

Department of Computer Applications

RATHINAM COLLEGE OF ARTS AND SCIENCE

(AUTONOMOUS)

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



Syllabus for BCA (Computer Applications) I - VI Semester

2019-2020 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

To inculcate candidates with technical competency and skill professionalism to make them competent to undertake the current challenges in industrial sector with a focus on societal transformation.

MISSION

To import quality based education by enhancing the talent, innovative idea, and problem solving skill and to promote the research project by establishing industrial linkage and entrepreneurial setup.

Program Educational Objectives (PEO)

PEO1	:	To apply hardware and software technologies that provides computing solutions for successful careers in industry/higher education/research.
PEO2	:	To set foundation of mathematics, computer science and problem solving methodology for efficient implementation in the area of software services and developments.
PEO3	:	To become entrepreneurs / innovators to accustom the principles of system analysis, design, development and project management in order to address social, technical and business challenges.
PEO4	:	To create awareness and to acquire leadership qualities with strong communication skills, professional and ethical values.
PEO5	:	To adopt lifelong learning and act with Integrity require to engage with commitment towards social responsibilities.

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.	PEO1, PEO2, PEO5

Mapping of Department Mission to PEO

Department Mission	PEO's
To produce undergraduate and postgraduate quality education committed to integrity, professionalism to establish Industry based program and to enhance the entrepreneurship skills.	PEO1, PEO2, PEO3, PEO5,

Program Outcomes (PO):

P01	:	To plan, execute and evaluate a computer-based system, process, component, or program to meet the requirements.
P02	:	To demonstrate the ability of professionalism in societal, environmental contexts and discipline as individuals as well as in a team.
P03	:	To use research-based knowledge and research methods which includes design of analysis, interpretation of data, synthesis of the information to provide valid conclusions.
P04	:	Continuous professional development through life-long learning.
P05	:	To design, formulate, and develop solutions to real world challenges.
P06	:	Apply the understanding of computing principles to manage the projects in multidisciplinary environments.
P07	:	Expertise in developing application with required domain knowledge.
P08	:	Development of absolute written and verbal communication skills.
P09	:	To become entrepreneurs to apply the concept of computer applications to face the business challenges societal needs.

Correlation between the POs and the PEOs

Program Outcomes		PEO1	PEO2	PEO3	PEO4	PEO5
P01	:	√	√		√	
P02	:		√		√	√
P03	:			√	√	
P04	:	√		√		
P05	:		√			√
P06	:	√		√		
P07	:	√	√		√	
P08	:			√		
P09	:			√	√	√

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	9
P01	√					√	√	√	√
P02	√	√		√	√				√
P03	√	√		√	√				√
P04		√		√	√				
P05	√	√					√		
P06			√				√	√	
P07							√	√	
P08		√		√	√				
P09		√		√	√				√

RATHINAM COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

Scheme of curriculum for BCA Computer Applications

for the students admitted in the Batch during 2019 - 2020

Board of Studies – Computer Science - UG

S.No.	Sem	Part	Sub Type	Sub Code	Subject	Credit	Hours Per Week	CIA	ESE	Total	Exam Hours
1	1	1	L1		Language – I	4	4	40	60	100	3
2	1	2	L2		English for Communication – I	4	4	40	60	100	3
3	1	3	Core	19BCA1CA	Core - C ++ Programming	4	4	40	60	100	3
4	1	3	Core Practical	19BCA1CP	Core Practical - C ++ Programming Lab	2	2	20	30	50	3
5	1	3	DSC	DSC	DSC 1C	4	4	40	60	100	3
6	1	3	DSC Practical	19BCA1CQ	DSC Practical - 1C	2	1	20	30	50	3
7	1	3	Allied-I	DSA	DSA 1A	4	5	40	60	100	3
8	1	4			Ability Enhancement Course I	2	1	50	0	50	3
9	1	6			Value Added Course - I%	2	0	100	0	100	3
						28					
1	2	1	L3		Language – II	4	4	40	60	100	3
2	2	2	L4		English for Communication – II	4	4	40	60	100	3
3	2	3	Core	19BCA2CA	Core - Java Programming	4	4	40	60	100	3
4	2	3	Core Practical	19BCA2CP	Core Practical - Java Programming Lab	2	2	20	30	50	3
5	2	3	DSC	DSC	DSC 2C	4	4	40	60	100	3
6	2	3	DSC Practical	19BCA2CQ	DSC Practical - 2C	2	2	20	30	50	3
7	2	3	Allied-II	DSA	DSA 2A	4	4	40	60	100	3
8	2	4			Ability Enhancement Course II	2	1	50	0	50	3
9	2	6			Value Added Course - II %	2	0	100	0	100	3
						28					
1	3	3	Core	19BCA3CA	Core - Web Technology	4	4	40	60	100	3
2	3	3	Core Practical	19BCA3CP	Core Practical - Web Technology Lab	2	2	20	30	50	3
3	3	3	DSC		DSC 3C	4	4	40	60	100	3

4	3	3	DSC Practical	19BCA3CQ	DSC Practical - 3C	2	2	20	30	50	3
5	3	3	Allied-III	DSA	DSA 3A	4	4	40	60	100	3
6	3	4	SEC	SEC-I	Skill Enhancement Courses – I	2	4	40	60	100	3
7	3	4			Ability Enhancement Course III	2	1	50	0	50	3
8	3	6			Value Added Course - III %	2	0	100	0	100	3
9	3	6			Inter Department Learning – I#	2	1	0	100	100	3
						24					
1	4	3	Core	19BCA4CA	Core – Open Source Tools (PHP & MySQL)	4	4	40	60	100	3
2	4	3	Core Practical	19BCA4CP	Core Practical - Open Source Tools	2	2	20	30	50	3
3	4	3	DSC	DSC	DSC 4C	4	4	40	60	100	3
4	4	3	DSC Practical	19BCA4CQ	DSC Practical - 4C	2	2	20	30	50	3
5	4	3	Allied-IV	DSA	DSA 4A	4	4	40	60	100	3
6	4	4	SEC	SEC-II	Skill Enhancement Courses – II	2	4	40	60	100	3
7	4	4			ABE	2	2	20	30	50	3
8	4	6			Value Added Course - IV %	2	0	100	0	100	3
9	4	6			Inter Department Learning – II#	2	1	0	100	100	3
						24					
1	5	3	Core	19BCA5CA	Core - Principles of Multimedia	4	4	40	60	100	3
2	5	3	Core Practical	19BCA5CP	Core Practical - Multimedia Lab	2	2	20	30	50	3
3	5	3	DSC	DSC	DSC 5C	4	4	40	60	100	3
4	5	3	DSC Practical	19BCA5CQ	DSC Practical - 5C	2	2	20	30	50	3
5	5	3	DSE	DSE – I	Elective - I – DSE 1E	4	4	40	60	100	3
6	5	3	DSE	DSE - II	Elective - II – DSE 2E	4	4	40	60	100	3
7	5	4	SEC	SEC-III	Skill Enhancement Courses – III	2	4	40	60	100	3
8	5	6			Value Added Course - V%	2	0	100	0	100	3
						24					
1	6	3	Core	19BCA6CA	Core - R Programming	4	4	40	60	100	3
2	6	3	Core Practical	19BCA6CP	Core Practical - R Programming Lab	2	2	20	30	50	3
3	6	3	DSE	DSE – III	Elective – III – DSE 3E	4	4	40	60	100	3

4	6	3	DSE	DSE – IV	Elective – IV – DSE 4E	4	4	40	60	100	3
5	6	3	Core Course - XI	DSC	Core Project	8	5	80	120	200	3
6	6	4	SEC	SEC-IV	Skill Enhancement Courses – IV	2	4	40	60	100	3
7	6	5			Extension Activity- EX %	2		50	0	50	
						26					

Note :

@ - No End Semester Examination, only Internal Exam.

- No Internal Examination, only End Semester Exam.

Discipline Specific Core					
S. No	Course Code	Course	Pre-request	Offering Department	Mandatory
1		Data Structures	-	Computer Science	Yes
2		Relational Database Management System	-	Information Technology	Yes
3		Software Engineering	-	Computer Application	
4		Computer Graphics	-	Computer Technology	
5		Scripting Languages	-	Computer Technology	
6		Linux & Shell Programming	Core - II		
7		Big Data Analytics	-	Information Technology	Yes
8		Ethical Hacking	-	Computer Science	
9		Data Structures Practical	DSC 1C S.N01		
10		RDBMS Lab	DSC 1C S.N02		
11		Software Engineering Lab	DSC 1C S.N03	Computer Application	
12		Computer Graphics Lab	DSC 1C S.N04	Computer Technology	
13		Scripting Languages Lab	DSC 1C S.N05	Computer Technology	
14		Linux & Shell Programming Lab	DSC 1C S.N06		
15		Big Data Analytics Lab	DSC 1C S.N07	Information Technology	
16		Ethical Hacking Lab	DSC 1C S.N08	Computer Science	
17		Professional Skills			

Allied					
S. No	Course Code	Course	Pre-request	Offering Department	Mandatory
1		Organizational Behaviors	-	Commerce	
2		Entrepreneurial Development	-	Commerce	Yes
3		Mathematics for Computer Science	-	Maths	
4		Quantitative Techniques	-	Maths	Yes
5		Discrete Mathematics	-	Maths	
6		Operations Research	-	Maths	
7		Principles of Management	-	Management	
8		Research Methodology	-	Commerce	
9		Principles of Accountancy	-	Commerce	
10		PC and Mobile Hardware	-	Computer Science	
11		Computer Networks	-	Computer Science	

Skill Based Subject					
S. No	Course Code	Course	Pre-request	Offering Department	Mandatory
1		Information and Cyber Security	-	Computer Science	
2		Animation and Multimedia	-	Computer Technology	Yes
3		Internet Of Things	-	Information Technology	Yes
4		Operating System	Core I	Computer Science	Yes
5		Data warehouse and data Mining	-	Information Technology	
6		Computer Architecture and Design	-	Computer Science	
7		Enterprise Resource Planning	-	Information Technology	
8		Distributed Programming		Information Technology	
9		Digital Image Processing	-	Computer Technology	

Discipline Specific Elective					
S. No	Course Code	Course	Pre-request	Offering Department	Mandatory
1		Software Project Management	-	Computer Application	
2		R Programming	-	Information Technology	
3		Blockchain Fundamentals	-	Information Technology	
4		Software Quality and Assurance	-	Computer Application	
5		Information Storage and Management	-	Information Technology	
6		Cloud Infrastructure and Services	-	Information Technology	
7		Software Testing	-	Computer Application	Yes
8		Data Sciences	-	Information Technology	Yes

Ability Enhancement Course					
S. No	Course Code	Course	Pre-request	Offering Department	Mandatory
1		Environmental Studies	-	General	Yes
2		Women Studies	-	Commerce II	
3		Constitution of India	-	Commerce I	
4		Human Rights	-	General	Yes
5		Yoga	-	Tamil	
6		NCC	-	Vis.Com	
7		Communicative English	-	English	
8		Quantitative Aptitude	-	Mathematics	

Mapping of Courses and POs:

S- Strong Coorelation M – Medium Coorelation B – Blank

Course Code	Course Name	Program Outcomes								
		P01	P02	P03	P04	P05	P06	P07	P08	P09
	Language – I	M	M	S	S		M	M	M	
	English for Communication – I	M			S		M		M	M
	Core - I – C++ Programming	M	M	M	M		M	M	M	M
	Core - I Practical - C++ Programming Lab		M		S			M	M	S
	DSC 1C	M	M				M	M		M
	DSC Practical - 1C			M		M			M	S
	DSA 1A									
	Ability Enhancement Course I	M	S	S	M		M	S	M	M
	Value Added Course - I%	M	M	M	S		M	M		

Kjw;gUtk;,,,,,,,,,,,,,,,,;

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
19BGE11T	Part I Tamil	3	6	1	0	Theory

Introduction: gFjp Kjy; ghkhf mikAk;> jkpo;g;ghlk; ftpijfs;> ,yf;fzk;> ,yf;fpatuyhW Mfpaitfs; nfhz;L mike;J cs;sJ. le;J myFfshf gFf;fg;gl;Ls;sJ.

Course Outcome:

- C01 : ghujpahh;> ghujpjhrd;> rpw;gp> Rujh Mfpa ftpijfspd; tpsf;fj;ij khzth;fs; mwpe;J nfhs;Stjhy;> jd;dk;gpf;ifia ntspf;nfhzUk; tifapy; cs;sJ.
- C02 : ngz; ftpQh;fspd; gilg;G ftpijia mwptjd; %yk; tho;tpay; nra;jpfisAk;> ajhh;j;j epiyAk; mwpa cjTfpwJ.
- C03 : jpU.tp f. kw;Wk; K.th fl;Liufis mwptJ gilg;igAk;> gilg;gpd; rpwg;igAk; rq;f fhy ,yf;fpa nra;jpfisAk; mwpa KbfpwJ.
- C04 : gilg;Gj;jpwid ntspg;gLk; tpjkhfTk;> ,yf;fzj;ij mwpa gaDs;sjhf mikfpwJ.
- C05 : ,yf;fpatuyhW gw;wpar; nra;jpfis nfhz;L mjd; tsh;r;rp epiyia mwpTk; tifapy; cs;sJ.

Unit I:

[12 Periods]

ghujpahh; - ngz; tpLjiy> ghujpjhrd; - tPuj; jkpod;> rpw;gp - epyTg;g+ Rujh - ehL Mfpatw;wpd; tpsf;fk; jUjy;.

Unit II:

[12 Periods]

G+.m ,utpe;jpud; - jhfk; jPh;f;fhj jz;zPh;> m. ntz;zpyh - ePhpyiyAk; Kfk; khyjp ikj;hp - fd;dpahFkhp> f;U\hq;fpdp - Gd;id kuk; Mfpa ftpijfspd; nra;jpfis mwptjhy; tho;tpay; R+oiyAk;> ajhh;j;j epiyiaAk; tpsf;Fjy;.

[12 Periods]

Unit III:

jpU.tp.fh -ngz;zpd; ngUik K.t - fw;gid Kidth; rpj;uh-jkpo; juKah;j;jYk>; epiyg;gLj;jYk>; ,uzpad; eh.F nghd;Drhkp – rq;f ,yf;fpaj;jpy; r%f mwk; Mfpatw;wpd; fl;Liufspd; nra;jpfis tpsf;fk; jUjy;.

Unit IV:

[12 Periods]

ngah; nrhy;> tpidr;nrhy;> ,ilr;nrhy;> chpr;nrhy;> vr;rk; -,yf;fzj;jpw;F tpsf;fk; mspj;jy;-gilg;gpyf;fpag; gapw;rp> ftpij vOjy; thndhypj; jkpo;> njhiyf;fhl;rpj; jkpo; gad;ghl;Lj;jkpo>; ,yf;fz Nehf;fpy; gapw;Wtpj;jy; vOJjy; ftpij+thndhyp Ngr;Rj;jpwd; tsh;j;jy;. Mfpaitfs; nfhz;;L jpwd; tsh;f;f cjTjy;.

[12 Periods]

Unit V:

etPdf; ftpij ,yf;fpa tbtq;fshd i`f;\$> Ff;\$> nrd;l;hpa+> f[y;> fzpdpj; jkpo; - fiyr;nrhw;fs; Mfpaitfspd; tsh;r;rp epiyfis mwpa cjTjy;.

gapw;rp;f;Fhpad

ghlEhy;fs;

1. ghujpahh; ftpijfs;
2. ghujpjhrd; ftpijfs;
3. Rujh ftpijfs;
4. rpw;gp ftpijfs;
5. m. ntz;zpyh

ghh;it Ehy;fs; : 1. ,yf;fpatuyhW – ghf;fpaNkhp>

2. ,yf;fz Ehy;>

3. K.t. -jkpo; ,yf;fpa tuyhW

Kjw;gUtk;;;;;;;;;;;;;;;;;

(ftpij> fl;Liu> ,yf;fzk;> gilg;gpyf;fpak;> ,yf;fpatuyhW)

myF 1;

1. ghujpahh; - ngz; tpLjiy
2. ghujpjhrd; - tPuj; jkpod;
3. rpw;gp - epyTg;g+
4. Rujh - ehL

myF 2

1. G+.m ,utpe;jpud; - jhfk; jPh;f;fhj jz;zPh;
2. m. ntz;zpyh - ePhpyiyAk; Kfk;
3. khyjp ikj;hp - fd;dpahFkhp
4. f;U\hq;fpdp - Gd;id kuk;

myF 3 ciueil

1. jpU.tp.fh -ngz;zpd; ngUik
2. K.t - fw;gid
3. Kidth; rpj;uh – jkpo; juKah;j;jYk>; epiyg;gLj;jYk;
4. ,uzpad; eh.F.nghd;Drhkp – rq;f ,yf;fpaj;jpy; r%f mwk;

myF 4

I ngah; nrhy;> tpidr;nrhy;> ,ilr;nrhy;> chpr;nrhy;> vr;rk;

gilg;gpyf;fpag; gapw;rp - 1. ftpij vOjy;

2. thndhypj; jkpo;

3. njhiyf;fhl;rpj; jkpo;

gad;ghl;Lj;jkpo; - ,yf;fz Nehf;fpy; gapw;Wtpj;jy;

1. vOJjy;- ftpij+thndhyp

2. Ngr;Rj;jpwd; tsh;j;jy;

myF 5 ,yf;fpa tuyhW

etPdf; ftpij ,yf;fpa tbtq;fs;

1. i`f;\$ 2. Ff;\$ 3. nrd;l;hpa+ 4. f[y;..

2. fzpdpj; jkpo; - fiyr;nrhw;fs;

gapw;rpf;Fhpad

ghlEhy;fs;

6. ghujpahh; ftpijfs;

7. ghujpjhrd; ftpijfs;

8. Rujh ftpijfs;

9. rpw;gp ftpijfs;

10. m. ntz;zpyh

ghh;it Ehy;fs; : 1. ,yf;fpatuyhW – ghf;fpaNkhp>

2. ,yf;fz Ehy;>

3. K.t. -jkpo; ,yf;fpa tuyhW

SEMESTER I

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
19BGE11F	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
19BGE11H	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
19BGE11M	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 words 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)

1. 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
19BGE11A	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
19BGE11U	PART I Urdu	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

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	English for Communication	4	6	0	0	Lang

Introduction : To encourage students to inculcate effective communications skills.

Course Outcome:

C01	:	To Gain an introductory knowledge of the some of the issues explored in influential works of the English-language tradition
C02	:	Read complex texts actively: recognize key passages; raise questions; appreciate complexity and ambiguity; comprehend the literal use of language.
C03	:	Practice writing as a process of motivated inquiry, engaging other writers' ideas through the use of quotations, paraphrase, allusions and summary. Use sources well and cite them correctly.
C04	:	Practice writing as a process of motivated inquiry, engaging other writers' ideas through the use of quotations, paraphrase, allusions and summary. Use sources well and cite them correctly.
C05	:	Interpret texts with an awareness of and curiosity for other viewpoints

Unit I: [12periods]

Living in digital Age -Computer Essentials -Inside the System -Buying a Computer - Type, click and Talk.

Unit II: [12periods]

Capture your favorite Image -Display screen and Ergonomics -Choosing a Printer - Devices for the Disabled -Magnetic Storage.

Unit III: [12periods]

Optical Storage -Flash Memory -The Operating System -Internet and E-mail -Web - Chat and Conferencing.

Unit IV: [12periods]

Internet Security -Graphics and Design -Desktop Publishing -Multimedia -Web Design.

Unit V: [12periods]

Program Design and Computer Languages -Jobs in ICT -Communication Systems - Networks -New Technologies.

Text Book :

1. Infotech English for Computer Users – Teacher’s Book, Santiago RemachaEsteras, Cambridge University Press, 4th Edition, 2009.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
19BCA1CA	Core - I – C++ Programming	4	5	1	0	Theory

Introduction :

To excel the students with the concepts of Object Oriented Programming and to gain better understanding in C++ Programming.

Course Outcome:

CO1	: To understand Object Oriented Programming concepts.
CO2	: An ability to create an simple C++ Programming.
CO3	: Implement the concept of classes and objects.
CO4	: An ability to develop a program using any type of Inheritance.
CO5	: To understand and develop a program using file operations.

Unit I

[12 periods]

Principles of OOP : Software Evolution- OOP Paradigm - Basic concepts of OOP - Benefits of OOP . Beginning with C++: what is C++? - Applications of C++ - A Simple C++ program - Structure of C++ Program - Creating the Source File - Compiling and Linking – **Tokens, Expressions and Control Structures:** Tokens - Keywords-identifiers and constants-Basic Data types - User-Defined Data types - Derived Data types.

Unit II :

[12 periods]

Tokens, Expressions and Control Structures: Symbolic Constants - Declaration of Variables – Reference Variables – Operators in C++ - Scope Resolution Operator - Manipulators - Type Cast Operator - Expressions and their Types- Implicit Conversions - Control Structures – **Functions in C++:** The Main Function - Function Prototyping - Call by Reference - Inline Function - Function Overloading - Friend and Virtual Functions.

Unit III :

[12 periods]

Classes and Objects: Specifying a class - Defining Member Functions - A C++ Program with Class - Array within a Class - Memory Allocation for Objects - Array of Objects - Objects as Function Arguments. **Constructor and Destructor:** - Constructors - Multiple Constructors in a Class - Constructor with Default Argument - Copy Constructor –Destructor – **Manipulating String:** Creating (String) Objects – String Characteristics – Accessing Characters in Strings.

Unit IV:

[12 periods]

Operator Overloading and Type Conversions: Defining Operator Overloading –Rule of Overloading Operators – Type Conversions. **Inheritance:** Introduction – Defining Derived class – Single Inheritance – Multilevel Inheritance- Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance – Virtual Base Class – Abstract Classes –**Pointers:** Pointers - Pointers to Objects –This Pointer.

Unit V:

[12 periods]

Managing Console I/O Operations: C++ Streams - C++ Stream Classes - Unformatted I/O Operations - Formatted Console I/O Operations –**Working with Files:** Classes for File Stream Operations - Opening and Closing a File - Detecting end-of-file – Sequential Input and Output Operations – Updating a File: Random Access – Error Handling During File Operations – Command-line Argument.

Textbook:

1. E.Balagurusamy, “Object oriented programming with C++”, TMH Publication, 4th Edition, 2010.

Reference :

1. Ashok N Kamthane, “Object oriented Programming with ANSI and Turbo C++”, Pearson Education Publication, 7th Impression, 2009.
2. Yashavant Kanetkar, “Let Us C++”, BPB Publications, 2nd Edition

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes								
	P01	P02	P03	P04	P05	P06	P07	P08	P09
C01	M			L	M				M
C02	M	L				M		M	
C03	M		L			M	L		
C04	M			L		M			M
C05			M	M		H		M	

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core - I –Practical C++ Programming - Lab	4	0	0	5	Practical

CO1	:	Understand basic Structure of the C ++ PROGRAMMING, declaration and usage of variables
CO2	:	Understand C++ programs using Class and 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 C++ program to check whether the given number is prime number or not.
2. Write a C++ program to find sum of individual digits of natural numbers
3. Write a C++ program to find largest of two numbers using inline function.
4. Write a C++ program to find the area of circle, rectangle and triangle using function overloading.
5. Write a C++ Program to add two complex numbers using friend function
6. Find factorial of a number using copy constructor
7. Write a C++ program to concatenate two strings by overloading binary operator ++ using member function.
8. Write a C++ program to process employee pay slip processing using single inheritance.
9. Write a C++ program to process student details using multiple inheritance.
10. Write a c++ program to check whether the given string is palindrome or not using pointers
11. Write a C++ program to merge two files into one file
12. Write a C++ program to copy from one file to another file using command line arguments

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core - IV Data Structures	4	5	0	0	Theory

Introduction :

Assess how the choice of data structures and algorithm design methods impacts the performance of programs. Choose the appropriate data structure and algorithm design method for a specified application.

Course Outcome:

C01	:	Students develop knowledge of basic data structures for storage and retrieval of ordered or unordered data.
C02	:	Students develop knowledge of linked lists.
C03	:	Students develop knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure.
C04	:	Student develop Knowledge of Tree
C05	:	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, Algorithms, 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.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes								
	P01	P02	P03	P04	P05	P06	P07	P08	P09
CO1	H	-	L	L	-	M	-	H	H
CO2	M	-	L	L	-	-	L	H	H
CO3	M	-	L	L	-	-	L	L	L
CO4	M	-	L	L	-	-	-	L	L
CO5	-	-	L	L	-	L	-	M	M

H - High ; M- Medium ; L- Low

Semester I:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core - Data Structure Practical	4			5	Practical

Course Outcome:

C01	:	Understand basic Concept of the data structure using C program
C02	:	Implementing STACK Operations using C Program
C03	:	Exercise linked List using C programs
C04	:	Understand nodes concepts in Linked List using C programs
C05	:	Implementing QUEUE Operations using C Program

1. Write a C program to implement a STACK using array
2. Write a C Program to Implement stack and perform push, and pop operations
3. Write a C program to create Linked List
4. Write a C Program to count the number of nodes in a link list
5. Write a C program to implement a QUEUE using array
6. Write a C program to sort an Array in Ascending and Descending Order

Semester I:

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Value added Course: C programming			0	0	Theory

Introduction :

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

Course Outcome:

CO1	:	Understand the basics of programming concept
CO2	:	Demonstrate the flowchart and design an algorithm for a given problem and to develop C programs using operators
CO3	:	Develop conditional and iterative statements to write C programs
CO4	:	Exercise user defined functions to solve real time problems
CO5	:	Exercise user defined data types including structures and unions to solve problem. Inscribe C programs that use Pointers to access arrays, strings and functions.

Unit I

Overview of computers and Programming - Computers Hardware - Computer Software - The Software development Method - C Language Elements - Variable Declarations and Data Types - General form of a C Program.

Unit II

Arithmetic Expressions - Common Programming Errors-Building Programs from Existing information - Library Functions - Top-Down Design and Structure charts - Functions without Arguments - Functions with Input Arguments .

Unit III :

Control Structures - Conditions - The if – if-else - nested if statements - The Switch Statement - While statement - The For statement - do-while statement and flag-controlled loops .

Unit IV:

Pointers and the Indirection Operator - functions with output parameters - Multiple calls to function with Input / Output parameters .

Unit V:

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 .

Text books:

2. 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

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes								
	P01	P02	P03	P04	P05	P06	P07	P08	P09
CO1	H	-	M	H	L	H	M	-	L
CO2	L	-	H	-	L	H	L	L	
CO3	M	-	-	L	L	L	-	M	M
CO4	-	M	L	-	M	L	-	-	
CO5	-	L	-	M	H	M	H	-	H

H - High ; M- Medium ; L- Low

,uz;lhk; gUtk;

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
19BGE21T	Part I Tamil	3	6	1	0	Theory

Introduction: ,uz;lhk; gUt ghli;jpl;lk; mw ,yf;fpak;> rpw;wpyf;fpak;> rpWfijfs;> ,yf;fzk;> ,yf;fpa tuyhW Mfpaitfs; nfhz;L cUthfpAs;sJ.

Course Outcome:

- C01 : ePjpnewp fUj;Jf;fis mwpe;J nfhs;Stjhy;> tho;f;ifapy; gz;Gfis gpd;gw;wTk;> mwnwpNthL thoTk; gaDs;sghf mikAk;.
- C02 : rpw;wpyf;fpaj;jpd; nra;jpfs; khzth;fs; njspthf mwpe;Jnfhs;StJ md;gpd; Nkd;ik> gz;G Mfpaitfs; mwpe;J nfhs;s KbfpwJ.
- C03 : mzp ,yf;fzk; mwptjhy; ,yf;fzj;jpd; rpwg;G Kf;fpak; vd;gij mwpayhk;.
- C04 : rpWfijfs;py; cs;s fijfs;py; cs;s ikaf;fUj;Jfisj; njhpe;J nfhs;StJ rKjhar; rpe;jisiaAk;> tpopg;Gzh;Tk; cUthf;f cjTfpwJ.
- C05 : ePjp rpw;wpyf;fpaq;fs; Mfpaw;wpd; nra;jpfis mwptJ jkpopd; tuyhw;iwAk;> gbepiyfisAk; mwpa gad; cs;sJ. fsg;gzpfis mwpayhk;.

Unit I: [12Periods]
mw ,yf;fpak; jpUf;Fws;> md;Gilik>mwpTilik> ehybahh;> gonkhop ehD}W-Mfpaitfs; ePjpapd; fUj;Jf;fs; nfhz;L ghkhf cs;sJ.

Unit II: [12Periods]

Kf;\$lw;gs;S-gs;sp Vry;> Fw;wyhf; FwtQ;rp – kiytsk;> fypq;fj;Jg;guzp fhL ghbaJ> mofh; fps;is tpL J}J> fypq;fj;Jg;guzp–Nfhapy; ghbaJ> fps;is tpL J}J Mfpa rpw;wpyf;fpaq;fspd; fUj;Jf;fis njspthf vLj;Jiuj;jy;.

Unit III: [12 eriods]

cUtf mzp> jw;Fwpg;Ngw;wzp> nrhw;nghUs; gpd;tU epiy mzp> ctik mzp mzp ,yf;fzk; - tpsf;fj;Jld; fw;gpf;fg;gLk;.

Unit IV:. [12 eriods]

Njh;e;njLf;fg;gl;l 4 -rpWfijfs; - khzth;fspd; jdpj;jpwid tsh;f;Fk; nghUl;L vLf;fg;gLk;.
rKjha nra;jpfis gw;wp tpsf;fk; jUjy;.

Unit V: [12 eriods]
ePjp ,yf;fpak;> rpw;wpyf;fpak;> Mfpaitfspd; Njhw;wj;ijAk;> tsh;r;rpAk; vLj;Jiuf;fg;gLk;.
njhy;ypay; mfoha;T mz;ikg; gjpTfs; - jpl;lf;fl;Liu xg;gilg;G> fsg;gzpfisg; ghh;itaply;> juTfisg; gl;bayply;. tpsf;fj;Jld; \$Wjy;.

Textbook:

ghIEhy;fs;

1. gjpndz;fPo;f;fzf;F Ehy;fs;
2. Kf;\$lw;gs;S Ehy;
3. Fw;wyhf;FwtQ;rp
4. fypq;fj;Jg;guzp

ghh;it Ehy;fs;

1. n[afhe;jd; rpWfij
2. GJikg;gpj;jd; rpWfij
3. R+lhkzp rpWfij
4. mk;ig rpWfij
5. K.t. -jkpo; ,yf;fpa tuyhW
6. lhf;lh; Nf.Nf gps;is – jkpof tuyhW kf;fSk; gz;ghLk;.
7. Nguh.Kidth; ghf;aNkhp - ,yf;fzk; ,yf;fpa tuyhW nkhopj;jpwd;.

,uz;lhk; gUtk;

(mw ,yf;fpak;> rpw;wpyf;fpak;> ,yf;fzk;> rpWfij> ,yf;fpa tuyhW)

myF I mw ,yf;fpak;

1. jpUf;Fws; - 2 mjpgfhuq;fs;
 1. md;Gilik 10 Fws;fs; mjpgfhuk; -8
 2. mwpTilik 10 Fws;fs; mjpgfhuk; -43
2. ehybahh; -5 ghly;fs; (132>133>135>136>139)
3. gonkhop ehD}W - 5 ghly;fs;; (90>91>93>95>100)

myF II rpw;wpyf;fpak;

1. Kf;\$lw;gs;S - gs;sp Vry;
2. Fw;wyhf; FwtQ;rp – kiytsk;
3. fypq;fj;Jg;guzp – fhL ghbaJ
4. mofh; fps;is tpL J}J

myF III ,yf;fzk;

mzp ,yf;fzk; - tpsf;fj;Jld; fw;gpj;jy;.

1. ctik mzp
2. cUtf mzp
3. jw;Fwpg;Ngw;wzp
4. nrhw;nghUs; gpd;tU epiy mzp

myF IV rpWfijfs;

1. n[afhe;jd; 2. GJikg;gpj;jd; 3. R+lhkzp 4. mk;ig - (4 rpWfijfs;)

myF V ,yf;fpa tuyhW

2. ePjp ,yf;fpak;
3. rpw;wpyf;fpak;
4. njhy;ypay; mfoha;T mz;ikg; gjpTfs; - jpl;lf;fl;Liu xg;gilg;G
fsg;gzpfisg; ghh;itaply;> juTfisg; gl;bayply;.

ghIEhy;fs;

1. gjpndz;fPo;f;fzf;F Ehy;fs;
2. Kf;\$lw;gs;S Ehy;
3. Fw;wyhf;FwtQ;rp
4. fypq;fj;Jg;guzp

ghh;it Ehy;fs;

1. n[afhe;jd; rpWfij
2. GJikg;gpj;jd; rpWfij
3. R+lhkzp rpWfij
4. mk;ig rpWfij
5. K.t. -jkpo; ,yf;fpa tuyhW
6. lhf;lh; Nf.Nf gps;is – jkpof tuyhW kf;fSk; gz;ghLk;.
7. Nguh.Kidth; ghf;aNkhp - ,yf;fzk; ,yf;fpa tuyhW nkhopj;jpwd;.

SEMESTER II

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
19BGE21F	PART I French	3	6	1	0	Theory

Prescribed Text: **LATITUDES I**

Units: 5 – 8

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 II

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
19BGE21H	PART I Hindi	3	6	1	0	Theory

(Modern Poetry, One Act Play, Translation & Letter Writing, Conversation)

1. MODERN POETRY : BHOOMIJA by NAGARJUN

Publishers : Rajkamal Prakashan
1B Nethaji Subash Marg,
New Delhi.

2. ONE ACT PLAY :

NAVEEN EKANKI SANGRAH
By Dr. Smt. MALATI THIVARI
SUMITHRA PRAKASHAN
ASHOK NAGAR
ALLAHABAD – 1.

3. TRANSLATION : HINDI-ENGLISH ONLY

(ANUVADH ABYAS-III)
Lessons – 1-15 only

PUBLISHER : DAKSHIN BHARATH HINDI PRACHAR SABHA
CHENNAI – 600 017.

4. LETTER WRITING : (Leave Letter, Job Application, Ordering Books,
Letter to Publisher, Personal Letter)

5. CONVERSATION : (Doctor & Patient, Teacher & Student, Storekeeper &
Buyer, Two Friends, Booking Clerk & Passenger at

Railway Station, Autorickshaw driver and Passenger)

Ref : Bolchal Ki Hindi Aur Sanchar by Dr. Madhu

Dhavan Vani Prakashan, New Delhi.

SEMESTER II

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
19BGE21M	PART I Malayalam	3	6	1	0	Theory

(Prose: Non-Fiction)

This paper will have the following five units:

Unit I & II Autobiography

Unit III, IV & V Travelogue

Text Books prescribed: Unit I & II Vazhithiruvukal-Dr.A.P.J.Abdulkalam
(D.C.Books, Kottayam)

Unit III, IV & V Alkoottathil Thaniyae - 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)

SEMESTER II

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
19BGE21A	PART I Arabic	3	6	1	0	Theory

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

SEMESTER II						
Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
19BGE21U	PART I Urdu	3	6	1	0	Theory

(POETRY, GHAZALITH & LETTER WRITING)

Urdu 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 Urdu 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 OR 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
	Java Programming	4	4	0		Core

Introduction: This course presents a conceptual and practical introduction to imperative and object oriented programming, exemplified by Java.

Course Outcome:

CO1	:	Define the concept of OOP as well as the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading.
CO2	:	Identify the situations of Program Control Statements, Introducing Classes, Objects and Methods of their usages.
CO3	:	Identify String Handling , Arrays, classes, objects, members of a class and the relationships among them needed for a specific problem.
CO4	:	OOP concepts like inheritance, Interface & package in real time situations.
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]

Java Programming Fundamentals: The Java Language, the Key Attributes of Object-Oriented Programming, the Java Development Kit, a First Simple Program, Handling Syntax Errors, the Java Keywords, Identifiers in Java, the Java Class Libraries Introducing. Data Types and Operators: Java's Primitive Types, Literals, A Closer Look at Variables, The Scope and Lifetime of Variables, operators, Shorthand Assignments, Type conversion in Assignments, Using Cast, Operator Precedence, Expressions.

Unit II : [12 periods]

Program Control Statements: Input characters from the Keyword, if statement, Nested ifs, if-else-if Ladder, Switch Statement, Nested switch statements, for Loop, Enhanced

for Loop, While Loop, do-while Loop, Use break, Use continue, Nested Loops. Introducing Classes, Objects and Methods: Class Fundamentals -Objects - Reference Variables and Assignment, Methods, Returning from a Method, Returning Value, Using Parameters, Constructors, constructor types, The new operator Revisited, Garbage Collection and Finalizers, The this Keyword.

Unit III : **[12 periods]**

More Data Types and Operators: Arrays, Multidimensional Arrays, Alternative Array Declaration Syntax, Assigning Array References, Using the Length Member, The Bitwise operators. String Handling: String Fundamentals, The String Constructors, Three String-Related Language Features, String Buffer and String Builder. A Closer Look at Methods and Classes: Controlling Access to Class Members, Pass Objects to Methods, How Arguments are passed, Returning Objects, Method Overloading, Overloading Constructors, Recursion, Understanding Static, Introducing Nested and Inner Classes, Var args: Variable-Length Arguments.

Unit IV: **[12 periods]**

Inheritance: Inheritance Basics, Member Access and Inheritance, Constructors and Inheritance, Method Overriding, Overridden Methods support polymorphism, Why Overridden Methods, Using Abstract Classes, Using final keyword. Interfaces: Fundamentals, Creating, Implementing, References, Implementing Multiple Interfaces, Constants, Interface extended, Nested Interfaces. Packages: Fundamentals, Packages and Member Access, Importing Packages, Static Import. Exception Handling: Hierarchy, Fundamentals, Uncaught Exception, Multiple catch clauses, try blocks, throwing an Exception, finally, throws, Java's Built-in Exceptions.

Unit V: **[12 periods]**

Multithreaded Programming: fundamentals, thread creation types, Multiple Threads, Thread Priorities, Synchronization, using Synchronization Methods. Enumerations, Auto boxing and Annotations: Enumerations, Java Enumeration are class types, Auto boxing, Annotations (metadata) Generics: Generics Fundamentals Bounded Types, Methods, Constructors, Some Generic Restrictions. Applets: basics - Skeleton, life cycle of applet – applet methods - Passing parameters to Applets.

Textbook:

1. Herbert Schildt, Java The Complete Reference, 11th Edition, Copyright © 2019 by McGraw-Hill Education (Publisher).

Reference :

1. Mahesh Bhavde and Sunil Patekar, "Programming with Java", First Edition, Pearson Education, 2008, ISBN:9788131720806.
2. Rajkumar Buyya, S Thamaraselsvi, Xingchen Chu, Object oriented Programming with java, Tata McGraw Hill education private limited.
3. E Balagurusamy, Programming with Java A primer, Tata McGraw Hill companies.
4. Anita Seth and B L Juneja, JAVA One step Ahead, Oxford University Press, 2017.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes								
	P01	P02	P03	P04	P05	P06	P07	P08	P09
CO1	M	-	L	L	-	H	-	M	
CO2	H	M	L	-	-	L	-	H	H
CO3	M	-	L	-	-	M	-	L	
CO4	H	-	-	L	L	-	-	L	L
CO5	-	-	L	M	-	L	-	L	M

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Java Programming lab	2	4	0		Practical

Course Outcome:

- CO1 : Execute JAVA programs based on simple constructs like arrays, loops , decision statements, functions etc
- CO2 : Incorporate object oriented concepts like classes, objects, inheritance, polymorphism resembling real time situation.
- CO3 : Demonstrate the use of packages and interfaces
- CO4 : Develop OOP programs containing User created Exception handling & Threading.
- CO5 : Familiarize with Java development Environment such as Eclipse, NetBeans etc. Suggestive list of programs.

List of Experiments:

1. To find the sum of any number of integers entered as command line arguments
2. To learn use of single dimensional array by defining the array dynamically.
3. To check if a number is prime or not, by taking the number as input from the keyboard
4. To find the sum of any number of integers interactively, i.e., entering every number from the keyboard, whereas the total number of integers is given as a command line argument
5. Write a program that show working of different functions of String and StringBuffer classes like setCharAt(), setLength(), append(), insert(), concat() and equals().
6. Write a program to show that during function overloading, if no matching argument is found, then java will apply automatic type conversions (from lower to higher data type)
7. Write a program to show the difference between public and private access specifiers. The program should also show that primitive data types are passed by value and objects are passed by reference and to learn use of final keyword
8. Write a program to demonstrate the concept of boxing and un-boxing.
9. Create a multi-file program where in one file a string message is taken as input from the

user

10. Write a program to create a multilevel package and also creates a reusable class to generate Fibonacci series, where the function to generate Fibonacci series is given in a different file belonging to the same package.
11. Write a program that creates illustrates different levels of protection in classes/subclasses belonging to same package or different packages
12. Write a program DivideByZero that takes two numbers a and b as input, computes a/b, and invokes Arithmetic Exception to generate a message when the denominator is zero.
13. Write a program to demonstrate priorities among multiple threads.
14. Write a program to generate a window without an applet window using main() function.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	m	-	L	L	-	M	-	M
C02	H	-	L	L	-	-	L	M
C03	L	-	M	M	-	-	M	L
C04	M	-	M	M	-	-	-	
C05	-	-	L	L	-	L	-	M

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core – Web Technology	4	4	0	0	Core

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 Servlet 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 :

1. 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 Jaworski, BPB Publications, 1999.

2. Core SERVLETS AND JAVA SERVER PAGES VOLUME 1: CORE TECHNOLOGIES By Marty Halland
Larry Brown Pearson, Pearson Education India

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes								
	P01	P02	P03	P04	P05	P06	P07	P08	P09
C01	H	-	M	-	L	M	-	L	
C02	H	M	-	L	M	-	L	M	L
C03	M	-	-	M	L	-	M	L	M
C04	H	L	M	-	L	-	-	L	M
C05	H	-	L	-	L	L	-	L	-

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core - Practical - I – Web Technology Lab	4	0	1 0	5	Practical

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.

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.

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 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
C01	H	-	M	-	L	M	-	L	M
C02	H	-	-	L	M	-	L	M	L
C03	M	-	-	M	L	-	M	L	M
C04	H	-	-	-	L	-	-	L	-
C05	-	-	L	-	L	L	-	L	L

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core - Practical - PHP and MySQL	2	0	0	4	Practical

1. Write PHP script to display person age and name using post method.
2. PHP script for sorting the marks.
3. Write PHP script to change color as per radio button selection.
4. Write PHP script to display images depends on check box selection.
5. Design of admission form using PHP-MYSQL.
6. Building a web-based e-mail services.
7. Building web forums.
8. Creating & updating and inserting into database & simple queries.
9. Write PHP script to upload file.
10. Write PHP script to connect to MySQL database, insert data, and fetch data from table.
11. Write PHP script to upload and fetch image from MySQL database.
12. Write PHP script that maintain session and set cookie of username and password.

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

Course Outcome:

C01	:	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.
C02	:	To become familiar with various tools used in the creation and implementation of multi- media
C03	:	To understand about the color and 3D Cloud
C04	:	To become familiar with Blender with images
C05	:	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. Vertices and Faces Logo Design- Boolean Operations.

Unit III : [12 periods]

Materials and textures: Material Panels- Transparency Using Z-Transparency - Halo Settings-Appling 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

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:

3. 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	PO2	P03	P04	P05	P06	P07	P08	P09
CO1	H	-	M	L	-	M	-	H	L
CO2	L	-	M	H	-	-	L	H	-
CO3	M	L	-	M	-	H	-	M	M
CO4	M	-	H	-	M	-	L	-	-
CO5	-	L	-	M	-	H	-	L	L

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core - Multimedia Lab	4	0	1	5	Practical

Course Outcome:

To give an overall view of multimedia tools.

To understand and differentiate text, image, video & audio

Design and implement an animation for various themes.

List of programs:

1. Design an advertisement in Flash with different effects like Tint, Tweening, Shape Tweening and Motion Tweening.
2. Develop a documentary film of your choice and integrate sound effects using flash.
3. Develop game software that interacts with the keyboard or mouse using flash script.
4. Write a program in Flash Fade In and Fade Out Effect
5. Program to generate frame by frame animation using multimedia Flash
6. Program to create an advertisement for a product using techniques like guide layer, masking, morphing, and onion skin using Flash
7. Write a program in photoshop to create Engraving Text effect.
8. Design a program in photoshop to create Rain Effect and Rainbow Effect for image
9. Design a program in photoshop to create Metal Polish Effect
10. Design a program in photoshop to create Picture in text
11. Design a program in photoshop to create Cloth Effect for Images
12. Make a Design in phototshop to illustrate morphing effect.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core - R PROGRAMMING	4	5	1	0	Theory

Introduction :

R is a programming language and software environment used for statistical analysis, data modeling, and graphical representation and reporting. R is best tool for software programmers, statisticians and data miners who looking forward for to easily manipulate and present data in compelling ways

Course Outcome:

C01	:	The data science course provides an in-depth understanding of the R language, R-studio, and R packages.
C02	:	The data science training course also includes various statistical concepts such as linear and logistic regression, cluster analysis and forecasting and hypothesis testing.
C03	:	Understand and use the various graphics in R for data visualization, Gain a basic understanding of various statistical concepts and strings and Lists
C04	:	Define, understand and use the various apply functions and DPLYR functions ,Arrays and functions
C05	:	Understand and use linear, non-linear regression models, and classification techniques for data analysis various types of file .

Unit I: [12 Periods]

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

Unit II: [12 Periods]

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 - R – FUNCTION : Function Definition - Function Components - Built-in Function - User-defined Function - Calling a Function - Lazy Evaluation of Function.

Unit III: [12 Periods]

R – STRINGS: Rules Applied in String Construction - String Manipulation - R – VECTORS : Vector Creation Accessing Vector Elements - Vector Manipulation - 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

[12 Periods]

Unit IV:

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 - 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

Unit V:

[12 Periods]

R – CSV FILES - R – EXCEL FILE - R – BINARY FILES - R – XML FILES - 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- R – NORMAL DISTRIBUTION : dnorm() - pnorm() - qnorm() - rnorm()- R – ANALYSIS OF COVARIANCE

Reference :

1. R programming Simple Easy learning Copyright 2016 by Tutorials Point (I) Pvt. Ltd.
2. Roger D. Peng, “R Programming for Data Science” Lean Publishing, 2014
3. Alain F. Zuur, Elena N. Ieno, Erik H.W.G. Meesters, “A Beginner’s Guide to R” Springer, 2009
4. Introductory R A beginner’s guide to data visualization and statistical analysis and programming in R, Robert Knell 2014
- 5.Using R for Data Analysis and Graphics Introduction, Code and Commentary , J H Maindonald Centre for Mathematics and Its Applications, Australian National University ,2002

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes								
	P01	P02	P03	P04	P05	P06	P07	P08	P09
C01	H	L						L	M
C02			M	L					L
C03	L		H					M	
C04			L			M			H
C05					M		M	M	M

H-High; M-Medium; L-Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core - R Programming Lab	4	0	1	5	Practical

Course Outcome:

The focus of this lab is to introduce you to R and the R Commander (a graphical user interface to R). To use R to analyze data, you will need to become familiar with the technical components of this software package. This lab will help familiarize you with the R software, including how to access data files, the various base components and how to define new variables and how to enter data.

List of programs:

1. Introduction to R Defining and Downloading R and installing R Programming
2. Write a simple R program to perform some Built-in mathematical functions
3. Write a simple R program to perform vector operations
4. Write a simple R program to Reading data from csv files, inspection of data.
5. Write a simple R program to Read data from Excel files
6. Write a simple R program to Working with datasets: Inspection, using variables, attaching
7. Write a simple R program to Transformation of variables, subsets of datasets and Merging datasets
8. Write a simple R program to perform Graphs
9. Write a simple R program to perform Regression
10. Write a simple R program to perform Analysis of variance (ANOVA)

Discipline Specific Core

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.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	RDBMS Lab	2	0	0	4	Practical

1.Database Schema for a customer-sale scenario

Customer(**Cust id : integer**, cust_name: string)

Item(**item id: integer**, item_name: string, price: integer)

Sale(**bill no: integer**, bill_data: date, **cust_id: integer**, **item_id: integer**, qty_sold: integer)

For the above schema, perform the following—

- Create the tables with the appropriate integrity constraints
- Insert around 10 records in each of the tables
- List all the bills for the current date with the customer names and item numbers
- List the total Bill details with the quantity sold, price of the item and the final amount
- List the details of the customer who have bought a product which has a price>200
- Give a count of how many products have been bought by each customer
- Give a list of products bought by a customer having cust_id as 5
- List the item details which are sold as of today
- Create a view which lists out the bill_no, bill_date, cust_id, item_id, price, qty_sold, amount
Create a view which lists the daily sales date wise for the last one week

2.Database Schema for a Student Library scenario

Student(**Stud no : integer**, Stud_name: string)

Membership(**Mem no: integer**, **Stud_no: integer**)

Book(**book no: integer**, book_name:string, author: string)

Iss_rec(**iss no:integer**, iss_date: date, **Mem_no: integer**, **book_no: integer**)

For the above schema, perform the following—

- Create the tables with the appropriate integrity constraints
- Insert around 10 records in each of the tables
- List all the student names with their membership numbers
- List all the issues for the current date with student and Book names

- e) List the details of students who borrowed book whose author is CJDATE
- f) Give a count of how many books have been bought by each student
- g) Give a list of books taken by student with stud_no as 5
- h) List the book details which are issued as of today
- i) Create a view which lists out the iss_no, iss_date, stud_name, book name
- j) Create a view which lists the daily issues-date wise for the last one week

3. Database Schema for a Employee-pay scenario

employee(**emp_id : integer**, emp_name: string)

department(**dept_id: integer**, dept_name:string)

paydetails(**emp_id : integer**, **dept_id: integer**, basic: integer, deductions: integer, additions: integer, DOJ: date)

payroll(**emp_id : integer**, pay_date: date)

For the above schema, perform the following—

- a) Create the tables with the appropriate integrity constraints
- b) Insert around 10 records in each of the tables
- c) List the employee details department wise
- d) List all the employee names who joined after particular date
- e) List the details of employees whose basic salary is between 10,000 and 20,000
- f) Give a count of how many employees are working in each department
- g) Give a names of the employees whose netsalary>10,000
- h) List the details for an employee_id=5
- i) Create a view which lists out the emp_name, department, basic, dedeuctions, netsalary
- j) Create a view which lists the emp_name and his netsalary

1. Write a program to find largest number from the given three numbers.
2. Write a program to check whether the given number is Armstrong or not
3. Write a program to generate all prime numbers below 100.
4. Write a program to demonstrate predefined exceptions.
5. Create a cursor, which displays all employee numbers and names from the EMP table.
6. Create a cursor, which update the salaries of all employees as per the given data.
7. Create a procedure to find reverse of a given number.
8. Create a trigger before/after update on employee table for each row/statement.
9. Create a trigger before/after delete on employee table for each row/statement.

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
C01	-	M	L	L	-	M	-	L	-
C02	L	-	M	H	-	-	L	H	H
C03	-	M	M	M	H	M	M		-
C04	H	-	L	L	H	-	-	H	H
C05	-	-	H	H	-	L	-	M	L

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Software Engineering Lab	2	0	0	4	Practical

Introduction: Understand the basic ideas and its usage of key diagrams in Software Engineering.

Course Outcome:

- C01 : To Understanding the Requirement tasks.
- C02 : To Understanding the Requirement analysis and SRS.
- C03 : To Implement a DFD and Structured chart.
- C04 : To Understand and Implement the concept of Use case Diagram.
- C05 : To Understand and Implement the concept of Class Diagram & Object Diagram.

Lab Experiments:

1. To assign the requirement engineering tasks
2. To perform the system analysis : Requirement analysis, SRS
3. To perform the function oriented diagram : DFD and Structured chart
4. To perform the user's view analysis : Use case diagram
5. To draw the structural view diagram : Class diagram, object diagram

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:

- C01 : To gain knowledge about the computer graphics and their hardware and software systems used to make these images.
- C02 : To Recognize and evaluate critical and aesthetic issues within computer graphics and the mixed media.
- C03 : To be able to describe the general software architecture of programs that use 3D computer graphics.
- C04 : 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.
- C05 : 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
CO1	M	L	M	L				L	L
CO2	M	M	M		M	L		L	L
CO3	M	L			L				M
CO4	M	M	M		M	L	L	L	
CO5	M	M		L				L	M

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Computer Graphics Lab	2	0	0	4	Practical

- 1.To implement the Bresenham's Algorithm for line, circle and ellipse drawing using C program.
2. To perform 2D transformations such as translation, rotation, scaling, reflection and shearing using C programs.
3. To implement the Cohen-Sutherland 2D clipping and window-viewport mapping using C program.
4. To perform 3D transformations such as translation, rotation and scaling using C programs.
5. To create sunflower using Adobe Photoshop.
6. To create plane flying using Adobe Photoshop.
7. To create the plastic surgery for the nose Adobe Photoshop.
8. To create the see through the text using Adobe Photoshop.
9. To create the web page layout design in the Adobe Photoshop
10. To change the image into black and white using Adobe Photoshop

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Scripting Languages	4	4	0	0	Theory

Introduction:

VP Script and JavaScript is a loosely-typed client side scripting language that executes in the user's web browser.

Course Outcome:

- C01 : Understand the concepts of scripting languages for developing web based projects.
- C02 : Illustrates object oriented concepts like VBscript, JavaScript.
- C03 : Create database connections using PHP and build the website for the world.
- C04 : Demonstrate IP address for connecting the web servers.
- C05 : Analyze the internet ware application, security issues and frame works for application.

Unit - I: [12 periods]

VBScript introduction - variables and data types - using variables - using comments - using built-in VBscript functions. Flow control : Branching - looping. Operators and Operator precedence. Organizing and Reusing Code: Modularization, Black boxes, Procedures and Sub procedures - Turning code into a function.

Unit - II : [12 periods]

Variables and Procedures : Option Explicit. Naming Variables . Procedures and Functions - Procedure Syntax - Function Syntax - Calling Procedures and Functions - Optional Arguments - Exiting a procedures or Function. Error Handling and Debugging : Types of Errors - Syntax Errors - Runtime Errors - Logic Errors. Handling Errors : Using the Err Object - Using the On Error Statements - Presenting and Logging.

Unit III:

Getting Started with JavaScript : JavaScripting introduction - Writing your first JavaScript Program: Setting up your development environment - downloading and installing chrome - reading javaScript code - running javascript in the browser window.

Unit - IV:

Working with variables: Understanding variables - declaring variables- understanding global and local scope - naming variables - creating constants using the const keyword- working with data types - number data types - string data type - Boolean data types.

Unit - V:

Understanding arrays - working with operators, expressions and statements - getting into the flow with loops and branches .

Text Book:

1. Adrian Kingsley-Hughes Kathie Kingley-Hughes, Deniel Read, "VBScript Programmer's Reference", Third Edition, 2007.

2. 2. John Wiley & Sons, "Coding with JavaScript for Dummies, Johan Wiley & Sons, Inc 2015.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes		Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08	P09
C01	H	M			L		L	L	
C02	L	M	L	H					H
C03	H		M		H		H	L	
C04	L	H		H					L
C05	M		H		M	M	M		L

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Scripting Languages Lab	2	0	0	4	Practical

1. Find whether given number is a odd number using VbScript.
2. Print odd numbers between given range of numbers using VbScript.
3. Find the factorial of a given number using VbScript.
4. Find the factors of a given number using VbScript.
5. Swap 2 numbers with out a temporary variable using JavaScript.
6. Write a program to Perform specified Arithmetic Operation on two given numbers using JavaScript
7. Find the length of a given string using JavaScript
8. Write a program to print the decimal part of a given number using JavaScript.
9. Write a Function to return a random number using JavaScript.
10. Write a Function to add and multiply two numbers using JavaScript

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
CO1	H	L	-	L	-	L	-	L	L
CO2	H	L	-	L	-	L	-	L	L
CO3	H	L	-	L	H	M	L	L	L
CO4	H	M	L	L	-	-		-	L
CO5	H	L	-	L	-	-		-	L

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Linux and Shell Programming Lab	2	0	0	4	Lab

Course Outcome:

- C01 : Comfortably use basic UNIX/Linux commands from the command line
- C02 : Organize and manage their files within the UNIX/Linux file system. And organize and manage their processes within UNIX/Linux
- C03 : Usefully combine UNIX/Linux tools using features such as filters, pipes, redirection, and regular expressions.
- C04 : Customize their UNIX/Linux working environment
- C05 : Know how to use UNIX/Linux resources to find additional information about UNIX/Linux commands

1. Write a Shell program to identify the Current Shell and length of the String.
2. Write a Shell program to Count backwards for 100 to 0 Using Loops.
3. Write a Shell program to Search File name using regular Expression.
4. Write a Shell program for sorting unique and duplicate Text Files.
5. Write a Shell program to perform operation using intersection, difference and set difference.
6. Write a Shell program to find and duplicate File in a directory of files.
7. Write a Shell program to perform Silent output for grep.
8. Write a Shell program to Printing lines before and after text matches.
9. Write a Shell program for printing text between line numbers or patterns.
10. Write a Shell program for Parsing e-mail addresses and URLs from text.

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 predictive 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
CO1	L	L	L	M		M		M	L
CO2	M	M	L	M	L			M	L
CO3	L	M	L		H	M	L	M	L
CO4	M	M	H					L	
CO5	H	M	H		H			L	M

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Big Data Analytics Lab	2	0	0	4	Practical

Introduction: In this course, students to understand more advanced tools used to wrangle and analyze big data.

Lab Experiments:

1. Prepare infrastructure and understand objective for software requirement for setting up single node Hadoop cluster.

- WinSCP
- Putty
- Ubuntu
- VMPlayer
- Hadoop version

2. Create single node Hadoop cluster.

- Installing Ubuntu on VM
- Installing Java
- SSH Configuration
- Core-site.xml Configuration
- Hdfs-site.xml Configuration
- Yarn-site.xml Configuration

3. Testing Single Node cluster, Web UI ports and Exploring different daemons of Hadoop Cluster.

4. Perform / Execute below sets of Hadoop basic commands:

- appendToFile
- cat
- chgrp
- chmod
- chown
- copyFromLocal
- copyToLocal
- count
- cp

4. Install eclipse IDE on single node cluster for executing Map Reduce Job and understand the role of dependent libraries for processing job.

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:

- C01 : Explain the importance of numerous methods of real-world information intelligence.
- C02 : Differentiate the processes of vulnerability assessment and ethical hacking from penetration testing.
- C03 : Comprehend the importance of appropriate countermeasures for managing vulnerabilities.
- C04 : To familiarize with the methodologies that can be used to hack into a target.
- C05 : 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 Webspay, 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
CO1	H	-	L	L	-	M	-	H
CO2	H	-	M	L	-	-	L	H
CO3	M	-	L	L	-	-	M	L
CO4	H	-	L	L	-	-	-	L
CO5	-	-	L	L	-	L	-	M

H - High ; M- Medium ; L- Low

Subject Code Type	Subject Title	Credit	Lecture	Tutorial	Practical
	Ethical Hacking Lab Practical	2	0	0	4

Course Outcome:

CO1	Implement the importance of ethical hacking in achieving the goals of information security.
CO2	Differentiate the processes of vulnerability assessment and ethical hacking from penetration testing.
CO3	Comprehend the importance of appropriate countermeasures for managing vulnerabilities.
CO4	Justify the need for meticulous documentation in writing reports for consumption of both technical and management audiences.
CO5	Articulate the rationale for having an adequate legal framework for dealing with hacking and ethical hacking.

List of Experiments:

Software:

- VM Player; Windows server; Windows 7/ 10; Kali Linux; All-in-one keylogger; DELmE virus maker

Experiments:

1. Perform network scan to revile active hosts, open ports and services running
2. Perform privilege escalation attack on Client operating system and gain control of a Client operating system and write a short note on its mitigation strategy
3. Demonstrate ARP Poisoning and detect ARP Poisoning in switch-based network
4. Perform man-in-the-middle attack and hijack an established session of a user. Write a report on the same with mitigation strategy
5. Crack FTP credentials using dictionary attack and write a report of possible suggestion on hardening the login services
6. Perform user system surveillance and write a mitigation report on the same
7. Exploiting NetBIOS vulnerability and password revelation from browsers and social networking application using Key Logger and Trojan
8. Perform denial service attack on a server operating system and write a report on the same with mitigation strategy

Allied

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Allied - Organisational Behaviour	4	4	0	0	Allied

Introduction : To enable the students to acquire and develop skills to take rational decisions in the Organisational Behaviour process. Human resources are always been observed as important in managing organizations.

Course Outcomes:

- CO 1 : Demonstrate the applicability of the concept of organizational behaviour and its nature
- CO 2 : To analyzing the complexities associated with management of individual behavior in the organization.
- CO 3 : To demonstrate the leadership skills and become a good leader
- CO 4 : To equip the students knowledge with Morale and Productivity and their importance.
- CO 5 : Demonstrate how the organizational behaviour can integrate in understanding the stress and role of counsellor.

UNIT I: Organisational Behaviour – Concept – Nature - Organisational Behaviour Models and other similar fields of study – Disciplines contributing to Organisational Behaviour.

UNIT II: Individual Behaviour – Perception – Personality – Group Dynamics – Formal and Informal Groups, Group Norms, Group Cohesiveness, Group Behaviour and Group Decision – making.

UNIT III: Leadership – Concept – Qualities of effective Leadership – Leadership Styles. Power and Authority - Definition of Power – Types of Power

UNIT IV: Definition of Authority – Characteristics – Types of Authority. Morale – Concept – importance - Morale and Productivity – Measurement of Morale – Steps to improve Morale in an organization.

UNIT V: Stress management—meaning, types of stress- consequences of work stress. Counselling -meaning - Importance of counsellor - types of counselling - merits of counselling.

BOOKS FOR REFERENCE:

1. Organisation Theory and Behaviour – V.S.P. RAO & D.S. Narayana
2. Organisational Behaviour – L.M. PRASAD
3. Organisational Behaviour – Dr. P.C. SEKAR
4. Organisational Behaviour – FRED LUTHENS

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Entrepreneurial Development Program	4	4	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.

Unit II

[12 Periods]

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.

Unit III

[12 Periods]

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.

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, IRCL, 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
C01	L		H	L	H	L		L	
C02	H	H	L	L		H	L	L	L
C03	H	L			L	L	L		M
C04	H	H	L	H	L		H		L
C05	L	H			L	L	L	H	H

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:

- C01 : To demonstrate a working knowledge of set notation and elementary set theory with its corresponding set operations and also Venn diagram.
- C02 : To apply the fundamental concepts of Mathematical Logic and Tautologies.
- C03 : To apply and understand the fundamental concepts of Relations and Functions.
- C04 : To demonstrate different traversal methods for graphs.
- C05 : 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, John Schlipf and Sue Whitesides
2. Discrete Mathematics by J.K.Sharma second edition – 2005. Macmillan India Ltd.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
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Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
18BCS3AA	Quantitative and Aptitude	4	4	0	0	Allied

Introduction: This paper enables the students to enhance the problem solving skills, to improve the basic mathematical skills and to help students who are preparing for any type of competitive examinations.

Course Outcome:

- C01 : Recall the fundamental concepts of mathematics
- C02 : Apply the concept of measurement and simple interest
- C03 : Understand the need of critical thinking to improve chance of employability
- C04 : Examine the ability of knowledge in mathematics
- C05 : Examine the knowledge in logical reasoning
- C06 : To Develop problem solving skills and Reasoning ability for cracking Competitive Exams

Unit - I

Area – Average – Partnership - Bankers Discount – Profit & Loss - Percentage -

Unit – II

Geometry and Measurements – Chain Rule – Number System - Ratio - Simple & Compound Interest

Unit – III

Probability – Permutation and Combination - Pipes and Cisterns - Problems on age - Time and work – Boats and streams

Unit - IV

HCM & LCM – Seating Arrangements – Calendar - Clocks – Cubes

Unit –V

Logical sequence – Logical Matching – Logical Connectives – Syllogism – Blood Relations – Venn Diagrams

Text Book :

1. Dr. R.S.Aggarwal ,” Quantitative Aptitude” , S.Chand, company limited,.

Reference Books

1. Dr.R.S.Aggarwal ,”A Modern Approach to Verbal and Non Verbal Reasoning, Revised Edition, S.Chand.
2. Edgar Thorpe “Mental ability and Quantitative Aptitude”, 2 Edition
3. Hand book on “Mental Ability and Logical Reasoning” by Bharathiar University, Coimbatore.

Allied – Operations Research

Introduction: This paper enables the students to learn various mathematical applications in industries and Decision making for real time environment.

Course Outcome:

- C01 : Recall the basic concepts of LPP.
 - C02 : Understand the concept of Transportation problems and uses.
 - C03 : Apply concept of Assignment method.
 - C04 : Explain the concept of Game theory.
 - C05 : Examine the concept of CPM and PERT.
 - C06 : Discuss the basic concepts of Operations Research and its applications.
- UNIT-I:** Definition of O.R – Applications of O.R – Limitations of O.R - Formulation of Linear Programming Problem – Graphical Solutions of LP.P : Feasible solution – Unbounded solution – Infeasible solution - Simple Problems only.
- UNIT- II :** Transportation problem: Introduction – Balanced Transportation Problems – North West Corner Rule – Least Cost Method – Vogel’s Approximation Method – Unbalanced Transportation Problems - Simple Problems Only .
- UNIT-III:** Assignment problem : Balanced Assignment Problems – Hungarian Assignment method - Unbalanced Assignment Problems – Maximization case in Assignment Problem –Traveling Salesman Problem – Simple Problems only.
- UNIT-IV :** Game Theory : The Maximin-Minimax Principle - Concept of Pure and Mixed Strategies – Solving 2 x 2 matrix with and without saddle point - 2 x n - m x 2 games.
- UNIT-V :** CPM : Basic Components – Rules of Network construction - Network representation - simple problems – Critical Path Analysis - Backward pass - Forward pass - Computation - PERT Network - - Standard Deviation – Variance – Simple Problems only .

Text books:

1. Manmohan, P.K. Gupta, Kanthiswarup, “ Operations Research “, S. Chand & Sons - 1997.

Reference Books:

1. Hamdy A Taha “Operations Research”, Pearson Education, 7th Edition, 2002.
2. P.K. Gupta, D.S. Hira, “Problems In Operations Research”, S. Chand Publications.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Allied- Principles of Management	4	4	-	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:

- C01 : Discuss and communicate the management evolution and how it will affect future managers
- C02 : Observe and evaluate the influence of Historical forces on the current practice of management
- C03 : Identify and evaluate social responsibility and ethical issues involved in business situations and logically articulate own position on such issues.
- C04 : Practice the process of management's four functions: planning, organizing, leading, and controlling.
- C05 : 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: 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 – Henry Fayol – Mary Parker Follet – McGregor and Peter F. Drucker.

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

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

UNIT IV: 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 : 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.
2. T. Ramasamy, "Principles of Management," Himalaya Publishing House, First Edition, 2014.

Reference

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

Course Outcomes	Program Outcomes								
	P01	P02	P03	P04	P05	P06	P07	P08	P09
C01	H	M	M	H	H		H	H	L
C02	L		H	L	H	H	M		H
C03		H		H	H		H	M	
C04	L	M	L	H	L	H	M		M
C05	H		H	M		H	H	H	H

H- High M – Medium B – Blank

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Research Methodology	4	4	0	0	Theory

Introduction:

Research Methods introduces students to the nature, scope, and significance of research and research methodologies. Additionally, the course studies primary and secondary research methods with applications to specific problems, using qualitative and quantitative designs for individual investigation on current problems within a student's area of interest. Students will complete an individual research proposal based on a business topic of interest, using the course's textbooks and selected scholarly and peer reviewed sources.

Course Outcome:

- CO1 : To know the basic of research and formation of problems
- CO2 : Understand and apply the major types of research designs and errors
- CO3 : Formulate clearly defined scaling techniques and report writing
- CO4 : Analyse and summarise the basic terms such as mean, median and mode
- CO5 : To deal with T-Test, Chi Square-Test etc

Unit I:**[12 Periods]**

Business Research – Meaning – Scope and Significance – Utility of Business research – Qualities of good researcher – Types of research – Research Process-Research design- Identification, Selection and formulation of research problems- Setting objectives – literature review

Unit II:**[12 Periods]**

Sampling – Methods and techniques – Sample size – Sampling error – Field work and data collection- Tools of data collection- Secondary data sources and usage- online data sources- Primary data collection methods – Interview schedule- Questionnaire – Observation, interview and mailed questionnaire – online surveys -pilot study and final collection of data.

Unit III:**[12 Periods]**

Measurement and scaling techniques – Processing and analysis of data – Editing and coding – Transcription and Tabulation – Statistical tools used in research – Hypothesis -Measures of Central tendency – Mean – Median - Mode-Standard deviation – Correlation – simple & multiple correlations.

Unit IV:**[12 Periods]**

Test of significance – 't' Test - large sample, test of significance for attributes, analysis of variants - Chi-square test and ANOVA test – Ranking Concept & Methods

Unit V:**[12Periods]**

Interpretations - Report writing– Types of Reports - contents and style of reports – Usage of Tables and Charts - Steps in drafting reports – Reference – Bibliography

Textbook:

1. Business Research Methods - Kothari - 4th Edition

Reference:

1. Business Research Methods - Emory
2. Business Research Methods – Rummel & Ballaine

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes								
	P01	P02	P03	P04	P05	P06	P07	P08	P09
C01	H	L	H		L		H	H	L
C02	L			H	H	L	L		H
C03		L				L		M	H
C04	H		H		L				
C05	L	L		H			L	H	

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

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
5. P.C. Tulsian - Advanced Accountancy – Tata McGraw Hill Companies - 1997

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes								
	P01	P02	P03	P04	P05	P06	P07	P08	P09
C01	H	H	L	L	L	L	H	L	L
C02	H	L	H	H	L	L	H	H	H
C03	L	H	L	L	L	H	L	L	L
C04	L	L	H	H	L	L	L	H	H
C05	H	L	H	L	L	L	H	L	H

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Allied - PC and Mobile Hardware Trouble Shooting	4	4	0	0	Allied

Introduction : To know the fundamentals of Computer Hardware and Software Installation.

Course Outcome:

- CO1 : Understand the basics of Computer Maintenance and understands the Mobile servicing.
- CO2 : Exercise Mobile Phone Repair and Maintenance , Diagnosing and repairing mobile phone faults
- CO3 : To learn about basic knowledge about Laptop device and components.
- CO4 : Understand basic troubleshooting in mobile and Ethics and Legal Aspects of Working
- CO5 : Understand basic repair and maintenance

Unit I: [12 periods]

Introduction to the Personal Computer - Safe Lab Procedures and Tool Use - Computer Assembly Step by Step - Install the Power Supply - Attach the Components to the Motherboard and Install the Motherboard - Install Internal Drives - Install Drives in External Bays - Install Adapter Cards - Connect All Internal Cables - Reattach the Side Panels and Connect External Cables to the Computer - Boot the Computer for the First Time.

Unit II : [12 periods]

Basics of Preventive Maintenance and Troubleshooting - the Purpose of Preventive Maintenance - Identify the Steps of the Troubleshooting Process - Fundamental Operating Systems - the Purpose of an Operating System - Determine Operating System Based on Customer Needs - Install an Operating System - Identify and Apply Common Preventive Maintenance Techniques for Operating Systems.

Unit III : [12 periods]

Fundamental Laptops and Portable Devices - Identify and Describe the Components of a Laptop - Compare and Contrast Desktop and Laptop Components - Compare the Different Mobile Phone Standards - Identify Common Preventive Maintenance Techniques for Laptops and Portable Devices- Fundamental Networks - the Principles of Networking - Types of Networks - Basic Networking Concepts and Technologies - the Physical Components of a Network - LAN Topologies and Architectures - the OSI and TCP/IP Data Models

Unit IV: [12 periods]

Fundamental Security - Why Security Is Important - Security Threats - Security Procedures - Common Preventive Maintenance Techniques for Security - Troubleshoot Security. Communication Skills - the Relationship Between Communication and Troubleshooting - Good Communication Skills and Professional Behavior - Ethics and Legal Aspects of Working with

Computer Technology - the Call Center Environment and Technician Responsibilities.

Unit V:

[12 periods]

Mobile Phone Repair and Maintenance – Types of Mobile Phones – Potential Hazards associated with Mobile Phone Repair – Parts of a Conventional Mobile Phone – Mobile Phone Repair Tools – Disassembling and Assembling a Mobile Cell phone – Diagnosing and repairing mobile phone faults – Repair of common mobile phone faults.

Textbook:

1. IT Essentials – PC Hardware and Software Companion Guide – David Anfinson, Ken Quammo, 3rd Edition, CISCO Press, 2008

Reference :

1. Repair and Maintenance of Mobile Cell Phones, Joan Mutero, Commonwealth of Learning, 2015.
2. B. Govindarajalu, “IBM PC and Clones: Hardware, Troubleshooting and Maintenance”, TMH, 2002.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes								
	P01	P02	P03	P04	P05	P06	P07	P08	P09
CO1	H	L	-	H	-	M	M	L	L
CO2	M	L	-	L	-	-	-	L	L
CO3	H	-	-	M	-	L	-	-	H
CO4	M	L	-	L	H	H	H	L	L
CO5	H	L	-	L	-	-	M	L	-

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	COMPUTER NETWORKS	4	4	0	0	Theory

Introduction :

This course provides a foundation to understand computer networks using layered architectures. It also helps students to understand the various network models, addressing concept, routing protocols and design aspects of computer networks.

Course Outcome:

- CO1 : To understand the basics of computer networks , models and services.
- CO2 : To explain the transmission media and to apply the error detection and correction of data transmission.
- CO3 : To analyze the importance and design issues of layers.
- CO4 : To differentiate the services and protocols of various layers.
- CO5 : To illustrate the types of security and digital signature.

Unit - I :- INTRODUCTION

[12 periods]

Uses Of Computer Networks - Business Applications - Home Applications - Mobile Users - Network Hardware : personal area networks - local area networks - metropolitan area networks - wide area networks - network software : protocol hierarchies - design issues for the layers - connection-oriented versus connectionless service - service primitives - reference models : the OSI reference model - the TCP/IP reference model - a comparison of the OSI and TCP/IP reference models - example networks : the internet - third-generation mobile phone networks - wireless LANS: 802.11 - RFID and sensor networks.

Unit – II : THE PHYSICAL LAYER

[12 periods]

Guided transmission media - wireless transmission - communication satellites - the Data link layer : data link layer design issues - error detection and correction - elementary data link protocols - sliding window protocols - example data link protocols.

Unit – III: THE MEDIUM ACCESS CONTROL SUBLAYER

[12 periods]

The medium access control sub-layer : the channel allocation problem - multiple access protocols - Ethernet - the network layer: network layer design issues - the network layer in the internet.

Unit – IV: THE TRANSPORT AND APPLICATION LAYER

[12 periods]

The transport service - elements of transport protocols - the application layer : DNS—The domain name system - electronic mail - the world wide web.

Unit – V: NETWORK SECURITY

[12 periods]

Cryptography - symmetric-key - DES (the data encryption standard) - AES (the advanced encryption standard) - public-key - RSA - digital signatures - symmetric-key signatures - public - key signatures - email security - web security.

Textbook:

1. ANDREW S. TANENBAUM & DAVID J. WETHERALL, "COMPUTER NETWORKS", FIFTH EDITION - 2011, Prentice Hall.

Reference :

1. Behrouz A. Forouzan, "Data Communications and Networking" 5th edition, July 1, 2010.
2. Todd Lammle, "CCNA Study Guide", Edition 7, Publication Date: April 5, 2011.
3. William Stallings, "Data and Computer Communications", Edition 9, 2010.
4. B. Forouzan, 1998, Introduction to Data Communications in Networking, Tata McGraw Hill, New Delhi.
5. F. Halsall, 1995, Data Communications, Computer Networks and Open Systems, Addison Wesley.
6. Bertsekas and R. Gallager, 1992, Data Networks, Prentice hall of India, New Delhi.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes								
	P01	P02	P03	P04	P05	P06	P07	P08	P09
CO1	H	L	M	L	M	-	M	M	-
CO2	H	L	-	M	-	L	M	-	-
CO3	M	L	H	H	L	L	H	L	-
CO4	L	L	L	M	H	L	M	H	-
CO5	L	L	L	M	H	L	M	H	-

H - High ; M- Medium ; L- Low

Skill Based Subject

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Skill Enhancement Courses – II					
	Information Security and Cyber	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:

- C01 : 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.
- C02 : To provide components of the Information and Cyber Security Organization.
- C03 : To achieve a basic understanding of information and Cyber Security.
- C04 : To master information security governance, and related legal and regulatory Issues
- C05 : 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
CO1	H	-	M	H	L	H	M	H	-
CO2	L	-	H	-	-	H	L	-	L
CO3	M	-	-	L	-	L	-	L	M
CO4	-	M	L	-	M	L	-	-	-
CO5	H	L	-	M	H	M	H	M	-

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Animation and Multimedia	2	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-Appling 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:

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

Reference :

3. Andleigh, P. K and Kiran Thakrar, —Multimedia Systems and Design||, PHI, 2003.
4. 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
C01	H	-	M	L	-	M	-	M	H
C02	L	-	M	H	-	-	L	-	H
C03	M	L	-	M	-	H	-	H	M
C04	M	-	H	-	M	-	L	-	-
C05	-	L	-	M	-	H	-	H	L

H - High ; M- Medium ; L- Low

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 Madiseti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach"
Waltenegus Dargie, Christian Poellabauer, "Fundamentals of Wireless 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
C01	H	H		L	L	H	L	H	H
C02	H	H		H	L	L	L		H
C03	H	H	L	H	H	H	L		M
C04	H	H		H	L	L		L	H
C05	H	H	L	L	L	L	L	H	H

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Operating System	2	4	0	0	Theory

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.

- C01 : After learning the fundamental concepts in Operating system including how OS has evolved over the years and different components of OS
- C02 : This will provide the necessary information for students to extract maximum benefits out of the OS while developing programs, working with applications and etc.
- C03 : These chapters cover methods for process scheduling, interprocess communication, process synchronization, and deadlock handling.
- C04 : These chapter covers the how storage is maintain in the computer
- C05 : Have the knowledge of provided by a mechanism that controls the access of programs, processes, or users to the resources defined by a computer system.

Unit-1: Introduction to Operating System [12 Hrs]

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 -2: Process Management – Processes and Threads [12 Hrs]

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.

Unit – 3: Process Management – Synchronization and Deadlocks [12 Hrs]

Process Synchronization: Mutual Exclusion, Critical – section problem, Synchronization hardware, Semaphores, Classic problems of synchronization. Deadlocks: System Model, Deadlock characterization, Methods for handling Deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Unit -4: Storage Management

[12

Hrs]

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.

Unit -5: Protection and Security

[12 Hrs]

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

Text Books:

1. ABRAHAM SILBERSCHATZ, PETER BAER GALVIN, GREG GAGNE “Operating system concepts” Ninth Edition,WILEY Publication
2. Milonkovic, Operating System Concepts and design, II Edition, McGraw Hill 1992.
3. Tanenbaum, Operation System Concepts, 2nd Edition, Pearson Education.
4. Silberschatz / Galvin / Gagne, Operating System,6thEdition,WSE (WILEY Publication)

Reference Books:

1. William Stallings,Operating System, 4th Edition, Pearson Education.
2. H.M.Deitel, Operating systems, 2nd Edition ,Pearson Education
3. Nutt: Operating Systems, 3/e Pearson Education 2004
4. Operating System by H.M.Deitel , 2nd Edition,Pearson Education
5. Operating Systems by Nutt, 3/e Pearson Education 2004

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes								
	P01	P02	P03	P04	P05	P06	P07	P08	P09
CO1	H	-	-	H	L	H	M	-	-
CO2	L	-	M	-	L	H	-	-	L
CO3	M	-	-	L	L	L	-	-	M
CO4	-	M	L	-	M	L	M	M	-
CO5	-	L	-	M	H	M	H	L	-

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Data warehouse and data Mining	4	4	0	0	Elective

Introduction:

This subject gives the Knowledge of Fundamentals of Data warehousing, Data mining and Data Mining Techniques.

CO1 : To explain the core concepts of the Data Warehousing. This Explain about the Concept of Different Types of Data warehouse and its features.

CO2 : To discuss Data Mining Techniques and issues.

CO3 : To analyze various Association Rules in Data Warehousing.

CO4 : To understand various Clustering techniques.

CO5 : To deploy applications of Web Mining.

UNIT I

[12 periods]

Data Warehousing: Introduction – Definition – Multidimensional Data Model - OLAP Operations – Warehouse Schema – Data warehousing Architecture – Metadata – OLAP Engine - Data Warehouse Backend Process.

UNIT II

[12

periods]

Data Mining: Definition – Comparison with other fields – DM Techniques – Issues - Application Areas.

UNIT III

[12 periods]

Association Rules: Methods – A Priori algorithm – Partition Algorithm – Pincer-Search Algorithm – Border Algorithm – Generalized Association Rules with Item constraints.

UNIT IV

[12 periods]

Clustering Techniques : Clustering Paradigms – Partitioning Algorithms – CLARA – CLARANS- Hierarchical Clustering – DBSCAN – Categorical Clustering Algorithms – STIRR. Decision Trees: Tree Construction Principle – Best Split – Splitting Indices – Splitting Criteria CART – ID3.

UNIT V

[12 periods]

Web Mining: Introduction – Web Content Mining – Web Structure Mining – Web Usage Mining – Text Mining – Hierarchy of Categories – Text Clustering.

Text Books:

1. Arun K Pujari , “Data Mining Techniques”, Universities Press, Second Edition 2013.

Reference books:

1. Jewie Han, Michelins Kamber, Jian pei, “Data Mining: Concepts and Techniques”, Morgan Kaufmann Publishers, Third Edition,2012.

2. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, “Introduction to Data Mining” , Pearson India Education Publishers, Second Edition, 2016.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes								
	P01	P02	P03	P04	P05	P06	P07	P08	P09
C01	M	-	L	L	-	-	M	-	H
C02	L	-	M	M	-	-	-	L	H
C03	M	-	M	M	H	-	M	M	M
C04	H	-	L	L	H	M	-	-	H
C05	-	-	H	H	-	L	L	-	M

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Computer Architecture and Design	2	4	0	0	Theory

Introduction : This course aims to provide a strong foundation for students to understand modern computer system architecture and to apply these insights and principles to future computer designs.

Course Outcome:

CO1	: To make students understand the basic structure and operation of digital computer.
CO2	: To understand the hardware-software interface.
CO3	: To familiarize the students with arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations.
CO4	: To expose the students to the concept of pipelining.
CO5	: To familiarize the students with hierarchical memory system including cache memories and virtual memory. To expose the students with different ways of communicating with I/O devices and standard I/O interfaces.

UNIT I OVERVIEW & INSTRUCTIONS

[12 periods]

Eight ideas – Components of a computer system – Technology – Performance – Power wall – Uniprocessors to multiprocessors; Instructions – operations and operands – representing instructions – Logical operations – control operations – Addressing and addressing modes.

UNIT II ARITHMETIC OPERATIONS

[12 periods]

ALU – Addition and subtraction – Multiplication – Division – Floating Point operations – Subword parallelism.

UNIT III PROCESSOR AND CONTROL

[12 periods]

Basic MIPS implementation – Building datapath – Control Implementation scheme – Pipelining – Pipelined datapath and control – Handling Data hazards & Control hazards – Exceptions.

UNIT IV PARALLELISM

[12 periods]

Instruction-level-parallelism – Parallel processing challenges – Flynn's classification – Hardware multithreading – Multicore processors

UNIT V MEMORY AND I/O SYSTEMS

[12 periods]

Memory hierarchy – Memory technologies – Cache basics – Measuring and improving cache performance – Virtual memory, TLBs – Input/output system, programmed I/O, DMA and

interrupts, I/O processors.

TEXT BOOK:

1. David A. Patterson and John L. Hennessey, "Computer Organization and Design", Fifth edition, Morgan Kauffman / Elsevier, 2014.

REFERENCES:

1. V.Carl Hamacher, Zvonko G. Varanescic and Safat G. Zaky, "Computer Organisation", VI edition, Mc Graw-Hill Inc, 2012.

2. William Stallings "Computer Organization and Architecture", Seventh Edition , Pearson Education, 2006.

3. Vincent P. Heuring, Harry F. Jordan, "Computer System Architecture", Second Edition, Pearson Education, 2005.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes								
	P01	P02	P03	P04	P05	P06	P07	P08	P09
CO1	M		M	L	M	M	-		
CO2	M	L	M				-		M
CO3	M						-	L	
CO4	H			L		M	M		
CO5			M	M			L		M

H - High ; M- Medium ; L- Low

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
C01	M		M	L	M	-	M	L	
C02	L	L	M			-			M
C03	M			M		-		L	
C04	H			L		M	M		
C05		L	M	M	L	L			M

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Distributed Programming	2	4	0	0	Theory

Introduction :

To enable the students to learn the introduction to Distributed system fundamentals, processing, models, memory systems.

Course Outcome:

- CO1 : To understand the foundations of distributed systems.
- CO2 : To learn process and naming concepts in distributed systems.
- CO3 : To learn issues related to clock Synchronization and the need for global state in distributed systems.
- CO4 : To understand the fault tolerance and recovery protocols in Distributed Systems.
- CO5 : To learn the characteristics of distributed object based System and file systems.

UNIT I

12

Hrs

Introduction : Definition of a Distributed System - Goals – Making Resources Accessible – Distribution Transparency – Openness – Scalability – Pitfalls – Types of Distributed Systems. Architecture – System Architectures – Architecture Versus Middleware.

UNIT II

12 Hrs

Processes: Threads - Virtualization - Clients - Servers - Code Migration: Approaches to Code Migration – Migration and Local Resources – Migration in Heterogeneous Systems .**Naming**: Names, Identifiers and Addresses – Structured Naming – Name Spaces - Name Resolution – The Implementation of a Name Space – Example : The Domain Name System.

UNIT III

12 Hrs

Synchronization: Clock Synchronization – Physical Clock – Global Positioning System - Clock Synchronization Algorithms - Logical Clocks – Mutual Exclusion – Global Positioning of nodes - Election Algorithms . **Consistency and Replication** : Introduction - Data-Centric Consistency Models - Client – Centric Consistency Models - Replica Management - Consistency Protocols.

UNIT IV

12 Hrs

Fault Tolerance: Introduction to Fault Tolerance – Process Resilience - Design Issues – Failure Masking and Replication – Reliable Client-Server Communication - Point-to-point Communication – RPC Semantics in the Presence of Failures – Reliable Group Communication - Basic Reliable – Multicasting Schemes – Atomic Multicast – Distributed Commit- Two-Phase Commit – Three -Phase Commit – Recovery.

UNIT V

12 Hrs

Distributed Object Based Systems: Architecture – Processes –Communication – Naming –Synchronization- Fault Tolerance. **Distributed File Systems:** Architecture – Processes –Communication – Naming –Synchronization- Consistency and Replication - Fault Tolerance – Security.

Text books:

1. Andrew S. Tanenbaum, Maarten van Steen, “ Distributed Systems – Principles and Paradigms “, PHI, 2004.

Reference books:

1. “Distributed Computing Principles, Algorithms, and Systems”, Ajay D. Kshemkalyani, Mukesh Singhal, Cambridge University Press.
2. George Coulouris, Jean Dollimore and Tim Kindberg, “Distributed Systems- Concepts and Design”, 3rd Edition, Pearson Education, 2002.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes								
	P01	P02	P03	P04	P05	P06	P07	P08	P09
C01	M		L	M		L		-	M
C02	M		L				L	-	
C03	L	M		L		L	M	-	
C04	L		M		M			M	L
C05	M	L				M		L	

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Skill Enhancement Course : 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.Gonzalez, 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
C01	M	M		M	L		H	H	M
C02	L		L			M	M		
C03	M	H		H	M	M	L		M
C04	M	L			L	M	M	M	M
C05	M			M		L	L	L	

H - High ; M- Medium ; L- Low

Subject Code	Discipline Specific Elective					Type
	Subject Title	Credit	Lecture	Tutorial	Practical	
	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 – Cost-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
C01	H	-	M	H	L	H	M	H	-
C02	L	-	H	-	-	H	L		L
C03	M	-	-	L	-	L	-		M
C04	-	M	L	-	M	L	-	M	-
C05	H	L	-	M	H	M	H	L	-

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	R Programming	4	6	0	0	Theory

Introduction: This course is used to provide an introduction to R, statistical language and environment that also provides more flexible graphics capabilities than other popular statistical packages. The course also covers the basics of R for statistical programming, computation, graphics and modeling

Course Outcome:

- C01 :To understand and explore the basics of R Programming language.
- C02 :Understand the basics of classes, lists and data frames
- C03 :To learn the integrated collection of tools for data analysis.
- C04 :Understand the working of various applications with functions
- C05 :To familiarize the graphical facilities for data analysis.

UNIT -I : [12 periods]

Introduction: Obtaining and Installing R from CRAN-Opening R for the First Time-Saving Work and Exiting R - R for Basic Math- Assigning Objects-Vectors. MATRICES AND ARRAYS: Defining a Matrix- Subsetting - Matrix Operations and Algebra-Multidimensional Arrays.

UNIT -II: [12 periods]

Non-Numeric Values: Logical Values-Characters- Factors. Lists And Data Frames: Lists Of Objects-Data Frames . Special Values, Classes, And Coercion: Some Special Values- Understanding Types, Classes, And Coercion.

UNIT-III: [12 periods]

Basic Plotting :Using Plot With Coordinate Vectors -Graphical Parameters-Adding Points, Lines, And Text To An Existing Plot - The Ggplot2 Package.Reading And Writing Files :Reading In External Data Files- Writing Out Data Files And Plots.

Unit-IV: [12 Periods]

Conditions And Loops: If Statements-Coding Loops -Other Control Flow Mechanisms. Writing Functions: The Function Command- Arguments- Specialized Functions.

Unit- V: [12 Periods]

Exceptions, Timings, And Visibility: Exception Handling-Progress And Timing - Masking. Basic Data Visualization: Barplots And Pie Charts- Histograms-Box-And-Whisker Plots - Scatterplots.

Text Book :

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

Reference Books:

1. Roger D Peng, "R Programming for Data Science", 2015.
2. Norman Matloff, "The Art of R Programming- A Tour of Statistical Software Design", 2011.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES:

Course Outcomes			Program Outcomes						
	P01	P02	P03	P04	P05	P06	P07	P08	P09
C01	H	-	L	L	-	M	-	H	
C02	M	-	L	L	-	-	L	H	H
C03	M	-	L	L	-	-	L	L	M
C04	M	-	L	L	-	-	-	L	
C05	-	-	L	L	-	L	-	M	L

H - High ; M- Medium ; L- Low

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 – Cryptocurrency – 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	P08
C01	H	-	L	L	-	M	-	H	
C02	M	-	L	L	-	-	L	H	H
C03	M	-	L	L	-	-	L		L
C04	M	-	L	L	-	-	-	L	
C05	-	-	L	L	-	L	-	M	M

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Software Quality Assurance	4	6	0	0	Theory

Introduction:

Software Quality Assurance (SQA) goal is to objectively evaluate software processes. This course introduces the concepts and methods required for effective and efficient SQA.

Course Outcome:

- C01** : Understand the basic concepts of software quality Assurance. The ability to understand the software requirements.
- C02** : Know the theoretical concept of software quality factors. The ability to know the software life cycle
- C03** : Understand the planning stages of software quality assurance. To know about the reviews of software quality assurance.
- C04** : Know the software development methodologies. The ability to know the verification and validation process.
- C05** : The ability to understand the testing concepts. To understand the quality and cost of the projects

Unit - I :

[12 periods]

The uniqueness of software quality assurance - The environments for which SQA methods are developed - What is software? - Software errors, faults and failures - Classification of the causes of software errors - Software quality – definition - Software quality assurance – definition and objectives - Software quality assurance and software engineering - The need for comprehensive software quality requirements .

Unit – II :

[12 periods]

Product operation software quality factors - Product revision software quality factors - Product transition software quality factors - Alternative models of software quality factors - Who is interested in the definition of quality requirements? - Software compliance with quality factors - The SQA system – an SQA architecture - Pre-project components - Software project life cycle components .

Unit – III:

[12 periods]

The CFV Project completion celebration - The contract review process and its stages - Contract review objectives - Implementation of a contract review - Contract review subjects - Contract reviews for internal projects - Development plan and quality plan objectives - Elements of the development plan - Elements of the quality plan - Development and quality plans for small projects and for internal projects.

Unit – IV:

[12 periods]

Classic and other software development methodologies - Factors affecting intensity of quality assurance activities in the development process - Verification, validation and qualification - A model for SQA defect removal effectiveness and cost - Review objectives - Formal design reviews (DRs) - Peer reviews - A comparison of the team review methods - Expert opinions.

Unit – V:

[12 periods]

Definition and objectives - Software testing strategies - White box testing - Black box testing - The unit test – Integration Test – Functional Testing – Performance Testing – Stress Testing – configuration Testing – security ,Recovery, Regression, Alpha, beta and Acceptance Testing programs.

Text Books :

1. Daniel Galin, “Software Quality Assurance”, Pearson Publication, 2009.
2. Claude y. laporte alain april, “Software Quality Assurance”, Wiley Publication, 2017.
3. Illene Burnstein, “ Practical Software Testing”, Springer International Edition, Chennai, 2003.

Reference Books:

1. Kshirasagar Naik and Priyadarshi Tripathy, “Software Testing and Quality Assurance”, Wiley Publication, 2008.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes								
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9
C01	H	-	L	L	-	M	H	-	H
C02	H	-	M	L	-	-		L	H
C03	M	L	L	L	-	-		M	L
C04	H	-	L	L	-	-	L	-	L
C05	-	L	L	L	-	L	M	-	M

H- High, M-Medium, L-Low

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

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:

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

Reference :

Robert Spalding, "Storage Networks: The Complete Reference", TataMcGraw Hill, Osborne, 2003.

Marc Farley, "Building Storage Networks", TataMcGraw Hill, Osborne. 2001.

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
C01	M	L	M	-	M	-	-	H	
C02	M	M	L	-	-	M	L		M
C03	L	L	L	-	-	L	M		H
C04	M	L	M	-	L	-	-	L	
C05	-	M	L	-	L	-	-	M	L

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Cloud Infrastructure and Service	4	6	0	0	Theory

Introduction :

The course presents a top down view of cloud computing, from applications and administration to programming, infrastructure, billing and security.

Course Outcome:

CO1	:	To explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing
CO2	:	To discuss system virtualization and outline its role in enabling the cloud computing system model.
CO3	:	To analyze various cloud programming models and apply them to solve problems on the cloud.
CO4	:	To understand various management and other distinguish services of AWS.
CO5	:	To deploy applications over commercial cloud computing infrastructures such as Amazon

UNIT - I : Cloud Computing Fundamentals [12 periods]

Cloud Computing definition, private, public and hybrid cloud. Cloud types; IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds, role of virtualization in enabling the cloud; Business Agility: Benefits and challenges to Cloud architecture. Application availability, performance, security and disaster recovery; next generation Cloud Applications.

UNIT - II : Virtualization and Cloud Platforms [12 periods]

Exploring virtualization, Load balancing, Hypervisors, Machine imaging, Cloud marketplace overview, Comparison of Cloud providers.

UNIT - III: Management of Cloud Services [12 periods]

Reliability, availability and security of services deployed from the cloud. Performance and scalability of services, tools and technologies used to manage cloud services deployment; Cloud Economics: Cloud Computing infrastructures available for implementing cloud based services.

UNIT - IV: Introduction to AWS [12 periods]

AWS history, AWS Infrastructure, AWS services, AWS ecosystem.

UNIT – V: Application Development

[12 periods]

Service creation environments to develop cloud based applications. Development environments for service development; Amazon, Azure, Google App.

Text Books:

1. Ray J. Rafaels , "Cloud Computing: From Beginning to End", April 2015.
2. Gautam Shroff, "Enterprise Cloud Computing Technology Architecture Applications", Cambridge University Press; 1 edition,[ISBN: 978-0521137355], 2010.

Reference Books :

1. Amazon Web Services For Dummies. Bernard Golden. For Dummies.
2. Rajkumar Buyya, Cloud Computing: Principles and Paradigms, John Wiley & Sons, First Edition
3. Amazon Security overview whitepaper-<https://aws.amazon.com/whitepapers>

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	P02	P03	P04	P05	P06	P07	P08
C01	H	-	L	M	-	M	-	H
C02	H	-	M	-	-	-	L	H
C03	M	-	L	L	H	-	M	-
C04	H	-	L	M	-	-	-	L
C05	-	M	L	L	-	L	-	M

H - High ; M- Medium ; L- Low

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.

Course Outcomes	Program Outcomes								
	P01	P02	P03	P04	P05	P06	P07	P08	P09
C01	H	-	M	H	L	H	M	H	-
C02	L	M	H	-	L	H	L	H	L
C03	M	-	-	L	L	L	-	L	M
C04	-	M	L	-	M	L	M	L	-
C05	-	L	-	M	H	M	H	M	M

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core - I - Data Science	4	6	0	0	Theory

Introduction: This subject to understand set spanning mathematics, statistics, machine learning, databases and other branches of computer science along with a good understanding of the craft of problem formulation to engineer effective solutions

Course Outcome:

- C01** : To understand about Data Science Process and how its components interact and Learn its application of Data Science
- C02** : To formulate about big data history and its innovation and Road map to Big Data
- C03** : To understand the Hadoop framework and its architecture and Learnt about installation of Hadoop ,Hive and Pig
- C04** : To have the ability to understand how big data analyzed into data science and explained about the way of its implementation.
- C05** : To particularly know about R Programming tool and its working principle. It provides an in-depth understanding of the R language, R-studio, and R packages and basic Pig Commands and functions.

UNIT I

Data Evolution: Data Development Time Line – ICT Advancement- A Perspective – Data Growth-A Perspective – IT Components-Business Process – Landscape-Data to Data Science – Data Science : Data Science-A Discipline- Data Analytics - Relation: Data Science, Analytics, Big Data Analytics - Data Science Components Data Engineering, Data Analytics-Methods and Algorithm, Data Visualization – Data Science Big technology – Data Science ontology – Data science user – Data science use cases.

UNIT II

Road map to Big Data- What Is Big Data - Characteristics of Big Data - Data in the Warehouse and Data in Hadoop- Wrapping It Up - Why Is Big Data Important - Big Data Use Cases: Patterns for Big Data Deployment: IT for IT Log Analytics - The Fraud Detection Pattern - They Said What? The Social Media Pattern - The Call Center Mantra: “This Call May Be Recorded for Quality Assurance Purposes” - Risk: Patterns for Modeling and Management - Big Data and the Energy Sector - Why IBM for Big Data? - A History of Big Data Innovation.

UNIT III

Hadoop: Basic Concepts-An Overview of Hadoop- Hadoop Architecture - The Hadoop Distributed File System – HDFS Architecture - Map Reduce Application – Hadoop Ecosystem – Limitations of Hadoop – Hadoop Yarn – Yarn infrastructure – Application startup in Yarn – Hadoop Ecosystem – Components of Hadoop Eco System – Hadoop Installation – PIG Installation – HIVE Installation.

UNIT IV

What is Big Data Analytics & Data Science –Big Data Analytics & Data Science Are they the same? - Introduction to Machine Learning - Big Data Technology Potentials – Limitations of Big Data and Challenges- Big Data Roles Data Scientist , Data Architect, Data Analyst – Skills – Case Study : Big Data – Customer Insights – Behavioral Analysis – Big Data Applications - Marketing – Retail – Insurance – Risk and Security – Health care.

UNIT V

R Programming : History and Overview of R - Getting Started with R - R Nuts and Bolts - Getting Data In and Out of R - Using the readr Package - Interfaces to the Outside World . Pig: Why Pig? – Pig user interactive modes – Pig Latin – Dataset – Pig Commands and functions – Relational Operators – Evaluation function – Batch Mode – Embedded Mode – PIG vs SQL .

Text Books

1. V. Bhuvaneswari, T. Devi, “Big Data Analytics: A Practitioner’s Approach” 2016.
2. Paul C. Zikopoulos ,Chris Eaton, Dirk de Roos, Thomas Deutsch ,George Lapis Understanding Big Data Analytics for Enterprise Class Hadoop and Streaming Data 2012.

Reference Books

1. Roger D. Peng, R Programming for Data Science 2013.
2. Zachary Radtka & Donald Miner” Hadoop with Python”, O’Reilly Media, First Edition

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes								
	P01	P02	P03	P04	P05	P06	P07	P08	P09
C01	H	H		M		H		H	M
C02	H		L		M				L
C03	M		L	H		L		L	H
C04		H			M				
C05	M			L			H	M	L

Ability Enhancement Course

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 Indecent 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
19BENAF C	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

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
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
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 of worries
- 4.2. Benefits of Blessings
- 4.3. Greatness of Friendship
- 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
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.
2. Introduction to Human Rights and Duties - Dr.T. S.N.Sastry, University of Pune, 2011
3. Human Rights Education for Bengineers - KWIRC , NHRC, 2005.
4. Layman's Guide to Law, Yetukuri Venkateswara Rao, Asia Law House, 2008.