DEPARTMENT OF COMPUTER SCIENCE

RATHINAM COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

Rathinam Techzone, Pollachi Road, Eachanari, Coimbatore – 641021

Syllabus for

B.Sc. Digital & Cyber Forensics

Curriculum

2020-2021 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, nuture 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 and Mission of the Department:

VISION

To be renowned it as a reputed organization in education and research aimed towards industrial and societal needs

MISSION

To provide quality education to meet the need of profession and society. Establish Industry Institute Interaction program to enhance the entrepreneurship skills.

Program Educational Objectives (PEO):

PEO1	:	To prepare the graduates as successful professionals ready for Industry, Government sectors, Academia, Research, Entrepreneurial Pursuit and Consultancy firms.
PEO2	:	Apply and continuously acquire knowledge, theoretical and applied, related to core areas of Information Technology.
PEO3	:	Demonstrate the ability to work effectively as a team member and/or leader in an ever-changing professional environment
PEO4	:	To prepare the graduates to adapt themselves for life-long learning through professional activities on latest technology and trends needed for a successful career

PEO5	:	To prepare graduates the ability to gain multidisciplinary knowledge through real-time projects and industry internship training and providing a sustainable competitive edge in R&D and meeting industry needs.

Program Outcomes (PO):

PO1	:	Acquire knowledge of Computing Fundamentals, Basic Mathematics, Computing Specialization, and Domain Knowledge of proper computing models from defined problems.
PO2	:	Apply Research based knowledge and methodologies to design, analyze and interpretation of data and find the solutions for complex problems by applying right tools
PO3	:	Capable of evaluating personal and professional choices in terms of codes of ethics and ethical theories and understanding the impact of their decisions on themselves, their professions, and on society.
PO4	:	Find out right opportunity for entrepreneurship and create and add value for the betterment of an individual and society at large
PO5	:	Function effectively as a team member or a leader to accomplish a common goal in a multidisciplinary team
PO6	:	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PO7	:	Engage in independent and life-long learning for continuous professional development.
PO8	:	Confidence for self and continuous learning to improve knowledge and competence as a computing professional
PO9	:	Identify, invent, research activities to provide solutions for complex computing problems using fundamental concepts of Mathematics, Computing Science and Relevant Domains

Correlation between the POs and the PEOs:

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

Components considered for Course Delivery is listed below:

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

Mapping of POs with Course Delivery:

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

RATHINAM COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

Scheme of curriculum for B.Sc. **Digital & Cyber Forensics**

for the Batch admitted during 2020 - 2021

S. No.	Sem	Part	Subject	Credit	Hrs	INT	EXT	Total
1	1	1	Language – I	4	4	40	60	100
2	1	2	English for Communication – I	4	4	40	60	100
3	1	3	Problem Solving Using in C	4	4	40	60	100
4	1	3	C Lab	4	4	40	60	100
5	1	3	DSC 1C -Data Structures and Algorithms	4	4	40	60	100
6	1	3	DSC Practical - 1C- Data Structures and Algorithms	2	4	20	30	50
7	1	3	DSA 1A -Mathematics for Computer science	4	4	40	60	100
8	1	4	Ability Enhancement Course I	2	2	50		50
9	1	6	Value Added Course - I%	2	-	50		50
Semester -II								
1	2	1	Language – II	4	4	40	60	100
2	2	2	English for Communication – II	4	4	40	60	100
3	2	3	Object Oriented Programming with C++	4	4	40	60	100
4	2	3	Object Oriented Programming with C++lab	4	4	20	30	50
5	2	3	DSC 2C -Computer Networks	4	4	40	60	100

6	2	3	DSC Practical - 2C Computer Networks Lab	2	4	20	30	50
7	2	3	DSA 2A -PC Hardware and Mobile Troubleshooting	4	4	40	60	100
8	2	4	Ability Enhancement Course II	2	2	50		50
9	2	6	Value Added Course-II %	2	-	50		50
Semester -III								
1	3	3	Java Programming	4	5	40	60	100
2	3	3	Java Programming Lab	2	4	20	30	50
3	3	3	DSC 3C-Computer Forensic Essentials	4	5	40	60	100
4	3	3	DSC Practical - 3C - Computer Forensic Essentials Lab	2	4	20	30	50
5	3	3	DSA 3A -Statistics and Probability	4	5	40	60	100
6	3	4	Skill Enhancement Courses – I Information and Cyber Security	2	5	20	30	50
7	3	4	Ability Enhancement Course III	2	2	50		50
8	3	6	Value Added Course - III %	2	-	50		50
9	3	6	Inter Department Learning – I#	2	-	50		50
Semester -IV								
1	4	3	Python Programming	4	5	40	60	100
2	4	3	Python Programming Lab	2	4	20	30	50
3	4	3	DSC 4C -Operating System Forensic Analysis	4	5	40	60	100
4	4	3	DSC Practical - 4C Operating System Forensic Analysis Lab	2	4	20	30	50
5	4	3	DSA 4A Entrepreneurial Development	4	5	40	60	100

6	4	4	Skill Enhancement Courses – II Information Security and Audit Monitoring	2	5	20	30	50
7	4	4	Ability Enhancement Course IV	2	2	50		50
8	4	6	Value Added Course - IV %	2	-	50		50
9	4	6	Inter Department Learning – II#	2	-	50		50
Semester -V								
1	5	3	Ethical Hacking -I	4	4	40	60	100
2	5	3	Ethical Hacking -I Lab	2	4	20	30	50
3	5	3	DSC 5C -Network Forensic Analysis	4	4	40	60	100
4	5	3	DSC Practical - 5C Network Forensic Analysis lab	2	4	20	30	50
5	5	3	Elective - I – DSE 1E Malware Analysis	4	5	40	60	100
6	5	3	Elective - II – DSE 2E - Cloud Infrastructure and Services	4	5	40	60	100
7	5	4	Skill Enhancement Courses – III Network Security and Cryptography	2	4	20	30	50
8	5	6	Value Added Course - V%	2	-	50		50
Semester VI								
1	6	3	Ethical Hacking -II	4	6	40	60	100
2	6	3	Ethical Hacking -II Lab	2	4	20	30	50
3	6	3	Elective – III – DSE 3E - Mobile Forensic Analysis	4	6	40	60	100
4	6	3	Elective – IV – DSE 4E - Virtualization and Cloud Security	4	6	40	60	100
5	6	3	Core Project	8	4	80	120	200
6	6	4	Skill Enhancement	2	4	20	30	50

			Courses – IV Cyber Crime and Digital Investigation					
7	6	5	Extension Activity- EX %	2	-	50		50
				26	**30**	**1900**	**1950**	**3850**
			Total credit	**154**				

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	-	Viscom	
7		Communicative English	-	English	
8		Quantitative Apotitude	-	Mathematics	

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

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

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

Course Outcome:

CO1 : 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.

CO2 : ngz; ftpQh;fspd; gilg;G ftpijia mwptjd; %yk; tho;tpay; nra;jpfisAk;> ajhh;j;j epiyAk; mwpa cjTfpwJ.

CO3 : 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.

CO4 : gilg;Gj;jpwid ntspg;gLk; tpjkhfTk;> ,yf;fzj;ij mwpa gaDs;sjhf mikfpwJ.

CO5 : ,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;> ahjh;j;j epiyiaAk; tpsf;Fjy;.

Unit III: [12 Periods]

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;rpf;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 works to Malayalam)

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

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

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

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 Urudu**	**3**	**6**	**1**	**0**	**Theory**

(PROSE, GRAMMER & TRANSLATION)

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

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

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

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:

CO1	:	To Gain an introductory knowledge of the some of the issues explored in influential works of the English-language tradition
CO2	:	Read complex texts actively: recognize key passages; raise questions; appreciate complexity and ambiguity; comprehend the literal use of language.
CO3	:	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.
CO4	:	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.
CO5	:	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.

SEMESTER – I

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core– I – Problem Solving Using C	4	7	0	0	Theory

Introduction :

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

Course Outcome:

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

Unit I **[12 periods]**

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

Unit II **[12 periods]**

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

Unit III : **[12 periods]**

Pointers and the Indirection Operator - functions with output parameters - Multiple calls to function with Input / Output parameters - Arrays - Declaring and Referencing Arrays - Array subscripts - Using array elements as function arguments- Array arguments -

Searching and sorting an Array - Multidimensional Arrays - Strings - String Basics - String Library functions - String Comparison - Arrays of pointers .

Unit IV: **[12 periods]**

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

Unit V: **[12 periods]**

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

Text books:

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

Reference Books :

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

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**
CO1	H	-	M	H	L	H	M	-
CO2	L	-	H	-	L	H	L	L
CO3	M	-	-	L	L	L	-	M
CO4	-	M	L	-	M	L	-	-
CO5	-	L	-	M	H	M	H	-

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Core– I – C Programming Lab	4	7	0	0	Theory

Course Outcome:

CO1	:	Understand basic Structure of C & declaration of variables, data types & Operators.
CO2	:	Exercise conditional and iterative statements to Write C program.
CO3	:	To demonstrate the concept of Pointers, Recursion using C.
CO4	:	To implement the concept of Structure & Union using C.
CO5	:	Can able to work out the file management and Error Handling.

Practical Exercises:

1. Write a program for find the max and min from the three numbers.
2. Write the program for the simple, compound interest.
3. Write program for students marks grading.
4. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
5.Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
6. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
7. Write a C program to find the roots of a Quadratic equation.
8. Write a C program that uses functions to perform the following:

i. a) Addition of Two Matrices b) Subtraction of Two Matrices.

9. Write a C program to determine if the given string is a palindrome or not using pointer.
10. Write a C program to count the lines, words and characters in a given text.
11. Write a C program which copies one file to another.
12. Write a C program to reverse the first n characters in a file. (Note: The file name and n are specified on the command line.)

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Value Added Course - I Office Automation	**2**	**0**	**0**	**2**	**Practical**

Introduction : To know the fundamentals of Microsoft Word, Ms Excel and Ms PowerPoint for their office automation.

Course Outcome:

CO1	:	Ability to understand basic level knowledge in Ms Word
CO2	:	To gain basic documentation works in Ms Work
CO3	:	Ability to working real time documentation process
CO4	:	Ability to identify and analyze worksheet in Ms Excel
CO5	:	Ability to understand diagnostic procedures and troubleshooting techniques to office automation

UNIT –I : **[6 periods]**

Ms word : Create a new document - Open, save and print a document - Edit and format text -Change the page layout, background and borders - Insert headers and footers - Insert and edit tables - Insert clip art and pictures to documents - Perform a mail merge - Share and review shared document files . Outline : Word Basics - Work with Text - Format Documents .

UNIT – II : **[6 periods]**

Ms Excel : Create, open and view a workbook - Save and print workbooks - Enter and edit data - Modify a worksheet and workbook - Work with cell references - Learn to use functions and formulas - Create and edit charts and graphics - Filter and sort table data.

UNIT- III : **[6 periods]**

Ms power point : Create a new presentation - Modify presentation themes - Add and edit text to slides - Add new slides to a presentation - Insert clipart images and shapes to slides - Insert and modify tables and charts - Add sound and video to a slide presentation - Insert and edit animations and slide transitions - Display a speaker-lead and self-running presentation –

Unit - IV : **[6 periods]**

Outline : PowerPoint Basics - Create Presentations - Insert and Modify Text - Work with Graphics and Media - Final Preparations -Deliver a Presentation.

Unit - V : **[6 periods]**

Creating tables in a desktop database : Exploring the access 2013 desktop database interface - designing tables in a desktop database - modifying your tables design.

Text Books:

1. Joyce Cox and Joan Prepernau, " Step by Step , Microsoft Office Work 2007", Microsoft Press, 2007.
2. Curtis D. Frye, "Step by Step , Microsoft Excel 2010", Microsoft Press, 2010.
3. Jeff Conrad, "Microsoft Access 2013 Inside Out", Microsoft Corporation by O'Reilly Media, Inc. 2013.

Reference Books:

1. Pradeep K Sinha and Priti Sinha , "Computer Fundamentals ", BPB Publications, 2004 .

Semester - I

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
DSC -	Data Structures & Algorithms	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:

CO1	:	Students will develop knowledge of basic data structures for storage and retrieval of ordered or unordered data.
CO2	:	Understand the concept of linked sets.
CO3	:	Appraise the applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure.
CO4	:	Student will be able to develop Knowledge of Tree.
CO5	:	Student will be able to comprehend the concept 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- Queue Array Representation.

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 - Insertion Sort - Selection Sort - Shell Sort - Merging - Merge-Sort - Quick Sort - Heap sort.

Unit IV: **[12 Periods]**

Trees

Introduction- Binary Trees - Representing Binary Trees in memory- Traversing Binary Trees - Traversal Algorithm using Stacks - Binary Search Trees - Searching - Inserting and deleting in Binary Search Trees

Unit V: **[12 Periods]**

Graphs Introduction – Definitions and terminology – graph representations – Depth first search – Breadth first search.

Text Books:

1. M. A. Weiss, "Data Structure and Algorithm Analysis in C", Pearson Education Asia,2002.

2. Gilberg, F Richard & Forouzan, A Behrouz, Data Structures: A Pseudocode approach with C, 2nd Edition, Cengage, 2008.

3. Horowitz Sahni Anderson-Freed, Fundamental of Data Structures in C, Universities Press, Reprint 2008.

Reference Books :

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

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

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	P01	PO2	P03	P04	P05	P06	P07	P08
CO1	H	-	L	L	-	M	-	H
CO2	M	-	L	L	-	-	L	H
CO3	M	-	L	L	-	-	L	L
CO4	M	-	L	L	-	-	-	L
CO5	-	-	L	L	-	L	-	M

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
DSC -	**Data Structures Lab**	**2**	**0**	**0**	**2**	**Practical**

Course Outcome:

Introduction: In this course, students to understand data structure's algorithm and implement the real time example programs by using the data Structure algorithams in C programs.

List of Programs:

1. Write a C program to implement a Stack Operations.
2. Write a C program to implement a Queue Operations.
3. Write a C program to implement a Merge Sort.
4. Write a C program to implement a Linked List.
5. Write a C program to reverse a string using Stack.

Allied

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Mathematics for Computer Science	4	6	0	0	Allied

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

Course Outcome:

CO1	:	To demonstrate a working knowledge of set notation and elementary set theory with its corresponding set operations and also Venn diagram.
CO2	:	To apply the fundamental concepts of Mathematical Logic and Tautologies.
CO3	:	To apply and understand the fundamental concepts of Relations and Functions.
CO4	:	To demonstrate different traversal methods for graphs.
CO5	:	To demonstrate different methods for trees and its properties.

Unit I: **[12periods]**

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

Unit II: **[12periods]**

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

Unit III: **[12periods]**

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

Unit IV: **[12periods]**

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

Unit V: **[12periods]**

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

Text Book:

1. Discrete Mathematics for Computer Science by Gary Haggard,JohnSchlipf and Sue Whitesides
2. Discrete Mathematics by J.K.Sharma second edition – 2005. Macmillan India Ltd.

,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 ghlj;jpl;lk; mw ,yf;fpak;> rpw;wpyf;fpak;> rpWfijfs;> ,yf;fzk;> ,yf;fpa tuyhW Mfpaitfs; nfhz;L cUthfpAs;sJ.

Course Outcome:

CO1 : ePjpnewp fUj;Jf;fis mwpe;J nfhs;Stjhy;> tho;f;ifapy; gz;Gfis gpd;gw;wTk;> mwnwpNthL thoTk; gaDs;sjhf mikAk;.

CO2 : rpw;wpyf;fpaj;jpd; nra;jpfs; khzth;fs; njspthf mwpe;Jnfhs;StJ md;gpd; Nkd;ik> gz;G Mfpaitfs; mwpe;J nfhs;s KbfpwJ.

CO3 : mzp ,yf;fzk; mwptjhy; ,yf;fzj;jpd; rpwg;G Kf;fpak; vd;gij mwpayhk;.

CO4 : rpWfijfspy; cs;s fijfspy; cs;s ikaf;fUj;Jfisj; njhpe;J nfhs;StJ rKjhar; rpe;jisiaAk;> tpopg;Gzh;Tk; cUthf;f cjTfpwJ.

CO5 : ePjp rpw;wpyf;fpaq;fs; Mfpatw;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 ghlkhf 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 Periods]

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:

ghlEhy;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 mjpfhuq;fs;
    1. md;Gilik 10 Fws;fs; mjpfhuk; -8
    2. mwpTilik 10 Fws;fs; mjpfhuk; -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;.

ghlEhy;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

Uinit 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 Urudu**	**3**	**6**	**1**	**0**	**Theory**

(POETRY, GHAZALITH & LETTER WRITING)
Urudu Language

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

Annexure : **13F** Page 2 of 4 SCAA DT. : 6-2-2014

[a] MANZOOMATH

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

(Selected four stanzas from each of the above)

3. JAWAB-E-SHIKWA – ALLAMA IQBAL

(Selected four stanzas from each of the above)

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

[b] GHAZALITH:

1. MEER TAQI MEER
2. KHAJA MEER DARD
3. SHAIK IBRAHIM ZAUQ
4. MIRZA GHALIB

5. MOMIN KHAN MOMIN
6. JIGAR MURADABADE
7. HASRATH MOHANI
8. FANI BADAYUNI
9. DANISH FARAZI
10. SHAKIR NAITHI

[c] LETTER WRITING:

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

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	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:

2. 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	PO2	P03	P04	P05	P06	P07	P08	P09
CO1	M			L	M				M
CO2	M	L				M		M	
CO3	M		L			M	L		
CO4	M			L		M			M
CO5			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
	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 APPLICATIION 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”, Edition7, Publication Date: April 5, 2011.
3. William Stallings, “Data and Computer Communications”, Edition 9, 2010.
4. B. Forouzan, 1668, Introduction to Data Communications in Networking, Tata McGraw Hill, New Delhi.
5. F. Halsall, 1665, Data Communications, Computer Networks and Open Systems, Addison Wessley.
6. Bertsekas and R. Gallagher, 1662, Data Networks, Prentice hall of India, New Delhi.

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	PO2	P03	P04	P05	P06	P07	P08
CO1	H	L	M	L	M	-	M	-
CO2	H	L	-	M	-	L	M	-
CO3	M	L	H	H	L	L	H	-
CO4	L	L	L	M	H	L	M	-
CO5	L	L	L	M	H	L	M	-

H - High ; M- Medium ; L- Low

Subject	Subject Title	Credit	Lecture	Tutorial	Practical	Type

Code						
	Computer Networks Lab	**4**	**4**	**0**	**0**	**Practical**

1. Simple Message Passing Program.
2. Implementation Of Client-Server Communication Using TCP.
3. Implementation Of CRC.
4. Downloading File From Http Server.
5. Implementation Of Simple FTP client.
6. Reading IP and port ID from command line and sending message to server.
7. Demonstration to generate SIGPIPE Error with Socket.

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.

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, Commenwealth 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	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**
CO1	H	L	-	H	-	M	M	L
CO2	M	L	-	L	-	-	-	L
CO3	H	-	-	M	-	L	-	H
CO4	M	L	-	L	H	H	H	L
CO5	H	L	-	L	-	-	M	-

H - High ; M- Medium ; L- Low

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, Identifies 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, tryblocks, 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 Bhave and Sunil Patekar, "Programming with Java", First Edition, Pearson Education,2008, ISBN:9788131720806.
2. Rajkumar Buyya,S Thamarasi selvi, 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	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**
CO1	M	-	L	L	-	H	-	M
CO2	H	M	L	-	-	L	-	H
CO3	M	-	L	-	-	M	-	L
CO4	H	-	-	L	L	-	-	L
CO5	-	-	L	M	-	L	-	L

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 StringBufferclasss 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	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**
CO1	m	-	L	L	-	M	-	M
CO2	H	-	L	L	-	-	L	M
CO3	L	-	M	M	-	-	M	L
CO4	M	-	M	M	-	-	-	
CO5	-	-	L	L	-	L	-	M

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Computer Forensic Essentials	**4**	**4**	**0**		**Core**

Course Outcome:

CO1	:	To help students understand how computer forensics is used as a powerful technique in digital investigation
CO2	:	To make it possible for students to learn the process, various steps, tools and techniques involved in computer forensics
CO3	:	comprehend steps involved in recovering data stored in various devices and various techniques used in windows, linux, network and web application forensics
CO4	:	justify the need for meticulous documentation in computer forensics
CO5	:	Articulate the rationale for having an adequate legal framework when dealing with computer forensics

Unit -I

Computer Forensics

Introduction to Computer Forensics, Forms of Cyber Crime, First Responder Procedure- Non-technical staff, Technical Staff, Forensics Expert and Computer Investigation procedure, Case Studies.

Unit -II

Storage Devices & Data Recover Methods

Storage Devices- Magnetic Medium, Non-magnetic medium and Optical Medium, Working of Storage devices-Platter, Head assembly, spindle motor, Data Acquisition, Data deletion and data recovery method and techniques, volatile data analysis, Case Studies.

Unit -III

Forensics Techniques

Windows forensic, Linux Forensics, Network forensics – sources of network-based evidence, other basic technical fundamentals, Mobile Forensics – data extraction & analysis, Steganography, Password cracking-Brute force, Cross-drive analysis, Live analysis, deleted files,

stochastic forensics, Dictionary attack, Rainbow attack, Email Tacking – Header option of SMTP, POP3, IMAP, examining browsers, Case Studies.

Unit -IV

Cyber Law

Corporate espionage, digital evidences handling procedure, Chain of custody, Main features of Indian IT Act 2008 (Amendment), Case Studies, Incident specific procedures – virus and worm incidents, Hacker incidents, Social incidents, physical incident, Guidelines for writing forensic report.

Unit -V

Forensic Analysis of Web Application

Forensic analysis of web server, network analysis of web server compromise, web server log analysis, web application forensic, forensic analysis of web application security, intruder profiling, forensic for code injection attack, Case Studies.

Text Books:

1. Computer Forensics: Computer Crime Scene Investigation by John Vacca, Laxmi Publications, 1st; 2015
2. Digital Forensic: The Fascinating World of Digital Evidences by Nilakshi Jain, et.al, Wiley, 1st ed; 2016
3. The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics by John Sammons, Syngress, 2nd ed; 2014.

Reference Books:

1. "Cyber Forensics in India: A Legal Perspective by Nishesh Sharma, Universal Law Publishing - an imprint of LexisNexis; First 2017 edition
2. Network Forensics: Tracking Hackers Through by Davidoff, Pearson India, 1st ed; 2013.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Computer Forensics Essential Lab	**4**	**4**	**0**		**Practical**

List of Experiments:

Hardware:

- I3/ I5 processor; 8GB RAM; 250GB HDD

Software:

- VM Player; Windows server; Linux server; Sys Internals; Helix ISO; Disk Internals; FTK; OpenStego; Xplico; BulkExtractor

Experiments:

1. System Forensics – System is switched on and off and imaging – To take an exact copy of evidence disk
2. Web browser and Internet forensics
3. Image steganography & Steganalysis and recovering deleted files
4. E- Mail investigation & analysis

SubjectCode	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Skill Enhancement Courses – II Information and Cyber Security	**2**	**4**	**0**	**0**	**Theory**

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

Course Outcome:

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

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

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

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

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

Unit -I :Information Security Overview [12 periods]

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

Unit –II : Risk Analysis [12 periods]

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

Unit– III: [12 periods]

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

Unit– IV [12 periods]

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

Unit– V: [12 periods]

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

Text Books:

1.“Information Security - The Complete Reference”, by Mark Rhodes-Ousley, 2ndEdition.

2.“Cyber Security Essentials”, by James Graham, Richard Howard & Ryan Olson , Published by CRCPress.

Reference Books:

1.John R. Vacca, “Computer and Information Security Handbook”, Elsevier, ThirdEdition

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

SEMESTER – IV

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

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

Course Outcome:

CO1	:	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions
CO2	:	Demonstrate proficiency in handling Strings and File Systems
CO3	:	Understand Lists, Dictionaries and Regular expressions in Python
CO4	:	Interpret the concepts of Object-Oriented Programming as used in Python
CO5	:	Implement exemplary applications related to Network Programming, Web Services and Databases in Python

Unit I: **[12 periods]**

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

Unit II : **[12 periods]**

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

Unit III: **[12 periods]**

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

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

Unit IV: **[12 periods]**

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

Unit V: **[12 periods]**

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

Reference Books:

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

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

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

Course Outcome:

CO1	:	Write, test, and debug simple Python programs.
CO2	:	Implement Python programs with conditionals and loops for stack, sorting algorithms.
CO3	:	Read and write data from/to files in Python.
CO4	:	Use Python lists, dictionaries for representing compound data.
CO5	:	Write Script to SQL and Demonstrate Exception in Python.

Lab Experiments:

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

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Operating System Forensic Analysis	**4**	**6**	**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. Operating systems perform basic tasks, such as recognizing input from the keyboard, sending output to the display screen, keeping track of files and directories on the disk, and controlling peripheral devices such as disk drives and printers.

CO1	:	After learning the fundamental concepts in Operating system including how OS has evolved over the years and different components of OS, students will continue to more significant.
CO2	:	This will provide the necessary information for students to extract maximum benefits out of the OS while developing programs, working with applications and etc.
CO3	:	These chapters cover methods for process scheduling, interprocess communication, process synchronization, and deadlock handling. Also included is a discussion of threads, as well as an examination of issues related to multicore systems and parallel programming.
CO4	:	These chapter covers the how storage is maintain in the computer
CO5	:	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

UNIX Process Management

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

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

Process Synchronization: Mutual Exclusion, Critical – section problem, Synchronization hardware, Semaphores, Classic problems of synchronization, Critical Regions, Monitors, OS Synchronization, Atomic Transactions. Deadlocks: System Model, Deadlock characterization,

Methods for handling Deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Unit -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. File-System Implementation: File-System structure. Directory Implementation, Allocation Methods, Free-space Management, Efficiency and Performance, Recovery. Disk Management: Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, Disk Attachment, stable-storage Implementation

The UNIX File System
Inodes - Structure of a regular file – Directories - Conversion of a path name to an inode - Super block - Inode assignment to a new file - Allocation of disk blocks. System calls for the file System: Open – Read - Write - Lseek – Close - File creation - Creation of special files - Changing directory and root - changing owner and mode – stat and fstat - pipes - Dup - Mounting and Un mounting file systems - Link and Un link.

Unit -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,

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

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 System by Abraham Silberschatz and peter Baer Galvin, 8th Edition, Pearson Education 1989 (Chapter 1,3.1,3.2,3.3,3.4,3.6,4,5,6 (Except 6.8,6.9), 7, 8,9,10,11,13, (Except 13.6) 19 (Except 19.6),20(Except 20.8, 20.9), 22,23).
6. Operating Systems by Nutt, 3/e Pearson Education 2004

Course Outcomes	Program Outcomes							
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**
CO1	H	-	-	H	L	H	M	-
CO2	L	-	M	-	L	H	-	L
CO3	M	-	-	L	L	L	-	M
CO4	-	M	L	-	M	L	M	-
CO5	-	L	-	M	H	M	H	-

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type

Operating System Forensic Analysis Lab	**4**	**6**	**0**	**0**	**Practical**

Course Outcome:

CO1	:	Understand basic Structure of the Operating System
CO2	:	Understand programs using implementation of system calls
CO3	:	To exercise and see the file operation
CO4	:	Understand the programs using problem concept
CO5	:	Understand by using the methods In Operating System

1. C Program for Implementation Of System Calls.
2. C Program for File Permissions.
3. C Program for File Operations.
4. C Program for File Copy and Move.
5. C Program for Dining Philosophers Problem.
6. C Program for Producer – Consumer Problem concept.
7. C Program for First In First Serve Algorithm.
8. C Program for Shortest Job First Scheduling Algorithm.
9. C Program for Round Robin Scheduling Method.
10. C Program for Priority Scheduling Algorithm.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES:

Course Outcomes	Program Outcomes							
	P01	PO2	P03	P04	P05	P06	P07	P08
CO1	H	-	L	L	-	M	-	H
CO2	M	-	L	L	-	-	L	H
CO3	M	-	L	L	-	-	L	L
CO4	M	-	L	L	-	-	-	L
CO5	-	-	L	L	-	L	-	M

H - High ; M- Medium ; L- Low

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 [12 Periods]

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

Textbook:

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

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes							
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**
CO1	L		H	L	H	L		L
CO2	H	H	L	L		H	L	L
CO3	H	L			L	L	L	
CO4	H	H	L	H	L		H	
CO5	L	H			L	L	L	H

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Information Security and Audit Monitoring	4	**4**	**0**	**0**	**Theory**

Introduction:

It includes people, processes and IT systems by applying a risk management process. It can help small, medium and large businesses in any sector keep information assets secure. The ISO 27000 family of standards helps organizations keep information assets secure. Using this family of standards will help your organization manage the security of assets such as financial information, intellectual property, employee details or information entrusted to you by third parties

Course Outcome :

CO1	:	Understand the difference between Security Metrics and Audits.
CO2	:	Knowledge on Vulnerability Management
CO3	:	Know the Information Security Audit Tasks, Reports and Post Auditing Actions
CO4	:	Understand Information Security Assessments
CO5	:	able a clear understanding and knowledge of Security Analyst foundations, and introduce the tool, technologies and programming languages which is used in day to day security analyst job role.E

Unit -I

Information Security Performance Metrics and Audit: Security Metrics and Reporting, Common Issues and Variances of Performance Metrics, Introduction to Security Audit, Servers and Storage devices, Infrastructure and Networks, Communication Routes, Information Security Methodologies (Black-box, White-box, Greybox), Phases of Information Security Audit and Strategies, Ethics of an Information Security Auditor etc.

Unit -II

Information Security Audit Tasks, Reports and Post Auditing Actions: Pre-audit checklist, Information Gathering, Vulnerability Analysis, External Security Audit, Internal Network Security Audit, Firewall Security Audit, IDS Security Auditing, Social Engineering Security Auditing, Web Application Security

Auditing, Information Security Audit Deliverables & Writing Report, Result Analysis, Post Auditing Actions, Report Retention etc.

Unit -III

Vulnerability Management: Information Security Vulnerabilities – Threats and Vulnerabilities, Human-based Social Engineering, Computer-based Social Engineering, Social Media Countermeasures, Vulnerability Management – Vulnerability Scanning, Testing, Threat management, Remediation etc.

Unit -IV

Information Security Assessments: Vulnerability Assessment, Classification, Types of Vulnerability Assessment, Vulnerability Assessment Phases, Vulnerability Analysis Stages, Characteristics of a Good Vulnerability Assessment Solutions &Considerations, Vulnerability Assessment Reports – Tools and choosing a right Tool, Information Security Risk Assessment, Risk Treatment, Residual Risk, Risk Acceptance, Risk Management Feedback Loops etc.

Unit -V

Configuration Reviews: Introduction to Configuration Management, Configuration Management Requirements-PlanControl, Development of configuration Control Policies, Testing Configuration Management etc

Text Book:

1. Assessing Information Security (strategies, tactics, logic and framework) by A Vladimirov, K.Gavrilenko, and A.Michajlowski

2. “The Art of Computer Virus Research and Defense by Peter Szor.”

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Ethical Hacking -I	**4**	**6**	**0**	**0**	**Theory**

Introduction:

To help students understand how ethical hacking is used as a method to prevent hacking. To make it possible for students to learn the process of identifying vulnerabilities and exploits of the technological ecosystem comprising of various hardware, software, network, OS and applications and identify suitable countermeasures. To facilitate students, appreciate the need for understanding non-technology aspects of ethical hacking such as legal frameworks, documentation and report writing.

Course Outcome:

CO1	:	Explain the importance of numerous methods of real-world informationintelligence.
CO2	:	Differentiate the processes of vulnerability assessment and ethical hacking from penetration testing.
CO3	:	Comprehend the importance of appropriate countermeasures for managing vulnerabilities.
CO4	:	To familiarize with the methodologies that can be used to hack into atarget.
CO5	:	To appreciate the wide variety of attacks that can be performed against a wireless network.

UNIT -I **[12 periods]**

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

UNIT–II: **[12 periods]**

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

UNIT–III: **[12 periods]**

Vulnerability Assessment & Network Sniffing: Introduction to Vulnerability Assessment - Pros and

Cons, NMap, Updation of database, Testing SCADA Environments with Nmap, Nessus, Sniffing: Types, Hubs versus Switches, Modes, MITM Attacks, ARP Protocol Basics- working, Attacks, DoS Attacks, Dsniff tool, Using ARP Spoof to Perform MITM Attacks, Sniffing the Traffic with Dsniff, Sniffing Pictures with Drifnet, Urlsnarf and Webspy, Sniffing with Wireshark, Ettercap- ARP Poisoning, Hijacking Session with MITM Attack, ARP Poisoning with Cain and Abel, Sniffing Session Cookies with Wireshark, Hijacking the Session, SSL Strip: Stripping HTTPS Traffic, Requirements, Automating Man in the Middle Attacks, DNS Spoofing, DHCP Spoofing.

UNIT–IV: [12 periods]

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

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. PatrickEngebretson,–TheBasicsof Hacking andPenetration Testing : Ethical Hacking and Penetration Testing Made Easy, Syngress Media, Second Revised Edition, 2013.

2. MichaelT.Simpson,KentBackman,JamesE.Corley,–Hands OnEthicalHacking and Network Defense, Cengage Learning, 2012.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES:

Course Outcomes	Program Outcomes							
	P01	**PO2**	**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	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Ethical Hacking I Lab	**4**	**6**	**0**	**0**	**Practical**

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:

Hardware:

- I3/ I5 processor; 8GB RAM; 250GB HDD

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

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes		Program Outcomes						
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**
CO1	H	-	M	H	L	H	M	-
CO2	L	-	H	-	L	H	L	L
CO3	M	-	-	L	L	L	-	M
CO4	-	M	L	-	M	L	-	-
CO5	-	L	-	M	H	M	H	-

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Network Forensic Analysis	**4**	**4**	**0**	**0**	**Theory**

Course Outcome

CO1	Students with a specialist understanding of the nature of malware, its capabilities, and how it is combated through detection and classification	
CO2	Students will be able to apply the tools and methodologies used to perform static and dynamic analysis on unknown executables.	
CO3	Students will have an intimate understanding of executable formats, Windows internals and API, and analysis techniques.	
CO4	Students will able to apply techniques and concepts to unpack, extract, decrypt, or bypass new antianalysis techniques in future malware samples	
CO5	students would have a broad understanding of the social, economic, and historical context in which malware occurs	

Unit -I

Computer Networking- Digital and Analog Signaling Methods, Network Types and Topologies, Overview of OSI Model and TCP/IP Protocol. Different types of IP Addresses and Classes, Subnet Masks, Subnetting and Supernetting. Network Hardware Devices and Client/Server Computing. Types of Networks – LAN, MAN and WAN. Routers and Routing Protocols.

Unit -II

Network threats and vulnerabilities, Types of network attacks eaves dropping, spoofing, modification, Cross-site scripting, DNS Spoofing, Routing Table Poisoning, ARP Poisoning, Web Jacking. Attacks on Wireless Networks. Social Engineering Attacks and its types. Packet Sniffing, Types of authentication, Attacks on WEP, WPA and WPA-2 Encryption, fake hotspots

Unit -III

IP security architecture, Security protocols, IPSec, Web Security – Firewalls, IDS, IDPS. Network Security Applications, Authentication Mechanisms: Passwords, Cryptographic authentication protocol, Kerberos, X.509 LDAP Directory. Digital Signatures. Web Security: Secure Socket Layer (SSL) Encryption, Transport Layer Security (TLS), Secure Electronic Transaction (SET) and Virtual Private Networks (VPN).

Unit -IV

Monitoring of computer network and activities, Live Packet Capturing and Analysis. Searching and collection of evidences from the network. Network Intrusion Detection and Analysis. SQL Injection, Event Log analysis- tools and techniques. Investigating network attacks. Evidence collection from Routers other networking devices.

Unit -V

Cloud Technology and its various components - private, public and hybrid cloud. Cloud types; IaaS, PaaS, SaaS. Role of virtualization in enabling the cloud. Technologies and the processes required when deploying web services. Cloud Security Architecture, Secure Cloud Page 35 of 57 based service, Identity and Access Management, Encryption and Key Management. Cloud Forensic – collection and analysis of evidence

Reference Books

1. Joakim Kävrestad. Guide to Digital Forensics: A Concise and Practical Introduction, Springer 2017 5.

2.John D.W. and Nicholas M.O. (2002), Biometrics: Identity Assurance in the Information age, McGraw Hill.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Network Analysis Lab	**4**	**6**	**0**	**0**	**Practical**

1. Configure the networking services with external and internal network using neutron
2. Creating the security groups and generate the key pair (RSA) for the instance of a project
3. Launching the instance in internal network and logging in using key pair
4. Configuring FWAAS in internal network of the private cloud
5. Installing openstack - mitaka in Enterprise linux (RHEL 7 based – Centos 7) and verifying the answer file

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Malware Analysis	**4**	**6**	**0**	**0**	**Elective**

Course Outcomes:

CO1	Students with a specialist understanding of the nature of malware, its capabilities, and how it is combated through detection and classification
CO2	Students will be able to apply the tools and methodologies used to perform static and dynamic analysis on unknown executables.
CO3	Students will have an intimate understanding of executable formats, Windows internals and API, and analysis techniques.
CO4	Students will able to apply techniques and concepts to unpack, extract, decrypt, or bypass new antianalysis techniques in future malware samples
CO5	students would have a broad understanding of the social, economic, and historical context in which malware occurs

Unit -I

INTRODUCTION: Introduction to malware, OS security concepts, malware threats, evolution of malware, malware typesviruses, worms, rootkits, Trojans, bots, spyware, adware, logic bombs, malware analysis, static malware analysis, dynamic malware analysis.

Unit- II

DYNAMIC ANALYSIS: Live malware analysis, dead malware analysis, analyzing traces of malware- system-calls, api-calls, registries, network activities. Anti-dynamic analysis techniquesanti-vm, runtime-evasion techniques, , Malware Sandbox, Monitoring with Process Monitor, Packet Sniffing with Wireshark, Kernel vs. User-Mode Debugging, OllyDbg, Breakpoints, Tracing, Exception Handling, Patchi

Unit -III

Malware Functionality: Downloader, Backdoors, Credential 6 10% Stealers, Persistence Mechanisms, Privilege Escalation, Covert malware launching- Launchers, Process Injection, Process Replacement, Hook Injection, Detours, APC injection

Unit -IV

Malware Detection Techniques: Signature-based techniques: malware signatures, packed malware signature, metamorphic and polymorphic malware signature Non-signature based techniques: similarity-based techniques, machine-learning methods, invariant inferences.

Unit -V

Android Malware: Malware Characterization, Case Studies – Plankton, DroidKungFu, AnserverBot, Smartphone (Apps) Security

Reference Books:

1. Practical malware analysis The Hands-On Guide to Dissecting Malicious Software by Michael Sikorski and Andrew Honig ISBN-10: 159327-290-1, ISBN-13: 978-1-59327-290-6, 2012 2

2. Computer viruses: from theory to applications by Filiol, Eric Springer Science & Business Media, 2006

3. Android Malware by Xuxian Jiang and Yajin Zhou, Springer ISBN 978-1-4614-7393-0, 2005

4. Hacking exposed™ malware & rootkits: malware & rootkits security secrets & Solutions by Michael Davis, Sean Bodmer, Aaron Lemasters, McGraw-Hill, ISBN: 978-0-07-159119-5, 2010

5. Windows Malware Analysis Essentials by Victor Marak, Packt Publishing, 2015

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

H - High ; M- Medium ; L- Low

Subject	Subject Title	Credit	Lecture	Tutorial	Practical	Type

Code

Network Security and Cryptography **5** **6** **0** **Skill**

Introduction : The course emphasizes to give a basic understanding of previous attacks on cryptosystems with the aim of preventing future attacks.

Course Outcome:

CO1	:	Explain the concepts of Cyber security
CO2	:	Illustrate key management issues and solutions
CO3	:	Familiarize with Cryptography and very essential algorithms & Design and develop simple cryptography algorithms
CO4	:	Understand about IEE security related applications in networking.
CO5	:	Introduce cyber Law and ethics to be followed. Understand cyber security and need cyber Law

Unit I: **[12 periods]**

Introduction - Cyber Attacks, Defence Strategies and Techniques, Guiding Principles, Mathematical Background for Cryptography - Modulo Arithmetic's, The Greatest Comma Divisor, Useful Algebraic Structures, Chinese Remainder Theorem, Basics of Cryptography - Preliminaries, Elementary Substitution Ciphers, Elementary Transport Ciphers, Other Cipher Properties, Secret Key Cryptography – Product Ciphers, DES Construction.

Unit II : **[12 periods]**

Public Key Cryptography and RSA – RSA Operations, Why Does RSA Work?, Performance, Applications, Practical Issues, Public Key Cryptography Standard (PKCS), Cryptographic Hash - Introduction, Properties, Construction, Applications and Performance, The Birthday Attack, Discrete Logarithm and its Applications - Introduction, Diffie-Hellman Key Exchange, Other Applications..

Unit III : **[12 periods]**

Key Management - Introduction, Digital Certificates, Public Key Infrastructure, Identity–based Encryption, Authentication–I - One way Authentication, Mutual Authentication, Dictionary Attacks, Authentication – II – Centalised Authentication, The Needham-Schroeder Protocol, Kerberos, Biometrics, IPSec- Security at the Network Layer – Security at Different layers: Pros and Cons, IPSec in Action, Internet Key Exchange (IKE) Protocol, Security Policy and IPSEC, Virtual Private Networks, Security at the Transport Layer - Introduction, SSL Handshake Protocol, SSL Record Layer Protocol, OpenSSL.

Unit IV: **[12 periods]**

IEEE 802.11 Wireless LAN Security - Background, Authentication, Confidentiality and Integrity, Viruses, Worms, and Other Malware, Firewalls – Basics, Practical Issues, Intrusion

Prevention and Detection - Introduction, Prevention Versus Detection, Types of Instruction Detection Systems, DDoS Attacks Prevention/Detection, Web Service Security – Motivation, Technologies for Web Services, WS- Security, SAML, Other Standards.

Unit V: **[12 periods]**

Network and Internet Security - Transport Level Security - Web Security Issues - Secure Socket Layer (SSL) - Transport Layer Security (TLS) - HTTPS - Secure Shell (SSH) - Wireless Network Security - Electronic Mail Security - IP Security

Textbook:

Cryptography, Network Security and Cyber Laws – Bernard Menezes, Cengage Learning, 2010 edition (Chapters-1,3,4,5,6,7,8,9,10,11,12,13,14,15,19(19.1-19.5),21(21.1-21.2),22(22.1-2.4),25

Reference :

Cryptography and Network Security- Behrouz A Forouzan, Debdeep Mukhopadhyay, Mc-GrawHill, 3rd Edition, 2015

Cryptography and Network Security- William Stallings, Pearson Education, 7th Edition

Cyber Law simplified- Vivek Sood, Mc-GrawHill, 11th reprint , 2013

Cyber security and Cyber Laws, Alfred Basta, Nadine Basta, Mary brown, ravindra kumar, Cengage learning

Mapping of Course Outcomes with Program Outcomes:

urse Outcomes	ogram Outcomes							
	P01	**PO2**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**
CO1	M	L	M	L	M	L	L	L
CO2	M	M	M	M	L	L	L	L
CO3	M	L		M	L	M	L	M
CO4	M	M	M	M	M	M	L	L
CO5	M	M		L				L

H - High ; M- Medium ; L- Low

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Ethical Hacking -II	**4**	**6**	**0**	**0**	**Theory**

CO1	:	Explain 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

Unit -I

Introduction to Ethical Hacking:
Hacking Methodology, Process of Malicious Hacking, and Foot printing and scanning: Foot printing, scanning. Enumeration: Enumeration. System Hacking and Trojans: System Hacking, Trojans and Black Box Vs. White Box Technique.

Unit -II **12 Hrs.**

Hacking Methodology:
Denial of Service, Sniffers, Session Hijacking and Hacking Web Servers: Session Hijacking, Hacking Web Servers. Web Application Vulnerabilities and Web Techniques Based Password Cracking: Web Application Vulnerabilities, Web Based Password Cracking Techniques.

Unit -III

Web and Network Hacking
SQL Injection, Hacking Wireless Networking, Viruses, Worms and Physical Security: Viruses and Worms, Physical Security. Linux Hacking: Linux Hacking. Evading IDS and Firewalls: Evading IDS and Firewalls

Unit- IV

Report writing & Mitigation

Introduction to Report Writing & Mitigation, requirements for low level reporting & high level reporting of Penetration testing results, Demonstration of vulnerabilities and Mitigation of issues identified including tracking**.**

Unit -V

Ethical Hacking and Legal System

Overview of India's Information Technology Amendment Act 2008 (IT Act 2008), hacker vs cracker, liabilities – civil and penal, cyber theft and IPC sec 378, IT Act 2008 – sections 43, 65 and 66, how to file a complaint of suspected hacking, Case Studies, understanding how hacking is legally dealt with among BRICS countries

Text Books:

1. Gray Hat Hacking The Ethical Hackers Handbook, 3rd Edition Paperback – 1 Jul 2017 by Allen Harper, Shon Harris, Jonathan Ness, Chris Eagle, McGraw Hill Education; 3 ed (1 July 2017)
2. CEH v9: Certified Ethical Hacker Version 9 Study Guide by Sean-Philip Oriyano, Sybex; Stg edition (17 June 2016)
3. Hacking for Beginners: Ultimate 7 Hour Hacking Course for Beginners. Learn Wireless Hacking, Basic Security, Penetration Testing by Anthony Reynolds, CreateSpace Independent Publishing Platform (10 April 2017)
4. An Ethical Guide To WI-FI Hacking and Security by Swaroop Yermalkar, BecomeShakespeare.com; First edition (15 August 2014)
5. Hands-On Ethical Hacking and Network Defense by Michael T. Simpson | Kent Backman | James Corley, Cengage India 1st edition (2016).

Reference Books:

1. The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy by Patrick Engebretson, Syngress; 2 edition (12 September 2013)
2. Hacking With Python: The Complete Guide to Ethical Hacking, Basic Security, Botnet Attack, Python hacking and Penetration Testing Kindle Edition by John C. Smalls.

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Ethical Hacking -II Lab	**4**	**6**	**0**	**0**	**Practical**

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

Perform denial service attack on a server operating system and write a report on the same with mitigation strategy

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Mobile Forensic Analysis	**4**	**6**	**0**	**0**	**Theory**

UNIT- I

Overview of wireless technologies and security: Personal Area Networks, Wireless Local Area Networks, Metropolitan Area Networks, Wide Area Networks. Wireless threats, vulnerabilities and security: Wireless LANs, War Driving, War Chalking, War Flying, Common Wi-fi security recommendations, PDA Security, Cell Phones and Security, Wireless DoS attacks, GPS Jamming, Identity theft.

Unit -II

CIA triad in mobile phones-Voice, SMS and Identification data interception in GSM: Introduction, practical setup and tools, implementation- Software and Hardware Mobile phone tricks: Netmonitor, GSM network service codes, mobile phone codes, catalog tricks and AT command set- SMS security issues

Unit -III

Mobile phone forensics: crime and mobile phones, evidences, forensic procedures, files present in SIM card, device data, external memory dump, evidences in memory card, operators systems- Android forensics: Procedures for handling an android device, imaging android USB mass storage devices, logical and physical techniques

Unit -IV

Digital forensics: Introduction – Evidential potential of digital devices: closed vs. open systems, evaluating digital evidence potential- Device handling: seizure issues, device identification, networked devices and contamination

Unit -V

Digital forensics examination principles: Previewing, imaging, continuity, hashing and evidence locations- Seven element security model- developmental model of digital systems- audit and logs- Evidence interpretation: Data content and context

References:

1. Gregory Kipper, “Wireless Crime and Forensic Investigation”, Auerbach Publications, 2007

2. Iosif I. Androulidakis, “ Mobile phone security and forensics: A practical approach”, Springer publications, 2012

3. Andrew Hoog, “ Android Forensics: Investigation, Analysis and Mobile Security for Google Android”, Elsevier publications, 2011

4. Angus M.Marshall, “ Digital forensics: Digital evidence in criminal investigation”, John – Wiley and Sons, 2008

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Virtualization and Cloud Security	**4**	**6**	**0**	**0**	**Theory**

CO1	:	To help students relate concepts of information security with Cloud computing
CO2	:	To make it possible for students to learn how important principles of Security are implemented in virtualization and Cloud platforms in managing issues and challenges
CO3	:	Explain how security is implemented in virtualization and cloud computing
CO4	:	articulate the importance of security principles in achieving trust and privacy in Cloud
CO5	:	rationalize the need for understanding legal aspects of security and privacy in Cloud computing

Unit -I

Introduction to Virtualization & Cloud

Virtualization and Cloud computing concepts – private vs public cloud, IaaS, PaaS & SaaS concepts, Virtualization security concerns – hypervisor and host/ platform Security, Security communications between – guest instances, hosts and guests, security challenges and mitigation measures.

Unit -II

Cloud Security

Cloud Security vulnerabilities and mitigating controls, top threats to Cloud security, mitigation through Cloud Controls Matrix.

Unit -III

Cloud Trust Protocol & Transparency

Introduction to Cloud Trust Protocol & Transparency, Cloud Trust Protocol and Transparency, Transparency as a Service, Privacy & Compliance aspects of Cloud, CloudTrust 2.0, Security Content Automation Protocol, Case Study on building transparent cloud.

Unit -IV

Cloud Data Security

Lifecycle, storage architecture security, foundational principles and strategies, data masking, secure migration and traceability technologies, encryption for data at rest and data in transit, platform and software specific Cloud Security aspects.

Unit -V

Legal aspects impacting Cloud Security and Privacy

Understanding legal challenges involved in Cloud, liability, copyright, data protection, IPR, data portability, inter-country legal frameworks, personal data protection and privacy, data controller and processor, contracts, provider's insolvency risk.

Text Books:

1. Virtualization Security: Protecting Virtualized Environments by Dave Shackleford, Sybex (4 December 2012)
2. OpenStack Cloud Security by Fabio Alessandro Locati, Packt Publishing Limited (28 July 2015)
3. Cloud Security – A comprehensive Guide to Secure Cloud Computing by Ronald L. Krutz and Russel Dean Vines, Wiley, 2010
4. Cloud Security and Privacy by Mather Tim, Shroff Publishers & Distributers Private Limited - Mumbai; First edition (2009).

Reference Books:

1. Securing the Cloud: Cloud Computer Security Techniques and Tactics by Vic (J.R.)

Winkler, Syngress (1 June 2011)
2. Practical Cloud Security: A Cross-Industry View by Melvin B. Greer Jr., Kevin L. Jackson CRC Press; 1 edition (2 August 2016)
3. CCSP (ISC)2 Certified Cloud Security Professional Official Study Guide 1st , Kindle Edition by Ben Malisow (Author)

Subject Code	Subject Title	Credit	Lecture	Tutorial	Practical	Type
	Cyber Crime and Digital Investigation	**4**	**6**	**0**	**0**	**Theory**

CO1	:	Analyze the fundamental concepts of cybercrime and Forensics.
CO2	:	Distinguish the motive and causes for cybercrime, detection and handling
CO3	:	Describe the areas affected by cybercrime and investigation
CO4	:	Illustrate tools used in cyber Forensic.
CO5	:	Demonstrate their knowledge of report writing and forensic ethics.

UNIT-I

Introduction to Cybercrime: Cybercrime: Definition and Origins of the Word, Cybercrime and information security, Who are Cybercriminals? Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens. Cyber offenses: How Criminals Plan Them: How Criminals Plan the Attacks. Social Engineering, Cyber stalking, Cybercafé and Cyber-crimes. Botnets: The Fuel for Cybercrime, Attack Vector, cloud Computing

Unit -II

Cybercrime: Mobile and Wireless Devices: introduction, Proliferation of Mobile and Wireless Devices. Trends in Mobility, Credit Card frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

Unit -III

Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, virus and Worms. Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks Phishing and Identity Theft: Introduction, Phishing, identity Theft (ID Theft)

Unit -IV

Understanding Computer Forensic: Introduction, Historical of Cyber forensics, Digital Forensics Science. The Need for Computer Forensics, Cyber forensics and Digital Evidence, Forensics, Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics. Approaching a Computer

Forensics Investigation, Setting up a Computer Forensics Laboratory: Understanding the Requirements Computer Forensics. Forensics and Social Networking sites. The Security/Privacy Threats, Computer Forensics from Compliance. Perspective,Challenges in computer Forensics, special tools and Techniques, Forensics, Forensics Auditing, Anti Forensics

Unit -V

Cybercrime: Illustrations, Examples and Mini-Cases, Introduction, Real-Life Examples, Mini-Cases, Illustrations of Financial Frauds in Cyber Domain, Digital Signature-Related Crime Scenarios, Digital Forensics Case Illustrations, Online Scams

Text Books:

1. Sunit Belapure and Nina Godbole. " Cyber Security: Understanding Cyber Crime, Computer Forensic And Legal Perspectives", Wiley India Pvt Ltd, ISBN: 978-81-265-2179, publish date 2013.

2. Bil Nelson, Amelia Philips and Christopher Steuart, " Guide to Computer Forensics and Investigation", 4th Edition, Cengage Learning 2015.

Reference Books:

1. Thomas J Mowbray, "Cybersecurity Managing Systems, Conducting Testing, and Investigating Intrusions", copyright 2014 by John Wiley & sons, ISBN: 978-1-118-84965, 2014.

2. James Graham, Ryan Olson, Rick Howard, "Cyber Security Essentials", CRC press, 15 Dec 2010.

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

Unit I

Laws, Legal Systems and Change

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

Unit II

Politics of land and gender in India

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

Unit III

Women's Rights: Access to Justice

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

Unit IV

Women's Rights

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

Unit V

Special Women Welfare Laws

Sexual Harassment at Work Places – Rape and Indecent Representation – The Indecedent Representation (Prohibition) Act, 1986 - Immoral Trafficking – The Immoral Traffic (Prevention) Act, 1956 - Acts Enacted for Women Development and Empowerment - Role of Rape Crisis Centers.

Reference books:

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

Women" Sage Publications 2001

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

Unit I - Vocabulary building - Puzzle

Unit II - Common error in English - Role Play

Unit III - Advertising - Newspaper Reading

Unit IV - Write the missing Verbs - Question Framing

Unit V - Description - Letter writing

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

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.

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

UnitIII –Sublimation

3.1. Purpose and Philosophy of life
3.2. Introspection - Analysis of Thought
3.3. Moralization of Desires
3.4. Neutralization of Anger

UnitIV-Human Resources Development

4.1.Eradicationofworries
4.2.BenefitsofBlessings
4.3.GreatnessofFriendship
4.4.IndividualPeaceandWorldPeace

UnitV-LawofNature

5.1.Unifiedforce- CauseandEffectsystem
5.2. Purity of ThoughtandDeedandGeneticCentre
5:3.LoveandCompassion
5.4.CulturalEducation-FivefoldCulture

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

UNIT – I: Concept of Human Values, Value Education Towards Personal Development - Aim of education and value education; Evolution of value oriented education; Concept of Human values; types of values; Components of value education. Personal Development: Self-analysis and introspection; sensitization towards gender equality, physically challenged, intellectually challenged. Respect to - age, experience, maturity, family members, neighbors, co-workers.
Character Formation towards Positive Personality: Truthfulness, Constructively, Sacrifice, Sincerity, Self-Control, Altruism, Tolerance, Scientific Vision.

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

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

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

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

Textbook:

1. Value Education – Human Rights – Learning Material, Bharathiar University, 2009.
1. Introduction to Human Rights and Duties - Dr.T. S.N.Sastry, University of Pune, 2011
2. Human Rights Education for Begineers - KWIRC , NHRC, 2005.
3. Layman's Guide to Law, Yetukuri Venkateswara Rao, Asia Law House, 2008.