழ்க்கணக்கு நூல்கள்
2. நந்திக்கலம்பகம்
3. குற்றலாக்குறவஞ்சி
4. கலிங்கத்துப்பரணி

பார்வை நூல்கள்

1. ஜெயகாந்தன் சிறுகதை
2. புதுமைப்பித்தன் சிறுகதை
3. சூடாமணி - சிறுகதை
4. எஸ். ராமகிருண்ணன-; சிறுகதை
5. மு.வ. -தமிழ் ,லக்கிய வரலாறு
6. டாக்டர் கே.கே பிள்ளை – தமிழக வரலாறு மக்களும் பண்பாடும்.

7. பேரா.முனைவர் பாக்யமேரி - , இலக்கணம் , இலக்கிய வரலாறு மொழித்திறன்.

இரண்டாம் பருவம்

(அற இலக்கியம், சிற்றிலக்கியம், இலக்கணம், சிறுகதை, இலக்கிய வரலாறு)

அலகு ஐ அற இலக்கியம்

1. திருக்குறள் - 2 அதிகாரங்கள்
   1. நட்பாராய்தல் 10 குறள்கள் அதிகாரம் -8
   2. அறிவுடைமை 10 குறள்கள் அதிகாரம் -43
   2. நாலடியார் -5 பாடல்கள் (132,133,135,136,139)
   3. பழமொழி நானூறு - 5 பாடல்கள்; (90,91,93,95,100)

அலகு ஐஐ சிற்றிலக்கியம்

1. நந்திக்கலம்பகம் - சிற்றிலக்கிய உறுப்புகள் (6 பாடல்கள் (புயம், ஊசல், தெற்றாறு வென்றவன்,மறம்)
2. குற்றலாக் குறவஞ்சி – மலைவளம்
3. கலிங்கத்துப்பரணி – காடு பாடியது
4. அழகர் கிள்ளை விடு தூது

அலகு ஐஐஐ இலக்கணம்

அணி இலக்கணம் - விளக்கத்துடன் கற்பித்தல்.
1.சிலேடை அணி 2. எடுத்துக்காட்டு உவமையணி 3. ஆர்வமொழியணி (உயர்வு நவிற்சியணி) 4. தீவக அணி

அலகு ஐஏ சிறுகதைகள்

1. ஜெயகாந்தன் - ஒரு பிரமுகர் 2. புதுமைப்பித்தன்- பூசணிக்காய் அம்பி
3. சூடாமணி – சொந்த வீடு 4. எஸ். ராமகிருணன் -பாதம் (4 சிறுகதைகள்)

அலகு ஏ இலக்கிய வரலாறு

1. நீதி இலக்கியம்
2. சிற்றிலக்கியம்
3. தொல்லியல் அகழாய்வு அண்மைப் பதிவுகள் - திட்டக்கட்டுரை ஒப்படைப்பு களப்பணிகளைப் பார்வையிடல், தரவுகளைப் பட்டியலிடல்.

பாடநூல்கள்

1. பதினெண்கீழ்க்கணக்கு நூல்கள்
2. முக்கூடற்பள்ளு நூல்
3. குற்றலாக்குறவஞ்சி
4. கலிங்கத்துப்பரணி

பார்வை நூல்கள்

1. ஜெயகாந்தன் சிறுகதை
2. புதுமைப்பித்தன் சிறுகதை
3. சூடாமணி சிறுகதை
4. எஸ். ராமகிருணன
5. மு.வ. -தமிழ் இலக்கிய வரலாறு
6. டாக்டர் கே.கே பிள்ளை – தமிழக வரலாறு மக்களும் பண்பாடும்.
7. பேரா.முனைவர் பாக்யமேரி - இலக்கணம் இலக்கிய வரலாறு மொழித்திறன்

PART – I – FRENCH

SEMESTER I I
PAPER II

SEMESTER II PAPER II

French II

1. Topics & Vocabulary:
   i. Review and practice level 1 vocabulary/grammar
   ii. Talking about family, friends and celebrities
   iii. Talking about oneself – key personal information + likes/dislikes
   iv. Talking about hobbies
   v. Daily life – routines, habits, free time
   vi. Days of the week
   vii. Animals
   viii. Telling the time
   ix. Consumer goods – clothes, accessories, food
   x. Describing objects – shape, colour, size
   xi. Talking about the weather
   xii. Shopping
2. Grammar:
   i. Possessive Adjective
   ii. Possessive pronouns
   iii. Revision 'ER' verbs
   iv. The immediate past: 'venir de'
   v. Negative sentences
   vi. Key verbs: faire, aller, sortir, etc.
   vii. Demonstrative pronouns
   viii. Frequency adverbs
   ix. Reflexive verbs in 'ER'
   x. Question words (quel)
3. Cultural Content:
   i. French speaking celebrities
   ii. French daily routine
   iii. French brands and products
   iv. Bruxelles
4. Skills Work:
   i. Lots of speaking/active practice
   ii. Role-plays
   iii. Lots of listening
   iv. Pronunciation – key sounds
   v. Essay writing

References:

1. Annie Monnerie-Goarin, Sylvie Schmitt, Stéphanie Saintenoy, Béatrice Szarvas, Métro Saint-Michel, CLE International, Paris, 2006.

2. Jean-Luc Penfornis, (Débutant) Méthode de français professionnel et des affaires, CLE International, VEUF-Paris, 2003.

Part I – Hindi Language
SECOND SEMESTER – Paper II

SECOND SEMESTER – PAPER II

I MODERN POETRY

PANCHVATI by MYTHLI SHARAN GUPT 18

II ONE ACT PLAY

EKANIKI PIYUSH

1. Owrangjeb ki aakirirath– Ramkumar varma

2. Ek din - Lakshminarayan Misra

3. Vapasi - Vishnuprabhakar

III LETTER WRITING

(Leave Letter, Job Application, Ordering Books, Letter to Publisher, Personal Letter)

IV CONVERSATION

(Doctor & Patient, Teacher & Student, Storekeeper & Buyer, Two Friends, Booking Clerk & Passenger at Railway Station, Auto rickshaw driver and Passenger)

V TRANSLATION

HINDI-ENGLISH ONLY Lessons – 1-15 only ANUVADH ABYAS-III

Text Book:

1. Panchvati, Mythili sharan Gupt, 2015, Rajkamal Prakashan

2. Ekaniki piyush ,Srimathi Usha mehra.

Part I –Malayalam Language
SECOND SEMESTER – Paper II

SECOND SEMESTER – PAPER II

Unit I & II Autobiography of Kamla Surayya

Uinit III,IV & V Travelogue

Unit III,IV & V Alkoottathil Thaniyae

Text Books prescribed:

1. Unit I & II Autobiography of Kamla Surayya
   (D.C.Books, Kottayam)

2. M.T Vasudhevan Nair
   (D.C.Books, Kottayam)

Reference books:

1. Athmakathasahithyam Malayalathil-Dr.Vijayalam Jayakumar (N.B.S.Kottayam)
2. Sancharasahithyam Malayalathil –Prof.Ramesh chandran. V,(Kerala Bhasha Institute, Trivandrum)

II SEMESTER

PAPER-II: COMMUNICATIVE ARABIC

Books Prescribed: 1. **Arabic Conversation Book (Lesson 1 to 19)**

By Mohd. Harun Rashid and Khalid Perwez**,** Published by Good word Books

II SEMESTER
POETRY, GHAZALITH & LETTER WRITING
Urudu Language

Book Prescribed: **Faizan-e-Adab** - Edited by Dr.K.Habeeb Ahmed
[Published by Ansaar Educational & Welfare Society,
Melvisharam- Contact No.9994965700,9443818785]
Part- I Urudu Language (Colleges) 2014-15

Annexure: **13F** Page 2 of 4 SCAA DT. : 6-2-2014
[a] MANZOOMATH

1. BARQ-E-KALESA – AKBAR ALLAHBADI
2. SHIKWA – ALLAMA IQBAL

(Selected four stanzas from each of the above)

3. JAWAB-E-SHIKWA – ALLAMA IQBAL

(Selected four stanzas from each of the above)

4. SUBH-E-AZADI – FAIZ AHMED FAIZ
5. TAJ MAHAL – SAHIR LUDHYANWI

[b] GHAZALITH:

1. MEER TAQI MEER
2. KHAJA MEER DARD
3. SHAIK IBRAHIM ZAUQ
4. MIRZA GHALIB
5. MOMIN KHAN MOMIN
6. JIGAR MURADABADE
7. HASRATH MOHANI
8. FANI BADAYUNI
9. DANISH FARAZI
10. SHAKIR NAITHI

[c] LETTER WRITING:

1. LETTER TO THE PRINCIPAL SEEKING LEAVE

2. LETTER TO THE MANAGER OF A FIRM SEEKING EMPLOYMENT
3. LETTER TO A PUBLISHER OT BOOK SELLER PLACING ORDER FOR BOOKS
4. LETTER TO THE MUNICIPAL COMMISSIONER DRAWING HIS ATTENTION
5. LETTER TO THE FATHER / GUARDIAN ASKING MONEY FOR PAYMENT OF COLLEGE FEES
6. LETTER TO A FRIEND INVITING HIM TO YOUR SISTER'S MARRIAGE

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Python Programming	**4**	**5**	**-**	**0**	**Theory**

Introduction: After learning the Syntax and Semantics and create Functions, Handle Strings and Files, Understand Lists, Dictionaries and Regular expressions, Implement Object Oriented Programming concepts, Build Web Services and introduction to Network and Database Programming students are able to develop rich dynamic websites in Python.

Course Outcome:

CO1 : Examine Python syntax and semantics and be fluent in the use of Python flow control and functions

CO2 : Demonstrate proficiency in handling Strings and File Systems

CO3 : Understand Lists, Dictionaries and Regular expressions in Python

CO4 : Interpret the concepts of Object-Oriented Programming as used in Python

CO5 : Implement exemplary applications related to Network Programming, Web Services and Databases in Python

Unit I: [12 periods]

Installing Python, Simple program using Python, Expressions and Values, Variables and Computer Memory, error detection, Multiple line statements, Designing and using functions, functions provided by Python, Tracing function calls in memory model, omitting return statement. Working with Text: Creating Strings of Characters, Using Special Characters in Strings, Creating a Multiline String, Printing Information, Getting Information from the Keyboard.

Unit II : [12 periods]

A Boolean Type , Choosing Statements to Execute, Nested If Statements , Remembering the Results of a Boolean Expression Evaluation , A Modular Approach to Program Organization, Importing Modules , Defining Your Own Modules, Testing Code Semi automatically Grouping Functions Using Methods: Modules, Classes, and Methods , Calling Methods the Object-Oriented Way, Exploring String Methods, Underscores.

Unit III: [12 periods]

Storing Collections of Data Using Lists: Storing and Accessing Data in Lists, modifying Lists, Operations on Lists, Slicing Lists, Aliasing, List Methods, Working with a List of Lists. Repeating Code Using Loops:

Processing Items in a List, Processing Characters in Strings, Looping Over a Range of Numbers, Processing Lists Using Indices, Nesting Loops in Loops, Looping Until a Condition Is Reached, Repetition Based on User Input, Controlling Loops UsingBreak and Continue Reading and Writing.

Unit IV: **[12 periods]**

Files: Kinds of files, Opening a File, Techniques for Reading Files, Files over the Internet, Writing Files, and Writing Algorithms That Use the File-Reading Techniques, Multiline Records. Storing Data Using Other Collection Types: Storing Data Using Sets, Storing Data Using Tuples, Storing Data Using Dictionaries, Inverting a Dictionary, Using the In Operator on Tuples, Sets, and Dictionaries, Comparing Collections.

Unit V: **[12 periods]**

Collection of New Information Object-Oriented Programming : Understanding a Problem Domain , Function "Isinstance," Class Object, and Class Book , Writing a Method in Class Book, Plugging into Python Syntax: More Special Methods, Creating Graphical User interface: Building a Basic GUI, Models, Views, and Controllers, Customizing the Visual Style Introducing few more Widgets, Object-Oriented GUIs, Keeping the Concepts from Being a GUI Mess.

Reference Books:

1. L. Halterman, "Fundamentals of Python Programming", Southern Adventist University July 26, 2018, Copyright © 2017 Richard L. Halterman Richard.
2. John V Guttag, —Introduction to Computation and Programming Using Python‘‘, Revised and expanded Edition, MIT Press , 2013
3. Robert Sedgewick, Kevin Wayne, Robert Dondero, —Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
4. Timothy A. Budd, —Exploring Python||, Mc-Graw Hill Education (India) Private Ltd.,, 2015.
5. Kenneth A. Lambert, —Fundamentals of Python: First Programs||, CENGAGE Learning, 2012.
   Charles Dierbach, Introduction to Computer Science using Python: A Computational ProblemSolving Focus, Wiley India Edition, 2013

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**1**	**3**		**3**		**2**				**3**	**3**		**3**
CO2		**2**	**3**		**1**		**3**	**2**	**3**				
CO3	**2**	**1**	**2**			**1**				**2**	**1**	**3**	**2**
CO4	**3**			**1**	**3**	**3**			**1**	**3**		**1**	**3**
CO5		**3**			**2**		**2**	**3**					

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Python Programming Lab	**4**	**0**	**-**	**5**	**Lab**

Introduction: Understand the basic operations and creations of various applications using python.

Course Outcome:

CO1 : Write, test, and debug simple Python programs.

CO2 : Implement Python programs with conditionals and loops for stack, sorting algorithms.

CO3 : Read and write data from/to files in Python.

CO4 : Use Python lists, dictionaries for representing compound data.

CO5 : Write Script to SQL and Demonstrate Exception in Python.

Lab Experiments:

1. Create a calculator program using Python.
2. Create Python program using different String functions.
3. Implement Selection sort algorithm using Python Program.
4. Implement stack Operation using Python Program.
5. Read and Write into a file using Python Program.
6. Demonstrate use of Dictionaries in Python Program.
7. Create Comma Separate Files (CSV), Load CSV files into internal Data Structure.
8. Write script to work like a SQL SELECT statement for internal Data Structure made in earlier exercise.
9. Write script to work like a SQL Inner Join for an internal Data Structure made in earlier exercise.
10. Demonstrate Exceptions in Python.

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**				**3**		**3**		**3**		**3**		**3**
CO2	**2**	**3**		**2**	**3**	**2**		**3**				**3**	
CO3	**3**	**2**	**3**			**3**	**2**		**2**	**1**	**3**		**1**
CO4			**2**	**3**	**3**					**1**		**2**	**2**
CO5	**1**	**3**		**1**		**2**	**2**		**3**		**1**		

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical
	Web Technology	**4**	**4**	**1**	

Introduction: To know the fundamentals of Web based Language and its features.

Course Outcome:

CO1 : Understand the basics of Internet and Its Protocol.

CO2 : To Learn about HTML Language and its features.

CO3 : To learn about basic knowledge about CSS.

CO4 : Understand basic in Servlete and HTTP

CO5 : Understand basic of JSP and Cookies

UNIT I :

Introduction –History of the Internet –Services and Accessibility –Uses –Protocols –Internet Standards.

UNIT II :

HTML –Introduction –HTML Document –Head Section –Body Section –HTML Forms –Java Script –Introduction –Language Elements –Objects of Java Script –Other Objects –Arrays.

UNIT III :

Cascading Style Sheets –Advantages of CSS –Properties of Tags –Property Values –Embedded Style Sheets –External Style Sheets –Grouping –Inheritance –Class as Selector –Pseudo Classes and Pseudo Elements –Positioning –Backgrounds –Element Dimensions.

UNIT IV:

Servlets –Introduction –Advantages of Servlets -Servlet Life Cycle -The Servlet API -A Simple Servlet –Handling HTTP GET Requests –Handling HTTP POST Requests –Cookies –Session Tracking.

UNIT V:

Introduction –Advantages of JSP –Developing First JSP –Components of JSP –Reading request information –Retrieving the data posted from a HTML file to a JSP File –JSP Sessions –Cookies –Disabling Sessions.

Textbook :

Web Technology –A Developers Perspective –N P Gopalan, J Akilandeswari, Prentice Hall of India Pvt. Ltd., New Delhi, 2008.

Reference Book :

1. Mastering Javascript, J Jaworkski, BPB Publications, 1999.
2. Core SERVLETS AND JAVA SERVER PAGES VOLUME 1: CORE TECHNOLOGIES By Marty Halland Larry Brown Pearson, Pearson Education India

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**	**3**			**2**		**2**			**3**	**3**		
CO2			**3**		**3**		**3**		**3**		**3**	**2**	**1**
CO3	**3**	**2**		**1**		**3**	**3**	**3**					**3**
CO4		**3**		**3**		**1**					**2**		
CO5			**2**		**3**			**2**	**1**	**2**		**3**	

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	DSC - Practical - I – Web Technology Lab	**4**			**5**	**Practical**

Course Objective:

To highlight the basic concepts of HTML and help the student to equip with the programming skills in implementing and developing web based applications. Each exercise should be completed within two hours. It is compulsory to complete all the exercises given in the list in the stipulated time.

List of Programs:

1. Create a website using internal links and images.

2. Design a calendar using table tag.

3. Create a HTML document to display a list of five flowers and link each one to another document displaying brief description of the flower, Add pictures wherever possible.

4. Write an HTML code to display a list of 5 cars in a frame, Link each one to a brief description in second frame. The left frame should display the list and the right frame should display the paragraph about the frame.

5. Create a simple HTML Form covering major form elements.

6. Embed Audio and Video in an HTML page.

7. Rotate an element using CSS.

8. Build a simple quiz.

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**		**2**			**3**	**3**			**3**		**3**	
CO2	**3**	**1**		**1**	**3**	**2**		**2**			**2**		**2**
CO3	**3**		**3**	**3**				**1**	**3**	**2**		**1**	
CO4		**3**	**3**		**2**	**3**	**3**	**3**			**3**		**3**
CO5			**3**	**1**			**3**		**3**	**1**		**3**	

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Android Application Development	**4**	**4**	**0**	**0**	**Theory**

Introduction:

This course is to enable the students to develop mobile based applications using activities and intents. To create rich user interfaces and to work with SMS, messaging APIs, and the Android SDK.

Course Outcome:

CO1 : To understand about the need for android and the basics in it. To know about the installation of Java JDK and Android SDK.

CO2 : To understand about the creation of android projects and user interfaces.

CO3 : To code the android applications and to work with android framework classes.

CO4 : To work with home screen widgets and app widgets in android.

CO5 : To create a distributable file and outsourcing it in the market for the developed application.

Unit I **[12 periods]**

Developing Spectacular Android Applications: Need of Develop for android - Android Programming Basics - Hardware Tools - Software Tools. Prepping Development Headquarters: Assembling Toolkit - Tuning Up the Hardware - Installing and Configuring Support Tools - Getting the Java Development Kit - Acquiring the Android SDK - Getting the Total Eclipse - Getting Acquainted with the Android Development Tools

Unit II : **[12 periods]**

First Android Project: Starting a New Project in Eclipse - Deconstructing Project - Setting Up an Emulator - Creating Launch Configurations - Running the Hello Android App - Understanding Project Structure. Designing the User Interface: Creating the Silent Mode Toggle Application - Laying Out the Application - Developing the User Interface - Adding an Image to Application - Creating a Launcher Icon for the Application - Adding a Toggle Button Widget - Previewing the Application in the Visual Designer

Unit III : [12 periods]

Coding Android Application: Understanding Activities - Creating the First Activity - Working with the Android Framework Classes- Installing and reinstalling the Application - Responding to Errors.

Unit IV: [12 periods]

Understanding Android Resources: Understanding Resources - Working with Resources. Turning the Application into a Home Screen Widget: Working with App Widgets in Android - Working with Pending Intents - Creating the Home Screen Widget - Placing the Widget on the Home Screen

Unit V: [12 periods]

Turning Publishing the App to the Android Market: Creating a Distributable File - Creating an Android Market Account - Pricing the Application - Getting Screen Shots for the Application - Uploading the Application to the Android Market - Watching the Installs Soar.

Textbook:

1. Michael Burton, Donn Felker, "Android application development for dummies", Wiley publishing inc, 2nd Edition, 2012.

Reference :

1. Mark L. Murphy, "The Busy Coder's Guide to Advanced Android Development", Commons ware.

2. Reto Meier, "Professional Android 4 Application Development", 2008, ISBN 978-1-118-10227-5, 2012.

3. Soham Mondal, Kyle Mew, "Android Application Development and Design Patterns", Packt Publishing, 2017

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	3		2			3	3			3		3	
CO2	3	1		1	3	2		2			2		2
CO3	3		3	3				1	3	2		1	
CO4		3	3		2	3	3	3			3		3
CO5			3	1			3		3	1		3	

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Android Application Development Lab	**2**	**0**	**0**	**4**	**Practical**

Course Outcome:

To build a native application using GUI components and Mobile application development framework. To develop an application using basic graphical primitives and databases.

List of Programs:

1. Getting Started with Mobile App Development

2. Create and validate a login application using username as Email ID else login button must remain disabled

3. Creating a Hello World program Experiment with the most basic features and mobile application interaction concepts lists, text boxes, buttons, graphics, etc)

4. Create a following menu items in mobile application programa. cut b. copy c. pasted. delete e. select all f. unselect all

5. Create an application to change screen color as per the user choice from a menu

6. Create an Android application with a combo box, spinner, toast message get selected item

7. Create an application to call a phone number entered by the user and edit Text

8. Develop a native application that uses GPS location information.

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**		**3**		**3**			**2**		**3**			**3**
CO2		**2**		**3**	**3**	**3**	**3**		**3**	**3**		**3**	**2**
CO3	**3**	**3**	**2**	**1**	**2**		**2**			**3**	**3**	**3**	**3**
CO4	**3**			**2**		**3**		**3**	**1**		**3**	**3**	
CO5	**3**	**3**	**1**			**2**	**3**				**2**		

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Machine Learning	4	6	0	0	Core

Introduction:

Machine learning uses interdisciplinary techniques such as statistics, linear algebra, optimization, and computer science to create automated systems that can sift through large volumes of data at high speed to make predictions or decisions without human intervention. Machine learning as a field is now incredibly pervasive, with applications spanning from business intelligence to homeland security, from analyzing biochemical interactions to structural monitoring of aging bridges, and from emissions to astrophysics, etc. This class will familiarize students with a broad cross-section of models and algorithms for machine learning, and prepare students for research or industry application of machine learning techniques.

Course Outcome:

CO1 : Understand the difference between continuous class label and discrete class label classification methods.

CO2 : Predict the continuous class variable using linear regression analysis.

CO3 : Predict the binary class variable using decision tree and random forest.

CO4 : Understand the importance of Logistic regression and its application in business.

CO5 : Apply the assessment method to find the better number of PCA and Clusters for the given data.

Unit I [12 periods]

Introduction to Machine Learning Algorithms:

Introduction to Machine learning – Statistical Learning – types of Machine Learning –learning models: geometric, probabilistic and logistic models, introduction to supervised, unsupervised and reinforcement learning – model evaluation – model implementation – model accuracy indicators.

Unit II [12 periods]

Supervised Learning –Regression Analysis:

Introduction to parametric machine learning method- assumptions of parametric machine learning methods- linear model and its assumptions- simple linear regression- parameter estimation- properties of regression parameters- testing the significance of regression parameters- estimation of σ^2, Interval Estimation of the Mean Response- prediction of new observations-Confidence interval for β_0, β_1 and σ^2-Multiple linear Regression analysis-parameter estimation, and significance of coefficients, assumptions of multiple linear regression parameters.

Unit III

[12 periods]

Classification Techniques – Decision Tree:

Introduction to decision tree algorithms- classification tree- characteristics of classification tree – size and hierarchical nature of tree- training and testing data set- induction algorithms-probability estimation in decision tree – Laplace correction and no match method- stopping criteria for tree development- pruning techniques and pruned tree-evaluation of decision tree classifiers- generalization error- F measure, Confusion matrix-ROC curve- Hit Rate Curve- Lift curve- McNemar's Test- Resample paired t test- K-fold cross validated paired t test- prediction using better model- Decision tree ensembles methods.

Unit IV [12 periods]

Classification Techniques – Logistic Regression:

Introduction to logistic regression- assumptions involved in logistic regression- concepts on odds and odds ratio- maximum likelihood estimation- binomial logistic regression- parameter estimation- properties of logistic regression coefficients- logistic regression for correlated data-model accuracy testing- confusion matrix-Receiver Operating Characteristic Curve-area under curve- likelihood ratio test- concepts and interpretation of Pseudo R square tests- Hosmer-Lemeshow Test- Wald Test, prediction using better fit model and interpretation.

Unit V [12 periods]

Unsupervised Learning:

Introduction to data dimension reduction techniques, linearity of variables- assumptions of linearity among variables- general purpose and description of principle component analysis-extraction of principle components- extraction techniques- orthogonal and oblique rotation of

linear combination of variables- factor analysis and its relevance with business application- introduction to cluster analysis and its validations.

Text Books:

1. Introduction to Linear Regression Analysis, Fifth Edition - DOUGLAS C. MONTGOMERY, ELIZABETH A. PECK, G. GEOFFREY VINING, A JOHN WILEY & SONS, INC., PUBLICATION
2. Introduction to Machine Learning – Ethem Alpaydm, The MIT Press

Reference Books:

1. Applied Regression Analysis, Third Edition – Norman R Draper, Harry Smith, John Wiley & Sons.

   2.Using Multivariate Statistics - Barbara G. Tabachnick, Linda S. Fidell, Pearson Education Inc.

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	3		3					3	3		2		
CO2		3			2		3	2	3	3		2	1
CO3	3	2		3		1	3		2	3	3	3	3
CO4	3	3	2	3	3	3	2	1			3		3
CO5			3	2		2				2			

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Machine Learning Lab	4	0	0	6	Practical

Introduction: Understand the basic concepts and its usage of Machine Learning using R.

Course Outcome:

CO1 : To Implement the Data frame R commands for tables.

CO2 : To Implement R programs for Regression.

CO3 : To Implement a ANOVA and compare with F and partial T test.

CO4 : To Understand and implement a plot command.

CO5 : To implement a lm() Command.

Exercise – 1

Consider the following table on Air Quality

S.No	Ozone	Solar R	Wind	Temp	Month	Day
1	41	190	7.4	67	5	1
2	36	118	8	72	5	2
3	12	149	12.6	74	5	3
4	18	313	11.5	62	5	4
5	27	192	14.3	56	5	5
6	28	193	14.9	66	5	6
7	23	299	8.6	65	5	7
8	19	99	13.8	59	5	8
9	8	19	20.1	61	5	9
10	24	194	8.6	69	5	10

11	7	152	6.9	74	5	11
12	16	256	9.7	69	5	12
13	11	290	9.2	66	5	13
14	14	274	10.9	68	5	14
15	18	65	13.2	58	5	15
16	14	334	11.5	64	5	16
17	34	307	12	66	5	17
18	6	78	18.4	57	5	18
19	30	322	11.5	68	5	19
20	11	44	9.7	62	5	20

1. Summarize the above table in R
2. Create the above table in data frame format in R without importing from outer source.
3. Find the linear regression line on given table taking ozone as dependent variable.
4. Predict 21st day of ozone level in the air with given factors.
5. Find the autocorrelation of error produced from the fitted line
6. Analyse multicollinearity among independent variables and find the suitable solution to remove multicollinearity.
7. Find the variance among error terms and comment on the equal variance among error terms in the output.
8. Estimate the presence of autocorrelation using Durbin – Watson test statistic.

Exercise - 2

1. Estimate appropriate regression line with suitable predictors. Compare different regression lines and comment on regression coefficients.
2. Estimate the significance of regression coefficients using ANOVA and compare with F and partial t test.

3. Model fit using R Square and Adjusted R square values.
4. Estimate Cook Statistic and Press Statistic for diagnostic checking
5. Post model statistical testing for the better fit and error free prediction.
6. Normality testing on error terms of fitted model

Exercise - 3

1. Plot residual versus Fitted values using plot command
2. Plot residual versus Observed using Plot command
3. Plot observed versus and fitted values using plot command
4. Find out the leverage value in the fitted values using which.max command.
5. Interpret the residual summary from the lm( ) command.
6. Find out the VIF values using inbuilt function available in R.

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**	**3**	**3**		**2**		**3**		**2**		**3**	**3**	
CO2				**3**				**1**		**3**			**3**
CO3	**3**	**2**	**2**	**3**	**3**	**3**	**2**	**3**	**3**	**1**		**2**	
CO4	**3**	**3**	**1**			**3**			**3**		**3**	**3**	
CO5	**3**			**1**		**2**			**3**	**2**			**3**

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Server Side Scripting	**2**	**4**	**0**	**0**	**Theory**

Introduction:

- To learn the server-side scripting languages and their applications. To understand complementarity of the class of languages to systems languages, their strengths and weaknesses.
- To learn Frameworks and CMS. To get knowledge about server-side scripting language python and ruby. Regular expressions, text processing, client, and server, level scripting and CGI, GUI programming using Python.

Course Outcome:

CO1	:	Explain basic Server web architecture	
CO2	:	Understand the working of python and its libraries	
CO3	:	Make use of CGI and GUI in python language	
CO4	:	Elaborate MVC Architecture and its use in Ruby.	
CO5	:	Understand and use advance rails application	

Unit I:

Introduction to Server-side Scripting Languages

Server-side Scripting, Different Scripting Languages, Web services, Web application frameworks – MVC, General purpose frameworks – e.g., Django, RoR; Discussion forums, Wikis, Weblogs, Content management system (CMS).

Unit II:

Introduction to Python

How to set up the environment, Lexical conventions and Syntax, Variables, Data Types, Operators, Statements and Expressions, Decision making, Loops, Strings, Tuples, Lists, Dictionary, Recursion, Date and Time, Functions, Modules – math, random; Files I/O, Exceptions

Unit III:

CGI and GUI Programming in Python

Classes and Objects, Regular Expressions, CGI Programming, Database Access Networking, Sending Email, Multithreading, XML Processing, GUI Programming, Extending and Embedding Python

Unit IV:

. Introduction to Ruby on Rails

MVC Architecture, how to install, Framework, Directory structure, Features, Basic Rails Application

Unit V:

Advanced Rails Applications

Setting up the database, Active records, Migrations, Controllers, Routes, Views, Layouts, Scaffolding, AJAX, uploading files, sending Email

Text Books:

1. Python: Essential Reference, by David M. Beazley
2. Core Python Programming, by Wesley J. Chun, Prentice Hall
3. Python Programming: An Introduction to Computer Science, by John M. Zelle, Franklin – Beedle and Associates

Reference Books:

1. Professional Ruby on Rails by Noel Rappin, Wiley India Pvt Ltd

Learn Ruby on Rails: Book one, by Daniel Kehoe

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**		**2**	**3**							**3**		**3**
CO2		**3**		**2**	**3**	**3**		**1**	**3**	**3**			
CO3	**2**		**3**	**3**		**1**	**3**		**2**	**3**		**2**	
CO4	**3**	**2**			**3**			**3**		**1**			**1**
CO5		**3**	**1**		**3**		**2**		**3**		**2**	**3**	

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Server Side Scripting Lab	**2**	**4**	**0**	**0**	**Theory**

Course Outcome:

CO1	:	Explain basic Server web architecture	
CO2	:	Understand the working of python and its libraries	
CO3	:	Make use of CGI and GUI in python language	
CO4	:	Elaborate MVC Architecture and its use in Ruby.	
CO5	:	Understand and use advance rails application	

List of Experiments:

1. Write Python script to print prime number form m to n. where m<n
2. Write Python script to create "Book" class with properties "id", "author" and "price". Create 4 Book objects and print details of books on console
3. Write Python script to list files and their sizes from a directory
4. Write Python script for performing simple mathematical calculations using GUI.
5. Write python script to generate Login Screen(GUI) and perform authentication using "client" and "server" as username and password respectively
6. Write Python script to create "Student" table with columns "sno", "sname" and "result" in MySQL server and insert minimum 3 records into the table and print them all on console
7. Write Python script for simple chat application using networking
8. Design and Develop Ruby on Rails web application, which contains a welcome screen and displays the welcome message to the user with his name after entering name using Request and Response objects.
9. Design and Develop Ruby on Rails web application to manipulate Book details using MySQL database. Web pages as follows
10. Add book details screen/page
11. List book details screen/page

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**					**3**	**2**			**3**		**2**	**3**
CO2	**1**	**1**	**3**	**1**	**3**	**3**		**2**	**3**	**1**	**3**		
CO3		**2**	**1**			**2**	**3**	**3**					**2**
CO4	**3**	**3**	**2**	**3**				**2**	**2**	**1**		**3**	
CO5			**2**		**3**		**1**		**3**		**2**		

Discipline Specific Core

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Data Structures	**4**	**4**	**0**	**0**	**Theory**

Introduction :

Assess how the choice of data structures and algorithm design methods impacts the performance of programs.

Course Outcome:

CO1 : Students develop knowledge of basic data structures for storage and retrieval of ordered or unordered data.
CO2 : Students develop knowledge of linked lists.
CO3 : Students develop knowledge of applications of searching, and sorting of each data structure.
CO4 : Student develop Knowledge of Tree
CO5 : Student develop Knowledge of Graph

Unit I: **[12 Periods]**
Introduction - Basic Terminology - Data Structures - Abstract Data Types. Stacks – operation of Stack- Array Representation - Arithmetic Expressions - Polish Notation - Application of Stacks - Queue – Operation of Queue- Application of Stacks Queue.

Unit II: **[12 Periods]**
Linked Lists Introduction - Linked lists- Operation of Linked List - Linked List Implementation of Stack and Queue- Circular Linked list – Doubly Linked List.

Unit III: **[12 Periods]**
Sorting Introduction- Sorting - Merging - Merge-Sort - Quick Sort - Heap sort.

Unit IV: **[12 Periods]**
Trees
Introduction- Binary Trees - Representing Binary Trees in memory- Traversing Binary Trees - Traversal Algorithm using Stacks - Binary Search Trees - Searching - Inserting and deleting in Binary Search Trees

Unit V: **[12 Periods]**
Graphs Introduction – Definitions and terminology – graph representations – Depth first search – Breadth

first search.

Text Books:

1. M. A. Weiss, "Data Structure and Algorithm Analysis in C", Pearson Education Asia,2002.
2. Gilberg, F Richard & Forouzan, A Behrouz, Data Structures: A Pseudocode approach with C, 2nd Edition, Cengage, 2008.
3. Horowitz Sahni Anderson-Freed, Fundamental of Data Structures in C, Universities Press, Reprint 2008.

Reference Books:

1. Richard Johnsonbaugh, Algorithims, Pearson Education, 2nd Edition, 2008.

2.L.Kathirvelkumaran and R. Muralidharan , "Data Structure for Beginners ",Coimbatore Institute of Information Technology ,First Edition 2019.

3. Knuth, Donald E, Art of Computer Programming, Sorting & Searching, Addison-Wesley, 3rd Edition, 2005.

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**		**3**		**3**			**2**		**3**			**3**
CO2		**2**		**3**	**3**	**3**	**3**		**3**	**3**		**3**	**2**
CO3	**3**	**3**	**2**	**1**	**2**		**2**			**3**	**3**	**3**	**3**
CO4	**3**			**2**		**3**		**3**	**1**		**3**	**3**	
CO5	**3**	**3**	**1**			**2**	**3**				**2**		

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	DSC – Operating System	**5**	**6**	**0**		**Core**

Introduction: The operating system is the most important program that runs on a computer. Every general-purpose computer must have an operating system to run other programs. Operating systems perform basic tasks, such as recognizing input from the keyboard, sending output to the display screen, keeping track of files and directories on the disk, and controlling peripheral devices such as disk drives and printers. This course covers the concept of operating system and its applications

Course Outcome:

CO1 : After learning the fundamental concepts in Operating system including how OS has evolved over the years and different components of OS.

CO2 : students will continue to more significant functions of OS like Process management, storage and memory management etc.

CO3 : This will provide the necessary information for students to extract maximum benefits out of the OS while developing programs, working with applications

CO4 : OOP concepts like inheritance, Interface & package in real time situations.K3

CO5 : Develop Java application programs using sound OOP practices (e.g., interfaces and APIs) and proper program structuring (e.g., by using access applet, multithreading)K3

Unit I: **[12 periods]**

Introduction to Operating System

Introduction- Objectives and Functions of OS- Evolution of OS- OS Structures- OS Components- OS Services- System calls- System programs- Virtual Machines.

History of UNIX- Features & Benefits- Versions of UNIX- Features of UNIX File System- Commonly Used Commands and getting Started (Login/Logout) . Creating and viewing files using cat- file comparisons- View files- disk related commands- checking disk free spaces.

Unit II : **[12 periods]**

Process Management – Processes and Threads

Processes: Process concept- Process scheduling- Co-operating processes- Inter process Communication

Threads: Introduction to Threads- Single and Multi-threaded processes

CPU Scheduling: Basic concepts- Scheduling criteria- Scheduling Algorithms- Multiple Processor Scheduling- Real-time Scheduling.

UNIX Process Management

The Process Creation – Signals – Process Termination – Invoking other programs – PID & PPID – Shell on a Shell.Structure of Processes: Process States and Transitions - Layout of system memory - Context of a process.

Unit III : **[12 periods]**

Process Management – Synchronization and Deadlocks

Process Synchronization: Mutual Exclusion, Critical – section problem- Synchronization Hardware- Semaphores- Classic problems of synchronization- Critical Regions- Monitors- OS Synchronization- Atomic Transactions. Deadlocks: System Model- Deadlock characterization- Methods for handling Deadlocks- Deadlock prevention- Deadlock Avoidance- Deadlock Detection- Recovery from Deadlock.

Unit IV: **[12 periods]**

Storage Management

Memory Management: Logical and physical Address Space- Swapping- Contiguous Memory Allocation- Paging- Segmentation with Paging. Virtual Memory Management: Demand paging- Process creation- Page Replacement Algorithms- Allocation of Frames- Thrashing- File-System Interface: File concept- Access Methods- Directory structure- File- system Mounting- File sharing- Protection and consistency semantics. File-System Implementation: File-System structure. Directory Implementation- Allocation Methods- Free-space Management- Efficiency and Performance- Recovery. Disk Management: Disk Structure- Disk Scheduling- Disk Management- Swap-Space Management- Disk Attachment- stable-storage Implementation.

The Unix File System

Inodes - Structure of a regular file – Directories - Conversion of a path name to an inode - Super block - Inode assignment to a new file - Allocation of disk blocks. System calls for the file System: Open –

Read - Write - Lseek – Close - File creation - Creation of special files - Changing directory and root - changing owner and mode – stat and fstat - pipes - Dup - Mounting and Un mounting file systems - Link and Un link

Unit V: **[12 periods]**

Protection and Security

Protection: Goals of Protection- Domain of Protection-Security: Security Problem- User Authentication- One – Time Password- Program Threats- System Threats.

UNIX System Administration

Common administrative tasks- identifying administrative files configuration and log files- Role of system administrator- Managing user accounts-adding & deleting users- changing permissions and ownerships- Creating and managing groups- modifying group attributes- Temporary disabling of user's accounts- creating and mounting file system- checking and monitoring system performance - file security & Permissions- becoming super user using su. Getting system information with uname, host name, disk partitions & sizes, users, kernel, installing and removing packages with rpm command search.

Textbook:

1. Milan Milonkovic, Operating System Concepts and design, II Edition, McGraw Hill 1992.

Reference :

1. Tanenbaum, Operation System Concepts, 2nd Edition, Pearson Education.
2. Silberschatz / Galvin / Gagne, Operating System,6thEdition,WSE (WILEY Publication)
3. William Stallings,Operating System, 4th Edition, Pearson Education.
4. H.M.Deitel, Operating systems, 2nd Edition ,Pearson Education
5. Nutt: Operating Systems, 3/e Pearson Education 2004
6. Operating System by H.M.Deitel , 2nd Edition,Pearson Education

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**		**3**					**3**	**3**		**2**		
CO2		**3**			**2**		**3**	**2**	**3**	**3**		**2**	**1**
CO3	**3**	**2**		**3**		**1**	**3**		**2**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**2**	**3**	**3**	**3**	**2**	**1**			**3**		**3**
CO5			**3**	**2**		**2**				**2**			

Subject Code	Subject Title	Credit	Tutorial	Practical	Lecture	Type
	Relational Database Management System	**4**	**0**	**0**	**4**	**Core**

Introduction :

This paper will help an entry-level programmer learn the foundational concepts of Relational Database Management Systems and to apply these in practice and learn how to use the Structured Query Language to work with databases.

Course Outcome:

CO1 : Demonstrate an understanding of the elementary & advanced features of DBMS & RDBMS

CO2 : Attain a good practical understanding of the SQL. Develop clear concepts about Relational Model.

CO3 : Prepare various database tables and joins them using SQL commands

CO4 : Able to design and documents data structures incorporating integrity constraints to satisfy business rules by applying the relational model

CO5 : Able to develop structured query language (SQL) queries to create, read, update, and delete relational database data

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. Relational Model – Structure of Relational Databases – Database Schema – Keys – Schema Diagrams – Relational Query Language – Relational Operations.

12 Lectures

Unit – II : Introduction to SQL – SQL Query Language – SQL Data Definition – Basic Structure – Additional Basic Operations – Set Operations – Null Values – Aggregate Functions – Nested Sub queries – Modification of Database – Join Expressions – Views – Integrity Constraints – SQL Data types and Schemas – Accessing SQL from a Programming Language – Functions and Procedures – Triggers.

12 Lectures

Unit – III: Database Design – Design Process – ER Model – Constraints – ER Diagrams – Reduction to relational Schemas – ER design Issues – Extended ER Features – Alternative Notations for Modelling data.

12 Lectures

Unit – IV: Relational Database Design – Atomic Domains and First Normal Form – Decomposition using Functional Dependencies – Functional Dependency Theory – Algorithms for Decomposition – Decomposition using Multi valued Dependencies.

12 Lectures

Unit – V: 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.

Text Book :

1. Abraham Silberschatz, Henry F Korth, S. Sudarshan, "Database System Concepts", 6th Edition, McGraw Hill, 2011.

Reference:

1. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Pearson Education.

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**	**3**	**3**		**2**		**3**		**2**		**3**	**3**	
CO2				**3**				**1**		**3**			**3**
CO3	**3**	**2**	**2**	**3**	**3**	**3**	**2**	**3**	**3**	**1**		**2**	
CO4	**3**	**3**	**1**			**3**			**3**		**3**	**3**	
CO5	**3**			**1**		**2**			**3**	**2**			**3**

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Linux and Shell Programming	**4**	**4**	**-**	**-**	**Theory**

Introduction : To give students knowledge about Linux File systems and use of basic Commands and Shell programming.

Course Outcome:

CO1 : Understanding the basic set of commands and utilities in Linux/UNIX systems.

CO2 : To learn to develop software for Linux/UNIX systems.

CO3 : To learn the important Linux/UNIX library functions and system calls.

CO4 : To obtain a foundation for an advanced file system manipulation.

CO5 : To understand the Pattern, URL and E-mail for web content.

Unit I **12 Hours**

Introduction-Printing in the terminal-Playing with variables and environment variables-Function to prepend to environment variables-Math with the shell-Playing with file descriptors and redirection-Arrays and associative arrays-Visiting aliases-Grabbing information about the terminal-Getting and setting dates and delays.

Unit II **12 Hours**

Concatenating with cat-Recording and playing back of terminal sessions-Finding files and file listing-Playing with xargs-Translating with tr-Checksum and verification-Cryptographic tools and hashes-Sorting unique and duplicates-Temporary file naming and random numbers-Splitting files and data.

Unit III **12 Hours**

Generating files of any size-The intersection and set difference (A-B) on text files-Finding and deleting duplicate files-Working with file permissions, ownership, and the sticky bit-Making files immutable-Generating blank files in bulk-Finding symbolic links and their targets-Enumerating file type statistics-Using loopback files-Creating ISO files and hybrid ISO-Finding the difference between files, patching.

Unit IV **12 Hours**

Using regular expressions-Searching and mining a text inside a file with grep-Cutting a file column-wise with cut-Using sed to perform text replacement-Using awk for advanced text processing-Finding the frequency of words used in a given file-Compressing or decompressing JavaScript-Merging multiple files as columns-Printing the nth word or column in a file or line.

Unit V **12 Hours**

Printing text between line numbers or patterns-Printing lines in the reverse order-Parsing e-mail addresses and URLs from a text-Removing a sentence in a file containing a word-Replacing a pattern with text in all the files in a directory-Text slicing and parameter operations

Text Book :

1. "Linux Shell Scripting Cookbook", by Shantanu Tushar & Sarath Lakshman,Published by Packt Publishing Ltd., Second Edition.

Reference Book:

1. Eric Foster Johnson, John C. Welch and Micah Anderson, " Beginning Shell Scripting",Wiley, 2005.
2. Carl Albing, JP Vossen and Cameron Newham,"Bash Cookbook", O'Reilly Media, 2007.
3. Richard Blum, "Linux Command Line and Shell Scripting Bible", Wiley, 2008.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	3	3	3		2		3		2		3	3	
CO2				3				1		3			3
CO3	3	2	2	3	3	3	2	3	3	1		2	
CO4	3	3	1			3			3		3	3	
CO5	3			1		2			3	2			3

Subject Code	Subject Title	Credit	Lecture	Practical	Tutorial	Type
	PHP & MySQL	4	6	0	0	Theory

Course Outcome:

CO1 : To provide an insight of PHP basics

CO2 : Understand and practice the function and array handling in PHP

CO3 : Understand and practice the the file handling and date functions

CO4 : To provide an insight of MYSQL basics

CO5 : Strategies of file handling and Cookies in MYSQL

UNIT I : [12 Periods]

Introduction to PHP - The structure of PHP-Using comments, Basic syntax -The structure of PHP -Variable, operators, Variable assignment, Multiple line commands -Variable typing- Constants- Predefined constants- The Difference Between the echo and print Commands -Functions- Variable Scope Expressions and Control Flow in PHP - Expression, Operators – Conditionals – Looping -Implicit and Explicit Casting.

UNIT II : [12 Periods]

PHP Functions and Objects -PHP Functions- Defining a Function- -Returning a Value- Returning an Array - PHP Functions - Do Not Pass Arguments by Reference- Returning Global Variables- Recap of Variable Scope -Including and Requiring Files -PHP Version Compatibility - PHP Objects- PHP Arrays- Basic Access- Numerically Indexed Arrays - Associative Arrays - Assignment Using the array Keyword.

UNIT III : [12 Periods]

PHP Arrays- Basic Access- Numerically Indexed Arrays - Associative Arrays - Assignment Using the array Keyword - The foreach...as Loop - Multidimensional Arrays -Using Array Functions. Practical PHP- Using printf - Date and Time Functions -Date Constants - Using checkdate -File handling - System Calls - XHTML or HTML5?.

UNIT IV: [12 Periods]

Introduction to MySQL- Basics -Accessing MySQL via the Command Line –Indexes -MySQL Functions -Accessing MySQL via phpMyAdmin - Mastering MySQL -Database Design- Normalization – Relationships –Transactions -Using EXPLAIN - Backing Up and Restoring - Querying a MySQL - Database with PHP - A Practical Example - Practical MySQL - Practical MySQL - Preventing Hacking Attempts.

UNIT V: **[12 Periods]**

Form Handling- Building Forms -Retrieving Submitted Data -An Example Program- What's New in HTML5? - Features Awaiting Full Implementation -Cookies, Sessions, and Authentication- Using Sessions. Learning PHP, MySQL & JavaScript , 4th edition, Robin Nixon

Text Book :

1. Robin Nixon, "Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5", 4th edition, O'Reilly, 2014.

Reference Books:

1. Luke welling, Laura Thomson, " PHP and MySQL Web Development", 4th edition, Developer's Library , 2015
2. Joel Murach,"Murach's PHP and MySQL",3rd Edition,Mike Murach & Associates,2017

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	3				3		3		3		3		3
CO2	2	3		2	3	2		3				3	
CO3	3	2	3			3	2		2	1	3		1
CO4			2	3	3					1		2	2
CO5	1	3		1		2	2		3		1		

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Big Data Analytics	**4**	**4**	**0**	**0**	**Theory**

Introduction: In this course, students to understand more advanced tools used to wrangle and analyze big data. Through this course the students got guided in basic approaches to querying and exploring data using higher level tools built on the top of a Hadoop platform.

Course Outcome:

CO1 : To understand the meaning of big data, need of big data and how worth to study by understands their characteristics of big data.

CO2 : To gain knowledge in evolution of Hadoop, understanding the components of Hadoop.

CO3 : To understand the value of data analyst and how to implementing a big data in organization.

CO4 : To analysis the big data in context, getting the knowledge of predictive analytics and big data.

CO5 : To understanding the concepts of humanizing and consumerization of big data analytics.

Unit - I: **[12 periods]**

Big Data- Form the Business perspective: What is big data- Characteristics of big data- Can There be enough? The Volume of the Data- Variety Is the spice of Life- How Fast Is Fast? The Velocity of Data- Data in the Warehouse and Data in Hadoop- Wrapping It Up.

Unit – II: **[12 periods]**

Big data- From the Technology perspective: All about Hadoop- The Histroy of Hadoop- Components of Hadoop- Application Development in Hadoop- Getting your Data into Hadoop.

Unit - III: **[12 periods]**

Getting Started with the big data Analytics- Changing Focus with big data- The role of the Data Analyst- Implementing Big Data Analytics within an Organization Using Alteryx- Blending Data from Multiple Sources- Looking at Alteryx Designer Desktop.

Unit – IV: **[12 periods]**

Analyzing big data in context: Focus on Context: Focus on Context, Not just Integration- Combining Big Data with Spatial Data- Leveraging External Data provider Resources. **Getting Value form predictive Analytics and big data:** Why do Predictivew Analytics on Big data?- Moving predicitive Analytics to the from predictive analysis.

Unit – V: **[12 periods]**

Humanizing Big Data Analytics: Putting Big Data in the Hands of Those Who Need it- Humanizing Data Design Principles- Humanizing Big Data Analytics Workflow- Considering Consumerization of Big Data Analytics- Getting an Alteryx Analytics Gallery overview- publishing Data and Analytics to Cloud Service- focusing on Consuming Applications- The Best platform for Strategic Analytics.

Text Books:

1. Understanding Big Data(Analytics for Enterprise Class Hadoop and Streaming Data), Chris Eaton, Drik Deroos, Tom Deutsch, George Lapis, Paul Zikopoulos, 2011(Unit-I, II).
2. Big Data Analytics for Dummies, Micheal Wessler, OCP & CISSP, 2012(Unit-III,IV,V)

Reference Books:

1. Big Data Analytics Using Splunk, Peter Zadrozny and Rahu Kodali, Apress 2013.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	3	3			2		2			3	3		
CO2			3		3		3		3		3	2	1
CO3	3	2		1		3	3	3					3
CO4		3		3		1					2		
CO5			2		3			2	1	2		3	

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Network Security	**2**	**4**	**0**	**0**	**Theory**

Introduction:

To help students understand various characteristics of network security, threats and risks to securing network

Course Outcome:

CO1	:	Relate fundamental concepts of information security with network and connectivity
CO2	:	Apply their understanding of network security in identifying common issues and propose suitable solutions
CO3	:	Articulate the importance of managing the network using policies, processes and framework for effective and efficient security
CO4	:	To facilitate students, gain hands-on experience of identifying and providing solutions for common network security challenges using various security tools and techniques
CO5	:	To make it possible for students to learn important network security protocols and means of achieving an effective network security

Unit I:

Introduction to Network Security

Perimeter Security – Overview of Network Security, Access Control, Device Security, Security features on Switches, Firewall, Types of firewall, Access Management, Multifactor Authentication, Wireless LAN (WLAN) Security and Network Admission Control (NAC)**.**

Unit II:

Threats, Vulnerabilities and Attacks

Threat; Vulnerabilities; Attacks – Application Attack, Network Attack and Mitigating & Deterring Attacks; Network Security – Security through network devices, Security through Network Technologies and Security through Network Design Elements, Administering a Secure Network.

Unit III:

Network Security Management

Secure Socket Layer (SSL) – Introduction to SSL, Open SSL basics, Problems with SSL, Cryptography, Message Digits Algorithms, Digital Signature and Public Key Infrastructure (PKI); Data Privacy – IPsec VPN, Dynamic Multipoint VPN (DMVPN), Group Encrypted Transport VPN (GET VPN), Secure Sockets Layer VPN (SSL VPN) and Multiprotocol Label Switching VPN (MPLS VPN).

Unit IV:

Network Security Controls

Network Intrusion Prevention – Overview of Intrusion Prevention System (IPS), Intrusion Detection System (IDS), Deploying IPS and IPS high Availability; host Intrusion Prevention; Anomaly Detection and Mitigation

Unit V:

Network Management

Security Monitoring and correlation; Security Management - Security and Policy Management and Security Framework and Regulatory Compliance; Best Practices Framework, Case Studies

Text Books:

1. Network Security Bible by Eric Cole, Wiley; Second edition (2009)
2. Network Security: Private Communication in a Public World by Charlie Kaufman, Radia Perlman, Mike Speciner, Pearson Education; Second edition (15 September 2016)
3. Network Security and Administration by Adesh K. Pandey, S.K. Kataria& Sons; Reprint 2013 edition (2013)
4. Network Security: A Beginners Guide by Eric Maiwald, McGraw Hill Education; Third edition (1 November 2012)
5. Information Security: The Complete Reference by Mark Rhodes-Ousley, McGraw Hill Education; Second edition (1 May 2013)
6. Information Systems Security: Security Management, Metrics, Frameworks and Best Practices by Nina Godbole, Wiley, 1st ed; 2008.

Reference Books:

1. Network Security Assessment: Know Your Network by Chris McNab, Shroff/O'Reilly; Third edition (1 December 2017)
2. The Network Security Test Lab: A Step–by–Step Guide by Michael Gregg, John Wiley & Sons (9 October 2015)

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**	**3**	**3**		**2**		**3**		**2**		**3**	**3**	
CO2				**3**				**1**		**3**			**3**
CO3	**3**	**2**	**2**	**3**	**3**	**3**	**2**	**3**	**3**	**1**		**2**	
CO4	**3**	**3**	**1**			**3**			**3**		**3**	**3**	
CO5	**3**			**1**		**2**			**3**	**2**			**3**

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Ethical Hacking	**5**	**6**		**5**	**Practical**

Introduction:

To help students understand how ethical hacking is used as a method to prevent hacking. To facilitate students, appreciate the need for understanding non-technology aspects of ethical hacking such as legal frameworks, documentation and report writing.

Course Outcome:

CO1 :Explain the importance of numerous methods of real-world information intelligence.

CO2 :Differentiate the processes of vulnerability assessment and ethical hacking from penetration testing.

CO3 :Comprehend the importance of appropriate countermeasures for managing vulnerabilities.

CO4 :To familiarize with the methodologies that can be used to hack into a target.

CO5 :To appreciate the wide variety of attacks that can be performed against a wireless network.

UNIT -I [12 periods]

Introduction To Hacking: Terminologies, Categories of Penetration Test, Writing Reports, Structure of a Penetration Testing Report, Vulnerability Assessment Summary, Risk Assessment, Methodology, Linux Basics: File Structure, Cron Job, Users, Common Applications , BackTrack, Services.

UNIT–II: [12 periods]

Information Gathering, Target Enumeration And Port Scanning Techniques: Active, Passive and Sources of information gathering, Copying Websites Locally, NeoTrace, Cheops-ng, Intercepting a Response, What Web, Net craft, Basic Parameters, Code Exploit Scanner, Interacting with DNS Servers, Fierce, Zone Transfer with Host Command and Automation, DNS Cache Snooping- Attack Scenario, Automating Attacks, SNMP - Problem, Sniffing Passwords, SolarWinds Toolset, sweep, Brute Force and Dictionary- Tools , Attack, Enumeration, Intelligence Gathering Using Shodan, Target enumeration and Port Scanning Techniques.

UNIT–III: [12 periods]

Vulnerability Assessment & Network Sniffing: Introduction to Vulnerability Assessment - Pros and Cons, NMap, Updation of database, Testing SCADA Environments with Nmap, Nessus, Sniffing: Types, Hubs versus Switches, Modes, MITM Attacks, ARP Protocol Basics- working, Attacks, DoS Attacks, Dsniff tool, Using ARP Spoof to Perform MITM Attacks, Sniffing the Traffic

with Dsniff, Sniffing Pictures with Drifnet, Urlsnarf and Webspy, Sniffing with Wireshark, Ettercap- ARP Poisoning, Hijacking Session with MITM Attack, ARP Poisoning with Cain and Abel, Sniffing Session Cookies with Wireshark, Hijacking the Session, SSL Strip: Stripping HTTPS Traffic, Requirements, Automating Man in the Middle Attacks, DNS Spoofing, DHCP Spoofing.

UNIT–IV: [12 periods]

Remote Exploitation : Understanding Network Protocols, Attacking Network Remote Services, Common Target Protocols, tools for cracking network remote services, Attacking SMTP, Attacking SQL Servers, Client Side Exploitation Methods: E-Mails Leading to Malicious Attachments & Malicious Links, Compromising Client Side Update, Malware Loaded on USB Sticks, **Post exploitation:** Acquiring Situation Awareness, Privilege Escalation, Maintaining Access, Data Mining, Identifying and Exploiting Further Targets, Windows Exploit Development Basics.

UNIT– V: [12 periods]

Wireless Hacking : Requirements , Aircracking , Hidden SSIDs , Monitor Mode , Monitoring Tool-Beacon Frames on Wireshark ,Airodump-ng , Wireless Adapter in Monitor Mode , Determining the Target , Cracking a WPA/WPA2 Wireless Network Using Aircrack-ng , Capturing Packets and Four-Way Handshake , Web Hacking : Attacking the Authentication , Brute Force and Dictionary Attacks , Types of Authentication , Crawling Restricted Links , Testing for the Vulnerability , Authentication Bypass with Insecure Cookie Handling , SQL injection, XSS – DOM based,BeEF,CSRF, Bypassing CSRF and BeEF with XSS, Vulnerability in FCKeditor, efront.

Text books:

1. Rafay Baloch ,-Ethical Hacking and Penetration Testing Guide, CRC Press, 2015.

References:

1. Patrick Engebretson, ‑The Basics of Hacking and Penetration Testing : Ethical Hacking and Penetration Testing Made Easy, Syngress Media, Second Revised Edition, 2013.

2. Michael T. Simpson, Kent Backman, James E. Corley, ‑Hands On Ethical Hacking and Network Defense, Cengage Learning, 2012.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES:

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	3		2			3	3			3		3	
CO2	3	1		1	3	2		2			2		2
CO3	3		3	3				1	3	2		1	
CO4		3	3		2	3	3	3			3		3
CO5			3	1			3		3	1		3	

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	NATURAL LANGUAGE PROCESSING	5	6	0	0	Theory

Introduction :To understand the pre-processing of text for natural language processing, the importance of considering syntactic parsing and the mechanism of natural language generation in processing of natural language.To understand the importance of corpus creation in natural language processing and the different statistical techniques used in natural language processing.

Course Outcome:

CO1 : The basic concepts of natural language processing and its important terminologies.

CO2 : The key role of syntactic parsing and semantic analysis in natural language processing

CO3 : The importance of corpus creation in natural language processing

CO4 : Know the important statistical techniques used in natural language processing

CO5 : Understand implementation procedure for natural language processing..

Unit I : [12 periods]

Introduction to Natural Language Processing

Introduction to text pre-processing- terminologies related with text processing- challenges of text pre-processing- tokenization- sentence segmentation- introduction to lexical analysis- finite state morphonology- finite state morphology- morphology vs lexical analysis- paradigm based lexical analysis.

Unit II : [12 periods]

Introduction to Natural Language Processing

Introduction to text pre-processing- terminologies related with text processing- challenges of text pre-processing- tokenization- sentence segmentation- introduction to lexical analysis- finite state morphonology- finite state morphology- morphology vs lexical analysis- paradigm based lexical analysis.

Unit III : [12 periods]

Natural Language Generation

Introduction to natural language generation- simple Examples of Generated Texts- The Components of a Generator: Components and level of representation- Approaches to Text Planning: The Function of the Speaker- Desiderata for Text Planning- Pushing vs. Pulling- Planning by Progressive Refinement of the Speaker's Message- Planning Using Rhetorical Operators- Text Schemas- The Linguistic Component: Surface Realization Components- Relationship to Linguistic Theory- Chunk Size- Assembling vs. Navigating- Systemic Grammars- Functional Unification Grammars

Unit IV: [12 periods]

Corpus Creation

Introduction and definition of corpus in natural language processing- corpus size- Balance, Representativeness, and Sampling- Data Capture and Copyright- Corpus Markup and Annotation- Multilingual Corpora- Multimodal Corpora- Corpus Annotation Types- Morphosyntactic Annotation- Treebanks: Syntactic, Semantic, and Discourse Annotation- The Process of Building Treebanks- application of Treebank

Unit V: [12 periods]

Statistical Techniques in Natural Language Processing

Introduction to statistics and its importance in natural language processing- general linear model- binary linear classification- one versus all method for multi-category classification- maximum likelihood estimation in parameter estimation in linear classification techniques- concepts of

generative and discriminative models- introduction to sequence prediction model and its application in natural language processing.

Text books:

1. Hand Book of Natural Language Processing, Second Edition – NITIN INDURKHYA FRl DAMERAU, CRC Press

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**	**3**		**3**			**2**	**3**		**3**		**3**	
CO2	**2**		**3**		**3**	**3**		**3**	**3**		**1**		**2**
CO3	**3**	**3**			**1**	**2**	**1**		**1**		**2**		
CO4		**2**		**2**		**3**		**2**		**2**	**3**	**3**	
CO5	**3**		**1**	**3**	**2**		**3**		**2**	**3**			**3**

ALLIED

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Principles of Multimedia	**4**				**Theory**

Course Outcome:

CO1 : To develop an understanding and awareness how issues such as content, information architecture, motion, sound, design, and technology merge to form effective and compelling interactive experiences for a wide range of audiences and end users.

CO2 : To become familiar with various tools used in the creation and implementation of multi- media

CO3 : To understand about the color and 3D Cloud

CO4 : To become familiar with Blender with images

CO5 : To create an animation and An introduction to the development of Graphics.

Unit I **[12 periods]**

Introduction: About Blender- Rendering and Animation Basics- Basic Blender Commands- The Basic Blender Buttons- The Blender Screen- The User Preferences Window-Open, Saving and Appending Files- Importing Objects (from other file formats). Working with view points: Moving Around in 3D -Window and Button Control- Creating Viewports (also called windows)- Typical Views and Buttons-Working with Basic Meshes.

Unit II : **[12 periods]**

Creating and Editing objects- Using Main Modifiers to Manipulate Meshes- Using the Transform Widgets- Edit Mode- Mesh Editing. Using the Shading Smooth-Flat Options and Auto Smooth- The Tool Shelf- Proportional Editing-Joining/Separating Meshes and Boolean Operations. Verticies and Faces Logo Design- Boolean Operations.

Unit III : **[12 periods]**

Materials and textures: Material Panels- Transparency Using Z-Transparency - Halo Settings- Applying Materials. Basic Textures Settings - Blender's Built-In Textures - Using Images and Movies as Texture - Displacement Mapping - Using Color, Stars and Mist - Creating a 3D Cloud Backgrounds – Adding world to your Landscape.

Unit IV: **[12 periods]**

Lighting and Cameras: Lighting Types and Settings - Basic Setup Options – Render settings Scene Settings - Rendering a JPEG (.jpg) Image - Creating an MPEG Movie File - Lighting and Shadows.

Ray Tracing - Reflection (mirror) and Refraction (transparency).

Unit V: **[12 periods]**

Animation Basics: Basic Key-framing and Auto Key-framing - Moving, Rotating and Scaling - Automatic Key-Framing - Viewing Your Animation - Working with the Graph Editor and Dope Sheet - Modifying Curves in the Graph Editor - Animating Materials, Lamps and World Settings (and more).

Textbook:

2. James Chronister, "Blender Basics", Classroom Tutorial Book 4th Edition 2011.

Reference :

1. Andleigh, P. K and Kiran Thakrar, —Multimedia Systems and Design||, PHI, 2003.
2. Judith Jeffcoate, —Multimedia in practice: Technology and Applications||, PHI, 1998

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**	**3**		**2**		**2**			**2**		**3**		
CO2	**3**		**3**	**3**	**3**		**1**		**3**	**3**		**2**	**3**
CO3		**2**				**3**		**3**		**1**			**2**
CO4	**3**		**1**	**3**		**2**	**3**	**3**	**3**		**3**	**3**	
CO5		**3**			**3**			**2**		**3**		**3**	**3**

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Principles of Information Security	**2**	**4**	**0**	**0**	**Theory**

Introduction:

Securing data is a vital role of any organization. Data is always at risk - it can either get lost, or corrupted or misused. This course primarily focuses on the types of threats, vulnerabilities, risks and other various concepts that about Information Security

Course Outcome:

CO1	:	Understand the importance of securing data, the concepts of IT security, threats, vulnerabilities, impact and control measures
CO2	:	Explain different ways of problem solving
CO3	:	Get to familiarize with access management, server and internet security and cyber laws
CO4	:	Understand how to act logically in real world problems
CO5	:	It explains the formation of security policy at various levels inside the Organization and provides the definition procedures, standard and guidelines.

Unit I:

Introduction to Information Security

Introduction: Security Definition, Why Security, Security and its need, Current Trends and Statistics, The C I A of Security the Relation: Security functionality and Ease of Use Triangle, Security Terminologies, Security Protocols. Security on Social Networking Sites , Securing Email Communications, Securing Mobile Devices, Securing the Cloud, Securing Network Connections.

Unit II:

User Identity and Access Management

User identity and Access Management: Authentication, Account Authorization, Validation, Access Control and Privilege management. Governance concepts. Organization processes. Cryptography- Encryption and Decryption, Algorithms, Hashing concepts and implementation.

Unit III:

System and Server Security

System Security concepts, Desktop & Server Security, Firewalls, Password cracking Techniques, Threats involved, Key-logger, viruses and worms, Malwares & Spy wares, Windows Registry. AntiMalware/AV/Anti Rootkit and other solutions

Unit IV:

Internet Security

Internet Security: Internet concepts and working, LAN Security, Threats involved, Hacking attacks and preventive measures. Internet mediums to malware. Data exposure. Data digging. Social engineering methodologies.

Unit V:

Risk Assessment and Cyber Laws

Vulnerability Assessment, Penetration Testing**,** Risk analysis, Risk mitigation, Cyber Laws, Cyber Threats and Kill Chain Methodology, Intelligence Reporting and Dissemination.

E-Resources:

1. https://www.eccouncil.org/programs/certified-secure-computer-user-cscu/
2. https://www.geeksforgeeks.org/identity-and-access-management/
3. https://www.ibm.com/security/identity-access-management
4. https://www.microsoft.com/en-in/security/business/identity

https://www.eccouncil.org/programs/threat-intelligence-training/

Reference Books:

1. Information Systems Security: Security Management, Metrics, Frameworks And Best Practices, Author: Nina Godbole, ISC2 Press, 2010.
2. Information Security Management Handbook, Volume 4,Author:Micki Krause, ISC2 Press, 2007

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**	**3**		**2**		**2**			**2**		**3**		
CO2	**3**		**3**	**3**	**3**		**1**		**3**	**3**		**2**	**3**
CO3		**2**				**3**		**3**		**1**			**2**
CO4	**3**		**1**	**3**		**2**	**3**	**3**	**3**		**3**	**3**	
CO5		**3**			**3**			**2**		**3**		**3**	**3**

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Enterprise Resource Planning	**4**	**5**	**1**	**0**	**Theory**

Introduction :

The course provides an overview of Enterprise Resource Planning (ERP) software systems and their role within an organization. It introduces key concepts integrated information systems and explains why such systems are valuable to businesses and their impact on organizations.

Course Outcome:

CO1 : To understand about ERP systems

CO2 : To expose the students to ERP software and modules, Implementation of ERP

CO3 : To familiarize Emerging trends on ERP

CO4 : Enhanced Evaluation of ERP systems, Business Analytics, Future trends in ERP Systems.

CO5 : To familiarize ERP SOLUTIONS AND FUNCTIONAL MODULES.

UNIT I INTRODUCTION [12 periods]

Overview of enterprise systems – Evolution - Risks and benefits - Fundamental technology - Issues to be consider in planning design and implementation of cross functional integrated ERP systems.

UNIT II ERP SOLUTIONS AND FUNCTIONAL MODULES [12 periods]

Overview of ERP software solutions- Small medium and large enterprise vendor solutions, BPR, Business Engineering and best Business practices - Business process Management. Overview of ERP modules -sales and Marketing, Accounting and Finance, Materials and Production management.

UNIT III ERP IMPLEMENTATION [12 periods]

Planning Evaluation and selection of ERP systems- Implementation life cycle - ERP implementation, Methodology and Frame work- Training – Data Migration. People Organization in implementation- Consultants,
Vendors and Employees.

UNIT IV POST IMPLEMENTATION [12 periods]

Maintenance of ERP- Organizational and Industrial impact; Success and Failure factors of and ERP Implementation.

UNIT V EMERGING TRENDS ON ERP [12 periods]

Extended ERP systems and ERP add–ons -CRM,SCM, Business analytics etc- Future trends in ERP systems-web enabled, Wireless Technologies.

TEXT BOOKS:

1. Alexis Leon, ERP demystified, second Edition Tata McGraw-Hill, 2007.

REFERENCE BOOKS:

1. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008
2. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill, 2008.
3. Mahadeo Jaiswal and Ganesh Vanapalli, ERP Macmillan India, 2009.
4. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India,2nd edition, 2006.
5. Summer, Enterprise Resource Planning,, Pearson Education, 2008.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	3		3		3			2		3			3
CO2		2		3	3	3	3		3	3		3	2
CO3	3	3	2	1	2		2			3	3	3	3
CO4	3			2		3		3	1		3	3	
CO5	3	3	1			2	3				2		

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Mathematics for Computer Science	4	4	0	0	Allied

Introduction : This paper focuses on the Mathematical logic, Relations& Functions, Formal languages and Graph Theories.

Course Outcome:

CO1 : To demonstrate a working knowledge of set notation and elementary set theory with its corresponding set operations and also Venn diagram.

CO2 : To apply the fundamental concepts of Mathematical Logic and Tautologies.

CO3 : To apply and understand the fundamental concepts of Relations and Functions.

CO4 : To demonstrate different traversal methods for graphs.

CO5 : To demonstrate different methods for trees and its properties.

Unit I: **[12periods]**

Set theory - Introduction-Basic definition-Types of sets-Operations on sets-Venn-Euler diagrams-Laws of set theory-Power sets and products-Inclusion and exclusion principle.

Unit II: **[12periods]**

Mathematical logic - Introduction to propositional logic-Basic logical operations-Tautologies-Contradiction - Predicates and Quantification.

Unit III: **[12periods]**

Relations-Binary Relations-Set operation on relations-Types of Relations-Partial order relation-Equivalence relation-Composition of relations-Functions-Types of functions-Invertible functions-Composition of functions

Unit IV: **[12periods]**

Graph theory - Basic terminology-Paths, cycle and connectivity-sub graphs-Types of graphs-Representation of graphs in computer memory.

Unit V: **[12periods]**

Trees-Properties of Trees- Binary trees- traversing Binary trees – Computer Representation of general trees.

Text Book:

1. Discrete Mathematics for Computer Science by Gary Haggard,JohnSchlipf and Sue Whitesides

   Discrete Mathematics by J.K.Sharma second edition – 2005. Macmillan India Ltd

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**		**3**		**3**			**2**		**3**			**3**
CO2		**2**		**3**	**3**	**3**	**3**		**3**	**3**		**3**	**2**
CO3	**3**	**3**	**2**	**1**	**2**		**2**			**3**	**3**	**3**	**3**
CO4	**3**			**2**		**3**		**3**	**1**		**3**	**3**	
CO5	**3**	**3**	**1**			**2**	**3**				**2**		

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Allied - I – Principles of Accounting	4	5	0	0	Theory

Introduction:

Principles of accounting course provide students with the opportunity to explore basic accounting systems, processes, and the resulting financial statements. Additionally, the students will closely examine accounting rules, procedures, and controls that are applicable to cash, receivables, and inventory.

Course Outcome:

CO1	To develop the able to discuss and describe the purpose of a company's basic accounts statements along with being able to prepare the basic financial statements when presented with account balances.
CO2	To develop the ledger's role in the accounting cycle, the nature of posting, and practices in record and organize transactions of various kinds through the Journal, Sub-Ledger, and General Ledger. And subsidiary books.
CO3	To develop Income statement is mostly a summary of account activity for the period in the firm's final Accounts. The Balance sheet is mostly a summary of the current balances in the firm's Assets, Liabilities, and they stand at the period end.
CO4	To develop describe the meaning and use of Bills of Exchange Outline the uses and advantages of Bills of Exchange Differentiate between Bill of Exchange and Promissory Note Illustrate practical accounting aspects of Bill in various situations.
CO5	To develop Any financial management and revenue generations principles and concepts in the non profit organizations and auditors educations.

Unit I **[12 periods]**

Introduction – Accounting Principles – concepts and conventions – branches of accounting – accounting rules.

Unit II **[12 periods]**

Journal – Ledger – Subsidiary Books including cash book – Trail balance

Unit III **[12 periods]**

Preparation of Final Accounts – Trading, Profit and Loss Account and Balance sheet with simple adjustments.

Unit IV **[12 periods]**

Bill of Exchange – Average Due Date – Account Current.

Unit V **[12 periods]**

Accounts for Non-Profit Organization hospitals – Clubs – Trust - Auditors – Education.

Textbook:

1. N. Vinayakam, P.L. Mani, K.L. Nagarajan – "Principles of Accountancy" – S.Chand & Company Ltd- 2009
2. S.P. Jain, K.L Narang – "principles of accountancy" – Kalyani Publishers – 2009

Reference:

1. R.L. Gupta, V.K. Gupta, M.C. Shukla – "Financial Accounting" – Sultanchand & sons-Reprint 2016.
2. T.S. Grewal –" Introduction to Accountancy"- S.Chand & Company Ltd., Kindle Edition.
3. S.N. Maheswari, T.S. Reddy – "Advanced Accountancy", Vikas publishers -2012
4. T.S Reddy and Dr. A. Moorthy – "Financial Accounting", Margham Publications -2012

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**		**3**					**3**	**3**		**2**		
CO2		**3**			**2**		**3**	**2**	**3**	**3**		**2**	**1**
CO3	**3**	**2**		**3**		**1**	**3**		**2**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**2**	**3**	**3**	**3**	**2**	**1**			**3**		**3**
CO5			**3**	**2**		**2**				**2**			

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Allied– Principles of Management	4	5	0	0	Theory

Introduction:

To enable the students to learn principles, concepts and functions of Management. Identify the key competencies needed to be an effective manager.

Course Outcomes:

CO1	:	Discuss and communicate the management evolution and how it will affect future managers
CO2	:	Observe and evaluate the influence of Historical forces on the current practice of management
CO3	:	Identify and evaluate social responsibility and ethical issues involved in business situations and logically articulate own position on such issues.
CO4	:	Practice the process of management's four functions: planning, organizing, leading, and controlling.
CO5	:	Identify and properly use vocabularies within the field of management to articulate one's own position on a specific management issue and communicate effectively with varied audiences.

Unit I **[12 periods]**

Introduction - Definition of management, nature and scope of management - Management as a science and art - Functions of management - Management and Administration-Contribution of F.W. Taylor – Heniry Fayol – Mary Parker Follet – Mc Gregor and Peter F. Drucker.

Unit II **[12 periods]**

Planning – Nature – Importance – Types – Steps in Planning –Decision Making – Process of Decision making – Types of Decisions – Problems involved in Decision Making.

Unit III **[12 periods]**

Organizing – Types of Organization (Line and Staff, Committees, Projects, Matrix) – Organizational structure – Span of Control – Departmentalization – Informal Organization.

Unit IV **[12 periods]**

Motivation – Need – Determinants of behaviour — Motivation Theories in Management (Maslow‟s Theory of Motivation, Herzberg's Motivation Hygiene Theory and McGregor's Participation Theory - Leadership styles – MBO – Management by Exception.

Unit V **[12 periods]**

Co-ordination – Need for Co-ordination – Types – Techniques -- Controlling – Meaning, importance and Types of Control - Control Process.

Textbook:

1. P.C. Tripathy, "Principles of Management," Tata McGraw hill publishing Company ltd, 5th Edition, 2012, New Delhi.

Reference

1. T. Ramasamy, "Principles of Management," Himalaya Publishing House, First Edition, 2014
2. R.K. Sharma & Shashi K.Gupta, "Principles of Management"
3. Bhushan Y.K, "Business Organization," Sultan Chand & Sons, Nineteenth Edition -2013.
4. L.M. Prasad, "Principles of Management", 5th Edition, Himalaya publication, Mumbai – 2006.

5.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**		**3**					**3**	**3**		**2**		
CO2		**3**			**2**		**3**	**2**	**3**	**3**		**2**	**1**
CO3	**3**	**2**		**3**		**1**	**3**		**2**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**2**	**3**	**3**	**3**	**2**	**1**			**3**		**3**
CO5			**3**	**2**		**2**				**2**			

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Entrepreneurial Development	4	5	0	0	Theory

Introduction:

To build the necessary competencies and creativity and prepare them to undertake entrepreneurship as a desirable and feasible career option.

COURSE OUTCOME:

CO1	:	To know about the role of the entrepreneur in India and around and the globe, understand the benefits and drawbacks of entrepreneurship and students has to avoid them; entrepreneurial failure.
CO2	:	The course aims to develop student's ability to create, lead and coordinate projects within the textile and fashion sector. It also intends to provide tools and methods in order to make use of entrepreneurial thinking to develop a business project.
CO3	:	Students will be able to define, identify and/or apply the principles of new venture financing, growth financing, and growth financing for existing businesses.
CO4	:	To understand process of women entrepreneur and how faced their problems
CO5	:	To understand difference between Micro, small and medium Enterprises.

Unit I **[12 Periods]**

Entrepreneur – importance- qualities, nature types – difference between entrepreneur and entrepreneurship and economic development – its importance – role of entrepreneurship – entrepreneurial environment.

[12 Periods]

Unit II

Project management: sources of business idea – project classifications – identifications – formulation and design – feasibility analysis – preparation of project report and presentation. Financial analysis – concept and scope project cost estimate – operating revenue estimate – ratio analysis – investment.

[12 Periods]

Unit III

Project finance: sources of finance – institutional finance – role of IFC, IDBI, ICICI, LIC, SFC, SIPCOT, commercial bank – appraisal of bank for loans. Institutional aids for entrepreneurship development.

Unit IV

[12 Periods]

The innovation process – the diagnosis – the consultation of group – selecting a strategy preparing the organization setting up the investment. Women entrepreneur – problems faces by women entrepreneur – economic impact of women entrepreneur.

[12 Periods]

Unit V

Setting small scale industries – step in setting SSI unit – problems of entrepreneur – sickness in small industries – reason and remedies – Incentives and subsidies role of DICS, SIDCO, NSICS, IRCI, NIDC, SIDBI, SISI, SIPCOT.

Textbook:

1. Robert D. Hisrich, Mathew J Manimala, Michael P Peters, Dean A Shepherd, "Entrepreneurship", McGraw Hill Education, 2014.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**		**3**					**3**	**3**		**2**		
CO2		**3**			**2**		**3**	**2**	**3**	**3**		**2**	**1**
CO3	**3**	**2**		**3**		**1**	**3**		**2**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**2**	**3**	**3**	**3**	**2**	**1**			**3**		**3**
CO5			**3**	**2**		**2**				**2**			

SKILL BASED

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Information and Cyber Security	**2**	**4**	**0**	**0**	**Theory**

Introduction: To give students knowledge about information Vulnerability in the modern cyber environment and need of cyber Security preparations are essential.

Course Outcome:

CO1 : The objective of this course is to provide students with a basic understanding of Information and Cyber Security issues and make them aware of the Challenges.

CO2 : To provide components of the Information and Cyber Security Organization.

CO3 : To achieve a basic understanding of information and Cyber Security.

CO4 : To master information security governance, and related legal and regulatory Issues

CO5 : To be familiarity with information security awareness and a clear understanding of its importance

Unit - I : Information Security Overview [12 periods]

The Importance of Information Protection-The Evolution of Information Security -Justifying Security Investment -Security Methodology -How to Build a Security Program -The Impossible Job-The Weakest Link-Strategy and Tactics-Business Processes vs. Technical Controls

Unit – II : Risk Analysis [12 periods]

Threat Definition -Types of Attacks - Malicious Mobile Code -Advanced Persistent Threats (APTs) -Manual Attacks -Risk Analysis.

Unit – III: [12 periods]

Cyber Security Fundamentals - Network and Security Concepts - Information Assurance Fundamentals - Authentication – Authorization – Nonrepudiation – Confidentiality – Integrity – Availability - Basic Cryptography - Symmetric Encryption - Example of Simple Symmetric Encryption with Exclusive OR(XOR) - Improving upon Stream Ciphers with Block Ciphers - Public Key Encryption -The Domain Name System (DNS) - Security and the DNS – Firewalls - History Lesson - What's in a Name? – Packet - Filtering Firewalls - Stateful Firewalls- Application Gateway Firewalls.

Unit – IV [12 periods]

Virtualization- In the Beginning, There Was Blue - The Virtualization Menu - Full Virtualization-Getting a Helping Hand from the Processor - If All Else Fails, Break It to Fix It - Use What You Have-Doing It the Hard Way-Biting the Hand That Feeds-Radio-Frequency Identification -Identify What?-Security and Privacy Concerns

Unit – V: [12 periods]

Microsoft Windows Security Principles-Windows Tokens-Introduction-Concepts behind Windows Tokens-Access Control Lists-Conclusions-Window Messaging - Malicious Uses of Window Messages -Solving Problems with Window Messages-Windows Program Execution-Validation of Parameters - Load Image, Make Decisions-Creating the Process Object-Context Initialization - Windows Subsystem Post Initialization - Initial Thread-Down to the Final Steps-Exploiting Windows Execution for Fun and Profit - The Windows Firewall.

Text Books:

1."Information Security - The Complete Reference", by Mark Rhodes-Ousley, 2nd Edition.

2."Cyber Security Essentials", by James Graham, Richard Howard & Ryan Olson , Published by CRC Press.

Reference Books:

1. John R. Vacca, "Computer and Information Security Handbook", Elsevier, Third Edition

2. Salvatorre J. Stolfo,Steven M. Bellovin, Shlomo Hershkop, Angelos Keromytis, Sara Sinclair, Sean W. Smith, "Insider Attack and Cyber Security beyond the Hacker", Springer Science, 2008.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	3	3	3		2		3		2		3	3	
CO2				3				1		3			3
CO3	3	2	2	3	3	3	2	3	3	1		2	
CO4	3	3	1			3			3		3	3	
CO5	3			1		2			3	2			3

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Internet of Things	**2**	**4**	**-**	**-**	**Theory**

Introduction :

The internet of things paradigm promises to make things including consumer electronic devices or home appliances, such as medical devices, fridge, cameras, and sensors, part of the internet environment.

Course Objective:

CO1	:	Students can understand and develop their knowledge of Internet of Things
CO2	:	Analyze basic protocols in wireless sensor network
CO3	:	Students can develop their knowledge of applications related with IOT.
CO4	:	Design IoT applications in different domain and be able to analyze their performance
CO5	:	Implement basic IoT applications on embedded platform.

UNIT- I Introduction to IoT [12 periods]

Defining IoT - Characteristics of IoT - Physical design of IoT – Logical design of IoT - Functional blocks of IoT - Communication models & APIs - Machine to Machine - Difference between IoT and M2M - Software define Network.

UNIT-II Network & Communication aspects [12 periods]

Wireless medium access issues - MAC protocol survey - Survey routing protocols - Sensor deployment & Node discovery - Data aggregation & dissemination.

UNIT-III Challenges in IoT [12 periods]

Design challenges - Development challenges - Security challenges - Other challenges.

UNIT-IV Domain specific applications of IoT [12 periods]

Home automation - Industry applications - Surveillance applications - Other IoT applications.

UNIT-V Developing IoTs [12 periods]

Introduction to Python - Introduction to different IoT tools - Developing applications through IoT tools - Developing sensor based application through embedded system platform - Implementing IoT concepts with python

Text Books:

1. Vijay Madisetti, Arshdeep Bahga, “Internet of Things: A Hands-On Approach”
Waltenegus Dargie,Christian Poellabauer, "Fundamentals ofWireless Sensor Networks: Theory and Practice

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**	**3**	**3**		**2**		**3**		**2**		**3**	**3**	
CO2				**3**				**1**		**3**			**3**
CO3	**3**	**2**	**2**	**3**	**3**	**3**	**2**	**3**	**3**	**1**		**2**	
CO4	**3**	**3**	**1**			**3**			**3**		**3**	**3**	
CO5	**3**			**1**		**2**			**3**	**2**			**3**

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Block chain Fundamentals	**4**	**6**	**0**	**0**	**Theory**

Introduction :

This subject covers the details of Block chain and its various applications.

Course Outcome:

CO1	:	understand Blockchain and its Uses
CO2	:	Understand the Bitcoin details.
CO3	:	Students will be familiar with blockchain and cryptography basics.
CO4	:	Students will learn how this system works and how can they utilize and what application can be build.
CO5	:	Build their own application using the learned concepts.

Unit I **[12 periods]**

Blockchain: An Introduction to Block chain –Why Block Chain – The Structure of Blockchain – Data Structure of Block chain – Data Distribution in block chain – Block Validation.

Unit II **[12 periods]**

What is Bitcoin? – History of Bitcoin – Bitcoin uses,Users and their stories – How bitcoin works? – Transactions- Bitcoin Mining –Value of Bitcoin – Advantages and Disadvantages.

Unit III : **[12 periods]**

Introduction -Public key cryptography and crypto-currency - Private and Public Keys 63 Private Keys 63 Public Keys – Bitcoin Networks.

Unit IV: **[12 periods]**

Ethereum – How to be the part of ethereum – Dapp –Components of Ethereum – Cryptocurency – Hyperledger

Unit V: **[12 periods]**

Metamask – Mist – Truffle- Embark – Solidity – Multichain.

Text books:

1. Cybrosys Limited Edition – BLOCK CHAIN E-BOOK
2. Antonopoulos, Mastering Bitcoin: Unlocking Digital Cryptocurrencies

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES:

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	3	3	3		2		3		2		3	3	
CO2				3				1		3			3
CO3	3	2	2	3	3	3	2	3	3	1		2	
CO4	3	3	1			3			3		3	3	
CO5	3			1		2			3	2			3

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Software Engineering	**4**	**4**	**0**	**0**	**Theory**

INTRODUCTION

This Subjects deals with the concept of present the role of software, system analysis, design concepts, testing methods and strategies.

CO1 : This gives the Knowledge about various models in software engineering.

CO2 : It gives the brief description about requirements.

CO3 : To understand knowledge about Planning.

CO4 : To analyze various testing in software testing

CO5 : It deals the concept of Maintenance.

UNIT I **[12 periods]**

The Evolving Role of Software – Definition of Software Engineering – The Changing Nature of Software – Software Myths – Terminologies – Software Life Cycle Models: Build and Fix Model – Evolutionary Process Models – Selection of a Life Cycle Model.

UNIT II **[12 periods]**

Requirements: Analysis and Specifications: Type of Requirements – Feasibility Studies – Requirement Elicitation: interviews, brain storming sessions, FAST – Requirement analysis: Data flow diagram, Data Dictionaries - Requirements Validation

UNIT III **[12 periods]**

Project Planning: Size Estimation – The Constructive Cost Model (COCOMO) – The Putnam Resource Allocation Model.

UNIT IV **[12 periods]**

Software Design: Design: Conceptual and Technical designs, Objectives of design – Modularity - Function Oriented Design – Software reliability: Basic concepts, software reliability, maturity levels.

UNIT V **[12 periods]**

Software Testing: A Strategic Approach to Software Testing – Testing – Functional Testing – Structural Testing – Levels of Testing – Validation Testing. **Software Maintenance:** Categories of Maintenance – Problems during Maintenance –Maintenance is Manageable – Potential Solutions to maintenance problems – Maintenance process –Estimation of maintenance cost.

Text Book:

1. K.K.Aggarwal, Yogesh Singh, "Software Engineering", New Age International Publishers, Jan 2008

Reference Book:

2. Richard e.Fairley “Software Engineering Concepts”, , McGrawHill,2012.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	3	3	3		2		3		2		3	3	
CO2				3				1		3			3
CO3	3	2	2	3	3	3	2	3	3	1		2	
CO4	3	3	1			3			3		3	3	
CO5	3			1		2			3	2			3

ELECTIVE I

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Cryptography & Network Security	4	6	0	0	Theory

Introduction:

To understand the various concepts and technical issues related to security, it is essential to know what we are trying to protect. These principles help us identify the various areas which are crucial while determining the security threats and possible solutions to tackle them.

Course Outcome:

CO1	:	To demystify all the complicated terms related to this technology
CO2	:	To deal with passive attacks is to think about prevention.
CO3	:	To resuse the existing message digest algorithm
CO4	:	To allow the addition of new algorithms and implementation in an effort
CO5	:	To know the mathematical background behind the various cryptography techniques

Unit I **[12 Periods]**

Attacks on Computers and Computer Security: Introduction – The need for Security – Security Approaches – Principles of Security – Types of Attacks – Cryptography: Concepts and techniques – Plain Text and Cipher Text – Substitution Techniques – Ttransposition Techniques – Encryption and Decryption – Symmetric and Asymmetric key Cryptography – Steganography – Key Range and Key size – Possible Types of Attacks.

Unit II **[12 Periods]**

Symmetric Key Algorithms and AES – Algorithm Types and Modes – An overview of Symmetric Key Cryptography – Data Encryption Standard – IDEA – RC4 – RC5 – Blowfish – AES - ASymmetric Key Algorithms – the RSA Algorithm – Symmetric and Asymmetric key cryptography together – Digital Signatures – Knapsack Algorithm – Some other Algorithms.

Unit III **[12 Periods]**

Digital Certificate and Public key infrastructure – Introduction – Digital Certificates – Private Key Management – PKIX Model – PKCS – XML,PKI and Security – Creating Digital Certificates using Java – Internet Security Protocols – SSL – TLS – SHTTP – TSP – SET – 3-D

Secure Protocol – Electronic money – Email Security – WAP Security – Security in GSM – Security in 3G.

Unit IV **[12 Periods]**

User Authentication and Kerberos – Authentication basics – Passwords – Authentication Tokens – Certificate-based Authentication – Biometric Authentication – Kerberos – KDC – Security Handshake Pitfalls – Single sign on Approaches – Cryptography in java, .NET and Operating system – Cryptographic toolkits – Security and Operating system – Database Security.

Unit V **[12 Periods**]

Network Security, Firewalls and Virtual Private Networks – Brief introduction to TCP/IP – Firewalls – IP Security – VPN – Intrusion – Case Studies on Cryptography and Security – Cryptography Solutions – SSO – Secure Inter-branch payment Transaction – DOS – IP Spoofing Attacks –CSSV – Contract Signing – Secret Splitting – Virtual Electrons – Creating VPN.

Textbook:

1. Atul Kahate, " Cryptography and Network Security", Tata McGraw-Hill, Second Edition, 2008.

References:

7. Network Security: Private Communication in a Public World by Charlie Kaufman, Radia Perlman, Mike Speciner, Pearson Education; Second edition (15 September 2016)
8. Network Security and Administration by Adesh K. Pandey, S.K. Kataria& Sons; Reprint 2013 edition (2013)
9. Network Security: A Beginners Guide by Eric Maiwald, McGraw Hill Education; Third edition (1 November 2012)

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**		**2**	**3**							**3**		**3**
CO2		**3**		**2**	**3**	**3**		**1**	**3**	**3**			
CO3	**2**		**3**	**3**		**1**	**3**		**2**	**3**		**2**	
CO4	**3**	**2**			**3**			**3**		**1**			**1**
CO5		**3**	**1**		**3**		**2**		**3**		**2**	**3**	

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Computer Graphics	**4**	**4**	**0**	**0**	**Theory**

Introduction : Computer graphics is concerned with producing images and animations (or sequences of images) using a computer.

Course Outcome:

CO1 : To gain knowledge about the computer graphics and their hardware and software systems used to make these images.

CO2 : To Recognize and evaluate critical and aesthetic issues within computer graphics and the mixed media.

CO3 : To be able to describe the general software architecture of programs that use 3D computer graphics.

CO4 : The task of producing photo-realistic images is an extremely complex one, but this is a field that is in great demand because of the nearly limitless variety of applications.

CO5 : To Apply aesthetic judgments and critical thinking skills to art and graphics related issues.

Unit - I : **[12 periods]**

A Survey of Computer Graphics - Computer-Aided Design - Presentation Graphics - Computer Art – Entertainment - Education and Training – Visualization - Image Processing - Graphical User Interfaces – Video Display Devices - Refresh Cathode-Ray Tubes - Raster-Scan Displays - Random-Scan Displays -Color CRT Monitors.

Unit – II : **[12 periods]**

Direct-View Storage Tubes - Flat-Panel Displays - Three-Dimensional Viewing Devices - Stereoscopic and Virtual-Reality Systems - Raster-Scan System Video Controller - Raster-Scan Display Processor - Random-Scan Systems - Graphics Monitors and Workstations - Input Devices – Keyboards – Mouse - Trackball and Spaceball – Joysticks Data Glove – Digitizers - Image Scanners - Touch Panels - Light Pens - Voice Systems.

Unit – III: **[12 periods]**

Two-Dimensional Geometric Transformations - Basic Transformations-Translation –Rotation Scaling - Matrix Representations and Homogeneous Coordinates - Composite Transformations – Translations – Rotations – Scalings. General Pivot-Point Rotation - General Fixed-Point Scaling - General Scaling Directions - Concatenation Properties. General Composite Transformations and Computational Efficiency

Unit – IV: **[12 periods]**

Three-Dimensional Display Methods- Parallel Projection - Perspective Projection - Depth Cueing - Visible Line and Surface – Identification - Surface Rendering - Exploded and Cutaway Views - Three-Dimensional and Stereoscopic Views - Three-Dimensional Graphics Package.

Unit – V: **[12 periods]**

Design of Animation Sequences - General Computer-Animation Functions - Raster Animations - Computer-Animation Languages - Key-Frame Systems – Morphing - Simulating Accelerations - Motion Specifications Direct Motion Specification - Goal-Directed Systems - Kinematics and Dynamics

Text Book :

1. Donald Hearn, Pauline Baker, Computer Graphics – C Version, second edition, Pearson Education,2004.

Reference Books:

1. F.S. Hill, Computer Graphics using OPENGL, Second edition, Pearson Education, 2003.

2. James D. Foley, Andries Van Dam, Steven K. Feiner, John F. Hughes, Computer Graphics-Principles and practice, Second Edition in C, Pearson Education, 2007.

3. Malay K. Pakhira, "Computer Graphics, Multimedia and Animation",PHI Learning Pvt. Ltd., 2010.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	3		2	3							3		3
CO2		3		2	3	3		1	3	3			
CO3	2		3	3		1	3		2	3		2	
CO4	3	2			3			3		1			1
CO5		3	1		3		2		3		2	3	

ELECTIVE II

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Wireless Sensor Network	**4**	**5**	**1**	**0**	**Theory**

Introduction :

After complete this course, students should be able to list various applications of wireless sensor networks, describe the concepts, protocols, and differences underlying the design, implementation, and use of wireless sensor networks. Also implement and evaluate new ideas for solving wireless sensor network design issues.

Course Outcome:

CO1 : To understand about Sensor networks overview and Basic Wireless Sensor Technology

CO2 : To expose Wireless Transmission Technology and Systems

CO3 : To familiarize Fundamentals of MAC Protocols and Routing Protocols for Wireless Sensor Networks

CO4 : To understand Transport Control Protocols for Wireless Sensor Networks , Middleware for Wireless Sensor Networks

CO5 : To familiarize Performance and Traffic Management and Operating Systems for Wireless Sensor Networks

UNIT I [12 periods]

Sensor networks overview: Introduction, Applications of WSN, Range of Applications, Design issues **Basic Wireless Sensor Technology:** Sensor node architecture, Hardware and Software, Sensor Taxonomy, WSN Operating Environment, Trend.

UNIT II [12 periods]

Wireless Transmission Technology and Systems: Introduction, Radio Technology Primer, Propagation & Propagation Impairments, Available Wireless Technologies **Fundamentals of MAC Protocols:** Performance Requirements, Common Protocols, MAC Protocols for WSNs, Schedule-Based Protocols, Random Access-Based Protocols, Sensor-MAC Case Study, Protocol Overview, Periodic Listen and Sleep Operations, Schedule Selection and Coordination, Schedule Synchronization, Adaptive Listening, Access Control and Data Exchange.

UNIT III [12 periods]

Routing Protocols for Wireless Sensor Networks: Routing Challenges and Design Issues in Wireless, Sensor

Networks, Network Scale and Time-Varying Characteristics, Resource Constraints, Sensor Applications Data Models, Routing Strategies in Wireless Sensor Networks, WSN Routing Techniques, Flooding and Its Variants, Sensor Protocols for Information via Negotiation, Low- Energy Adaptive Clustering Hierarchy, Power-Efficient Gathering in Sensor Information Systems, Directed Diffusion, Geographical Routing.

UNIT IV [12 periods]

Transport Control Protocols for Wireless Sensor Networks: Transport Protocol Design Issues, Examples of Existing Transport Control Protocols, CODA (Congestion Detection and Avoidance), ESRT (Event-to-Sink Reliable Transport), RMST (Reliable Multisegment Transport), PSFQ (Pump Slowly, Fetch Quickly),
GARUDA, ATP (Ad Hoc Transport Protocol), Problems with Transport Control Protocols, Performance of Transport Control Protocols, Congestion, Packet Loss Recovery.

UNIT V [12 periods]

Middleware for Wireless Sensor Networks: Introduction, Network Management Requirements, Traditional Network Management Models, Simple Network Management Protocol, Telecom Operation Map, Network Management Design Issues, Example of Management Architecture: MANNA, Other Issues Related to Network Management, Naming, Localization. **Performance and Traffic Management:** WSN Design Issues, MAC Protocols, Routing Protocols, Transport Protocols, Performance Modeling of WSNs, Performance Metrics,
Basic Models, Network Models. **Operating Systems for Wireless Sensor Networks:** Operating System Design Issues, Examples of MANTIS, SenOS, MagnetOS

TEXT BOOKS

1.Kazem Sohraby, Daniel Minoli and Taieb Znati, " Wireless Sensor Networks Technology, Protocols, and Applications", John Wiley & Sons, 2007.

2.Holger Karl and Andreas Willig, "Protocols and Architectures for Wireless Sensor Networks", John Wiley & Sons, Ltd, 2005.

REFERENCE BOOKS

1. Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.

2. Anna Hac, "Wireless Sensor Network Designs", John Wiley & Sons Ltd.

3. Wireless Sensor Networks: Technology, Protocols, and Applications by Kazem Sohraby/wiley.

4. Security in Wireless Sensor Networks by Piotr Szczechowiak , Lap Lambert Academic Publishing

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**		**2**	**3**							**3**		**3**
CO2		**3**		**2**	**3**	**3**		**1**	**3**	**3**			
CO3	**2**		**3**	**3**		**1**	**3**		**2**	**3**		**2**	
CO4	**3**	**2**			**3**			**3**		**1**			**1**
CO5		**3**	**1**		**3**		**2**		**3**		**2**	**3**	

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	R Programming	**5**	**5**	**0**	**0**	**Theory**

Introduction :

To Provides an introduction to fundamental concepts of R programming language and software environment for statistical analysis, graphics representation and reporting.

Course Outcome:

CO1	:	To understand and explore the basics of R Programming language.
CO2	:	Understand the basics of operators for calculations on arrays, lists, vectors and matrices.
CO3	:	To learn the integrated collection of tools for data analysis.
CO4	:	Understand the working of various applications with lists and arrays.
CO5	:	To familiarize the graphical facilities for data analysis.

Unit 1: **[12 Hrs]**

R OVERVIEW and Evolution of R - Features of R and ENVIRONMENT SETUP - Local Environment Setup - R BASIC SYNTAX R Command Prompt - R Script File and Comments in R - R DATA TYPES - R Vectors , Lists - R Matrices - Arrays , Factors - Data Frames - R VARIABLES ,Variable Assignment - Data Type of a Variable ,Finding Variables , Deleting Variables.

Unit 2: **[12 Hrs]**

R OPERATORS: Types of Operators - Arithmetic Operators , Relational Operators , Logical Operators - Assignment Operators, Miscellaneous Operators - R DECISION MAKING : R If Statement - R If...Else Statement, The if...else if...else Statement - R Switch Statement - R LOOPS: R Repeat Loop - R While Loop ,R For Loop - Loop Control Statements, R Break Statement, R Next Statement.

Unit 3: **[12 Hrs]**

R FUNCTION: Function Definition Function Components - Built in Function , User defined Function , Calling a Function - Lazy Evaluation of Function. R STRINGS: Rules Applied in String Construction - String Manipulation - R VECTORS: Vector Creation Accessing Vector Elements -

Vector Manipulation.

Unit 4: [12 Hrs]

R LISTS: Creating a List , Naming List Elements - Accessing List Elements - Manipulating List Elements - Merging Lists - Converting List to Vector - R MATRICES: Accessing Elements of a Matrix - Matrix Computations. R ARRAYS: Naming Columns and Rows , Accessing Array Elements - Manipulating Array Elements - Calculations Across Array Elements - R FACTORS: Factors in Data Frame - Changing the Order of Levels - Generating Factor Levels.

Unit 5: [12 Hrs]

R DATA FRAMES: Extract Data from Data Frame - Expand Data Frame - R PACKAGES: R DATA RESHAPING - Joining Columns and Rows in a Data Frame - Merging Data Frames - Melting and Casting , Melt the Data , Cast the Molten Data. R CSV FILES - R EXCEL FILE - R PIE CHARTS - R HISTOGRAMS - R Regressions - R DATABASES : RMySQL Package - Connecting R to MySql , Inserting Data into the Tables - Creating Tables in MySql - Dropping Tables in MySql.

Text Book :

1. Tilman M. Davies, “The Book of R – A first Course in Programming and Statistics”, 2016.

Reference :

1.Roger D Peng, “R Programming for Data Science”, 2015.

2.Chambers, “Software for Data Analysis: Programming with R”, Springer, 2010.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	3		2	3							3		3
CO2		3		2	3	3		1	3	3			
CO3	2		3	3		1	3		2	3		2	
CO4	3	2			3			3		1			1
CO5		3	1		3		2		3		2	3	

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Learning Maya	5	75	Theory		

Introduction:

This subject covers in detail all aspects of the commonly shortened to Maya is a 3D computer graphics application that runs on Windows, macOS and Linux, originally developed by Alias Systems Corporation (formerly Alias|Wavefront) and currently owned and developed by Autodesk, Inc. It is used to create interactive 3D applications, including video games, animated film, TV series, or visual effects.

Course Outcome:

CO1	:	Working in Autodesk Maya, Creating and editing using Hypergraph,Displaying and Creating projects
CO2	:	Animation, joint basics, creating animation using joints and constraints, creating key frames and basics on Driven keys.
CO3	:	To introduce specific modeling techniques including: smoothing, polygon, decimation, vertex merging, end edge loops selection and edge loop insets.
CO4	:	Explaining about organic modeling,shaping,tools used in modeling, Quad draw
CO5	:	Techniques for working with Deformers, animating the scenes, creating jiggle effect, editing and applying motion capture.

Unit I: **[15 periods]**

Working in Autodesk Maya-Color Management-Creating and Editing Nodes-Using the Hypergraph-Connecting Nodes with the Node Editor-Creating Node Hierarchies in the Outliner-Displaying Options in the Outliner-The Channel Box-The Attribute Editor-Working with Shader Nodes in the Hypershade-Creating Maya Projects-Creating New Project-Editing and Changing Projects.

Unit II: [12 periods]

Introduction to Animation -Using Joints and Constraints-Joint Basics-Point Constraints-Aim Constraints-Inverse Kinematics-IK Handle Tool-Creating a Master Control-Keyframe Animation-Creating Keyframes-Auto Keyframe-Moving and Scaling Keyframes on the Timeline-Copy, Paste, and Cut Keyframes-The Graph Editor-Animation Curves-Editing Animation Curves-Weighted Tangents-Additional Editing Tools-Breakdowns and In-Betweens-Pre- and Post-Infinity-Playblast and FCheck-Driven Keys.

Unit III: [12 periods]

Hard-Surface Modeling-Understanding Polygon Geometry-Polygon Vertices-Polygon Edges-Polygon Faces-Working with Smooth Polygons-Understanding NURBS-Understanding Curves-Understanding NURBS Surfaces-Surface Seams-NURBS Display Controls-Using Subdivision Surfaces-Employing Image Planes-Lofting Surfaces-Attaching Surfaces-Converting NURBS Surfaces to Polygons.

Unit IV: [12 periods]

Organic Modeling -Implement Box Modeling-Shaping Using Smooth Mesh Polygon Geometry-Multi-Cut with Edge Flow-Slide Edge Tool-Offset Edge Loops-Employ Build-Out Modeling-Extrude along a Curve-Sculpt Polygons-Soft Select Tool-Sculpting Tools-Use Retopology Tools-Importing and Exporting-Alembic Cache Files-Slide on Surface-Quad Draw-Reduce.

Unit V: [12 periods]

Animation Techniques -Working with Deformers-Shrink-wrapping Geometry-Using Textures to Deform Objects-Delta Mush-Animating Facial Expressions Using Blend Shapes-Creating Blend Shape Targets-Creating Blend Shapes-Painting Blend Shape Weights-Adding Targets-Animating a Scene Using Nonlinear Deformers-Creating a Wave Deformer-Squashing and Stretching Objects-Twisting Objects-Creating a Jiggle Effect-Applying Jiggle Deformers-Painting Jiggle Weights-Optimizing Animations with the Geometry Cache-Creating a Geometry Cache-Editing the Cache Playback-Applying Motion Capture.

Textbook:

1. Mastering Autodesk Maya, Todd Palamar, 2016.

Reference:

1. Autodesk Maya 2008.
2. Autodesk Maya 2016, Kelly L. Murdock.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	3					3	2			3		2	3
CO2	1	1	3	1	3	3		2	3	1	3		
CO3		2	1			2	3	3					2
CO4	3	3	2	3				2	2	1		3	
CO5			2		3		1		3		2		

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Software Project Management	**4**	**6**	**0**	**0**	**Theory**

Introduction : To outline the need for Software Project Management also highlight different techniques for software cost estimation and activity planning.

Course Outcome:

CO1 : To understand and explore the basics of Software Projects and Risks.
CO2 : Understand the Methods and techniques of Software Projects.
CO3 : To learn the functions of Classes and Objects.
CO4 : To familiarize the Project schedules and activities
CO5 : Implementing Framework and Management control

Unit I: **[12 Periods]**

Introduction – what is a project? – Activities by software project Management – software project vs other project – The project as a system – What is Management? – Management control – Stakeholders-Requirements specifications

Unit II: **[12 Periods]**

Introduction to stepwise project planning – Select project – Project scope and objectives – project infrastructure – project characteristics – project products and activities – estimate effort for each activity – Identify activity risk – Allocate Resources – Review/Publicize plan – Execute plan and lower levels of planning

Unit III: **[12 Periods]**

Project Evaluation – Strategic and Technical Assessment – Coat-benefit Analysis – Cost-benefit Evaluation Techniques – Risk Evaluation

Unit IV: **[12 Periods]**

Project approach – Technical plans –Structure Methods- Rapid Application Development - Waterfall Model - V-process model - spiral model- prototype model –Software prototyping - Incremental Delivery

Unit V: **[12 Periods]**

Effort Estimation- Estimation Basis – Techniques – COCOMO Model- Activity planning – CPM/PERT-Risk Management and its Techniques – Resource allocation – Monitoring control

Text Books :

1. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – second Edition, Tata McGraw Hill, New Delhi, 2012.
2. "Software Projects Management" DCAP304/DCAP515– Lovely professional University,pagwara

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**					**3**	**2**			**3**		**2**	**3**
CO2	**1**	**1**	**3**	**1**	**3**	**3**		**2**	**3**	**1**	**3**		
CO3		**2**	**1**			**2**	**3**	**3**					**2**
CO4	**3**	**3**	**2**	**3**				**2**	**2**	**1**		**3**	
CO5			**2**		**3**		**1**		**3**		**2**		

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	CLOUD WEB SERVICES	**4**	**4**	**-**	**-**	**Theory**

Course Outcomes:

At the end of this course students able to

CO1	**:**	Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures
CO2	**:**	Design different workflows according to requirements and apply map reduce programming model.
CO3	**:**	Apply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms
CO4	**:**	Create combinatorial auctions for cloud resources and design scheduling algorithms for computing clouds
CO5	**:**	Apply cloud services at different scenarios.

Unit I: Cloud Computing As A Service

Cloud Computing, Software-as-a-service: SaaS, Platform-as-a-service: PaaS, Hardware-as-a-service: HaaS, Infrastructure-as-a-service: IaaS, Google Cloud Infrastructure, Google File System, Search engine, Apache Hadoop, Grid Computing, Amazon Web Services, REST APIs, SOAP API, Query API, User Authentication, Connecting to the Cloud, Open SSH Keys, Tunneling / Port Forwarding, Image (glance), Object Storage (swift), ACL,Logging,Signed URI, Compute (nova).

Unit II:Networking Basics

Overview, Keypairs, Network Types, LAN, Gateways and Router, IP Classes and Subnets, CIDR, Utilities, Instances Management, Image Management, Security groups, Block Storage (cinder), Ubuntu in the Cloud, Installation, Utilities, File system, Shell.

Unit III: Programming and Control Structures

Business context, aligning business objectives with security architecture, operational risk and impact assessment, influence of business processes, workflow, organizational structure on

security architecture, location and time dependencies, security architectural layering, entity model and trust framework, security domain model, case studies

Unit VI: Backup and Recovery

Backup and Recovery, Database Sharding, Compute (nova) Applications, Web application design, Focus on Search Engine, Security, Firewall, Data, Network and Host Compute (nova) Capacity Planning, Apache Servers, Mysql Servers.

Unit V: Open stack Cloud

Telemetry (ceilometer), Monitoring Tools Shared File System Service (Manila), Youtube, Elastic Load Balancing Using Octavia, Cluster Balancing, Autoscaling with Heat, Apache Scaling, Mysql Scaling, Openstack Networking (neutron), DHCP, DNS, NFS, NIS, Virtualization, Private Cloud for Enterprise, Hybrid Cloud for Enterprise.

References:

1. OpenStack Essentials by Dan Radez (Author)
2. Cloud Computing: Principles and Paradigms, Editors: RajkumarBuyya, James Broberg, Andrzej M. Goscinski, Wiley, 2011
3. Visible Ops Private Cloud: From Virtualization to Private Cloud in 4 Practical Steps, Andi Mann, Kurt Milne, Jeanne Morain, IT Process Institute, Inc.; first edition (April 8, 2011)
4. OpenStack Cloud Computing Cookbook - Third Edition by Egle Sigler, Cody Bunch, Kevin Jackson

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	3					3	2			3		2	3
CO2	1	1	3	1	3	3		2	3	1	3		
CO3		2	1			2	3	3					2
CO4	3	3	2	3				2	2	1		3	
CO5			2		3		1		3		2		

ELECTIVE III

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Information Storage Management	**4**	**6**	**0**	**0**	**Theory**

Introduction:

To understand the storage architecture and available technologies. To learn to establish & manage datacenter. To learn security aspects of storage & data center

Course Outcome:

CO1	:	Select Various Technology for Information Storage Management
CO2	:	Illustrate the various Storage System Architecture.
CO3	:	Apply Networked Storage Levels.
CO4	:	Apply security measures to safeguard storage & farm
CO5	:	Analyze Quos on Storage

Unit I: [12 periods]

Introduction to Storage Technology: Data creation and The value of data to a business, Information Lifecycle, Challenges in data storage and data management, Solutions available for data storage, Core elements of a Data Center infrastructure, role of each element in supporting business activities.

Unit II : [12 periods]

Storage Systems Architecture: Hardware and software components of the host environment, Key protocols and concepts used by each component ,Physical and logical components of a connectivity environment ,Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications, Concept of RAID and its components, Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6.

Unit III : [12 periods]

Introduction to Networked Storage: Evolution of networked storage, Architecture, components, and

topologies of FC-SAN, NAS, and IP-SAN, Benefits of the different networked storage options, Understand the need for long-term archiving solutions and describe how CAS fulfill the need.

Unit IV: **[12 periods]**

Information Availability, Monitoring & Managing Data Center: Reasons for planned/unplanned outages and the impact of downtime, Impact of downtime. Differentiate between business continuity (BC) and disaster recovery (DR), RTO and RPO, Identification of single points of failure in a storage infrastructure and solutions to mitigate these failures, Architecture of backup/recovery and the different backup/ recovery topologies, replication technologies and their role in ensuring information availability and business continuity.

Unit V: **[12 periods]**

Securing Storage and Storage Virtualization: Information Security, Critical security attributes for information systems, Storage security domains, Analyze the common threats in each domain. Storage Virtualization: Forms, Configurations and Challenges. Types of Storage Virtualization: Block-level and File-Level.

Textbook:

1. G.Somasundaram, Alok Shrivastava, EMC Education Series, "Information Storage and Management", Wiley, Publishing Inc., 2011.

Reference :

1. Robert Spalding, "Storage Networks: The Complete Reference",TataMcGraw Hill,Osborne, 2003.
2. Marc Farley, "Building Storage Networks",TataMcGraw Hill, Osborne. 2001.
3. MeetaGupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**					**3**	**2**			**3**		**2**	**3**
CO2	**1**	**1**	**3**	**1**	**3**	**3**		**2**	**3**	**1**	**3**		
CO3		**2**	**1**			**2**	**3**	**3**					**2**
CO4	**3**	**3**	**2**	**3**				**2**	**2**	**1**		**3**	
CO5			**2**		**3**		**1**		**3**		**2**		

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Database Security	**2**	**4**	**0**	**0**	**Theory**

Introduction:

- Understand the fundamentals of security, and how it relates to information systems
- Master the security architecture
- Learn good password policies, and techniques to secure passwords in your organization
- Learn and implement administration policies for users
- Demonstrate the knowledge and skills for administration of user, profiles, password policies, privileges and roles.

Course Outcome:

CO1	:	Explain the different models in the Security Architecture	
CO2	:	Understand how to adjust policies and practices based on feedback mechanisms using different security models.	
CO3	:	Establish strong passwords and manage resources through the use of profiles	
CO4	:	Compare and contrast database management system facilities for establishing access	
CO5	:	Identify and define SQL injection exploits	

Unit I:

Concepts of Database Management System

Introduction to SQL concepts, SQL language statement: DML, DDL, DCL, TCL. Concept of NoSQL Databases, Advantages of NoSQL: Elastic Scaling, Big Data, Goodbye DBAs', Economics/Cost, Flexible Data models. Least privileges, Understanding permissions, Creating schemas for security, Cross-database Security.

Unit II:

Database Security Lifestyle

Database security lifecycle: Create, Store, Use, Share, Archive and Destroy, Data risk assessment, Analyze data threats, Risks and vulnerabilities, Understand the need for a

database security architecture, Database security architecture, Implement a feedback mechanism, Understand how to adjust policies and practices based on feedback mechanisms using different security models.

Unit III:

Administration of Users

Introduction to administration of users, Defining and using profiles, Designing and Implementing password policies, Authentication and Authorization, Gathering and revoking user privileges, Privilege in Oracle and SQL server, Creating, Assigning and Revoking user roles, Creating roles with Oracle and SQL Server.

Unit IV:

Database Exploitation and Defense

Understanding SQL injection, Identifying vulnerabilities, Exploitation and Information gathering, Real data extraction using statement exploits, UNION, Condition, and Large scale extraction, Exploitation of privileges and password, Protecting SQL Server against DOS, Protecting SQL Server against SQL injection, Securing dynamic SQL from injection

Unit V:

Database security Auditing and Testing

Security Auditing, Classification of Audit, Gal of Audit, Process of Audit, Database auditing: Preparation and planning for a database security audit, Reporting a database security audit, Auditing – Using the profiler to audit SQL server access, Auditing using DML trigger, Auditing using DDL triggers, Configuring SQL server auditing, Security testing, Testing methodology.

Reference Books:

1. Richard I Levin, David S. Rubin: Statistics for Management, Pearson Prentice Hall Education Inc. Ltd, NewDelhi, 5th Ed. 2007
2. Bajpai, N. Business Statistics, Pearson, 2010
3. Sharma J.K., Business Statistics, Pearson Education India, 2010.
4. Anderson; David R, Dennis J. Sweeney and Thomas A. Williams, Quantitative Methods for Business, Prentice-Hall, WestPublishing Company, 1996.
5. CAT Complete course, UPKAR publications

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**					**3**	**2**			**3**		**2**	**3**
CO2	**1**	**1**	**3**	**1**	**3**	**3**		**2**	**3**	**1**	**3**		
CO3		**2**	**1**			**2**	**3**	**3**					**2**
CO4	**3**	**3**	**2**	**3**				**2**	**2**	**1**		**3**	
CO5			**2**		**3**		**1**		**3**		**2**		

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Digital Image Processing	**2**	**4**	**0**	**0**	**Theory**

Introduction :

To enable the students to learn the introduction to digital image processing, fundamentals, image enhancement and image restoration techniques.

Course Outcome:

CO1 : Understand the fundamentals of digital image processing and sampling and quantization concepts.

CO2 : Apply image processing techniques in both the spatial and frequency domains using various transform techniques.

CO3 : Understanding the filtering techniques for Image restoration and reconstruction.

CO4 : Understanding fundamentals and some basic models of Image Compression

CO5 : Applying the image segmentation process.

UNIT- I **12 Hrs**

Introduction: What is digital image processing – The origin of DIP – Examples of fields that use DIP – Fundamentals steps in DIP – Components of an image processing system. Digital image fundamentals: Elements of Visual perception – Light and the electromagnetic spectrum – Image sensing and acquisition – Image sampling and quantization – Some basic relationship between pixels – Linear & Nonlinear operations

UNIT- II **12 Hrs**

Intensity Transformations and Spatial Filtering: - Background – Some basic intensity transformation functions– Histogram processing – Fundamentals of spatial filtering – Smoothing spatial filters – Sharpening spatial filters – Combining spatial enhancement methods.

UNIT- III **12 Hrs**

Image restoration and reconstruction: A model of the image degradation /restoration process – Noise models – Restoration is the presence of noise only - Spatial filtering - Periodic Noise Reduction by Frequency Domain Filtering - Estimating the degradation function – Inverse filtering – Minimum mean square error filtering – Constrained least squares filtering – Geometric mean filter .

UNIT- IV **12 Hrs**

Image compression: fundamentals – image compression models – Image Formats, Containers and Compression Standards .Some Basic Compression Methods – Digital Image Watermarking.

UNIT- V **12 Hrs**

Image segmentation: Fundamentals – Points, Lines and Edge Detection – Threshold – Region-based segmentation

Text Book:

1. Rafael C.Gonazalez, Richard E. Woods, "Digital Image Processing", Pearson Education, Third Edition.

Reference Books:

1. B.Chanda, D.Dutta Majumder, "Digital Image Processing and Analysis", PHI, 2003.

2. William K.Pratt, "Digital Image Processing", 3 rd edition, Wiley India Pvt. Ltd, 2013

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	3					3	2			3		2	3
CO2	1	1	3	1	3	3		2	3	1	3		
CO3		2	1			2	3	3					2
CO4	3	3	2	3				2	2	1		3	
CO5			2		3		1		3		2		

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Software Testing	**4**	**6**	**0**	**0**	**Theory**

Introduction:

This Subject gives the knowledge about software development Life Cycle Models and various testing Concepts.

Course Outcome:

CO1 : To explain the core concepts of the software testing Basics. How and why this testing shift came about, the characteristics, advantages and challenges brought about by the various Testing and services in Software Testing.

CO2 : To discuss various types of Testing and its features.

CO3 : To analyze various Testing Technique which is directly implemented into real time application software

CO4 : To Analyze Performance and Functional of Real time Application Software.

CO5 : To Plan Overall Software Development Process.

UNIT I: [12 periods]

A Perspective on Testing- Basic Definitions - Insights from a Venn Diagram- Identifying Test Cases- Levels of Testing-. The Triangle Problem- The NextDate Function - The Commission Problem- The SATM System

UNIT II: [12 periods]

Testing Overview - What is testing- Who does testing? - Difference between Verification & Validation- Difference between Testing, Quality Assurance and Quality Control- Difference between Audit and Inspection- Difference between Testing and Debugging- Testing Myths

UNIT III: [12 periods]

Testing Types- Manual Testing - Automation Testing - Testing Methods - Black Box Testing - White Box Testing - Grey Box - Levels of Testing Functional Testing- Unit Testing - Limitations of Unit Testing - Integration Testing - System Testing - Regression Testing - Acceptance Testing

UNIT IV: [12 periods]

Non-Functional Testing Performance Testing- Usability Testing- Security Testing - Portability Testing - Path Testing- Data Flow Testing- Retrospective on Unit Testing- Life Cycle–Based Testing- Agile Testing- Agile Model–Driven Development- Model-Based Testing

UNIT V [12 periods]

Integration Testing- System Testing- Object-Oriented Testing- Software Complexity- Model-Based Testing for Systems of Systems - Exploratory Testing- Test-Driven Development- Evaluating Test Cases - Software Technical Reviews

Text Book:

1. Paul C. Jorgensen, "Software Testing", A Craftsman's Approach, Fourth Edition

Reference Books:

1. C.Kaner,J.Bach and Pettichord, "Lessons Learned in Software Testing" Willey Publishers , First Edition, 2002.

2. Boris Beizer, "Lessons Learned in Software Testing Technique", Wiley Publishers, Second Edition, 2008.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	3					3	2			3		2	3
CO2	1	1	3	1	3	3		2	3	1	3		
CO3		2	1			2	3	3					2
CO4	3	3	2	3				2	2	1		3	
CO5			2		3		1		3		2		

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Open stack Cloud	**2**	**4**	**0**	**0**	**Theory**

Introduction:

- To understand the basic concepts of openstack cloud.
- To understand the importance of core services in openstack cloud.
- To work on the deployment nodes of openstack cloud.
- To configure core services of openstack cloud using command line interface.
- interface/ command line interface.

Course Outcome:

CO1	:	Understand the architecture of openstack	
CO2	:	Recognize the services provided by the openstack	
CO3	:	Identify the services of the openstack with respect to the infrastructure resources	
CO4	:	Understand the deployment of various services Configure the services of openstack using command line	
CO5	:	To configure advance services of openstack cloud using graphical user	

Unit I:

Introduction To Openstack

Introduction to openstack, Origin of openstack , Overview – conceptual architecture – logical architecture – characteristics of openstack ,Deployment models supported by openstack , Service models offered by openstack – openstack licensing, Core services offered by openstack, Releases of openstack, Services introduced in ocata – ocata vs newton

Unit II:

Core Services

Keystone: Identity service – Architecture – features, Glance: Image service – configuration – image formats ,Nova: Compute service – Architecture – flavors – project- role – users-hypervisors, Neutron: Networking service – Architecture – neutron agent – open vSwitch, Horizon: user interface , Swift: Object storage service – swift rings, Cinder: Block storage service – block storage services, Ceilometer: Telemetry service – monitoring

Unit III:

Deployment Of Openstack

Compute node – Controller node – network node – determining the type of deployment, resource planning, All in one deployment: installing openstack_ocata – automating the services using packstack utility- generating and analyzing the answer file – modifying the answer file, deploying openstack with respect to answer-file – adding a compute node in an existing cloud

Unit IV:

Configuring Core Services Using CLI

Identifying admin key privilege – creating projects, users and roles, Adding images in the cloud – creating a customized flavors, Configuring bridge between neutron and physical network, Creating an internal network – creating an external network, Determining the floating ip – creating a router – creating a security groups, Generating the RSA key in .PEM key format, Launching an instance in the internal network – accessing the instances from physical network.

Unit V:

Configuring Advanced Services Using GUI/CLI

Configuring DNS service using DESIGNATE, Configuring FWAAS – Configuring LBAAS – Configuring VPNAAS, Configuring object storage – Configuring block storage – adding an external disk in the controller node (.vmdk or .VDI), Configuring ceilometer and monitor the resource management cloud orchestration using heat services, Configuring shared file system using manila, Configuring clustering service using senlin service.

Text Books:

1. OpenStack Essentials, Dan Radez, Paperback – Import, 29 Jul 2016
2. Openstack Operations Guide, Tom Fifield, Paperback – 1 Jul 2014
3. OpenStack Cloud Computing Cookbook, Kevin Jackson, Cody Bunch, Second Edition Paperback – October 17, 2013

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**		**3**			**3**	**3**		**1**	**3**	**1**		**3**
CO2		**2**		**2**	**3**					**1**	**1**	**3**	
CO3	**3**				**2**	**1**		**1**	**3**	**2**			**3**
CO4	**3**	**3**		**3**			**1**				**2**	**3**	
CO5			**3**		**3**	**3**			**2**		**3**		**1**

ELECTIVE IV

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Cyber Security Incident Response Management	**2**	**4**	**0**	**0**	**Theory**

Introduction:

- Deduce the lifecycle process of incident response.
- Explore the various methods for preventive measures from cyber security incidents.

  Determine the various effects of various real time cyber security incidents

Course Outcome:

CO1	:	Understand the overview of CSIRM.	
CO2	:	Explore the lifecycle of incident response	
CO3	:	Interpret the various methods to recover from the cyber security incident	
CO4	:	Discover preventive measures for cyber security incidents	
CO5	:	Analyze the various real time cyber security incidents	

Unit I:

Need for CSIRM

Differences between an event, incident and disaster, what are cyber security incidents, need for CSIRM, policy, plan and procedure, importance of communication protocol, key internal and external stakeholders, law enforcement, role of media, team structure and roles – important considerations

Unit II:

Handling a Cyber Security Incident

Incident response lifecycle, incident handling infrastructure and facilities requirements, detection and analysis, process, tools and techniques, attack vectors, recognizing signs of an incident,

precursors, indicators and historical organization data, incident correlation, review of logs and vital system parameters, incident handling checklist, documentation and reporting

Unit III:

Recovering from Cyber Security Incidents

Nature of incidents and the type of resources it affects, assessment of an incident's impact on business, IT operations and information, determining the amount of time and resources needed in recovering from an incident, prioritization, incident notification structure, containment, eradication and recovery – choosing a containment strategy, evidence gathering and handling, identifying the attack hosts, eradication and recovery, post-incident analysis, evidence retention and lessons learned

Unit IV:

Preventing Cyber Security Incidents

Incident analytics as input to proactive security measures to prevent incidents, risk assessment, host security, network security, malware prevention, user awareness and training, analysis of cost of control versus cost of incident impact, best practices

Unit V:

Cyber Security Incidents Analysis through Scenarios

Flow chart of scenario questions, scenarios – DoS attack on DNS server, worm and DDoS agent infestation, military-classified documents stolen by an insider, compromised database server, unauthorized access to payroll records, identities and credentials stolen by hackers, antisocial propaganda in media through compromised home wifi network, personal files stored in Cloud are compromised, remote hacking of smart home network, malware infection in home and office network simultaneously, large scale of citizens' biometric data stolen by cyber war groups

Text Books:

1. 1 NIST SP 800-61r2 – Computer Security Incident Handling Guide
2. Computer Incident Response and Product Security (Networking Technology: Security) by Damir Rajnovic 1st, Kindle Edition
3. The Computer Incident Response Planning Handbook: Executable Plans for Protecting Information at Risk by N.K. Mccarthy, Matthew Todd, Jeff Klaben, McGraw-Hill Education, 2012
4. Tools and Techniques for Fighting Malicious Code: Malware Analyst's Cookbook by Michael Hale Ligh, Steven Adair, Blake Hartstein, Matthew Richard, Wiley, 2010
5. Incident Response: A Strategic Guide to Handling System and Network Security Breaches by E. Eugene Schultz, Russell Shumway, Sams, 2001

Information Security: Incident Response and Disaster Recovery by Michael E. Whitman, Herbert Mattford, Cengage Learning India Pvt Ltd, 2009

Reference Books:

1. Incident Response & Computer Forensics by Jason T. Luttgens, Matthew Pepe, Kevin Mandia, McGraw-Hill Education; 3rd edition, 2014
2. Principles of Incident Response and Disaster Recovery by Michael Whitman, Herbert Mattord Delmar Cengage Learning; 2nd Revised edition, 2013

Computer Incident Response and Forensics Team Management: Conducting a Successful Incident Response by Leighton Johnson, Syngress, 2013

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**		**3**			**3**	**3**		**1**	**3**	**1**		**3**
CO2		**2**		**2**	**3**					**1**	**1**	**3**	
CO3	**3**				**2**	**1**		**1**	**3**	**2**			**3**
CO4	**3**	**3**		**3**			**1**				**2**	**3**	
CO5			**3**		**3**	**3**			**2**		**3**		**1**

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Introduction To RPA Tools	**2**	**4**	**0**	**0**	**Theory**

Introduction:

The Students should understand the Basics of RPA Tools and the Process and to understand the designing RPA Solutions.

Course Outcome:

CO1	:	Analyze technical goals and tradeoffs.	
CO2	:	Know the importance of RPA tools.	
CO3	:	Envision a basic RPA implementation plan	
CO4	:	Understand the challenges and risks when implementing RPA.	
CO5	:	Appreciate knowledge onautomation and optimization of business process.	

Unit -1 **[12 Periods]**

Robotic Process Automation concepts: Introduction to RPA: Scopes and techniques of RPA- About UiPath- The future of automation **Record and Play:** Record and Play- UiPath Stack- Installing and Learning UiPath studio- Task recorder.

Unit -I1 **[12 Periods]**

Sequence and Data Manipulation: Sequence: Sequence- Flowchart and Control Flow- sequencing the workflow- control flow- various types of loops and decision making- step by step example using sequence- Flowchart and Control Flow.

Data Manipulation: Variables and scope- Collections, Arguments- Collections- Clipboard management- File operation- CSV/Excel to data table and vice versa.

Unit -I1I **[12 Periods]**

User Interface Components: Ribbon- Toolbars Access- Library panel- project panel- Outline panel- locals panel, Debugging, Recording, Workflow execution, context menu, properties panel, Designer panel, Universal search bar.

Workflow Design and UiPathStudio: Layout diagrams- Type of Decisions- switch activity- Flow Decision- Flow switch- Naming conventions- managing variables in studio- types of

variables- managing arguments- Argument panel- Types of Recording-Automatic recording- Basic, web and desktop automatic recording- Manual recording- Data scraping, Screen scrapping and its methods

Unit -IV **[12 Periods]**

Control Flow Activities and Selectors: Assign activity- Delay activity- While activity- Do while activity- If activity, Switch activity- For each activity and Break activity. **Selectors and input/output methods:** Simple selectors- Generation of Dynamic selectors- passing the variables in selectors- Input methods, Output methods, Full text, Native, OCR.

Unit -V **[12 Periods]**

Automation Excel and PDF Automation:

Reading and working with rows of excel, looping with excel, working with PDF and excel files, retrieving data from web. **Email Automation:** Outlook Email activity, Get IMAP mail activity, Get POP3 mail message, get exchange mail activity, sending and receiving mail messages. **Orchestrator**: Dashboard, Robots, Processes, Jobs, Queues, Schedules, Transaction

Reference Books:

1. Intelligent Control: A stochastic optimization approach by Kaushik Das Sharma, Amitava Chatterjee, AnjanRakshit. –Springer edition

2. Learning Robotic Process Automation with UiPath – Alok Mani Tripathi, Packt.

3. Robotic Process Automation- Guide to building robots by Richard Murdoch.

4. Robotic Process Automation and Risk Mitigation: The Definitive Guide by Mary C. Lacity and Dr. Leslie P. Willcocks

5. Introduction to robotic process automation by Frank Casale

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**		**1**			**3**			**3**			**1**	**2**
CO2	**2**	**3**		**3**	**1**		**3**	**2**		**3**			
CO3		**2**		**3**		**1**	**3**	**3**	**1**		**2**	**3**	**3**
CO4	**3**	**3**			**3**		**3**	**3**		**3**	**3**	**3**	
CO5			**3**	**2**		**3**			**3**		**3**		

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	3D Animation	**4**	**5**	**1**	**0**	**Theory**

Introduction :

This course will focus on creating 3D spaces, and 2D & 3D animations. Students will learn to use Autodesk Maya, Adobe Flash, and Adobe Premiere.

Units will include:

2D Animation - Timing, and walk cycles

3D Design - Creating objects and characters

3D Animation - Timing, walk cycles, camera movement

Students will also be introduced to the history of both 2D and 3D animation.

Course Outcome:

CO1 : To know the basics of animation timing and How to design a character for both 2D and 3D animation.

CO2 : To know about the importance of walk cycles and their basic construction

CO3 : To understand about the purpose of keeping a sketchbook as an animator

CO4 : To know about the drawing principles used to create a believable background.

CO5 : To create an animation showreel and An introduction to the development and evolution of animation

Unit I **[12 periods]**

3D Animation Overview : The history of 3D animation - Understanding the Production Pipeline's Components - Working in 3D Animation Preproduction - Working in 3D Animation Production - 2D Visual Effects/Motion Graphics - Color Correction - Folder Management and Naming Conventions.

Unit II : **[12 periods]**

Understanding Digital Imaging and Video : Digital Imaging-Pixels-Raster Graphics vs. Vector

Graphics-Basic Graphic-File Formats- Digital Video - Resolution, Device Aspect Ratio, and Pixel Aspect Ratio-Digital Image Capture-Using Principles of Fine Art and Traditional Animation-Building a Good Story.

Unit III : [12 periods]

Understanding Modeling and Texturing : Modeling- Texturing -Rigging and Animation: Rigging – Parenting-Pivot Positions-Scripting-Expressions-The Basic Rigging Workflow-Animation-Key frame-Timeline-Dope Sheet-Workspace-Tracking Marks and Ghosting -FK and IK- Video Reference-The Basic Animation Workflow- Animation Techniques.

Unit IV: [12 periods]

Creating Visual Effects : Particles - Hair and Fur – Fluids - The Basic VFX Workflow – Lighting-Light Types- Light Attributes- Lighting Techniques -Rendering - Basic Rendering Methods-Global Illumination- Advanced Shader Functions- The Basic Rendering Workflow.

Unit V: [12 periods]

Hardware and Software Tools of the Trade : Choosing a Computer - Using Monitors/Displays - Working with Graphics Tablets- Using 3D Scanners- Setting Up Render Farms- Finding Data Storage Solutions- Choosing Software- Comprehensive 3D Animation Packages- CAD- Digital Imaging- Using Motion Capture- Working in Virtual Studios.

Textbook:

Andy Beane , “3D Animation Essentials”, John Wiley & Sons , Inc [ISBN: 978-1-118-14748-1], 2012.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P09	PS01	PS02	PS03	PS04
CO1	3		1			3			3			1	2
CO2	2	3		3	1		3	2		3			
CO3		2		3		1	3	3	1		2	3	3
CO4	3	3			3		3	3		3	3	3	
CO5			3	2		3			3		3		

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Virtualization and Cloud Security	**2**	**4**	**0**	**0**	**Theory**

Introduction:

- To compare modern security concepts as they are applied to cloud computing.
- To assess the security of virtual systems.
- To evaluate the security issues related to multitenancy.
- To appraise compliance issues that arise from cloud computing.
- To analyse protection of data stored online via cloud computing platforms

Course Outcome:

CO1	:	Explain how security is implemented in virtualization and cloud computing.	
CO2	:	Discover the importance of security principles in achieving trust and privacy in Cloud	
CO3	:	Elaborate the need for understanding legal aspects of security and privacy in Cloud computing	
CO4	:	Choose the appropriate technologies, algorithms, and approaches for the related issues	
CO5	:	Identify problems, and explain, analyse, and evaluate various cloud computing solutions	

Unit I:

Introduction to Virtualization and Cloud

Introduction to Unit, Virtualization and Cloud computing concepts, Private cloud Vs Public cloud IAAS, PAAS and SAAS concepts, Virtualization security concerns – hypervisor and host/ platform Security, Security communications between – guest instances, hosts and guests, security challenges and mitigation measures, Conclusion of the Unit

Unit II:

Introduction to Cloud Security, Cloud Trust Protocol and Transparency

Introduction to Cloud Computing, various Cloud Delivery models including Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) in

the context of Security, Cloud deployment models – public, private and hybrid in the context of Security, Trusted Cloud Initiative (TCI) and Cloud Trust Protocol (CTP), Transparency as a Service (TaaS) and Security as a Service (SecaaS), Cloud Security, Incident and Response (Cloud SIRT), Cloud Data Governance and Governance, Risk and Compliance (GRC) Stack, top threats to Cloud Security, comparison of traditional IT and Cloud Security.

Unit III:

Cloud Security Architecture

Architectural considerations, Cloud storage and data security, identity management and access control, autonomic security, encryption and key strategies, secure connection, Privacy in Cloud, architecture changes for different Cloud deployment models, Business Continuity Management and Disaster Recovery in the Cloud, OpenStack Cloud Security, Cloud forensics.

Unit IV:

Cloud Security Controls

Introduction to Cloud Controls Matrix, 13 domains of Security controls, fundamental security principles, deterrent, preventive, detective and corrective security controls for Cloud computing, assessing security risk of a cloud provider.

Unit V:

Legal aspects impacting Cloud Security and Privacy

Introduction to Unit, Understanding legal challenges involved in Cloud, liability, copyright, data protection, IPR, data portability, inter, country legal frameworks, personal data protection and privacy, data controller and processor, contracts, provider's insolvency risk, Conclusion of the Unit

Text Books:

1. Virtualization Security: Protecting Virtualized Environments by Dave Shackleford, Sybex (4 December 2012).
2. OpenStack Cloud Security by Fabio Alessandro Locati, Packt Publishing Limited (28 July 2015).
3. Cloud Security – A comprehensive Guide to Secure Cloud Computing by Ronald L. Krutz and Russel Dean Vines, Wiley, 2010

Reference Books:

1. Cloud Security and Privacy by Mather Tim, Shroff Publishers & Distributers Private Limited – Mumbai; First edition (2009).
2. Securing the Cloud: Cloud Computer Security Techniques and Tactics by Vic (J.R.) Winkler, Syngress (1 June 2011).
3. Practical Cloud Security: A Cross-Industry View by Melvin B. Greer Jr., Kevin L. Jackson CRC Press; 1 edition (2 August 2016).

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**		**1**			**3**			**3**			**1**	**2**
CO2	**2**	**3**		**3**	**1**		**3**	**2**		**3**			
CO3		**2**		**3**		**1**	**3**	**3**	**1**		**2**	**3**	**3**
CO4	**3**	**3**			**3**		**3**	**3**		**3**	**3**	**3**	
CO5			**3**	**2**		**3**			**3**		**3**		

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Reinforcement Learning	**2**	**4**	**0**	**0**	**Theory**

Introduction:

1. Provide an over view of what constitute the main component of a Reinforcement Learning method.
2. Explain about the modern solution frameworks used in contemporary Reinforcement Learning
3. Describe problem representation that contains variables and solving relational and first order logical Markov decision process.
4. Explains sequential decision making under uncertainty.
5. Explains about the influence of Reinforcement Learning in other fields.

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Course Outcome:

CO1	:	Understand what constitute the main component of a Reinforcement Learning method	
CO2	:	Got to know contemporary Reinforcement learning methods.	
CO3	:	Understands how to solving relational and first order logical Markov decision process	
CO4	:	Understands sequential decision making under uncertainty.	
CO5	:	Knowing the influence of Reinforcement Learning in other fields	

Unit I: Reinforcement Learning and Markov Decision Process

Introduction- Reinforcement Learning - Examples OF Reinforcement Learning-Elements of Reinforcement Learning- Example: Tic-Tac-Toe - History of Reinforcement Learning -Learning Sequential decision Making-A Formal Frame Work on Markov Decision Process and Policies-Value Function and Bellman Equations-Solving Markov Decision Process-Dynamic Programing Model Based Solution Technique-Reinforcement Learning Model Free Solution Technique

Unit II :Efficient Solution Framework

Introduction- The Batch Reinforcement Learning Problem- Foundations of Batch Reinforcement Learning Algorithms- Batch Reinforcement Learning Algorithms: Kernel-Based Approximate Dynamic Programming- Fitted Q Iteration- Least-Squares Policy Iteration- Identifying Batch Algorithms. Theory of Batch Reinforcement Learning- Neural Fitted Q Iteration (NFQ)- Batch Reinforcement Learning for Learning in Multi-agent Systems- Deep Fitted Q Iteration. Least-

Squares Methods for Approximate Policy Evaluation- Least-Squares Policy Iteration- Performance Guarantees.

Unit III:Constructive- Representational Directions

Reinforcement learning in continuous state and action space: Function Approximation- Approximate Reinforcement Learning.- Solving Relational and first-order logical Markov decision: Introduction to sequential decision in relational Reinforcement Learning- model based solution techniques- model free solution- Hierarchical Approaches- Approaches to hierarchical reinforcement learning – Evolutionary computation for Reinforcement Learning: Neuro-evolution - Hybrids-Coevolution.

Unit IV:Probabilistic Model For Self and Other

Bayesian Reinforcement Learning: Model free Bayesian Reinforcement Learning - Model based Bayesian Reinforcement Learning- Partially observable Markov decision process: Decision making in partially observable environments- model based techniques-Predictively defined representation of state: PSRs- Learning a PSR model- Game theory and multi agent Reinforcement Learning – Reinforcement Learning in Repeated games- Sequential games.

Unit V: Domain and Background

Reinforcement Learning in games- challenges of applying Reinforcement Learning to games- Reinforcement Learning in Robotics: challenges in robot REINFORCEMENT LEARNING- Foundations of Robotic Reinforcement Learning- tractability through simulation, representation and prior knowledge.

References:

1. Syntactic Pattern Recognition And Applications, Fu K.S., Prentice Hall, Eaglewood Cliffs
2. Pattern Recognition: Techniques And Applications by RajjanShinghal : Oxford University Press, 2008,
3. Pattern Classification and Scene Analysis, John Wiley, Duda& Hart P.E.
4. Syntactic Pattern Recognition - An Introduction by Addison Wesley Gonzalez R.C. & Thomson M.G

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**PS01**	**PS02**	**PS03**	**PS04**
CO1	**3**		**1**			**3**			**3**			**1**	**2**
CO2	**2**	**3**		**3**	**1**		**3**	**2**		**3**			
CO3		**2**		**3**		**1**	**3**	**3**	**1**		**2**	**3**	**3**
CO4	**3**	**3**			**3**		**3**	**3**		**3**	**3**	**3**	
CO5			**3**	**2**		**3**			**3**		**3**		

Ability Enhancement Course

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
19BCSAFC	Environmental Studies	**2**	**2**	**0**	**0**	**FC**

Unit I

A Multidisciplinary Subject – Natural Resources – Forest Resources – Water Resources – Mineral Resources – Food Resources – Energy Resources – Land Resources.

Unit II

Ecosystem – Concepts of Ecosystem – Characteristics – Food Chains – Food Web – Ecological Pyramids – Energy Flow in an Ecosystem – Nutrient Cycling – Primary Production – Ecosystem Regulation – Ecological Succession – Major Ecosystem Types.

Unit III

Biodiversity and its Conservation – Diversity – Biogeographically Classification of India – Value of Biodiversity – Global Biodiversity – Biodiversity: National, Regional or Local – Hot Spots of Bio Diversity – Threats to Biodiversity – Loss of Habitat – Poaching – Man-wildlife Conflicts – Endangered Species of India – Endemic Species of India – Conservation of Biodiversity.

Unit IV

Environmental Pollution – Air pollution – Noise Pollution – Water Pollution – Thermal Pollution – Marine Pollution – Soil Pollution – Nuclear Hazards – Solid Waste Management – Role of an Individual in Prevention of Pollution – disaster Management.

Unit V

Social Issues and the Environment – From unsustainable to sustainable development – Urban problems related to energy – Water Conservation – Rainwater Harvesting – Watershed Management – Resettlement and Rehabilitation Issues – Environmental Ethics – Climate change – Global Warming – Acid Rain – Ozone Layer Depletion – Environmental Legislation.

Reference books:

1. Perspectives in Environmental Studies – Aubha Kaushik, C. P. Kaushik, New Age International Publishers, Second Edition, 2004.
2. Basics of Environmental Science – Michael Allaby, Routledge – London, 2nd Edition, 1996.
3. Principles of Environmental Science and Technology – K. Saravanan, S. Ramachandran and R. Baskar, New Age International Publishers, 2005.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
19BCMAFC	Women Studies	**2**	**2**	**0**	**0**	**FC**

Unit I

Laws, Legal Systems and Change

Definition - Constitutional law, CEDAW and International Human Rights – Laws and Norms – Laws and Social Context – Constitutional and Legal Framework.

Unit II

Politics of land and gender in India

Introduction – Faces of Poverty – Land as Productive Resources – Locating Identities – Women's Claims to Land – Right to Property - Case Studies.

Unit III

Women's Rights: Access to Justice

Introduction – Criminal Law – Crime Against Women – Domestic Violence – Dowry Related Harassment and Dowry Deaths – Molestation – Sexual Abuse and Rape – Loopholes in Practice – Law Enforcement Agency.

Unit IV

Women's Rights

Violence Against Women – Domestic Violence - The Protection of Women from Domestic Violence Act, 2005 - The Marriage Validation Act, 1982 - The Hindu Widow Re-marriage Act, 1856 - The Dowry Prohibition Act, 1961

Unit V

Special Women Welfare Laws

Sexual Harassment at Work Places – Rape and Indecent Representation – The Indecedent Representation (Prohibition) Act, 1986 - Immoral Trafficking – The Immoral Traffic (Prevention) Act, 1956

- Acts Enacted for Women Development and Empowerment - Role of Rape Crisis Centers.

Reference books:

1. Nitya Rao “Good Women do not Inherit Land” Social Science Press and Orient Blackswan 2008
2. International Solidarity Network “Knowing Our Rights” An imprint of Kali for Women 2006
3. P.D.Kaushik “Women Rights” Bookwell Publication 2007
4. Aruna Goal “Violence Protective Measures for Women Development and Empowerment” Deep and Deep Publications Pvt 2004
5. Monica Chawla “Gender Justice” Deep and Deep Publications Pvt Ltd.2006
6. Preeti Mishra “Domestic Violence Against Women” Deep and Deep Publications Pvt 2007
7. ClairM.Renzetti, Jeffrey L.Edleson, Raquel Kennedy Bergen, Source Book on “Violence Against Women” Sage Publications 2001

Subject Code	**Subject Title**	**Credit**	**Lecture**	**Tutorial**	**Practical**	**Type**
19BCCAFC	**Constitution of India**	**2**	**2**	**0**	**0**	**FC**

Unit I

Making of Constitution - Constituent Assembly - Dr.Rajendra Prasath - Dr.B.R.Ambedkar - Salient features - Fundamental Rights.

Unit II

Union Executive - President of India - Vice-President - Prime Minister - Cabinet - Functions

Unit III

Union Legislature - Rajiya Sabha - Lok Sabha - Functions and Powers

Unit IV

Union Judiciary - Supreme Court - Functions - Rule of law

Unit V

State - Executive - Legislature - Judiciary

Reference books:

1. Agharwal.R.C. - National Moment and Constitutional Development – New Delhi, 1977
2. Chapra B.R., Constitution of India, New Delhi, 1970
3. Rao B.V., Modern Indian Constitution, Hyderabad, 1975.
4. Nani Palkhivala - Constitution of India, New Delhi, 1970
5. Krishna Iyer, V.R., Law and Justice, New Delhi, 2009

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
19BPYAFC	Value Education – Human Rights	**2**	**2**	**0**	**0**	**FC**

UNIT – I: Concept of Human Values, Value Education Towards Personal Development - Aim of education and value education; Evolution of value oriented education; Concept of Human values; types of values; Components of value education. Personal Development: Self-analysis and introspection; sensitization towards gender equality, physically challenged, intellectually challenged. Respect to - age, experience, maturity, family members, neighbors, co-workers.

Character Formation towards Positive Personality: Truthfulness, Constructively, Sacrifice, Sincerity, Self-Control, Altruism, Tolerance, Scientific Vision.

UNIT – II: Value Education towards National and Global Development - National and International Values: Constitutional or national values - Democracy, socialism, secularism, equality, justice, liberty, freedom and fraternity. Social Values - Pity and probity, self-control, universal brotherhood. Professional Values - Knowledge thirst, sincerity in profession, regularity, punctuality and faith. Religious Values - Tolerance, wisdom, character. Aesthetic values - Love and appreciation of literature and fine arts and respect for the same. National Integration and international understanding.

UNIT – III: Impact of Global Development on Ethics and Values - Conflict of cross-cultural influences, mass media, cross-border education, materialistic values, professional challenges and compromise. Modern Challenges of Adolescent Emotions and behavior; Sex and spirituality: Comparison and competition; positive and negative thoughts. Adolescent Emotions, arrogance, anger, sexual instability, selfishness, defiance.

UNIT - IV: Introduction – Law – Functioning of Court – Hierarchy of Courts – seeking Justice – Dragged into the Net – Help thy Neighbor – You snooze, You Lose - Crime & Punishment – Introduction to Criminal Law – Encounter with Criminal Law – Limitation and other restrictions for prosecution – Major offences and punishments - Guardianship and Minority – Civil Marriage – Compulsory Registration of

Marriages – Relief through Family Court – Writing a Will.

UNIT - V: Protection of Women under Civil Law – Protection of Women under Criminal law – Protection of Child under Civil and Criminal Law - Protection of Workmen - Consumer Protection – Consumer friendly forums – Defective and Hazardous Good – Deficiency in Service – Unfair and Restrictive trade practices – Quality of Goods – Right to Information Act – Cyber Crimes – E- Commerce.

Textbook:

1. Value Education – Human Rights – Learning Material, Bharathiar University, 2009.

1. Introduction to Human Rights and Duties - Dr.T. S.N.Sastry, University of Pune, 2011
2. Human Rights Education for Begineers - KWIRC , NHRC, 2005.
3. Layman's Guide to Law, Yetukuri Venkateswara Rao, Asia Law House, 2008.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
19BTAAFC	Yoga	**2**	**2**	**0**	**0**	**FC**

Unit I - Yoga and Physical Health

1.1. Physical Structure - Three bodies - Five limitations
1.2. Simplified Physical Exercises - Hand Exercises -Leg Exercises – Breathing Exercises - Eye Exercises – Kapalapathi
1.3. Maharasanas 1-2 - Massages - Acu-puncture – Relaxation
1.4. Yogasanas - Padmasana- Vajrasanas - Chakrasanas . (Side)- Viruchasanas- Yoga muthra- Patchimothasanas – Ustrasanas - Vakkarasanas - Salabasanas

Unit II - Art of Nurturing the life force and Mind

2.1. Maintaining the youthfulness - Postponing the ageing process

2.2. Sex and Spirituality - Significance of sexual vital fluid - Married life - Chastity

2.3. Ten stages of Mind

2.4 Mental frequency - Methods for concentration

Unit III – Sublimation

3.1. Purpose and Philosophy of life

3.2. Introspection - Analysis of Thought

3.3. Moralization of Desires

3.4. Neutralization of Anger

Unit IV - Human Resources Development

4.1. Eradication ofworries

4.2. Benefits of Blessings

4.3. Greatness ofFriendship

4.4. Individual Peace and World Peace

Unit V - Law of Nature

5.1. Unified force- Cause and Effect system

5.2. Purity of Thought and Deed and Genetic Centre

5:3. Love and Compassion

5.4. Cultural Education - Five fold Culture

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
19BENAFC	Communicative English	**2**	**2**	**0**	**0**	**FC**

Unit I - Vocabulary building - Puzzle

Unit II - Common error in English - Role Play

Unit III - Advertising - Newspaper Reading

Unit IV - Write the missing Verbs - Question Framing

Unit V - Description - Letter writing