

FACULTY OF HUMANITIES AND SCIENCE

LEARNING OUTCOME BASED CURRICULUM

Curriculum and Syllabus

BACHELOR OF SCIENCE

INFORMATION SCIENCE AND CYBER FORENSICS

REGULATION 2022

DEPARTMENT

OF

COMPUTER SCIENCE AND ENGINEERING



Vision:

To become a Premier Institution of Excellence in Computer Science and Engineering that would develop self-sustaining and globally competent Computer Science and Information Technology Professionals.

Mission:

- M1 Enable students and faculty with the best of Technologies and Knowledge emerging in the domain of Computer Science and Engineering.
- M2 Equip the department laboratories with the power of in-demand Technologies and Software for the On-Demand Industry.
- M3 Share and Collaborate knowledge across the IT Industries for holistic development of skilled and talented students.
- M4 Impart the students with Ethical values, Critical thinking and Broad-based computational skills, to enable students to become Entrepreneurs.
- **M5** Motivate the students to comprehend problems across Inter Disciplinary Domains and offer innovative solution using ICT.

Program Educational Objectives (PEO)

The Graduate will be able to

- **PEO1** Establish a career in the fields of cyber security and related disciples with the skills and knowledge attained.
- PEO2 Successfully pursue Higher Studies in the field of Science, Technology and Management and/or take up Research
- **PEO3** Capability to provide ethical and social solution for entrepreneurs to promote Design, Research and implementation of Products and Services in the field of cyber forensics.
- **PEO4** Engage himself in a Professional, Ethical and Responsible manner to the Profession, Industry, Nation and the Society
- **PEO5** Undertake the development of Innovative Systems and Solutions using Hardware and Software integration



Programme Outcome

PO1:	Capable of demonstrating comprehensive knowledge and understanding
Disciplinary knowledge	of one or more disciplines that form a part of the undergraduate
	programme of study.
PO2:	Ability to understand and express thoughts and ideas effectively in writing
Communication Skills	and orally; to present complex information in a clear and concise manner
	to different groups.
PO3:	Capability to analyze and evaluate evidence, arguments, claims, beliefs
Critical thinking and	on the basis of empirical evidence; formulate coherent arguments;
Problem solving	critically evaluate practices, policies and theories by following scientific
	approach to knowledge development and apply their competency to solve
	different kinds of problems and apply to real life situations.
PO4:	Ability to analyze, interpret and draw conclusions from
Analytical and	quantitative/qualitative data; and critically evaluate ideas, evidence and
Scientific reasoning	experiences from an open-minded and reasoned perspective.
PO5:	Ability to recognize cause-and-effect relationships, define problems,
Research-related skills	formulate hypotheses, test hypotheses, analyze, interpret and draw
	conclusions from data, ability to plan, execute and report the results of an
	experiment or investigation.
PO6:	Function effectively as an individual, and as a team member or leader in
Team work and	diverse teams, and in multidisciplinary environment.
Leadership qualities	
PO7:	Capability to use ICT tools in a variety of learning situations, demonstrate
Information/digital	ability to access, evaluate, and use a variety of relevant information
literacy	sources; and use appropriate software for analysis of data and further
	presentation.
PO8:	Ability to embrace moral/ethical values in conducting one's life,
Moral and ethical	formulate a position/argument about an ethical issue from multiple
awareness	perspectives, and use ethical practices in all work. Appreciating
	environmental and sustainability issues; and adopting objective, unbiased
	and truthful actions in all aspects of work
PO9:	Ability to update knowledge and skills, participating in learning activities
Lifelong learning:	throughout life, through self-paced and self-directed learning aimed at
	personal development, meeting economic, social and cultural objectives

Program Specific Outcomes (PSO)

PSO's describe what students are expected to know or be able to do by the time of graduation from the program.

PSO1	Ability to apply fundamental principles and methods of information security to
	provide solutions for real world problems.
PSO2	Ability to design economic, innovative hardware and software systems for various
	Domains
PSO3	Ability to create secured platforms for information sharing and management.



PEO with mission statement:

	M1	M2	M3	M4	M5
PEO1	3	2	3	3	3
PEO2	3	2	3	2	3
PEO3	3	3	3	3	3
PEO4	3	2	3	3	3
PEO5	3	3	2	3	2

PEO-PO:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
PEO1	3	3	3	3	2	2	3	2	3
PEO2	3	3	2	1	1	1	3	3	2
PEO3	2	3	3	3	3	2	3	2	3
PEO4	1	2	3	2	2	3	3	2	1
PEO5	2	2	1	3	3	2	2	3	3

PEO-PSO:

	PSO1	PSO2	PSO3
PEO1	3	2	3
PEO2	2	3	2
PEO3	3	3	3
PEO4	2	2	3
PEO5	3	3	3

Strength of Correlation 3- High, 2- Medium, 1-Low



	I - SEMESTER									
S.NO.	SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/ R	Ty/ Lb/ ET			
1	HBTA22001/ HBHI22001/HBFR2200	LANGUAGE (TAMIL-I/ HINDI-1/FRENCH-1)	3	3	0/0	0/0	Ту			
2	HBEN22001	LANGUAGE (ENGLISH – I)	3	3	0/0	0/0	Ту			
3	HBMA22ID1	ALLIED-I MATHEMATICS – I	3	3	0/0	0/0	Ту			
4	HBCF22001	FUNDAMENTALS OF COMPUTERS AND PROGRAMMING	3	3	0/0	0/0	Ту			
5	HBCC22001	ENVIRONMENTAL STUDIES	3	3	0/0	0/0	Ту			
		PRACTICALS*								
1	HBCC22L01	COMPUTER SOFTWARE LAB	2	0	0/0	3/0	Lb			
2	HBCF22L01	C PROGRAMMING LAB	2	0	0/0	3/0	Lb			
3	HBCC22I01	COMMUNICATION SKILL	1	0	0/0	2/0	IE			
4	HBCC22I02	SOFT SKILL-I (English)	1	0	0/0	2/0	ΙĒ			
			Credits	Sub To	tal: 21					

	II- SEMESTER									
S.NO.	SUBJECT	SUBJECT NAME	C	L	T/	P/R	Ty/			
	CODE				S.Lr		Lb/			
1	HBTA22002/ HBHI22002/HBFR22	LANGUAGE (TAMIL-II / HINDI-II /FRENCH -II)	3	3	0/0	0/0	Ту			
2	HBEN22002	LANGUAGE (ENGLISH – II)	3	3	0/0	0/0	Ту			
3	HBMA22ID2	ALLIED-II MATHEMATICS – II	3	3	0/0	0/0	Ту			
4	HBCF22002	PYTHON PROGRAMMING	4	3	1/0	0/0	Ту			
5	HBCF22003	DATA STRUCTURES	4	3	1/0	0/0	Ту			
		PRACTICALS*								
1	HBCF22L02	DATA STRUCTURES USING PYTHON	2	0	0/0	3/0	Lb			
2	HBMA22IL1	ALLIED LAB I MATHEMATICS LAB I	2	0	0/0	3/0	Lb			
3	HBCC22I03	SOFT SKILL- II (English)	1	0	0/0	2/0	IE			
	Credits Sub Total:22									



	III- SEMESTER								
S.NO.	SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/		
1	HBEC22ID3	ALLIED-IIIELECTRONICS	3	3	0/0	0/0	Ту		
2	HBCF22004	COMPUTER NETWORKS	4	3	1/0	0/0	Ту		
3	HBCF22005	FUNDAMENTALS OF THREATS AND VULNERABILITIES	4	3	1/0	0/0	Ту		
4	HBCF22006	INTRODUCTION TO INFORMATION SECURITY	3	3	0/0	0/0	Ту		
5	HBCF22007	JAVA PROGRAMMING	3	3	0/0	0/0	Ту		
		PRACTICALS*							
1	HBCF22L03	INFORMATION SECURITY LAB	2	0	0/0	3/0	Lb		
2	HBEC22IL2	ALLIED LAB II ELECTRONICS LAB	2	0	0/0	3/0	Lb		
3	HBCC22I04	STATISTICAL AND NUMERICAL METHODS	2	0	0/0	3/0	IE		
4	HBCC22I05	SOFT SKILL – III (MATHS)	1	0	0/0	2/0	IE		
	Credits Sub Total:24								

	IV- SEMESTER									
S.NO.	SUBJECT CODE	SUBJECT NAME	C	L	T/ S.Lr	P/R	Ty/ Lb/			
1	HBBT22ID4	ALLIED IV BIOINFORMATICS	3	3	0/0	0/0	Ту			
2	HBCF22008	DATABASE MANAGEMENT SYSTEM	3	3	0/0	0/0	Ту			
3	HBCF22009	DIGITAL FORENSICS	4	3	1/0	0/0	Ту			
4	HBXX22OEX	OPEN ELECTIVE –I	3	3	0/0	0/0	Ту			
5	HBCF22EXX	PROGRAMME ELECTIVE –I	4	3	1/0	0/0	Ту			
		PRACTICALS*								
1	HBXX22OLX	OPEN ELECTIVE LAB	2	0	0/0	3/0	Lb			
2	HBCF22L04	DATABASE MANAGEMENT SYSTEM LAB	2	0	0/0	3/0	Lb			
3	HBCC22I06	CRITICAL THINKING SKILL	1	0	0/0	2/0	IE			
4	HBCF22I01	CORE SKILL-I DIGITAL FORENSICS AND INVESTIGATION LAB	1	0	0/0	2/0	IE			
			Credits S	ub Tota	al:23					



	V- SEMESTER										
S.NO.	SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/				
1	HBCF22010	INFORMATION GATHERING AND EVIDENCE MANAGEMENT	4	3	1/0	0/0	Ту				
2	HBCF22EXX	PROGRAMME ELECTIVE –II	3	3	0/0	0/0	Ту				
3	HBCF22011	DATA PRIVACY	3	3	0/0	0/0	Ту				
4	HBXX22OEX	OPEN ELECTIVE –II	3	3	0/0	0/0	Ту				
5	HBCC22002	ENTREPRENURSHIP DEVELOPMENT	3	3	0/0	0/0	Ту				
		PRACTICALS*									
1	HBCF22L05	INFORMATION GATHERING AND EVIDENCE MANAGEMENT LAB	2	0	0/0	3/0	Lb				
2	HBCF22I02	CORE SKILL –II CRYPTOGRAPHY AND VULNERABILITY ASSESSMENT LAB	1	0	0/0	2/0	IE				
3	HBFL22IXX	FOREIGN LANGUAGE	1	0	0/0	2/0	IE				
4	HBCC22I07	NCC/NSS/INTERNSHIP	1	0	0/0	2/0	IE				
		Credits Sub Total:21									

	VI- SEMESTER									
S.NO.	SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/			
1	HBCF22EXX	PROGRAMME ELECTIVE –III	3	3	0/0	0/0	Ту			
2	HBCF22012	CYBER LAWS AND ETHICS	4	3	1/0	0/0	Ту			
3	HBCC22ET1	UNIVERSAL HUMAN VALUES	3	2	0/0	2/0	ETP			
		PRACTICALS*								
1	HBCF22L06	PROJECT	9	0	0/0	18	Lb			
		Credits Sub Total:19								

Credit Summary

 Semester : 1
 : 21

 Semester : 2
 : 22

 Semester : 3
 : 24

 Semester : 4
 : 23

 Semester : 5
 : 21

 Semester : 6
 : 19

Total Credits : 130



Regulation 2022 - 2023 (Optional for Honors Programme)

Semester : 7

Theory:

Course Code	Course Title	С	L	T/SLr	P/R	T/L/ ETP
HBCC22003	Research methodology	3	3	0/0	0	Ту
HBCF22013 /	Advanced Digital Forensics	4	3	1/0	0	Ту
HMCF22002						•
HBCF22014/	Network Troubleshooting and	4	3	1/0	0	Ty
HMCF22003	Security					
HBCF22015/	Security of Cloud Computing	4	3	1/0	0	Ty
HMCF22004						
Due eties lu						

Practical:

HBCF22I03	Mini Project	2	0	0/0	4/0	IE
HBCF22I04	Internship	1	0	0/0	2/0	IE

Total credits:18

Semester: 8

Theory:

						T/L/E
Course Code	Course Title	С	L	T/SLr	P/R	TP
HBCC22004	Startup strategies	3	3	0/0	0/0	Ту
HBCC22005	Principles of Digital Marketing	3	3	0/0	0/0	Ту
HBCC22006	Intellectual Property rights and Patent	3	3	0/0	0/0	Ту

Practical:

HBCF22L07	Major project	6	0	0/0	12/12	Lb
HBCF22I05	Research Publication	2	0	0/0	0/4	IE

Total credits:17

Total no. of credits (I to VIII semesters):165



PROGRAMME ELECTIVE –I									
S.NO.	SUBJECT	SUBJECT NAME	С	L	Τ/	P/R	Ty/L		
	CODE				S.Lr		b/ET		
1	HBCF22E01	OS SECURITY	4	3	1/0	0/0	Ту		
2	HBCF22E02	CLOUD COMPUTING	4	3	1/0	0/0	Ту		
3	HBCF22E03	WEB TECHNOLOGY	4	3	1/0	0/0	Ту		
4	HBCF22E04	MOBILE SECURITY	4	3	1/0	0/0	Ту		
5	HBCF22E05	E COMMERCE SECURITY	4	3	1/0	0/0	Ту		

	PROGRAMME ELECTIVE –II								
S.NO.	SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/L b/ET L		
1	HBCF22E06	DIGITAL IMAGE PROCESSING	3	3	0/0	0/0	Ту		
2	HBCF22E07	PRINCIPLES OF SECURE CODING	3	3	0/0	0/0	Ту		
3	HBCF22E08	DATABASE SECURITY	3	3	0/0	0/0	Ту		
4	HBCF22E09	WIRELESS SECURITY	3	3	0/0	0/0	Ту		
5	HBCF22E10	ARTIFICIAL INTELLIGENCE	3	3	0/0	0/0	Ту		

	PROGRAMME ELECTIVE III									
S.NO.	SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL			
1	HBCF22E11	CRYPTOLOGY	3	3	0/0	0/0	Ту			
2	HBCF22E12	MALWARE ANALYSIS	3	3	0/0	0/0	Ту			
3	HBCF22E13	OPEN SOURCE SOFTWARE	3	3	0/0	0/0	Ту			
4	HBCF22E14	EVIDENCE MANAGEMENT	3	3	0/0	0/0	Ту			
5	HBCF22E15	INCIDENT RESPONSE MANAGEMENT	3	3	0/0	0/0	Ту			



List of OPEN ELECTIVE-2022 Regulations.

For All H&S, Management Studies and Computer application faculties-UG Programmes.

Offering Department	S.NO	Theory/Lab	Subject Code	Subject Name
Mathematics	1.	Theory	HBMA22OE1	Graph Theory
	2.	Theory	HBMA22OE2	Optimization Techniques
	3.	Theory	HBPH22OE1	Fundamentals of Optics and Sound
Physics	4.	Theory	HBPH22OE2	Every day Physics
	5.	Lab	HBPH22OL1	Basic Physics lab
	6.	Theory	HBCS22OE1	Office Automation
Computer Science	7.	Theory	HBCS22OE2	Fundamentals of Computer and Internet
	8.	Lab	HBCS22OL1	Multimedia lab
Economics	9.	Theory	HBEM22OE1	Indian Economy
	10.	Theory	HBEM22OE2	Gender Economics
	11.	Theory	HBCH22OE1	Chemistry in our Daily Life
Chemistry	12.	Theory	HBCH22OE2	Food Chemistry
	13.	Lab	HBCH22OL1	General Chemistry Lab
English	14.	Theory	HBEN22OE1	English For Media
	15.	Theory	HBEN22OE2	Creative Writing
	16.	Theory	HBGE22OE1	Disaster Mitigation and Management
Geology	17.	Theory	HBGE22OE2	Remote Sensing and GIS
	18.	Lab	HBGE22OL1	Remote sensing and GIS lab
	19.	Theory	HBPY22OE1	Health & Yoga
Psychology	20.	Theory	HBPY22OE2	Organizational Behavior
	21.	Lab	HBPY22OL1	Understanding Self & Others



	22.	Theory	HBFD22OE1	Applications of Textiles
Fashion Design	23.	Theory	HBFD22OE2	Introduction to Fashion
	24.	Lab	HBFD22OL1	Embroidery Practical Lab
	25.	Theory	CBCA22OE1	Web design
Computer Applications	26.	Theory	CBCA22OE2	E-Commerce
	27.	Lab	CBCA22OL1	Web Designing Laboratory
	28.	Theory	HBFS22OE1	Principles of Nutrition
Food Science Nutrition and Dietetics	29.	Theory	HBFS22OE2	Food Safety and Quality Control
	30.	Lab	HBFS22OL1	Community Nutrition Practical
	31.	Theory	HBHM22OE1	Fundamentals of Food Production and Patisserie
Hotel Management and Catering Technology	32.	Theory	HBHM22OE2	Bakery and Confectionery Basics
	33.	Lab	HBHM22OL1	Fundamentals Front office operation practical
Defense and Strategic Studies	34.	Theory	HBDS22OE1	Independent India
Studies .	35.	Theory	HBDS22OE2	Human Rights
	36.	Theory	MBFP22OE1	Marketing of Financial Services
Financial Planning	37.	Theory	MBFP22OE2	Business strategy
	38.	Lab	MBFP22OL1	Interview Techniques
Bio Technology	39.	Theory	HBBT22OE1	Food and Nutrition
	40.	Theory	HBBT22OE2	Human Physiology
	41.	Theory	HBBT22OE3	Basic Bioinformatics
	42.	Lab	HBBT22OL1	Basic Bioinformatics Lab
Physical Education and Sports	43.	Theory	HBPE22OE1	Rule of Games and Sports
Shore	44.	Theory	HBPE22OE2	Health and Fitness
	45.	Theory	HBHR22OE1	Workplace Counseling
Human Resource	46.	Theory	HBHR22OE2	Corporate Social Responsibility



Information Science and	47.	Theory	HBCF22OE1	Introduction to Data Science
Cyber forensics	48.	Theory	HBCF22OE2	Data Mining
	49.	Theory	HBCF22OE3	Introduction to IoT
	50.	Theory	HBCF22OE4	Introduction to Big Data
	51.	Lab	HBCF22OL1	Data Science Lab
	52.	Lab	HBCF22OL2	Data Mining Lab
Management Studies	53.	Theory	MBBA22OE1	Principles of Management and Science
	54.	Theory	MBBA22OE2	Business Ethics

Note: HODs can permit their students to choose open electives from the above list, other than their own department electives.

LIST OF FOREIGN LANGUAGES 2022 REGULATION

S.NO	COURSE CODE	COURSE NAME
1	EBFL22I01 / HBFLI01	FRENCH
2	EBFL22I02 / HBFLI02	GERMAN
3	EBFL22I03 / HBFLI03	JAPANESH
4	EBFL22I04 / HBFLI04	ARABIC
5	EBFL22I05 / HBFLI05	CHINESE
6	EBFL22I06 / HBFLI06	RUSSIAN
7	EBFL22I07 / HBFLI07	SPANISH



Credits Distribution for Bachelor of Science

S. No	CATEGORY	Description	No. of Courses	Credits	Total Credit	Credit %Weightage	Contact Hours
		Core Theory	12	43			645
1	CORE COURSES	Core Lab	5	10	53	40.76%	300
2	ELECTIVE COURSES	Department Electives / Skill enhancement electives	3	10	10	7.6%	150
		Open Elective theory	2	6			90
3	OPEN ELECTIVES	Open Elective Lab	1	2	8	6.15%	60
	INTERDISCIPLINARY/ ALLIED SUBJECTS	Theory	4	12	16		180
4		Lab	2	4		12.3%	120
		Language 1 & 2	2	6		-	90
		English 1 & 2	2	6			90
		Soft Skills	3	3			90
		Life Skill	N/A				N/A
	HUMANITIES &	Foreign Language	1	1			30
5	SOCIAL SCIENCES &	Environmental Studies	1	3	33	25.3%	45
	SKILLS & SOFT	Skill Development	6	8			240
		Entrepreneurship Development	1	3			45
		Universal Human Values	1	3			60
	PROJECTS /	Project 1	1	9			45
6	INTERNSHIP / CORE SKILL	Internship / NSS / NCC	1	1	10	7.6%	30
	Total		48	130	130		2310



Credits Distribution for Honors Programme

S. No	CATEGORY	Description	No. of Courses	Credits	Total Credit	Credit %Weightage	Contact Hours
1	CODE COUDSES	Core Theory	15	55	65	20.20/	825
1	CORE COURSES	Core Lab	5	10	03	39.3%	300
2	ELECTIVE COURSES	Department Electives / Skill enhancement electives	3	10	10	6%	150
2	ODEN ELECTIVES	Open Elective theory	2	6	0	4.00/	90
3	OPEN ELECTIVES	Open Elective Lab	1	2	8	4.8%	60
4	INTERDISCIPLINARY/	Theory	4	12	16	9.6%	180
	ALLIED SOBJECTS	Lab	2	4			120
		Language 1 & 2	2	6			90
		English 1 & 2	2	6			90
	HUMANITIES & SOCIAL SCIENCES & LIFE SKILLS & SOFT SKILLS	Soft Skills	3	3	42		90
		Life Skill	N/A				N/A
		Foreign Language	1	1			30
		Environmental Studies	1	3			45
		Skill Development	6	8		25.45%	240
5		Entrepreneurship Development	1	3			45
		Universal Human Values	1	3			60
		Startup strategies	1	3			45
		Principles of Digital Marketing	1	3			45
		Intellectual Property	1	3			45
	PROJECTS /	Project 1	3	17			90
6	INTERNSHIP / CORE SKILL	Internship / NSS / NCC	2	2	19	11.5%	60
7	RESEARCH COMPONENT	Research methodology, Publication, IPR and Patents etc.	2	5	5	3%	75
8	Any other						
	Total		59	165	165		2775



TABLE 2:

Revision / modification done in syllabus content:

S. No	Course (Subject) Code	Course (Subject) Name	Concept/ topic if any, removed in current curriculum	Concept/topic added in the new curriculum	% of Revision / Modification done
1	HBCF22001	Fundamentals of computers and programming	Concept of internet	Introduced the c programming, included understanding computer memory	40%
2	HBCF22002	Python programming	Object Oriented Programming subject removed	Python programming is added	100%
3	HBCF22003	Datastructures		Linear Data Structures, Tower of Hanoi Problem, Representation of Polynomial	40%
4	HBCF22L02	Data structures using python	Data structure using c++ lab replaced by data structure lab using python	Data structure lab using python	100%
5	HBCF22L03	Information Security Lab is introduced	Instead of Java Programming Lab, Information Security Lab is introduced	Information Security Lab is introduced	100%
6	HBCF22005	Fundamentals of Threats and Vulnerabilities	Removed Prevention Systems, and also removed Protecting, Remote connections	Security Technology and Tools included, Planning for security added	40%
7	HBCF22011	Data privacy	Intrusion detection system	Data privacy is included	100%
8	HBCF22009	Digital forensics	Cyber forensics	Current computer forensics tools included	40%
9	HBCF22010	Information gathering and evidence management		Information gathering and evidence management isadded newly.	100%
10	HBCF22L05	Information gathering and evidence management lab		Information gathering and evidence management lab	100%



TABLE 3:

List of New Courses / value added courses / life skills / Electives / interdisciplinary / courses focusing on employability / entrepreneurship / skill development

S.No	New Courses	Value added	Life Skill	Electives	Inter	Focus on
	(subjects)	Courses			Disciplinary	employability /
	(subjects)					Entrepreneursnip / skill
						development
Sem 1		Environmental	Communicat		Mathematics I	ICT TOOLS LAB
		Studies	Ion Skin,			
			Soft Skill I			
Sem 2	1. Python		Soft Skill Ii		Mathematics Ii,	
	Programming				Mathematics I :	
	2 Data Structures				Lab	
	Using Python					
Sem 3	1.Information		Soft Skill –		Electronics,	Analytical Skill
	Security Lab		In (Maths)		Electronics Lab	(Statistical
						Analysis Lab)
Sem 4	Digital Forensics,			OS Security	Bioinformatics	.Critical Thinking
	.Digital Forensics			Cloud Computing		Skill (Case Study
	And Investigation			Web Technology		And Analysis)
	Lab			F Commerce		
				Security		
Sem 5	1.Information			Image Processing		Entrepreneurship
	Gathering And	Foreign	Ncc/Nss/	Principles Of		Development
	Evidence Management	Language	Internship	Secure Coding		Cryptography And
	2.Information			Wireless Security		Vulnerability
	Gathering And			Artificial		Assessment Lab
	Evidence Management lab			Intelligence		
	3. Data Privacy			8		
Sem 6		UNIVERSAL		Cryptology		Project
		HUMAN		Incident Response		
		VALUES		Management		
				Open Source		
				Software		
				Evidence		
				Management		



SEMESTER I

Subject Code:	Su	bject Name TAM	: IL PAPER	k - 1			с	L	T/SLr	P/R	Ty/Lb /ETL
HB1A2200	¹ Pr	erequisite:	Knowledge	e of Tamil i	n Higher	•	3	3	0/0	0/0	Ту
	Se	condary lev	el		U						
L : Lecture	T : Tuto	rial SLr : Su	pervised Le	earning P: P	roject R :	Resea	urch C	: Credit	8		T/L/EL
: Theory / I	Lab / Em	bedded Theo	ory and Lab								
OBJECTI	VES										
• Und	lerstand t	he aims and	objectives o	of teaching	Tamil.						
• Und	lerstand t	he rational fo	or learning	Tamil.							
• To r	notivate	and stimulate	e the studer	its to overco	ome their	inferio	ority co	mplex a	and imp	rove fl	uency in
the	language						•		•		·
• Lean	rn signifi	cance of spo	ken skill.								
• The relationship between language &culture and the implications for language teaching.											
COURSE OUTCOMES (Cos) - Students completing this course were able to											
CO1	Tami	l students are a	ctively engage	ed in learning	Tamil langı	lage an	d culture	in a mea	ningful se	tting	
CO2	Focu	s on applying th	e language in	real life situa	tions.	-			-	-	
CO3	Use	proficiency desc	criptors to mo	tivate learners	to progress	to the	next stag	e of learn	ing		
CO4	Less	ons are customi	zed to arouse	students inter	est and ignit	te the jo	y of lear	ning Tan	il langua	ge.	
CO5	Deve	lop a strong for	undation in lis	stening & spea	aking skills.						
Mapping of Course Outcome with Program Outcome (POs)											
Cos/POs	PO1	PO2	PO3	PO4	PO 5	PO6		PO7	PO)8	PO9
CO1	3	3	2	3	2	3		3	3	;	2
CO2	2	2	3	2	3	2		2	(*)	3	3
CO3	3	3	2	3	2	3		3	3	;	2
CO4	2	2	3	2	2	2		2	3	3	2
CO5	3	3	3	3	3	3		2	2		3
<u> </u>			1	PS					2	-	0004
		<u>250 0.</u> 2	L	PS	3			2 U.	3		<u>25004</u>
CO 2		2			2			3			<u> </u>
CO 3		3			3			3			2
CO 4		2			2			3			3
CO 5		3			2			2			3
Category	Program Core	Program elective	Humaniti es and social Science	Open Elective	Skill enhancin g elective	Inte Dis ary, d	er ciplin /Allie	Skill Compo ent	Pra on /Pro inte p	ctical oject/ ernshi	Others
	√ Science										



பொதுத்தமிழ்

இளநிலை மாணாக்கருக்கு

B.A/B.Sc/B.Com/B.B.A/B.C.A/B.PES

HBTA22001

முதலாம் ஆண்டு - முதல் பருவம்

கற்றல் நோக்கம்: 1.மாணவர்களின் கவிதை,கட்டுரை எழுதும் திறன் வளர்த்தல்

2. தமிழில் பிழையின்றி பேசும் எழுதும் திறன் வளர்த்தல்

11 மணி நேரம்

அலகு - 1

அ) மரபுக்கவிதை

1. செந்தமிழ் நாடு - மகாகவி பாரதியார்

2.தமிழின் இனிமை, இன்பத்தமிழ், எங்கள் தமிழ், சங்கநாதம் - பாரதிதாசன்

3.தமிழ் வளர்க்க சபதம் - நாமக்கல் கவிஞர் வெ.இராமலிங்கம் பிள்ளை

4. கோயில் வழிபாடு, வாழ்க்கைத் தத்துவங்கள் - கவிமணி தேசிக விநாயகம் பிள்ளை

5.கும்மிப்பாடல் - சுத்தானந்த பாரதியார்

6. தமிழ்த்தாய் வாழ்த்து - மனோன்மணியம் பெ.சுந்தரம் பிள்ளை

7.விடுதலை விளைத்த உரிமை - கவியரசர் கண்ணதாசன்

8. அன்பெனும் பிடியுள்..., முரசறைத்தல் - வள்ளலார் இராமலிங்க அடிகள்

ஆ) புதுக்கவிதை

1.பாட்டாளிகளின் குரல் - பட்டுக்கோட்டை கலியாணசுந்தரம்

2. மகாத்மா காந்தியடிகள் - கவிஞர் வாலி



3. காகிதப் பூக்கள் - நா.காமராசு

4.வள்ளுவர் வழங்கும் விடுதலை - ஈரோடு தமிழன்பன்

- 5. உலகம் வைரமுத்து
- 6. இன்னமுத மாமழை பேரா. முனைவர் பொற்கோ
- 7.தமிழ்ப்பற்று மீரா
- 8.ஐந்தாம் வகுப்பு அபிரிவு நா.முத்துக்குமார்

அலகு - 2

நாட்டுப்புற இலக்கியம்

- 1. பொது அறிமுகம்
- 2. நாட்டுப்புற இலக்கிய வகைகள்
- 3.நாட்டுப்புறக்கலைகள்

அலகு - 3

அ) சிறுகதைகள்

- 1. தேங்காய்த் துண்டுகள் (மு.வரதராசனார்)
- 2. அறம் (மாலன்)
- 3. நாற்காலியும் நான்கு தலைமுறைகளும் (திலகவதி)
- 4.அன்னையும் பிதாவும் (இராஜாஜி)
- 5. விடியுமா? (கு.ப.ராஜகோபாலன்)

ஆ) உரைநடை

- 1. மு.வ. என்னும் மந்திரம் (இரா.மோகன்)
- 2. தமிழிசை இயக்கம் (க.வெள்ளைவாரணனார்)
- 3. மதுரை மாநகரம் (ரா.பி.சேதுப்பிள்ளை)

B.Sc. (Information Science and Cyber Forensics)-Regulation 2022-2023

12 மணி நேரம்

7 மணி நேரம்



அலகு - 4

6 மணி நேரம்

9 மணி நேரம்

- 1. புதுக்கவிதை தோற்றமும் வளர்ச்சியும்
- 2. உரைநடை தோற்றமும் வளர்ச்சியும்
- 3. சிறுகதை தோற்றமும் வளர்ச்சியும்

அலகு - 5

அ) இலக்கணம்

- 1. வழக்கு
- 2. தொகாநிலைத் தொடர்
- 3. எழுத்துப் போலி
- 4. பதவியல்

ஆ) மொழிப்பயிற்சி

- 1. தன்வினை பிறவினை
- 2. ஒருமை பன்மை மயக்கம்
- 3. பிறமொழிச் சொற்களை நீக்குதல்
- 4. விண்ணப்பம் எழுதுதல்



Subject		Subject Na	me: HINDI	I			c	L	T/SLr	P/R	Ty/Lb /ETL	
Code: HBHI220	01	Prerequisit	te : Knowle	dge of Hir	ndi		3	3	0/0	0/0	Ту	
	-											
L : Lecti	ure, T : Tut	orial,SLr : S	upervised I	Learning,	P: Project,	R : Resea	rch, C :	Credi	ts,			
T/L/ETL	:Theory /	Lab / Embe	edded Theo	ry and La	b							
OBJECT	IVES											
1. T	o Underst	and the Hin	di Literatur	re, culture	e and the us	sage of la	nguage	e in th	e various	strea	ms	
2. T	o Build up	the Confid	ence in con	versing ir	n Hindi lang	uage.						
		Knowledge	of the usag	ge of Hind	i language	in the var	ious G	overn	ment Offi	ces		
S	tudents co	mpleting t	nis course v	vere able	to							
CO1	Understand the basic concepts and Origin of Hindi											
CO2	Know about the roots of Hindi Literature and its perspective and methods.											
CO3	Elaborate	and understa	and philosop	ohical meth	hods of Hind	li Literatur	e.					
CO4	Evaluate th	e concept of	f Hindi from	past to pro	esent and to	study the	societ	y close	ly through	Litera	ature	
CO5	Understand	d the import	ance of Hind	li in the co	ntemporary	world.						
Mappin	g of Cours	e Outcome	with Progr	am Outco	ome (POs)							
Seml				Program	nmeOutco	mes(Pos)						
Cos	PO1	PO2	PO3	PO4	PO5	PO6	P	07	PO8	Р	09	
CO1	3	2	3	2	3	3	-	3	3		3	
CO2	3	3	3	3	2	3	:	3	3		2	
CO3	3	3	2	3	3	3		3	3		2	
CO4	2	3	3	3	3	2		2	3		3	
CO5	3	3	3	3	3	2		2	3		3	
	3,	2/1 Indica	tes Strengtl	h Of Corre	elation, 3 –	High, 2-	Mediu	m, 1-	Low			
	Program	Program	Humanities	Open	Skill	Inter	Skill rvCom	nonent	Practical	Other	rs	
Category	Core	elective	and social Science	Elective	elective	/Allied		ponent	rnship			
			✓									



Subject Code:	Subject Name: HINDI I	С	L	T/SLr	P/R	Ty/Lb /ETL		
HBHI22001	Prerequisite : Knowledge of Hindi	3	3	0/0	0/0	Ту		
L : Lecture, T : Tutorial,SLr : Supervised Learning, P: Project, R : Research, C : Credits,								

T/L/ETL :Theory / Lab / Embedded Theory and Lab

UNIT - IProse –Understanding the secret of the culture and how to draft the letters in Government offices, technical terms

- 1. Sabhyata kaRahasya
- 2. Personal Applications
- 3. Leave Letters
- 4. Government Order
- 5. Administrative Terminology Hindi to English (25 Words)

UNIT - IIProse-Understanding the human relations and also to know the procedures to open the account in the bank, technical terms

- 1. Mitrata
- 2. Letter to the Editor
- 3. Opening anA/C
- 4. Demi OfficialLetter
- 5. Administrative Terminology English to Hindi (25 Words)

UNIT-IIIProse-the contribution of youth in developing India, drafting memo and technical things used in memo

- 1. YuvavonSe
- 2. Application for Withdrawal
- 3. Circular
- 4. Memo
- 5. Administrative Terminology Hindi to English (25 Words)

UNIT-IVProse-The effect of Nuclear energy and usage of technical terms in offices

- 1. Paramanu Oorja evam Khadya PadarthSanrakshan
- 2. Transfer of an A/C
- 3. Missing of Pass Book / ChequeLeaf
- 4. OfficialMemo
- 5. Administrative Terminology English to Hindi (25 Words)

UNIT-VProse-The Obstacles faced by the youth for getting employment, drafting complaint letters, technical terms

- 1. Yougyata aur Vyavasay kaChunav
- 2. Complaints
- 3. Ordering forBooks



4. Notification

5. Official Noting Hindi to English (25 words)

REFERENCE:

1. Prayojan MoolakHindi: Dr. Syed Rahamathulla, PoornimaPrakashan 4/7, Begum III Street, Royapettah, Chennai – 14

2.Hindi Gadhya Mala Dr. Syed Rahamathulla, PoornimaPrakashan

4/7, Begum III Street, Royapettah, Chennai – 14



Sul	niect Code			Subject	Name	С	L	T/SL	P/R	Ty/L b	
541								0/0		/ETL	
HE	3FR22001		F	RENCH I	(THEORY)	3	3	0/0	0/0	Ty	
L : Lecture T	: Tutorial	SLr : Super	vised Lea	rning P: Pr	oject R : R	esearch C:	Credits			4	
T/L/ETL : The	eory / Lab /	/ Embeddeo	d Theory a	and Lab							
OBJECTIVE	S										
1. The stude	ents will acq	uire a diffe	rent perspe	ective of the	ir own cultu	re in relatio	n to the Fre	ench culture	;		
2. The stude	ents will dis	cover new at	titudes tow	ards familia	ar practices						
3. The stude	ents will acq	uire a sens	e of the Fre	ench languag	ge, its music	and rhythn	ns and basic	e usage.			
4. The students will acquire a comprehensive view of the European Union and the member states											
COURSE OUTCOMES (Cos)											
Students cor	npleting th	is course w	ere able to) 							
COT laer	itify the Fre	ench languag	e from oth	er Europear	i language	and to show	and tell Fr	ench word	s and		
expl	ression		<u> </u>								
	lerstand ho	w the langua	ige works c	liscovering	the pronunc	ciation					
CO3 Star	t writing sh	ort dialogue	s of greetin	igs							
Try to interact with someone with life skill question –what where, who etc											
Describe persons and places											
CO4 Discover France and its physical tributes, develop an idea about the importance of France in the world											
attairs											
Analyze ideas in the content of short paragraphs, paintings etc., and everyday contexts.											
Appreciate the culture and uniqueness of France.											
	cuss in Engli	sn various as	spects of Fr	ance and a	new cultura	li events and	d compare	with currer	it scena		
CO5 Dev	elop enoug	h confidence	e to introdu	ice oneself a	and ask oth	ers simple q	uestions at	out persor	ial deta	ills.	
Inte	ract as long	s as other pe	rson speak	s slowly and	clearly			· .			
CO6 Plar	a rendezvo	ous ,a casual	meeting b	y Interacting	g with basic	sentences a	and express	sions as lon	g as the	ĩ	
pers	son to with	whom he/sh	e speaks c	can help to r	reformulate	the senten	ces				
	te a simple	message car	i fill a simpl	le questioni	haire .write	ones names	s, nationalit	y ,address	etc. on	а	
hote	el registratio	on card /pas	sport etc.								
Mapping of						DOG	DOZ		DOO		
COS/PUS	PUT	POZ	P03	P04	P05	P06	P07	PU8	P09		
CO1	3	2	2	2	2	1	2	2	3		
CO2	2	2	2	2	1	1	3	2	3		
CO3	2	3	2	3	1	1	2	2	3	į	
CO4	3	3	3	2	2	2	2	3	3	j	
CO5	2	2	2	3	3	2	3	2	3		
CO6	3	3	2	2	3	3	3	3	3		
C07	3	3	2	2	3	3	3	3	3	1	
	3/2/2	1 Indicates	Strength C	Of Correlati	<u>on, 3 – Hig</u>	h, 2- Medi	um, 1- Lov	V			
	Program	Program	Humanities	Open	Skill	Inter	Skill	Practical	Others		
Core elective			and social	Elective	enhancing	Disciplinary/	Component	Project/int			
Category			Science			Allicu		crusinp			
Category		,	/								



Sub.Code	Subject Name	С	L	T/SLr	P/R	Ty/Lb /ETL
HBFR22001	FRENCH – I (THEORY) LANGUAGE-I	3	3	0/0	0/0	Ту

UNIT I

Se saluer, La Graphie- écrire (compréhension orale, expression orale)

- Se Présenter-
- La langue française
- La Graphie écrire L'alphabet, L'abécédaire
- Les Accents et les Ponctuations
- L'interaction de base.
 - Clip audios : Exercices orales, compositions orales et épreuves orales. (20 –durée moins de 2 minutes)
 - Audio clips- For oral expressions, oral assignments and oral test-20 duration less than 2 minutes (10 oral exercises, 6 audio reading compositions & 4 tests).

UNIT II

S'informer-Interactions aidant des Compétences De base

- Des modèles interrogatifs
- Les nombres, demander le cout /le prix
- Demander l'heure, Les jours, Les mois de l'année.
- Clip audios : Exercices orales, compositions orales et épreuves orales. (20 durée moins de 2 minutes)
- Audio clips- For oral expressions, oral assignments and oral test-20 duration less than 2 minutes (10 oral exercises, 6 audio reading compositions& 4 tests).

UNIT III

Localiser –La France

- Quelque symbole de la France.
- La carte de l'Europe, La France dans le contexte international, La France et les Fuseaux horaires, La francophonie, L'union Européen
- La France physique, industrielle, touristique rt administrative
- Quelque symbole de Paris.
 - Clip audios : Exercices orales, compositions orales et épreuves orales. (20 durée moins de 2 minutes)
 - Audio clips- For oral expressions, oral assignments and oral test-20 duration less than 2 minutes (10 oral exercises, 6 audio reading compositions& 4 tests).

B.Sc. (Information Science and Cyber Forensics)-Regulation 2022-2023

9 Hrs

9 Hrs

9 Hrs



UNIT IV

Lire et prononcer Le française

- Les son française, les voyelles françaises, les sons nasaux, les consonné, Quelque sons uniques.
- Les syllabus français, Les Rythme de la langue française.
 - Clip audios : Exercices orales, compositions orales et épreuves orales.(20 durée moins de 2 minutes)
 - Audio clips- For oral expressions, oral assignments and oral test-20 duration less than 2 minutes (10 oral exercises ,6 audio reading

UNIT V

Observer et Comprendre

- La vie de la France quotidienne, En cas d'urgence.
- La grammaire initiale
 - Clip audios : Exercices orales, compositions orales et épreuves orales. (20 durée moins de 2 minutes)
 - Audio clips For oral expressions, oral assignments and oral test -20 duration less than 2 minutes (10 oral exercises, 6 audio Reading compositions& 4 tests).

Total Hrs: 45

Reference Books:

1. **Parlez-vous français?Partie 1 -** Dr.M.Chandrika.V.Unni & Mrs. Meena Mathews 2019 by Universal publisher

- 2. CLE INTERNATIONAL Lectures Clé en français facile. (2012) Hachette Paris
- 3. Cosmopolite: Livre d'élève A1 by Nathalie Hirsch sprung, Tony Tricot, Claude Le Ninan
- 4. Latitudes-1 Régine Mérieux & Yves l'oiseau, Didier 2017
- 5. Alter Ego 1 Catherine Dolez, Sylvie Pons : (2014) Hachette, Paris

9 Hrs

9 Hrs

Dr. M.G.R. EDUCATIONAL AND RESEARCH INSTITUTE DEMED TO BE UNIVERSITY UNIVERSITY UNIVERSITY UNIVERSITY CONCRETENTION (A 10 2010) 2012 Confidentiation) Periyar E.V.R. High Boad, Madurawyal, Chennal-95. Taminadu, India.

					ENG	GLISH	I			С	L	T/SL	P/R	Tv/L
Subj.	Code	(C	ommon	to all U	UG Cou	irses ur	nder H&	&S)			-	r		b /FTI
		То	tal cont	act hour	rs – 45					3	3	0/0	0/0	Ту
HBEN	N22001	Pre	erequisi	te – Eng	glish La	nguage								
		Co	urse de	signed b	by – Dej	partmen	t of Eng	glish						
Cours	se Obje	ctives												
1.	Devel	lop Eng	lish Lar	iguage s	skills (L	SRW)	to comr	nunicat	e in Eng	glish	wit	hout an	y inh	ibition.
2.	Learn	vocabu	ilary an	d syntax	to be f	luent in	English	n for so	cial and	acac	lemi	ic com	nunic	ation
3.	Demo	onstrate	content	knowle	edge thr	ough ap	propria	te langu	age use	for	acac	lemic s	ucces	s.
4.	5. Engage in academic and business writing with a focus on social and professional ethics.													
Course Outcomes (COs)														
1. Possess Language skills (LSRW) to communicate in English without any inhibition.														
2.	Express	s with a	ppropria	ate lexis	and syn	ntax in l	English	for soci	al and a	cade	emic	comm	unica	tion
3.	3. Demonstrate content knowledge through appropriate language use for academic success.													
4.	4. Analyse and interpret any genre of literature in English for research, projects, placement etc.,													
5. Engage themselves in organized academic and business writing with professional ethics.														
Program Specific Outcomes (PSOs)														
1.	1. Demonstrating mastery of the components of English language and literature.													
2.	2. Explaining through literature in English, diverse historical cultural and social ethics													
3. 4	Prom	otina a	ultura		s and r	es lo ge eal-life	akilla	through	anarysis oh Enol	ich	lanc		and	1511
т.	liter	ionny c	unu u	i vulues	s unu i	cui-in e	5 38113	muou	in Engi	1311	lang	juuge	ana	
Mann	ving of a	unure (nitcom		with]	Program	n Oute	omes (I	P()\$)&]	Prna	ran	1 Sneci	fic O	utcomes
Tupp	(3/2	2/1 ind	icates	the str	rength	of cor	relatio	n) 3= ł	ligh; 2	= M	ediu	ım; 1=	Low	uteomes
СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	Ρ	P:	502	Ρ	PSO4
										S			S	
										0			0	
										1			3	
1	3	3	3	3	3	3	3	1	3	3	3		3	3
2	3	3	3	3	3	3	3	1	3	3	3		3	3
3	3	3	3	3	3	3	3	1	3	3	3		3	3
4	3	3	3	3	3	3	3	1	3	3	3		3	3
5	3	3	3	3	3	3	3	1	3	3	3		3	3
3.			ð		ş	ar	ing	ent				~		
Cate	gory		cor	н Ц р	cti	olin ed	ve	0 Vo	al	t	1	Į		
		1&5	am	grc	Ele	iscij Allid	nhc cti	цт	letic) je		2		
		7	ъ́р	Pro Ele	en	erdi y/	Ele	<u> </u>	Pra	Prc	+	E	0	thers
			Ρης		do	Int	Ski	Skil			F	-		
								()						



HBEN22001	Semester I	С	L	T/SLr	P/R	Ty/Lb /ETL
	ENGLISH I	3	3	0/0	0/0	Ту
	(Common to all UG Programs under H&S)					

Course Objectives:

Thestudents willbe facilitatedto

- 1. Develop English Language skills (LSRW) to communicate in English without any inhibition.
- 2. Learn vocabulary and syntax to be fluent in English for social and academic communication
- 3. Demonstrate content knowledge through appropriate language use for academic success.
- 4. Develop in them analytical and interpretative skills for research, projects, placement etc.,
- 5. Engage in academic and business writing with a focus on social and professional ethics. 9 Hrs

Unit I: Prose

- 1. Beware the loss of Biodiversity
- 2. The Urban Rural Divide
- 3. Grading down Plastics
- 4. The Unsung Hero of Covid 19 in India
- 5. From Aircrafts to Drones
- 6. My Vision for India

Unit II: Poetry	
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1. On Killing a Tree 3. Anthem for Doomed Youth 2. The Road Not Taken **Unit III: Short Story** 9 Hrs 1. Portrait of a Lady 2. The Connoisseur

Unit IV: Drama

- 1. The Never-Never Nest
- 2. Frederick Douglass

9 Hrs Unit V: Functional Grammar - Charts & LSRW Development

Functional Grammar: (Grammar exercises spread up in all four units)

Parts of speech- use of articles- prepositions - their uses - verb + prepositions- words followed by prepositions - modals -tenses- active -passive- impersonal passive forms- concordconditional sentences - question tags - Common errors - Punctuation

Vocabulary development- word formation - prefixes-suffixes - synonyms-antonyms homophones -homonyms - words often confused

Charts/Diagrams and their interpretation - their use

Tables- Flow chart- Pie chart -Bar chart

Letters: Formal and Informal

LSRW Development: audio, video and tasks for the content of lessons under each unit.

Total Hrs: 45

9 Hrs

9 Hrs



Course Outcomes:

On completing the course the students will be able to

- 1. Possess Language skills (LSRW) to communicate in English without any inhibition.
- 2. Express with appropriate lexis and syntax in English for social and academic communication
- 3. Demonstrate content knowledge through appropriate language use for academic success.
- 4. Analyse and interpret any genre of literature in English for research, projects, placement etc.,
- 5. Engage themselves in organized academic and business writing with professional ethics.

Prescribed Text:

- 1. M. Chandrasena Rajeswaran, R. Pushkala& S. Bhuvaneswari, Pinnacle: A Skills Integrated Textbook
- 2. V. Karpagavadivu, S. Bhuvaneswari, J. Valentina Rani ,S. Magdelin Percy, English Workbook

Suggested Reading: Wren and Martin: Grammar and Composition, Chand & Co, 2006



	Code:	Su	ibject Na	ame: ALLI	ED-I MA1	THEMATICS	5-I	С	L T,	/SLr	P/R	Ty/Lb /ETL	
	2101	Pre	erequisite	e: Higher S	econdary	Mathemat	ics	3	3 (0/0	0/0	Ту	
L:Lect	ure T :	Tutor	ial C: C	redits									
OBJEC	TIVES												
• Ti • Ti • Ti • Ti • Ti	o unders o unders o unders o unders o unders SE OU	stand th stand th stand th stand th stand th FCOM	ne concep ne Basic co ne Basic co ne Basic co ne Basic co IES (Cos	ts in Matrice oncepts in Ti oncepts in Ir oncepts in P oncepts in St S)	es and its c rigonomet ntegration robability tandard Di	operations ry stributions							
Student	ts com	s completing this course were able to											
C01		Unders	tand the b	basic concep	ot of Rank r	matrices and	d Solv	/ing simu	Itaneous	equati	ons .		
CO2	E E	Understand to solve the problem of Expansions of Sin n θ , Cos n θ in powers of Sin θ and Cos θ . Expansions of Sin ⁿ θ and Cos ⁿ θ in terms of Sines and Cosines of multiples of θ and also problem in Hyperbolic functions.											
CO3	p	Learn how to solve problems in Methods of Integration, Integration by substitution , Integration by parts , Definite Integrals , Properties of Definite Integrals and Problems on finding Area											
CO4	4 Understand the concept of Axioms of Probability , Conditional probability , Total probability Baye's Theorem , Random variable ,Probability mass function , Probability density function.												
C05		Analys	es summ	ation of seri	es using B	inomial, Exp	onen	itial , Poi	sson and r	orma	l distribu	tion	
Mappir	ping of Course Outcome with Program Outcome (POs)												
				PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8									
Cos/PO	s PC	001 30 01	PO2	PO3	PO4	PO5	P	06	P07	P	D8	PO9	
Cos/PO CO1	s PC)1	PO2 2	PO3 3	PO4 3	PO5 3	P(D6	PO7	P(2	PO9	
Cos/PO CO1 CO2	s PC	00130	PO2 2 2	PO3 3 2	PO4 3 3	PO5 3 2 2	P(2 2	D6	PO7 1 1		D8 2 1	PO9 3 3 3	
Cos/PO CO1 CO2 CO3	s PC 2 3 3 2		PO2 2 2 2 2	PO3 3 2 3 2	PO4 3 3 3 2	PO5 3 2 3 3 2 3	P(2 2 2 1	D6	PO7 1 1 1 1		D8 2 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	PO9 3 3 2 2	
Cos/PO CO1 CO2 CO3 CO4	s PC s PC 2 3 3 2 4 2 5 3		PO2 2 2 2 2 2 2 2 2 2	PO3 3 2 3 3 3 3 3	PO4 3 3 3 2 3	PO5 3 2 3 3 3 3 3	P(2 2 2 1 2	D6	PO7 1 1 1 1 1 2		D8 2 1 1 2 2	PO9 3 3 2 3 2 3 2	
Cos/PO CO1 CO2 CO3 CO4 CO4	s P(s P(2 3 3 2 4 2 5 3		PO2 2 2 2 2 2 2 2 2	PO3 3 2 3 3 3 3	PO4 3 3 2 3	PO5 3 2 3 3 3 3	P(2 2 2 1 2	D6	P07 1 1 1 1 2		D8 2 1 2 2 2 2	PO9 3 3 2 3 2 2	
Cos/PO CO2 CO2 CO3 CO4 CO5	s PC s PC 2 3 3 2 4 2 5 3	PS0	PO2 2 2 2 2 2 2 2 2	PO3 3 2 3 3 3 3	PO4 3 3 3 2 3 PS02	PO5 3 2 3 3 3	P(2 2 2 1 2		P07 1 1 1 2 PS0		D8 2 1 2 2 2 2	PO9 3 2 3 2 2	
Cos/PO CO1 CO2 CO3 CO4 CO5 CO5	s PC s PC 2 3 3 2 4 2 5 3 0 0 s	PSO	PO2 2 2 2 2 2 2 2 1 3	PO3 3 2 3 3 3	PO4 3 3 3 2 3 PSO2	PO5 3 2 3 3 3 2	P(2 2 2 1 2		P07 1 1 1 2 PS0	P(2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	D8 2 1 2 2 2 2	PO9 3 2 3 2 3 2 3 2	
Cos/PO CO2 CO3 CO4 CO4 CO5 CO5 /PS CO1 CO2	s P(s P(2 3 3 2 5 3 0 0 5 3 1 2 5 3 1 2 5 3 1 2 5 3 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	PSO	PO2 2 2 2 2 2 2 2 1 3 3	PO3 3 2 3 3 3	PO4 3 3 3 2 3 PSO2	PO5 3 2 3 3 2 2 2 2 2 2 2 2 2 2 2 2 2	P(2 2 2 1 2		P07 1 1 1 2 PSC	PC 22 23 3 22	D8 2 1 2 2 2	PO9 3 3 2 3 2	
Cos/PO CO1 CO2 CO3 CO4 CO5 CO5 CO5 CO5 CO1 CO2 CO3	s PC s PC 2 3 3 2 4 2 5 3 0 5 3	PSO	PO2 2 2 2 2 2 2 2 2 1 3 3 3	PO3 3 2 3 3 3	PO4 3 3 3 2 3 PSO2	PO5 3 2 3 3 3 2 2 2 2 2 2 2 2 2 2 2 2 2	P(2 2 2 1 2		P07 1 1 1 2 PS0	PC PC PC PC PC PC PC PC PC PC	D8 2 1 2 2 2	PO9 3 3 2 3 2	
Cos/PO CO2 CO3 CO4 CO5 CO5 CO5 CO5 CO1 CO2 CO3 CO4	S P(S P(2 3 3 2 4 2 5 3 0 5 3 0 5 3 1 3 2 3 1 3 2 3 3 2 4 2 5 3 1 3 2 3 3 2 4 3 5 3 5 4 5 4 5 4 5 4 5 4 5 4 5 4 5 4	PSO	PO2 2 2 2 2 2 2 2 2 2 2 3 3 3 3 3	PO3 3 2 3 3	PO4 3 3 3 2 3 PSO2	PO5 3 2 3 3 3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	P(2 2 2 1 2		P07 1 1 1 2 PSC	PC 2 3 2 2 2 2 2	D8 2 1 2 2 2	PO9 3 3 2 3 2	
Cos/PO CO2 CO3 CO4 CO5 CO5 CO5 CO1 CO2 CO3 CO4 CO5	S PC S PC 2 3 3 2 5 3 5 3 5 3 5 3 5 3 5 3 5 3 5 3 5 3 5 3	PSO	PO2 2 2 2 2 2 2 2 2 2 1 3 3 3 3 2	PO3 3 2 3 3 3	PO4 3 3 3 2 3 PSO2	PO5 3 2 3 3 3 2	P(2 2 2 1 2		P07 1 1 1 2 PSC	PC PC 2 2 2 2 3	D8 2 1 2 2 2	PO9 3 3 2 3 2	
Cos/PO CO2 CO3 CO4 CO5 CO5 CO5 CO1 CO2 CO3 CO4 CO3 CO4 CO5 3/2/1 Inc	s PC s PC 2 3 3 2 5 3 5 3 5 3 5 3 5 3 5 3 5 3 5 3 5 3 5 3	PSO	PO2 2 2 2 2 2 2 2 1 3 3 3 2 gth Of C	PO3 3 2 3 3 3 3 orrelation,	PO4 3 3 3 2 3 PSO2	PO5 3 2 3 3 3 2 3	P(2 2 2 2 1 2 2 1 2 2 1 2 1 2 1 2	D6	P07 1 1 2 PSC	PC PC 2 3 3 2 2 2 3	D8 2 1 2 2 2	PO9 3 3 2 3 2	
Cos/PO CO1 CO2 CO3 CO4 CO5 CO5 CO1 CO2 CO3 CO4 CO5 3/2/1 Ind Category	s PC s PC s PC s S s S s S s S s S s S s S s S s S s S	PSO Streng Pso	PO2 2 2 2 2 2 2 2 2 2 2 3 3 3 2 gth Of C ogram ctive	PO3 3 2 3 3 3 orrelation, Humanities and social Science	PO4 3 3 3 2 3 PSO2 3 - High Open Elective	PO532333332222222233333333333322222235899 <tr< th=""><th>Prove the second second</th><th>D6</th><th>PO7 1 1 1 2 PSC</th><th>PC 22</th><th>D8 2 1 2 2 2 2 Practical /Project/ internshi p</th><th>P09 3 3 2 3 2 3 2 Others</th></tr<>	Prove the second	D6	PO7 1 1 1 2 PSC	PC 22	D8 2 1 2 2 2 2 Practical /Project/ internshi p	P09 3 3 2 3 2 3 2 Others	

Sub.Code	Subject Name	С	L	T/SLr	P/R	Ty/Lb /ETL/EVI
HBMA22ID1	ALLIED- I MATHEMATICS I	3	3	0/0	0/0	Ту
	Common to Lum / Loom DCA /D Co [/			Champintum (atura minal)

(Common to I yr / I semBCA /B.Sc [CS, Physics, Chemistry, ISCF, Electronics])

Course Outcomes:

To understand the Basic concepts in Matrices

To understand the Basic concepts in Trigonometry

To understand the Basic concepts in Integration

To understand the Basic concepts in Probability

To understand the Basic concepts in Standard Distributions

UNIT I MATRICES

Elementary operations on Matrices – Rank of a Matrix – Solving simultaneous equations (atmost three equations with three unknowns).

UNIT II TRIGONOMETRY

Expansions of Sin n θ , Cos n θ in powers of Sin θ and Cos θ – Expansion of Tan n θ – Expansions of Sinⁿ θ and Cosⁿ θ in terms of Sines and Cosines of multiples of θ – Hyperbolic functions – Separation into real and imaginary parts.

UNIT III INTEGRATION

Basic concepts of Integration – Methods of Integration – Integration by substitution – Integration by parts – Definite Integrals – Properties of Definite Integrals – Problems on finding Area using single integrals (simple problems).

UNIT IV INTRODUCTION TO PROBABILITY

Axioms of Probability – Conditional probability – Total probability – Baye's Theorem – Random variable – Probability mass function – Probability density function – Properties (Definition and simple problems).

UNIT V STANDARD DISTRIBUTIONS

Binomial – Poisson – Exponential – Normal distributions.

Reference Books:

- 1) Vittal.P.R, Allied Mathematics, Margham Publications., Chennai, (2012).
- 2) Venkatachalapathy.S.G, Allied Mathematics, Margham Publications., Chennai, (2007).
- 3) Singaravelu, Allied Mathematics, Meenakshi Agency., Chennai, (2001).
- 4) Gupta S.C., Kapoor V.K., Fundamentals of Mathematical Statistics, S.Chand& Co., (2007).
- 5) Vittal.P.R, Malini, *Statistical & Numerical Methods*, Margham Publications., Chennai, (2012).

B.Sc. (Information Science and Cyber Forensics)-Regulation 2022-2023

(9 hrs)

(9 hrs)

(9 hrs)

(9 hrs)

Total no. of hrs: 45



(9 hrs)



Subject	Subject Name :							L	T/SLr	P/R	Ty/Lb /ETL/EVL		
Code:													
HBCF22001								0	0/0	0/0			
	Prerequ	lisite: NIL			3		3 Cuedite	0/0	0/0	Ty			
	utorial	S.Lr : Super	vised Lear	ning P:I	Project R:	Researcr	1 C: (credits					
	OBJECTIVES :												
To understand basics of computer and working with OS													
 Founderstand basics of computer and working with US Possess the knowledge of basic hardware peripherals 													
 Fossess the knowledge of basic hardware peripherals To teach how to write modular, efficient and readable C programs 													
 To describe the techniques for creating program modules in C using functions and recursive 													
functions.													
COURSE OUTC	OURSE OUTCOMES (COs) : (3- 5)												
CO1	To Foc	us Fundam	entals of	Comput	ers and Pe	riphera	s						
CO2	Explair	the needs	of hardw	are and	software	required	l for	r a com	putatior	ı task.			
CO3	To Intr	oduce prog	gramming	langua	ge and awa	are the s	stud	ents ab	out pro	gramn	ning		
	paradi	zm								-	0		
CO4	Design programs involving decision structures. loops. arrays and functions.												
CO5	CO5 Use pointers to understand the dynamics of memory												
Mapping of Co	urse Out	comes with	n Program	Outcom	es (POs)								
COs/POs	PO1	PO2	PO3	PO4	POS	5 PC	D 6	PO7	PO	8	PO9		
CO1	2	2	2	1	2	1	2	3	3		2		
CO2	2	3	2	3	3		3		3		1		
CO3	2	2	3	3	2		3		1		1		
CO4	2	3	2	2	2	1	2	1	2		2		
CO5	2	2	3	2	1	1	L	2	1		2		
COs / PSOs		PSO1			PSO2			PSO3					
CO1		3			1		2						
CO2		3			2					3			
CO3		2			1					2			
CO4		3			2		2						
CO5		3			2					1			
3/2/1 indicates	s Strengt	h of Correla	ation 3-H	ligh, 2- N	/ledium, 1-	Low							
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter Disciplinary/	Allied Skill Component		Practical /Project/intern	ship Others			
	\checkmark												

Sub. Code	Subject Name	С	L	T/SLr	P/R	Ty/Lb /ETL/EVL
HBCF22001	FUNDAMENTALS OF COMPUTER	3	3	0/0	0/0	Ту
	AND PROGRAMMING					

UNIT I

Introduction to computers, characteristics and limitations of computer, Block diagram of computer, types of computers, uses of computers, computer generations. Input and output devices: Keyboard and mouse, inputting data in other ways, Types of Software: system software, Application software, commercial, open source, domain and free ware software, Memories: primary, secondary and cache memory. Windows basics: desktop, start menu, icons.

UNIT II

Introduction to C: Introduction – Structure of C Program – Writing the first C Program – File used in C Program – Compiling and Executing C Programs – Using Comments – Keywords – Identifiers – Basic Data Types in C – Variables – Constants – I/O Statements in C- Operators in C- Programming Examples – Type Conversion and Type Casting.

UNIT III

Decision Control and Looping Statements: Introduction to Decision Control Statements - Conditional Branching Statements – Iterative Statements – Nested Loops – Break and Continue Statement – Goto Statement Functions: Introduction – using functions – Function declaration/ prototype – Function definition – function call - return statement - Passing parameters - Scope of variables - Storage Classes - Recursive function

UNIT IV

Arrays: Introduction – Declaration of Arrays – Accessing elements of the Array – Storing Values in Array – Calculating the length of the Array – Operations on Array – one dimensional array for inter-function communication - Two dimensional Arrays - Operations on Two Dimensional Arrays Strings: Introduction String and Character functions

UNIT V

Pointers: Understanding Computer Memory – Introduction to Pointers – declaring Pointer Variables – Pointer Expressions and Pointer Arithmetic – Null Pointers – Generic Pointers - Passing Arguments to Functions using Pointer – Pointer and Arrays – Passing Array to Function – Structure, Union, and Enumerated Data Types: Structures and Functions - Unions - Enumerated Data Types Files: Introduction to Files - Using Files in C -Reading Data from Files – Writing Data from Files – Detecting the End-of-file –Close a file – Random Access Files – Binary Files – Command line arguments

TEXT BOOKS:

1. Ashok.N.Kamthane," Computer Programming", Pearson Education (India) (2008).

2. Behrouz A.Forouzan and Richard.F.Gilberg, "A Structured Programming Approach Using C", II Edition, Brooks-Cole Thomson Learning Publications, (2007).

REFRENCE BOOKS:

1.Let us C, Yashwant Kanitkar

2. C: The Complete Reference, Herbert Schildt, McGrawHill

3. Computer fundamentals and Programming in C, Pradip dey and Manas Ghosh, Oxford

9 Hrs

9 Hrs

9 Hrs

9 Hrs

Total Hours: 45

9 Hrs





Subject C HBCC220	ubject Code : Subject BCC22001			ENVIR	ONME	NTAL ST	UDIES	6	С	L	T/SLr	P/R	Ty/ Lb/ ETL
		Prerequ	equisite : None							3	0/0	0/0	Ту
L : Lectur	e T : Tutori	al P:Pro	oject C:	Credit	S								
 OBJECTIVES : To acquire knowledge of the Environment and Ecosystem & Biodiversity To acquire knowledge of the different types of Environmental pollution To know more about Natural Resources and social issues and the Environment To attain familiarity of human population and Environment COURSE OUTCOMES (Cos) : Students completing the course were able to 													
CO1	To known about Environment and Ecosystem & Biodiversity												
CO2	2 To clearly comprehend air, water, Soil, Marine, Noise, Thermal and Nuclear Pollutions and Solid Waste management and identify the importance of natural resources.												
CO3 To know about the natural resources and environmental problems associated with climate change, global warming, acid rain, ozone layer depletion etc., and explain possible solution.													
COs/POs PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PS01							501	PSO2	PSO3				
CO1	2	1	1	1	2	1	1	2	2		1	2	1
CO2	2	1	1	1	2	1	2	2	2		2	2	2
CO3	2	1	1	1	2	1	1	2	2		1	1	1
				·			· · · · ·		1				
Category	Program Core	Progra m elective	Humanities and social	Science	Open Elective	Skill enhancing	elective	elective Inter Disciplinary/ Allied			Practical /Project/inter	nship	Others
			V										

Subject Code : HBCC22001	Subject Name : ENVIRONMENTAL STUDIES	С	L	T/SLr	P/R	Ty/ Lb/ ETL
	Prerequisite : None	3	3	0/0	0/0	Ту

UNIT I ENVIRONMENT AND ECOSYSTEMS

Definition, scope and importance of environment – need for public awareness – concept, structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem.Biodiversity at National and local levels – India

UNIT II ENVIRONMENTAL POLLUTION

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Nuclear hazards (g) E-Wastes and causes, effects and control measures

UNIT III NATURAL RESOURCES

Forest resources: Use and over-exploitation, deforestation. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns climate change, global warming, acid rain, ozone layer depletion, nuclear accidents ,central and state pollution control boards- Public awareness.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT

Population growth, variation among nations – population explosion, environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health

Total no of Hours : 45

TEXT BOOKS:

- 1. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education (2004).
- 2. Benny Joseph, 'Environmental Science and Engineering', Tata McGrawHill, NewDelhi, (2006).

9 Hrs

9 Hrs



9 Hrs

9 Hrs

9 Hrs



Subject Code:	Subject	Name :		С	L	Т/	P/R	Ту/						
HBCC22L01	COMPUT	ER SOFTWA	RE LAB (WO			S.Lr		Lb/						
		F	PAINT, INTER					ETL						
	Prerequ	isite: NIL		2	0	0/0	3/0	Lb						
L : Lecture T : T	utorial S	S.Lr : Superv	ised Learni	h C: Cre	dits									
Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab														
OBJECTIVES :														
• To train students how to use MS Office applications use in office work such as creating professional-quality														
documents; store, organize and analyze information; arithmetic operations and functions.														
 MS Excel to enable the students for creating tables, scatter plots, and completing data analysis. Gain knowledge in practical applications of Word Excel Powerpoint Paint and Internet 														
Gain Knowledge in practical applications of Word, Excel, Powerpoint, Paint and Internet. COURSE OUTCOMES (COs) : (3- 5)														
CO1	Demonst	rate the usag	ge of various	operation	ns in MS Wor	d								
CO2	Perform	calculations i	n Microsoft	Excel usin	g both manua	ally ir	putting f	ormulas ar	nd built-in f	unction	s.			
CO3	Develop	dynamic slide	e presentatio	ons with a	nimation, nar	rratio	n, image	s, and mucl	n more, dig	itally ar	ıd			
	effective	ly.												
CO4	To create	e drawings to	include clip	art, color,	shape, size, t	ext, e	enhance t	text						
CO5	Understa	inding how to	o search spe	cific webs	ite, sending n	nails e	etc							
Mapping of Co	urse Outo	omes with	Program O	utcomes	(POs)									
COs/Pos	PO1 PO2 PO3 PO4 PO5						PO6	PO7	PO8	3 1	2 0 9			
CO1	3	3	1	2	1		2	3	2		2			
CO2	3	2	3	2	2		2	3	2		3			
CO3	3	3	1	2	1		2	3	2		2			
CO4	3	2	1	1	1		2	2	2		2			
CO5	3	3	1	1	1		2	3	2		3			
COs / PSOs		PSO1			PSO2			PSO3						
CO1		3			2			1						
CO2		3			3		2							
CO3		2			2		1							
CO4		3			1				1					
CO5		3			1				1					
3/2/1 indicates	Strength	of Correlat	tion 3- Hig	gh, 2- Me	edium, 1-Lov	N								
					ing		٩II		ısh					
~	Core		and	ive	anc		ry/1	ıt	terr					
gory	m C	-	ties	lecti	enh e		lina	inei	al :t/in					
ate	gra	ive	nami al So	υE	ll c	3r	cip	II npc	ctic <i>jec</i>	lers				
Ŭ	Pro	rog	Hum ociź	Deer	Ski ele(Inté	Dis ied	Ski Coi	Pra /Pru	ip Oth				
		ен	E E E E E E E E E E E E E E E E E E E		1				\checkmark					
			I		1	I								


Subject	Subject Name :	С	L	т/	P/R	Ту/
Code:	COMPUTER SOFTWARE LAB (WORD, EXCEL,			S.Lr		Lb/
HBCC22L01	POWERPOINT, PAINT, INTERNET)					ETL
	Prerequisite: NIL	2	0	0/0	3/0	Lb

UNIT1: OFFICEAPPLICATIONS-I

MS OFFICE: MS-WORD

- UNIT2: OFFICEAPPLICATIONS-II MSOFFICE:MS-EXCEL
- UNIT3: OFFICEAPPLICATIONS-III MSOFFICE:MS-POWERPOINT
- UNIT 4: MICROSOFT PAINT EXERCISES IV
- UNIT 5: INTERNET& ITS APPLICATIONS- V

Total No. of Hrs : 45



HBCC22L01 Computer software lab (MS office-Word, Excel, Powerpoint,

Paint and Internet)

SUGGESTED HANDS ON EXERCISES

UNIT 1 :MS OFFICE: MS-WORD

- 1. Preparing a Govt.Order / Official Letter/ Business Letter/ Circular Letter Covering formatting commands -font size and styles -bold, underline, upper case, lowercase, superscript, subscript, indenting paragraphs, spacing between lines and characters, tab settings etc.
- Preparing a newsletter: To prepare a newsletter with borders, two columns text header and footer and inserting a graphic image and page layout.
- Creating and using styles and templates
 To create a style and apply that style in a document
 To create a template for the styles created and assemble the styles for the template.
- Creating and editing the table
 To create a table using table menu
 To create a monthly calendar using cell editing operations like inserting, joining, deleting,
 splitting and merging cells
 To create a simple statement for math calculations viz. Totalling the column.
- Creating numbered lists and bulleted lists
 To create numbered list with different formats (with numbers, alphabets, roman letters)
 To create a bulleted list with different bullet characters.
- Printing envelopes and mail merge.
 To print envelopes with from addresses and to addresses
 To use mail merge facility for sending a circular letter to many persons To use mail merge facility for printing mailing labels.
- Using the special features of wordTo find and replace the text To spell check and correct. To generate table of contents for a documentTo prepare index for a document.
- 8. Create an advertisementPrepare a resume.

UNIT2: MSOFFICE:MS-EXCEL

- Using formulas and functions: To prepare a Worksheet showing the monthly sales of a company in different branchoffices (Showing Total Sales, Average Sales).
 Prepare a Statement for preparing Result of 10 students in 5 subjects (using formula to get Distinction, A Grade, B Grade, C Grade and Fail under Result column against each student).
- Operating on the sheets: Finding, deleting and adding records, formatting columns, row height, merging, splitting columns etc. Connecting the Worksheets and enter the data.



- 3. Creating a Chart: To create a chart for comparing the monthly sales of a company in different branch offices.
- 4. Using the data consolidate command: To use the data consolidate command to calculate the total amount budgeted for all departments (wages, travel and entertainment, office supplies and so on) or to calculate the average amountbudgeted for – say, department office expenses.
- 5. Sorting Data, Filtering Data and creation of Pivot tables.

UNIT 3: MS OFFICE: MS-POWER POINT

- 1 Creating a new Presentation based on a template using Auto content wizard, design template and Plain blank presentation.
- 2 Creating a Presentation with Slide Transition Automatic and Manual with different effects.
- 3 Creating a Presentation applying Custom Animation effects Applying multiple effects to the same object and changing to a different effect and removing effects.
- 4 Creating and Printing handouts.

UNIT 4: MICROSOFT PAINT EXERCISES

- 1. To show your understanding of Microsoft Paint, label the drawing with the following labels: zoom tool, eraser, line thickness, example clipart, arrow shape, line tool, get more colors, add text, document title, save icon, undo, select, rotate, icon, fill, freehand tool, copy, color 2. You only need to use each label once.
- 2. Microsoft Paint Exercise
 - A. Create a logo for a business.

B. Examples: for a computer shop, a greengrocer, a garage, an education centre, a restaurant, a sports club, or anything you choose!

- C. Get ideas by looking at other business/popular logos.
- D. You can insert clipart.
- E. Save your drawing as Logo.
- F. Print your logo. Use Page Setup to fit your logo to the page.

*Ensure your logo represents the business and contains some text.

UNIT 5: INTERNET & ITS APPLICATIONS

- 1. Searching for a web site / application / text documents viewing and downloading.
- 2. Create an E-mail account, Retrieving messages from inbox, replying, attaching files filtering and forwarding
- 3. Operating on a Tablet / Smart Phone browsing and practising on some important applications (UcBrowser, Skype) operating on internet creating and sending messages / mails using the applications like WhatsApp and WeChat downloading text and media files and video conferencing using Skype.



Subject Code:	Subject	Name :					C	L	٦	г/	P/R	Ty/
HBCF22L01		C PR	OGRAMM	ING LAE	3				S	.Lr		Lb/
												ETL
	Prerequ	isite: Funda	mentals of	Compute	er and		2			10	2 /0	
	Program	nming					2	0	0	/0	3/0	LD
L : Lecture T : T	utorial S	S.Lr : Superv	ised Learnii	ng P:Pro	oject R : Re	sear	ch C: Cre	dits		•		
Ty/Lb/ETL : The	ory/Lab/	Embedded 1	Theory and	Lab								
OBJECTIVES :												
To train	students l	now to use M	IS Office app	lications u	se in office v	vork	such as ci	reating p	rofess	ional-qua	lity	
docume MS Exce	nts; store,	organize and the student	analyze info	ormation; g tables s	arithmetic o	perat	tions and	tunction	IS. nalvcio	-		
Gain kno	owledge ir	practical ap	plications of	Word, Ex	cel, Powerpo	int, F	Paint and	Internet				
COURSE OUTCOR	MES (COs)	: (3- 5)		-	•							
CO1	Demonst	rate the usag	ge of various	operation	is in MS Wor	d						
CO2	Perform	calculations i	n Microsoft	Excel usin	g both manu	ally ii	nputting	formulas	and b	uilt-in fun	ctions	.
CO3	Develop	dynamic slide	e presentatio	ons with a	nimation, na	ratio	on, image	s, and m	uch m	ore, digita	lly an	d
604	effective	ly.	to also also alter									
C04	To create	e drawings to	Include clipa	art, color,	snape, size, t	ext,	ennance	text				
Manning of Course Outcomes with Program Outcomes (POs)												
							POG	D	07	POS		
CO1	3	3	1	2	1	, ,	2	- F	3	1	-	2
CO2	3	2	3	2	2		2		3	1		3
CO3	3	3	1	2	1		2		3	-		2
CO4	3	2	1	1	1		2		2	-		2
CO5	3	3	1	1	1		2		3	1		3
		•	•									
COs / PSOs		PSO1			PSO2					PSO3		
CO1		3			2					1		
CO2		3			3					2		
CO3		2			2					1		
CO4		3			1					1		
205	<u></u>	3		h 2 h4	1					1		
3/2/1 indicates	Strengtr	of Correlat	ion 3-Hig	gh, 2- Me	dium, 1-Lov	N					1	
ategory	gram Core	ram ive	lanities and I Science	1 Elective	ll enhancing ctive	ŗ	ciplinary/All	ll nponent		ctical oject/internsh	lers	
Ü	Pro	Prog elect	Hum socie	Opei	Ski elec	Inte	Dis ied	Ski Coi		Pra /Pro ip	Oth	
		♥								√		



Subject Code:	Subject Name :	С	L	Т/	P/R	Ту/
HBCF22L01	C PROGRAMMING LAB			S.Lr		Lb/ ETL
	Prerequisite: Fundamentals of Computer and Programming	2	0	0/0	3/0	Lb

Write a C program for the following:

- 1. Finding Biggest number among three numbers
- 2. Finding whether the given number is prime or not
- 3. Reverse a string and check for palindrome
- 4. GCD of two numbers
- 5. Fibonacci series
- 6. Matrix Operations
- 7. Factorial using Recursion
- 8. Prepare student mark sheet using structures
- 9. Swapping using Pointers
- 10. File Operations

Total Hrs: 45



			C	омми	JNICATI	ON SK	ILL		С	L	T/S.L r	P/R	Ty/Lb / ETL
HBCC22I0 ⁻	1 Tota	l contact l	nou	rs– 15					1	0	0/0	2/0	IE
	Prer	equisite-F	Plus	2Engl	ish								
	Cou	rse desigr	ned	by–De	epartme	ent of	Englis	h					
Course Ob	jectives:			-			-						
 Undersit Shed of focused Listenal Read at Read at Use lan global of 	tandthecol ff language d on gramr ndspeakfo nd write fo iguage skil culture.	nceptsofo e anxieties nar and co rinterpers r life long lls to prac	omn s an onve ona lear tice	nunica d gair ersatio lcomr rning, coope	ationand on. nunicati knowle eration a	ionan dge e and te	dacade nhanc	nguageasan ak in Englisl emicactivitie ement and i irit and follo	h with es. resea	rch.	ethics i	n the	e
1 Us	e Enalish a	as a medi	um	of con	nmunica	ation	or aca	demic and	profe	ssio	nal atta	inm	ent
2 Shi pra 3 Lis	Shedoff language anxieties and gain confidence to speak through communication practices. Listen and speak for interpersonal communication and academic activities.												
4 Re	ad and wr	ite for lifel	ong	learn	ing, kno	wledg	ge enh	ancement a	and re	esea	rch.		
5 Use English language skills to practice cooperation and team spirit and follow social ethics in the global culture.													
Program Specific Objectives													
PS01 PS02	PSO1 Understanding of the basic concepts of English language and literature.												
PSO2													
PSO4	Promotion	ofculturaly	alua	sandre		illethr		alishlanayaa		itora	turo	511	
(H/M/L indicat	tes the stren	Mapping ath of correl	of co	ourse ou	i tcomes (COs) wi /Iedium	th Progra	am Outcomes (POs)				
Cos	PO1	PO2	P	, 03	PO4		PO5	PO6	PO7		PO8		PO9
1	3	3		3	1		3	3	2		2		3
2	3	3		3	1		3	3	2		2		3
3	3	3		3	1		3	3	2		2		3
4	3	3		3	1		3	3	2		2		3
5	3	3		3	1		3	3	2		2		3
C	ז	viapping of c	ourse	eoutcor	mes (Cos)	with pr	ogram S	pecific outcom	es (PSO	is)		DCC	4
COS	1	2			PSO2			PS03				PSO4	4
CO1		2			2			2				2	
CO2		2			2			2				2	
CO4		3			3			3				3	
CO5		3			3			3				3	
		H/M//L Ind	icate	s Strens	gth of Cor	relatior	 : H- Hig	h; M- Medium;	L- Low	r		-	
Category	Program Core	Program elective		Huma and so Scien	Humanities Open El and social Science		Elective	Skill enhancing elective	Inter Discip y/Allie	linar 2d	Skill Compon t	Pr en/P rn	actical roject/inte ship
4	Approval	/al Meeting of Academic Council June 2022											



Sub. Code	Subject Name	С	L	T/S.Lr	P/R	Ty/Lb/ ETL
HBCC22I01	COMMUNICATION SKILL	1	0	0/0	2/0	Ε

(Common to all UG H&S Courses) PRACTICAL-LANGUAGESKILLSDEVELOPMENT

Prefatory note:

The paper seeks to train students in communicative skills and also give a firm foundation in listening and speaking by engaging students with authentic audios and videos ; the students will immensely benefit from strategy instruction for effective reading and writing; they will be able to recognize the importance of grammar and vocabulary for effective reading and writing. The present global scenario requires increasing need for clear and cordial communication with people from different culture. Cultural Intelligence is given as a unit to help students learn about low and high context cultures. It aligns with the University's mission of disseminating knowledge in the pursuit of education, learning and research at the highest international levels of excellence.

Methodology: Flipped Classrooms and Mobile Assisted Language Learning

Course **Objective**

The students will be facilitated to

- 1. UseEnglishasamediumofcommunicationforacademicandprofessionalattainment
- 2. Shed off language anxieties and gain confidence to speak through communication practices.
- 3. Listen and speak for interpersonal communication and academic activities.
- 4. Read and write for life long learning, knowledge enhancement and research.
- 5. Use language skills to practice cooperation and team spirit and follow social ethics in the global culture.

Unit-I Listening

- Listening for Social and Academic purposes
- Non-verbal and co verbal communication
- Imitating for pronunciation ,intonation, wordstress, etc.,

Cognitive Activity: Note taking during lecture sessions

Unit-II Speaking

The art of speaking and negotiating **Interpersonal Communication**



- 1. Opening conversation
- Introducing oneself
 Asking about others

18. Expressing dislikes

- 19. Comparing
- 20. Complaining

- 4. Making small talk
- 5. Asking for directions
- 6. Enquiring
- 7. Thanking
- 8. Appreciating
- 9. Offering help
- 10. Requesting
- 11. Persuading
- 12. Warning
- 13. Expressing regret
- 14. Agreeing
- 15. Disagreeing
- 16. Endinga conversation
- 17. Saying what you intend to do



Academic Communication

- 1. Instructional conversations
- 2. PowerPoint Presentation
- 3. Narrating about incidents
- 4. Public speaking -explaining success stories of self and others
- 5. Group Discussion
- 6. Interview for Projects and Placement

Unit-III Reading skills

- 1. Types and mechanics of reading
- 2. Tips for effective reading
- 3. Reading Strategies
- 4. Cognitive Strategy: Note Making, Comprehension exercise, oraland written review,

Unit-IV Writing Skills

- The Process of Writing
 - 1. Grammar, vocabulary, discourse markers and sentence construction
 - 2. Writing & Rewriting: drafting, revising, editing.
- Writing as ascaffolding activity
 - 1. Summarising
 - 2. Paraphrasing
 - 3. Precis writing
 - 4. Short notes and Essay writing

Unit-V Intercultural communication skills

- 1. Go local
- 2. Group behaviour
- 3. Email and intercultural communication
- 4. High and low context cultures
- 5. Cultural diversity interms of time and space

Total Hrs: 30

ASSESSMENT

Clubbed with each unit in the form of Audio listening, watching Videos, quiz, role play – public speaking, PPT presentation, reading and writing.



Course Outcome

On completing the course, the students will be able to

- Use English a same dium of communication for academic and professional attainment
- Shed off language anxieties and gain confidence to speak through communication practices.
- Listen and speak for interpersonal communication and academic activities.
- Read and write for life long learning, knowledge enhancement and research.
- Use language skills to practice cooperation and team spirit and follow social ethics in the global culture.

Prescribed Text

J. C. Richards with J. Hull & S.Proctor, Interchange, Cambridge University Press, 2015

Recommended Reading

- 1. P.D.Chaturvedi&M.Chaturvedi,CommunicationSkills,Pearson,2012
- Anderson, Kenneth Joan Maclean and Tony Lynch. Study Speaking , Cambridge:CUP 2004
- 3. Dutt, Kiranmai, P., Geetha Rajeevan, CLN Prakash, A Course in Communication Skills, Delhi:Foundations Books , 2008
- 4. LynchTony. Study Listening, Cambridge: CUP,2004
- 5. SeelyJohn.TheOxford Guideto WritingandSpeaking. Oxford:oup,1998.
- 6. Sethi, J., P.V. Dhamija. A Course in Phonetics and Spoken English2ndEd. NewDelhi,PrenticeHall ofIndiaPvt Ltd.2005.
- 7. Francoise, Grallet: Developing Reading Skills, Cambridge, CUP, 1981.
- 8. Yadugiri, M.A., MakingSenseofEnglish, NewDelhi, VivaBooks, 2006.
- 9. Yadugiri, M.A., The Pronunciation of English, New Delhi, VivaBooks, 2013.
- 10. Bailey, Stephen: Academic Writing: APractical Guide for Students, London and Newyork: Routledge Falmer, 2004.
- 11. Bjork Lennart Christine Raisanen: <u>Academic Writing- A University Writing Course</u>,3rded, Delhi
- 12. Ham-Lyons, LizBenHeasely: StudyWriting, Cambridge: CUP, 2006
- 13. Hewings, Martin: Advanced English Grammar, Cambridge: CUP, 1999
- 14. M.C. Rajeswaran, Dialogic paradigm in teaching and assessing English for Specific Purposes(ESP)inHigher Education, IUPJournalofEnglishStudies,Vol.XIV,No.4,Dec.2019
- 15. M.C. Rajeswaran, Permuting Role play in Oral Skill Assessment, International Journal of Innovative Research& Studies, Vol.13, Issue 12, pp.91-100, Dec. 2014
- 16. M.C. Rajeswaran, Enhancing Oral Communication Skills of Engineering Students through Role Play, Unpublished thesis, Dr. MGR, Educational and Research Institute, Chennai, April, 2017.



			SOFT SK	CILL I (F	nglish)		C	L	T/S.Lr	P/R	Ty/Lb/	
		(B .	A/BBA/BC	OM/BSV	V Program	s)					ETL	
HBCC2	22102	Total contac	ct hours – 15				1	0	0/0	2/0	IE	
		Prerequisite	-Plus 2 Eng	glish			·					
		Course desi	gned by – D	epartmen	t of English	l						
Objecti	ves:											
1.	Becom	e good listene	ers to get eng	gaged in i	nteractive c	communicati	on for ef	fecti	ve team bu	ilding.		
2.	Develo	p assertive ar	nd adaptive b	ehaviour	to be leade	rs						
3.	Develo	p peer interac	ction for a su		lifelong lea	rning.	с ·	1	. ,			
4.	Learn s	Kills necessat	ry for a coop	f research	ving in acad	temic and pi	ofession	al er	vironment	S		
J.			e purposes o	1 lesearci				1 pro				
Course	Outcol	mes (Cos)	1.1		1			66		.1 1.		
00	1	Become good	1 listeners to g	get engage	d in interacti	ve communic	ation for e	errec	tive team bu	illaing.		
00	2	Develop asse	rtive and adap	ptive beha	viour to be le	eaders						
00	3	Develop peer	interaction for	or a succes	stul litelong	learning.						
004	4	Learn skills r	necessary for a	a cooperat	ive living in	academic and	professio	onal e	environment	S		
00.	5	Use soft skill	se soft skills for the purposes of research and follow ethics in society and profession									
Progra	m Spec	ific Objectiv	es									
PSC	D1	Understanding of the basic concepts of English language and literature.										
PSC	02	Learning through literature in English, diverse historical cultural and social ethics										
PSC	03	Application of	of literary criti	ical perspe	ctives to ger	erate original	analysis	of lit	erature in Ei	nglish		
PSC)4	Promotion of	cultural valu	es and real	-life skills th	rough Englis	h languag	e and	literature			
(H/M/L ii	ndicates t	ا he strength of co	Mapping of co prrelation) H= H	urse outco Tioh: M= N	nes (COs) wi fedium: L = L	th Program O	utcomes (I	POs)				
COs	PO	s PO2	PO3	PO4	PO5	PO6	PO7	1	PO8		PO9	
1	3	3	3	1	2	2	1		2		3	
2	3	3	3	1	2	2	1		2		3	
3	3	3	3	1	2	2	1		2		3	
4	3	3	3	3	3	2	1		2		3	
5	3	3	3	3	3	2	1	(D)	2		3	
		Map	ping of course	outcomes	$\frac{(\cos)}{\sin^2}$ with pr	ogram Specifi	c outcome	s (PS	Os)	DSO4		
	<u>roi</u>	r	301	Г	2	Г,	2			2		
	$\frac{101}{102}$		2		2		2			2		
	CO3		3		2		2			2		
(CO4		3		2		2			2		
0	CO5		3		2		2			2		
		H/M	I//L Indicates	Strength of	f Correlation	: H- High; M	Medium;	L-L	ow			
Category	Prog	a Progra	Humanitie	Open	Skill	Inter	Skill		Practical			
	m Co	re m	s and	Electiv	enhancin	Disciplinar $v/Alliod$	Compo	nen	/Project/in	iter		
		elective	social	e	elective	y/Ameu	ľ		nsmp			
			Science									
		1					V					

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Sub. Code	Subject Name	С	L	T/S.Lr	P/R	Ty/Lb/ETL
HBCC22I02	SOFT SKILL I (English)	1	0	0/0	2/0	IE

Prefatory Note

This paper aims to equip students with skills essential for work place and global environment to which they will move on from the university, once they complete the course. As such, this paper provides students with a set of ten interlinked soft skills: Listening, team work, emotional intelligence, assertiveness, learning to learn, problem solving, attending interviews, adaptability, non-verbal communication and written communication. Students will get engaged in pair work, group work, role play, discussion, presentation, story telling, writing assignments etc.,

Course Objective

The students will be facilitated to

- 1. Become good listeners to get engaged in interactive communication for effective team building.
- 2. Develop assertive and adaptive behaviour to be leaders
- 3. Develop peer interaction for a successful lifelong learning.
- 4. Learn to learn skills necessary for a cooperative living in academic and professional environments
- 5. Use soft skills for the purposes of research and follow ethics in society and profession.

Unit -I

Listening, Speaking, Reading and Writing skills (LSRW)

Unit -II

Team work skills: adaptability, emotional intelligence, learning skills

Unit -III

Leadership Qualities: assertiveness, reasoning, compassion and compatibility

Unit -IV

Problem solving: willingness to learn, creative thinking, developing observation skills

Unit -V

Interview skills: employability skills, resume writing

Course outcome

On completion of the course the students will

1. Become good listeners to get engaged in interactive communication for effective team building.

Total Hrs: 30

- 2. Develop assertive and adaptive behaviour to be leaders
- 3. Develop peer interaction for a successful lifelong learning.
- 4. Learn skills necessary for a cooperative living in academic and professional environments
- 5. Use soft skills for the purposes of research and follow ethics in society and profession.

Suggested reading S.P. Dhanavel, English and Soft Skills, Vol. 1, Orient Blackswan Pvt. Ltd. 2010



SEMESTER II

Subject		Subj	ect Name:						С	L	T/SLr	P/	Ty/
Code:			TAMII	L PAPER - I	11							R	Lb/
HBTA220)2	Pror	anisite K	nowledge of	Tomil				3	3	0/0	0/	
		1101	equisite. K	nownedge of	1 anni				5	5	0,0	0/	ТУ
L : Lectur	e T : 1	Futoria	l SLr : Supe	ervised Learn	ning P: Proj	ect F	R : Resear	rch C :	Cred	its		Τ/	L/EL
: Theory /	Lab /	Embeo	lded Theory	and Lab									
OBJECT	IVES												
• Co:	mmun	nicating	with friend	ls from arou	nd the worl	d via	social ne	etworki	ng op	oportu	unities		
• To	devel	op 21 st	century lea	rners who lo	ve & appre	ciate	Tamil la	nguage					
• Lea	arn sig	gnificar	ice of spoke	en skill.									
• The	e relat	ionship	between la	inguage &cu	lture and th	e im	plication	s for la	ngua	ge tea	ching		
• Tra	vellin	ling to other countries and learning about other cultures.											
COURSE	OUT	TCOMES (Cos)											
Students c	omple	eting this course were able to											
CO1		Stren	Strengthen literacy skills										
CO2		Engag	Engage in learning Tamil language and culture in a meaningful setting										
CO3		Engro	Engross in independent and life-long learning										
CO4		Develop a strong foundation in listening & speaking skills.											
CO5	Arouse students interest and ignite the joy of learning Tamil language.												
Mapping of	Cours	ourse Outcome with Program Outcome (POs)											
Cos/POs		P01	PO2	PO3	PO4	P()5	PO6	P	07	PO	8	PO9
C01		3	3	2	3	2	,	3	-	3	3		2
CO2		2	2	3 2 3 2 2					3		3		
CO3		~		-	-			2			-		
CO4		3	3	2	3	2	,	3		3	3		2
C04		3 2 2	3 2	2 3	3 2	2	,	3 2		3 2	3		2 2
CO4 CO5	Strop oth	3 2 3	3 2 3	2 3 3	3 2 3	2 2 3	,	3 2 3		2 3 2 2	3 3 2		2 2 3
CO5 3/2/1 Indicates	Strength	3 2 3 n Of Corre	3 2 3 Elation, 3 – High	2 3 3 n, 2- Medium, 1-	3 2 3 Low	2 2 3 95	Os	3 2 3		2 3 2 2	3 3 2		2 2 3
CO5 3/2/1 Indicates COs	Strength	$\frac{3}{2}$	3 2 3 elation, 3 – High	2 3 3 n, 2- Medium, 1-	3 2 3 Low	2 2 3 PS	Os	3 2 3 PSO3		3 2 2	3 3 2	PSO4	2 2 3
CO5 3/2/1 Indicates COs	Strength	3 2 3 n Of Corre	3 2 3 elation, 3 – High PSO1 3	2 3 3 , 2- Medium, 1-	3 2 3 Low PSO2 3	2 2 3 PS	Os	3 2 3 PSO3 3		<u>3</u> 2 2	3 3 2	PSO4 3	2 2 3
CO5 3/2/1 Indicates CO5 CO 1 CO 2	Strength	3 2 3 n Of Corre	3 2 3 slation, 3 – High PSO1 3 2	2 3 3 n, 2- Medium, 1-	3 2 3 Low PSO2 3 2	2 2 3 PS	Os	3 2 3 PSO3 3 3		2 3 2 2	3 3 2	PSO4 3 3	2 2 3
CO5 3/2/1 Indicates COs CO 1 CO 2 CO 3	Strength	3 2 3 n Of Corre	3 2 3 elation, 3 – High PSO1 3 2 3	2 3 3 , 2- Medium, 1-	3 2 3 Low PSO2 3 2 3	2 2 3 PS	Os	3 2 3 PSO3 3 3 3 3		2 3 2 2	3 3 2	PSO4 3 3 3	2 2 3
CO3 3/2/1 Indicates COs CO 1 CO 2 CO 3 CO 4	Strength	3 2 3 n Of Corre	3 2 3 elation, 3 – High PSO1 3 2 3 2	2 3 3 , 2- Medium, 1-	3 2 3 Low PSO2 3 2 3 2 3 2	2 2 3 PS	Os	3 2 3 PSO3 3 3 3 3 3 3		2 3 2 2	3 3 2	PSO4 3 3 3 3 3	2 2 3
CO3 3/2/1 Indicates COs CO 1 CO 2 CO 3 CO 4 CO 5	Strength	3 2 3 n Of Corre	3 2 3 elation, 3 – High PSO1 3 2 3 2 3 3	2 3 3 a, 2- Medium, 1-	3 2 3 Low PSO2 3 2 3 2 3 2 3 2 3	2 2 3 PS	Os	3 2 3 PSO3 3 3 3 3 3 3 3 3 3			3322	PSO4 3 3 3 3 3 2	2 2 3
CO3 3/2/1 Indicates COs CO 1 CO 2 CO 3 CO 4 CO 5	Strength	3 2 3 n Of Corre 3/2/1	3 2 3 elation, 3 – High PSO1 3 2 3 2 3 1 ndicates S	2 3 3 a, 2- Medium, 1-	3 2 3 Low PSO2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 Correlatic	2 2 3 PS	Os - High,	3 2 3 PSO3 3 3 3 3 3 2- Mee	dium	2 2 2	3 3 2	PSO4 3 3 3 3 2	2 2 3
CO5 3/2/1 Indicates COs CO 1 CO 2 CO 3 CO 4 CO 5 Category	Strength	3 2 3 0 Of Corre 3/2/1	3 2 3 elation, 3 – High PSO1 3 2 3 2 3 1 ndicates S	2 3 3 a, 2- Medium, 1-	3 2 3 Low PSO2 3 2 3 2 3 Correlatic	22 22 33 PS	Os - High,	3 2 3 PSO3 3 3 3 3 3 3 2- Mee	dium	2 2 2 5, 1 - I Skill	3 3 2 	PSO4 3 3 3 3 2 Practical	2 2 3
CO5 3/2/1 Indicates COs CO 1 CO 2 CO 3 CO 4 CO 5 Category	Strength	3 2 3 0 Of Corre 3/2/1 ram	3 2 3 PSO1 3 2 3 2 3 2 3 Program alastiva	2 3 3 a, 2- Medium, 1- Strength Of Humanitie s and	323LowPSO23232323CorrelaticOpen Elective	22 22 33 PS	Os - High, ill hancing	3 2 3 7 9SO3 3 3 3 3 3 3 2- Mee Discip	dium	2 2 2 5 7 7 7 7 7 7 7	3 3 2 2 Low	PSO4 3 3 3 3 2 Practical Project/i	2 2 3 0 0 the rs
CO5 3/2/1 Indicates COs CO 1 CO 2 CO 3 CO 4 CO 5 Category	Strength	3 2 3 n Of Corre 3/2/1 ram	3 2 3 elation, 3 – High PSO1 3 2 3 2 3 Program elective	2 3 3 a, 2- Medium, 1-	323LowPSO232323CorrelaticOpen Elective	PS	Os - High, ill hancing ective	3 2 3 PSO3 3 3 3 3 3 3 3 2- Mee Discip ary/All	dium	5 , 1 - I Skill Comj nent	3 3 2 	PSO4 3 3 3 3 2 Practical Project/i tternship	2 2 3 0 0 the rs
CO5 3/2/1 Indicates COs CO 1 CO 2 CO 3 CO 4 CO 5 Category	Strength	3 2 3 0 Of Corre 3/2/1 ram	3 2 3 elation, 3 – High PSO1 3 2 3 2 3 2 3 Program elective	2 3 3 , 2- Medium, 1-	323LowPSO232323CorrelaticOpen Elective	PS	Os - High, ill hancing ective	3 2 3 PSO3 3 3 3 3 3 3 2- Mee Inter Discip ary/All d	dium	2 2 2 n, 1- I Skill Comp nent	3 3 2 	PSO4 3 3 3 3 2 Practical Project/i iternship	2 2 3 Othe rs



பொதுத்தமிழ்

இளநிலை மாணாக்கருக்கு

B.A/B.Sc/B.Com/B.B.A/B.C.A/B.PES

HBTA22002

முதலாம் ஆண்டு - இரண்டாம் பருவம்

கற்றல் நோக்கம்: 1.தமிழர் பண்பாட்டினை அறியச் செய்தல் 2. கடிதம் எழுதும் திறன் வளர்த்தல் 3.தமிழ் இலக்கிய வரலாற்றினை அறிதல்

அலகு - 1 சங்க இலக்கியம்

9 மணி நேரம்

1. புறநானூறு - பா.எண் - 183,184,192

2. குறுந்தொகை - பா. எண் 2,40,167

3. நெடுநல்வாடை - 1 முதல் 44 வரிகள் வரை

4.**கலித்தொகை - பா.எண்** 102,133

அலகு - 2 காப்பியம்

1. சிலப்பதிகாரம் - வழக்கு உரை காதை முழுவதும்

அலகு - 3 நீதி இலக்கியம்

9 மணி நேரம்

9 மணி நேரம்

1.திருக்குறள் - 34,72,96,102,103,116,124,136,158,395 (10 குறள்கள்) 2.நாலடியார் - 1,11,29,32,43,51,74,103,116,135 (10 பாடல்கள்) 3.ஆசாரக்கோவை - 20,23,25,76,96 (5 பாடல்கள்) 4.திரிகடுகம் - 7,12,27,31,38,(5 பாடல்கள்)

அலகு - 4 தமிழ் இலக்கிய வரலாறு 🧴 🤋 மணி நேரம்

- 1. பக்தி இலக்கியம்
- 2. சிற்றிலக்கியம்

அலகு - 5 இலக்கணம்

9 மணி நேரம்

- 1.வல்லினம் மிகும் இடங்கள்
- 2. வல்லினம் மிகா இடங்கள்
- 3. வினா வகைகள்
- 4. விடை வகைகள்

மொழிப்பயிற்சி



1. கடிதம் எழுதும் முறை

2.செய்வினை - செயப்பாட்டு வினை

3.மயங்கொலிப் பிழையை நீக்குக



Subject	Sub	oject Name: HINI	DI II				с	L	T/SLr	P/R	Ty/ Lb/	
Code: HBHI220	02 Pre	requisite : Know	ledge of Hind	di			3	3	0/0	0/0	Ty	
L : Lecture	e, T : Tu	torial,SLr : Super	vised Learnir	ng, P: F	Project,	R : Resea	arch, C	: Credits	5,		<u>.</u>	
T/L/ETL :T	heory /	Lab / Embedded	l Theory and	Lab								
OBJECTIV	ES											
1.To	o Under	stand the Ancier	nt Hindi plays	s and i	ts aspec	ts.						
2.To	o under	stand the mediva	al stories and	l well	known r	novels						
3.To	o know	the techniques i	n writing An	notati	on and ⁻	Franslati	on					
COURSE C	OUTCON	MES (Cos)										
Stu	dents co	ompleting this co	urse were al	ole to								
CO1	Introdu	ice students to the	real world si	tuatior	n with the	e help of	Plays a	nd storie	s written	by variou	s poets	
	and wr	ıd writers.										
CO2	Understand the Literature in broader areas than merely confined to the subject											
CO3	Evalua	te the concept of I	Hindi from pa	st to p	resent ar	nd to stud	dy the s	ociety clo	osely thro	ugh Litera	ature.	
CO4	Make	the best use of H	indi languag	e in va	arious st	reams.						
CO5	Helps i	n their Career ac	quiring knov	vledge	e in a lan	guage						
Mapping	of Cours	se Outcome with	Program Ou	tcome	e (POs)							
Sem II	Progra	ammeOutcomes	(Pos)									
Cos	PO1	PO2	PO3	PO4	PO5	P	06	PO7	,	PO8	PO9	
CO1	3	2	3	2	3		3	3		3	3	
CO2	3	3	3	3	2		3	3		3	2	
CO3	3	3	2	3	3		3	3		3	2	
CO4	2	3	3	3	3		2	2		3	3	
CO5	3	3	3	3	3		2	2		3	3	
	-	3/2/1 Indicates	Strength Of	Corre	elation.	3 – High	, 2- Me	edium. 1	- Low			
Category F	Program F Core	Program elective	Humanities and social Ele Science	en Sl ective ^{er}	kill hancing ective	Inter Disciplina	ry/Allie	Skill dCompon	Practic ent/Projec	al t/internshij	Others	



Subject	Subject Name: HINDI II	•		T/OI		
Subject		С	L	1/SLr	P/R	Ty/ Lb/
Code:		2	2	0/0	0/0	
HBHI22002	Prerequisite : Knowledge of Hindi	3	3	0/0	0/0	ТУ
L : Lecture, T	: Tutorial, SLr : Supervised Learning, P: Project, R : Research,	, C : Crec	lits, T/L/	ETL		
:Theory / Lat) / Embedded Theory and Lab					
UNIT – I One	Act Play – novel and translation of hindi language)				9 H	rs
1. Aurar	zeb ki AakhiriRaat					
2. Mukt	nidhan					
3. Practi	ce of Annotation Writing					
4. Practi	ce of Summary and Literary evaluation Writing					
	Act Play - novel and translation of hindi language)				٥u	rc
1. Laksm	ni kaSwagat				511	13
2. Mitha	veewala					
3. Practi	ce of AnnotationWriting					
4. Practi	ce of Summary and Literary evaluationWriting					
					• • •	
UNIT-III One	Act Play – novel and translation of hindi language)				9 H	rs
I. Basan	t Ritu kaNatak					
2. Seb A	ur Dev					
3. Practi	ce of Annotation writing					
4. Practi	ce of Summary and Literary evaluationWriting					
UNIT-IV One	Act Play – novel and translation of hindi language)				9 H	rs
1. Bahut	BadaSawal					
2. Vivah	ki TeenKathayen					
3. Practi	ce of AnnotationWriting					
4. Practi	ce of Summary and Literary evaluationWriting					
UNIT-V (Tran	slation of Hindi Lanaguage to English language-paragrap	h, techr	nical ter	ms)	9 H	łrs
1. Translatior	Practice. (English to Hindi)					
1. Aatl	n Ekanki, Edited by Devendra Raj Ankur, Mahesh AnandVa	aani pra	kashan,	4695, 21	L- A	
Dariy	vagunj, New Delhi-110002		• · /=			
2. Swai (opp	na Manjari, Edited by Dr.Chitti Annapurna, Rajeshwari Pu .Ranganthan Street) T.Nagar, Chennai-600017	ublicatio	ns 21/3	Mothila	al street	1

- 3. Prayojan Mulak Hindi : Dr.Syed Rahmathullah, Poornima Prakashan, 4/7, Begum III street, Royapettah, Chennai-14
- 4. Anuvad Abhyas Part III Dakshin Hindi Prachar Sabha, T.Nagar , Chennai -17



Department of French

Course	e /subject	New sub cod	e:	Semester	п				
C	ode	HBFR22002	2						
Cat	egory	All UC	B Progr	ams	С	L	T/SLr	P/R	Ty/ Lb/ ETL
Cour	se Title	FRENCH	II (TI	HEORY)	3	3	0/0	0/0	Ту
L: Lecture	T: Tutorial SL	Lr: Supervised Lea	arning	P: Project R :]	Resea	urch (C: Crec	lits	
T/L/ETI	L: Theory / La	ab / Embedded Th	neory a	nd Lab					
Objectives 1. Studen and distin 2. The st catalogue 3. The st 4. The st their livit	nts will be able nctly. sudents will be es. udents will be a tudents will be ng spaces	to understand the able to reads; he/sl ble to communicate able to use expres	familian he will e and as sions an	r words and exp be able to unde sk and reply to s nd write simple	oressio erstand simple sente	ons w d the e ques	when som posters stions of withou	neone f , advert n famili t faults	talks slowly isements or ar subjects to describe
Course Outcome	Course Outcome Bloor								
CO 1	Repeating the basics learnt and memorizing new a factors like theRemenconjugations								nembering
CO 2	Understandin immediate su simple annou	g very frequent exp rrounding and wha ncements and clea	oressior It conce r messa	ns and vocabula erns the speaker age.	ry coi . Alsc	ncern o und	ing erstand	Un	derstanding
CO 3	Can read ,und papers or cata messages	lerstand and act up alogues ,menu card	on on s Is, timin	hort announce ngs and persona	ments I shot	s clas: and	sified in		Applying Analyzing
CO 4	Can utilize a so terms family l activities	eries of sentences iving conditions stu	or expro udies ar	essions to descr nd actual and re	ibe in cent l	i simp profe	ole ssional	E	valuating
CO 5	Can communicate simple and direct exchange originating from simple habitual tasks on familiar activities and subjects.								Creating
CO 6	Can communi habitual tasks	cate simple and dir on familiar activiti	rect exc es and	hanges originat subjects	ing fr	om si	mple		Creating
CO 7	Can write notes and simple and short messages, write like on picture postcard messages of personal vacations and thank you letters.					ure		Creating	

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(An ISO 21001 : 2018 Certified Institution) Perivar E.V.R. High Road, Maduravoval, Chennai-95, Tamilnadu, India.	

			MAPPI	ING OF	Cos WI	TH POs			
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	1	2	2	2	2	3	2	2	1
CO2	2	2	2	2	3	3	1	2	3
CO3	2	1	2	1	3	3	2	2	1
CO4	1	2	1	2	2	2	2	1	1
CO4	2	2	2	1	1	1	1	2	1
CO5	1	1	2	2	1	1	1	1	1
CO6	1	1	2	2	1	1	1	1	1
CO7	1	1	2	2	1	1	1	1	1
	H/N	M/L indica	tes strengt	h of corre	lation 1-	High 2-M	edium 3-	Low	
Category	Program Core	Progr am electi	Humanities and social Science	Open Elective	Skill enhancing elective	Inter Disciplinar y/Allied	Skill Componen t	Practical /Project/int ernship	Others
			~						



Subject	Subject Name: FRENCH-II (THEORY)	С	L	T/SLr	P/R	Ty/ Lb/
Code:						ETL
	Prereguisite : Knowledge of Hindi	3	3	0/0	0/0	Ту
HBFR22002						-
L : Lecture, T :	Tutorial, SLr : Supervised Learning, P: Project, R : Research	, C : Crec	lits, T/L/I	ETL		
:Theory / Lab	/ Embedded Theory and Lab					

UNIT I

9hrs

Compétences communicatives, phonologiques, linguistiques, grammaticales et culturelles

• Se saluer, prendre congé, se présenter quelqu'un/quelque chose, Salutations, présentatifs, détails d'identité, professions, quartiers

• Genres, nombres, articles, présentatifs, pluriels des noms, c'est/il est, pronoms toniques

• Salutations française, comportement des salutations, les quartiers parisiens, le peintre Monet

Clip audios : Exercices orales, compositions orales et épreuves orales. (20 –durée moins de 2 minutes)

Audio clips- For oral expressions, oral assignments and oral test-20- duration less than 2 minutes (10 oral exercises, 6 audio reading compositions& 4 tests).

UNIT II

9hrs

Compétences communicatives, phonologiques, linguisiques, grammaticales et culturelles

• Dialogue de la vie d'étudiant, des liens familiaux, de l'appartenance, des habitudes ; poème, le son « eu » énonces a répéter, lecture guidée.

• S'exprimer de la fréquence, des habitudes, articles, present de l'indicatif, verbes a la terminaison – er, adjectifs possessifs et qualificatifs, locutions avec « avoir »

• Demander l'heure, Les jours, Les mois de l'année.

Clip audios : Exercices orales, compositions orales et épreuves orales.(20 –durée moins de 2 minutes)

Audio clips- For oral exercises, oral assignments and oral test-20 duration less than 2 minutes (10



oral excercises ,6 audio reading compositions& 4 tests).

UNIT III

9hrs

Compétences communicatives, phonologiques, linguistiques, grammaticales et culturelles

• Parler des voyages, identifier les vêtements, caractériser de personnes, faire des exclamations, s'informer sur la vie d'étudiant français.

- Poème, le « son i », décrire des personnes, prononcer le nom des pays et des nationalités, appréciation/exclamation
- Transport et voyages, les pays, nationalités, la mode, la partie du corps ,Adjectifs de nationalités et genres, adjectifs réguliers/irréguliers, prépositions de lieux, verbes aller- venir et verbes a la terminaison –ir

• L'aéroport de Roissy, a la douane, les vêtements, a mode a paris, quelques professions, le sport et la sante ; a Joconde, la BD,

Clip audios : Exercices orales, compositions orales et épreuves orales. (20 –durée moins de 2 minutes)

Audio clips- For oral expressions, oral assignments and oral test-20-duration less than 2 minutes (10 oral exercises ,6 audio Reading compositions& 4 tests)

UNIT IV

9hrs

Compétences communicatives, phonologiques, linguistiques, grammaticales et culturelles

• Communication au restaurant, des recettes, le gout et les préférences identifier le type des restaurants.

• Poème, le son « o » énonces simples, des sons nasaux, exercices de répétition

• Les repas français recette activités et sportives

Clip audios : Exercices orales, compositions orales et épreuves orales.(20 –durée moins de 2 minutes)

Audio clips- For oral expressions, oral assignments and oral test-20 duration less than 2 minutes (10 oral exercises ,6 audio reading

UNIT V

9hrs

Compétences communicatives, phonologiques, linguistiques, grammaticales et culturelles

• Planifier des vacances, parler des concours, du sport, du temps qu'il fait, s'exprimer au comparatif

INSTITUTE

- Poème le son « yu », répétition d'énonces, lire de noms de quelques villes
- Activités de vacances, mots de localisation, plan de Paris, le climat et l'écologie, un concours international, les saisons
- Adjectifs de couleur, nombres ordinaux, quelques verbes irréguliers,
- 3 temps autour du présent « de » et « a » et des verbes. Différentes formes du négatif, « il fait » le comparaient le superlatif absolu
- Auberges de jeunesse, vacance, plan de Parise arrondissements quelques monuments parisiens, tourisme fluvial français

Clip audios : Exercices orales, compositions orales et épreuves orales. (20 –durée moins de 2 minutes)

Audio clips- For oral expressions, oral assignments and oral test-20 duration less than 2 minutes (10 oral exercises , 6 audio Reading compositions& 4 tests).

Total Hrs: 45

Reference Books:

1. Parlez-vous français?Partie 1 - Dr.M.Chandrika.V.Unni &Mrs. Meena Mathews 2019 by Universal publisher

- 2. CLE INTERNATIONAL Lectures Clé en français facile. (2012) Hachette Paris
- 3. Cosmopolite: Livre de eleve A1 by Nathalie Hirsch sprung, Tony Tricot, Claude Le Ninan
- 4. Latidudes-1 by Régine Mérieux & Yves l'oiseau, Didier 2017
- 5. Alter Ego 1 Catherine Dolez, Sylvie Pons : (2014) Hachette, Paris



HBEN	1	ANGUA	GE II - I		1 11				Т	y/Lb/	L	T/ P/	R C
22002	2 (Commo	n to all	UG Cou	irses ur	der H&	S)		E	TP	S	.Lr	
	-	Fotal co	ntact ho	ours – 45	5				Т	ý	3 0	/0 0	3
	I	Prerequi	site – E	nglish La	anguage	5					11		
		T/L/:The	ory/Lab	L:Lectu	reT:Tut	orialP:P	ractical	/Project	R:Resea	archC:C	redits		
Cours	e Objec	tives											
1.	Devel	op four l	anguage	skills ap	propriat	e to the l	level of e	education	n.				
2.	Demo	onstrate k	nowledg	e of voc	abulary : ledge in	and sente	ence con	struction	in appr ral conte	opriate c	contexts.		
4.	Attair	a compi	chensiv	e knowle	edge of c	ommuni	cation sl	kills to u	se ethica	lly.			
5.	Devel	lop organ	ized aca	demic ar	nd busine	ess writi	ng for pr	ofession	al career	s.			
Cours	e Outco	omes (C	Os)		•								
	. Devel	lop four l Instrate k	anguage nowleds	skills ap e of voc	propriat abulary :	e to the l and sente	level of e ence con	education struction	n. 1 in appr	opriate c	ontexts		
3	. Expre	ess divers	e forms	of knowl	ledge in	different	social a	nd cultu	ral conte	xts.			
4	. Attair	n a compi	ehensiv	e knowle	edge of c	ommuni	cation sl	cills to u	se ethica	lly.			
J Drogra	am Sno	op organ			ia busine	ess writh	ng for pr	oression	al career	S.			
FIUgit	Demo	nstrating	master	v of the	compo	nents of	f Englis	h langu	age and	literatu	re		
•	 Demonstrating mastery of the components of English language and literature. Explaining through literature in English, diverse historical cultural and social ethics 												
•	 Explaining through literature in English, diverse historical cultural and social ethics Applying literary critical perspectives to generate original analysis of literature in English 												
•	Prom	oting cu	ultural	values	and re	al-life	skills t	hroug	h Engli	sh lang	uage o	ind	
	Liter	ature						5	5	5	5		
Mappi	ing of co	urse out	comes (COs) wit	h Progra	m Outco	omes (PO	Os)& Pro	ogram Sp	ecific O	utcome	s	
	T	(3/2/1 i	ndicate	s the s	trength	of cor	relatior	n) 3= Hi	gh; 2= /	Medium	; 1= Lo	W	1
СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO	PSO	PSO	PSO
										1	2	3	4
1	3	3	3	3	3	3	3	1	3	3	3	3	3
2	3	3	3	3	3	3	3	1	3	3	3	3	3
3	3	3	3	3	3	3	3	1	3	3	3	3	3
4	3	3	3	3	3	3	3	1	3	3	3	3	3
5 2	3	3	3	3	3	3	3	1	3	3	3	3	3
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Course Code		Ty/Lb/	L	T/	P/R	С
	LANGUAGE-II : ENGLISH II					
HBEN22002	(Common to all UG H&S Courses)	Ту	3	0/0	0/0	3
	T/L/:Theory/LabL:LectureT:TutorialP:Practical/ProjectR:Res	earchC:C	Crec	lits	II	

Course Objective

- 1. Develop four language skills appropriate to the level of education.
- 2. Demonstrate knowledge of vocabulary and sentence construction in appropriate contexts.
- 3. Express diverse forms of knowledge in different social and cultural contexts.
- 4. Attain a comprehensive knowledge of communication skills to use ethically.
- 5. Develop organized academic and business writing for professional careers.

Unit I:

- 9 Hours 1. All the World's a Stage – William Shakespeare 2. Speech of Barack Obama 3. The Verger- Somerset Maugham Unit II: 9 Hours 1. Spider and the Fly - Mary Howitt 2. "They thought that a bullet would silence us, but they failed". - Malala Yousafzai 3. Refund – Fritz Karinthy Unit III: 9 Hours 1. Night of the Scorpion-Nissim Ezekiel 2. On Running after one's hat- G.K.Chesterton 3. The Last Leaf – O. Henry Unit IV: 9 Hours 1. Polonius Advice to Laertes-William Shakespeare 2. 'We Must Continue to Dream Big': An open letter from Serena Williams 3. The Necklace - Guy de Maupassant Unit V: 9 Hours 1. Functional English: Letter Writing (Formal, Informal, Email) 2. Resume 3. Précis 4. Reading Comprehension
 - Developing the hints

Course Outcome: On completion of the course, the students will be able to

- 1. Develop four language skills appropriate to the level of education.
- 2. Demonstrate knowledge of vocabulary and sentence construction in appropriate contexts.
- 3. Express diverse forms of knowledge in different social and cultural contexts.
- 4. Attain a comprehensive knowledge of communication skills to use ethically.



5. Develop organized academic and business writing for professional careers. **Prescribed Text**:

- 'Greatest Speeches of the Modern World', Rupa Publications India, 2018.
- Woudhuysen H.R. 'The Arden Shakespeare third series', the Arden Shakespeare Publishers, 2020.
- Karinthy. Fritz, 'Refund: A Play in One Act', French. Samuel, 1938.
- Simpson H. C & Wilson E. H, 'A Senior Anthology of Poetry', Macmillan Education, 1952.
- O'Brien. Terry, '50 Greatest Short Stories', Rupa Publications India; First Edition, 2015.
- J. C. Richards with J. Hull & S.Proctor, Interchange, Level 3, Cambridge University Press, 2021.
- Mark Hancock, English Pronunciation in Use, CUP, 2016.
- M. Chandrasena Rajeswaran &R. Pushkala, Communication Lab Work book 2022.
- M. Chandrasena Rajeswaran, R. Pushkala & S. Bhuvaneswari Pinnacle: A Skills Integrated Text, 2022
- Dutt, K, Rajeevan, G & Prakash, , A Course on Communication Skills, 1st edn, CUP, Chennai, 2008

Suggested Links:

- <u>https://www.poetrybyheart.org.uk/poems/the-spider-and-the-fly/Reference.</u>
- <u>https://poets.org/poem/unknown-citizen</u>



Subject HBMA2	Code: 2ID2	Subject N	ame: ALL	IED-II MAT	THEMATICS	-11	С	L	T/SL r	P/R	Ty/Lb / ETL
		Prerequisit	te: Higher S	Secondary	Mathemati	CS	3	3	0/0	0/0	Ту
L : Lect	ure T : T	utorial C: (Credits								
OBJEC	TIVES										
• T	o understa	nd the Basic o	concepts in C	Ordinary Diff	ferential equ	ations					
• T	o understa	nd the Basic o	concepts in P	artial Differ	entiation						
• T	o understa	nd the Basic o	concepts in N	/ultiple inte	grals						
• T	o understa	nd the Basic o	concepts in L	inear progra	amming						
• T	o understa	nd the Basic o	concepts in T	ransportati	on and Assig	nment					
COURS	SE OUTC	OMES (Co	os)								
Studen	ts comple	eting this co	ourse were	able to							
CO1	Unc	erstand the b	asic concept	t First order	differential e	equations – S	econd a	nd hig	her orde	r linea	r
	diffe	erential equat	ions with co	nstant coef	ficients.			-			
CO2	Unc	erstand how	to solve the	Problem in	Partial deriv	atives ,Jacobi	ans ,Ma	ixima a	and Mini	ma of	
	fund	ctions of two	variables and	d Lagrange's	multipliers.						
CO3	Lea	n how to solv	e problems	in Cartesian	and Polar C	o-ordinates (I	Double a	and Tri	ple integ	ral) an	d
	Cha	nge of order o	of integratio	n.							
CO4	Unc	erstand the c	oncept inFo	rmulation of	f LPP, Standa	rd form of LP	P, Grap	hical m	nethod a	nd Sim	plex
	met	hod.									
CO5	Lea	n to solve pro	oblems in Tr	ansportatio	n using MO	DI method a	nd Assig	nment	problem	n using	
	Hur	garian metho	od.								
Mappir	ng of Col	urse Outco	me with H	rogram (Jutcome (POs)					
Cos/PO	s PO1	P02	PO3	P04	P05	P06	P0/	, 	804		PO9
		2	3	3	2	1	2		2		1
	2 3	2	2	3	3	2	1		2		3
	3 3	2	3	2	3	2	2		1		3
	+ 3 5 3	3	2	3	2	2	2		2		2
		PS01	5	•	5	PS02			2 P	503	0
CO1		1001	3			2			3		
CO2	2		3			2			2		
COS	3		3			2			2		
CO4	1		3			2			2		
COS	5		2			2			3		
		3/2/1 Ind	licates Stre	ength Of C	Correlation,	, 3 – High, 2	2-				
Category		iviedium,	I-LOW	L	S1-11	Inter	Ski11	D.	ractical	Other	*0
Calegory	Program Core	Program elective	Humanities and social Science	Open Elective	enhancing elective	Disciplinary /Allied	Compo	nent/F er	Project/in mship	t	18
						✓					

Subject Code: HBMA22ID2	Subject Name: ALLIED-II MATHEMATICS-II	С	L	T/SLr	P/R	Ty/Lb/ ETL
	Prerequisite: Higher Secondary Mathematics	3	3	0/0	0/0	Ту
	(Common to Lyr / II semBCA /B Sc [CS_Physics_Chemistry	ISCE	Flect	ronics])		

(Common to I yr / II semBCA /B.Sc [CS, Physics, Chemistry, ISCF, Electronics])

Course Outcomes:

To understand the Basic concepts in Ordinary Differential equations To understand the Basic concepts in Partial Differentiation To understand the Basic concepts in Multiple integrals To understand the Basic concepts in Linear programming To understand the Basic concepts in Transportation and Assignment

UNIT I ORDINARY DIFFERENTIAL EQUATIONS

First order differential equations - Second and higher order linear differential equations with constant coefficients and with RHS of the form: e^{ax} , x^n , Sin ax, Cos ax, $e^{ax}f(x)$, x f(x) where f(x) is Sin bx or Cos bx(simple problems).

UNIT II PARTIAL DIFFERENTIATION

Partial derivatives – Jacobians – Maxima and Minima of functions of two variables – Lagrange's multipliers.

UNIT III **MULTIPLE INTEGRALS**

Double integrals in Cartesian and Polar Co-ordinates – Change of order of integration – Triple integrals in Cartesian Co-ordinates (simple problems).

UNIT IV LINEAR PROGRAMMING

Formulation of LPP – Standard form of LPP – Graphical method – Simplex method.

UNIT V TRANSPORTATION AND ASSIGNMENT

Formulation of Transportation problem – North West corner method – Least cost method – Vogel's approximation method – Optimality test – MODI method – Degeneracy – Assignment problem: Hungarian method.

Total no. of hrs: 45

Reference Books:

- 1) Vittal.P.R, *Allied Mathematics*, Margham Publications., Chennai, (2012).
- 2) Venkatachalapathy.S.G, Allied Mathematics, Margham Publications., Chennai, (2007).
- 3) Singaravelu, Allied Mathematics, Meenakshi Agency., Chennai, (2001).
- **4)** Hamdy A. Taha, *Operations Research: An Introduction (10th ed.)*, Pearson, (2017).
- 5) Hira D.S., Gupta P.K., Operations Research, S.Chand& Co., (2014).

B.Sc. (Information Science and Cyber Forensics)-Regulation 2022-2023

(9 hrs)



Subject	Subject	Name :			NC			С	L	G	T/	P/R	Ty/
HBCF22002		11110			UU					3	.Lr		LD/ ETL
	Prerequ	isite: C, C+	+					4	3		1/0	0/0	Ту
L : Lecture T :	Tutorial	S.Lr : Sup	ervised Lea	arning P	: Proj	ect R	:Re	search	C: Cre	dits			
Ty/Lb/ETL : T	heory/La	b/Embedded	d Theory ar	nd Lab									
OBJECTIVES	S:	11 1 1 1	1										
• The stu	idents wi	II be able to	do prograr	nming in	1 Pythe	on. the D	41			- 10m a			
Devel See the	op a basi	r understand	ing of prog	iety of di	g allu ifferen	t disc	y <i>mor</i> inlin	es-es	umming pecially	, lang	uage. relates i	n	
engine	ering.	i programmi	ing in a van	icty of th	incici		ipiin	<u>cs</u> cs	peciality	as n	i ciaco i	.11	
	e												
COURSE OU	TCOME	$\frac{\mathrm{COs}(\mathrm{COs}):(}{\mathrm{COs}(\mathrm{COs}):()}$	3- 5)										
COI	Remem	ber the synt	ax and sem	antics of	t pytho	on pro	gran	ming.	1				
C02	Will un	derstand ho	w functiona	al and op	eratio	ns are	to b	e utiliz	ed.	to m	0.000000	ing la	
003	by deve	loping stud	ng knowled	ige of col	ncepts	and t	ermi	nology	related	to pr	ogramn	ing la	nguage
CO4	Student	s will analy	se the probl	lem and i	provid	le solı	ition	s for th	e probl	em.			
CO5	Will ab	le to incorpo	orate the kn	owledge	for va	arious	prot	olems.	• 1001				
Mapping of C	Course Outcomes with Program Outcomes (POs)												
COs/Pos	PO1	PO2	PO3	3 PO4 PO5			5	PO6	P	07	PO8		PO9
CO1	3	3	2	2		2		3 1		1	1		2
CO2	3	2	1	2		2		3		3	2		1
CO3	3	2	1	3		3		3		2	1		2
CO4	3	3	2	3		1		3		1	1		2
CO5	3	2	2	2		1		3		3	2		3
COs / PSOs		PSO1			PS	SO2					PSO3		
CO1		1				3					1		
CO2		2				2					1		
CO3		3				3					3		
CO4		3				2					2		
CO5	~	3		_		3					3		
3/2/1 indicates	Strengt	h of Correl	ation 3- I	ligh, 2-	Mediu	um, 1	-Lov	V					
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing	elective	Inter	Disciplinary/Alli ed	Skill Component	,	Practical /Project/internsh	1p Others	
	✓												

С **T**/ P/R L Tv/ **SUBJECT** SUBJECT NAME S.Lr Lb/ CODE ETL **HBCF22002** PYTHON PROGRAMMING 4 3 1/00/0 Ty

OBJECTIVES:

- The students will be able to do programming in Python.
- Develop a basic understanding of *programming* and the *Python programming* language.
- See the value of *programming* in a variety of different disciplines.

UNIT I INTRODUCTION

Introduction of Python, Need of Python Programming, Applications of Python Programming, Running Python Scripts, Editing Python Files, Variables, Keywords, Input-Output, Indentation.

UNIT II TYPES, OPERATORSANDCONTROL FLOW

Types - Integers, Strings, Booleans; Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators. Control Flow- if, if-else, for, while, break, continue.

UNIT III FUNCTIONS

Defining Functions, Calling Functions, Passing Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Scope of the Variables in a Function - Global and Local Variables.

UNIT IV DATA STRUCTURES

Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences. Comprehensions.

UNIT V OBJECT ORIENTED PROGRAMMING OOP IN PYTHON

Classes Principles of Object Orientation - Creating Classes -Instance Methods- Constructor Method, Inheritance, Overriding Methods and Data hiding.

TEXT BOOKS:

- 1. Python Programming: A Modern Approach, VamsiKurama, Pearson.
- 2. Learning Python, Mark Lutz, Orielly.

REFERENCE BOOKS:

- 1. Think Python, Allen Downey, Green Tea Press
- 2. Core Python Programming, W.Chun, Pearson.
- 3. Introduction to Python, Kenneth A. Lambert, Cengage.

12 Hrs

12 Hrs

12 Hrs

12 Hrs

12 Hrs

Total Hours: 60

EDUCATIONAL AND RESEARCH INSTITUTE DECEMBED TO BE UNIVERSITY UNIVERSITY WITH GRADE AUTONOMY STATE (An ISO 210011: 2018 Corrified Institution) Periyar E.V.R. High Road, Maduravoyal, Chennat-95. Tamilnadu, India.



Subject	Subject	Name					С	L	,	Τ/	P/R	Tv/
Code:	U	DAT	TA STRUC	TURES					S	.Lr		Lb/
HBCF22003												ETL
	Prerequ	isite: NIL					4	3	1	1/0	0/0	Ту
L : Lecture T :	Tutorial	S.Lr : Sup	ervised Lea	arning P	: Project R	R : Re	esearch	C: Cred	lits			
Ty/Lb/ETL : T	heory/La	b/Embedded	d Theory ar	nd Lab								
OBJECTIVES	5:	1 ·		1 1'	1	1.	1.4					
Develo Te Un	p skills to	o design and	1 analyze si	mple line	ear and non	linea	ar data s	structur	es.			
• To Uno		basic concep	ous about su	acks, que	ion of the d	rees a	and graf	DIIS	1			
• 10 IIII	ouuce va	lious techni	ques for fej	presentati		ata II	I the rea	u worte	l			
COURSE OU	тсоме	S (COs) : (3- 5)									
CO1	Learn fu	undamentals	s of data str	uctures a	and their app	plicat	tions es	sential	for pr	ogramn	ning/p	roblem
<u>CO2</u>	Analyze	and annly	linear data	structure	s Stack O	101100	a Liete 1	to solve	nroh	lem		
CO3	Underst	and the wor	king nrinci	ples of I	inked List	acues	, L 1313		, prot			
CO4	illustrat	e and comp	are various	techniqu	es for searc	hing	and sor	ting				
CO5	Implem	ent and anal	lyze graph	n data structure								
Mapping of C	ourse Ou	tcomes wit	h Program	1 Outcon	nes (POs)							
COs/POs	PO1	PO2	PO3	PO4 PO5			PO6	P	07	PO8		PO9
CO1	2	3	3	2	2		1		1	2		2
CO2	2	3	3	2	1		1		3	1		3
CO3	2	2	3	2	3		2		1	2		2
CO4	2	3	3	3	2		2		1	1		2
CO5	2	3	3	2	2		2		1	2		3
COs / PSOs		PSO1			PSO2					PSO3		
<u>CO1</u>		3			3					2		
<u>CO2</u>		3			3					$\frac{1}{2}$		
<u>CO3</u>		2			2					3		
C04		2			2					<u> </u>		
3/2/1 indicates	Strengt	of Correls	ation 3-1	High. 2-	<u></u>	-Lov	V			4		
					50							
Category	ogram Core	gram elective	nanities and social	en Elective	ill enhancin sctive	ler	sciplinary/Allied	ill Component		actical roject/internship	hers	
	► Pr	Pro	Hur Scie	Ope	Sk ele	Int	Di	Sk		Pri /P1	ŏ	

С **T**/ P/R Tv/ L **SUBJECT** SUBJECT NAME S.Lr Lb/ CODE ETL **DATA STRUCTURES HBCF22003** 4 3 1/00/0Ty

UNIT: I

Introduction to Data structure

Introduction to the Theory of Data Structures-Data Representation- Operations on Data Structure -Abstract Data Types, primitive and composite Data Types- Array, Representation of One and Two **Dimensional Array**

UNIT: II

Stack & Queue

Linear Data Structures - Introduction to Stacks - stack operation- Application of stack-Infix to postfix conversion-Tower of Hanoi Problem- Introduction Queue-Queue Operation Recursion

UNIT: III

Linked List

Introduction to Linked Lists- Singly Linked List - Operation - Doubly Linked List - Operations -Representation of a Polynomial, Polynomial Addition

UNIT: IV

Tree & Graph

Non- Linear Data Structures- Binary Trees- Representation of Binary Trees- Binary Tree Traversal -Operations on a Binary Search Tree - Introduction to Graphs- Representation of Graphs- Types of Graphs- DFS and BFS

UNIT: V

Searching and sorting

Linear and binary search- Insertion, Bubble, Quick and Merge sort- Radix sort-Heap sort

Total Hours: 60

TEXT BOOKS:

1. C++ plus Data structure by N. Dale, publishers narosa publishing, Edition 2016.

REFERENCE BOOKS:

- 1. Data Structures, A. Chitra, P.T. Rajan, Tata McGraw Hill Education 2007.
- 2. Fundamentals of Data Structures, Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, Universities Press,2008.

12 Hrs

12 Hrs

12 Hrs

12 Hrs



12 Hrs



Subject Code: HBCF22L02	Subject [Name : DATA STRUG	CTURE USIN	IG PYTH	ON LAB		С	L	S	T/ 5.Lr	P/R	Ty/ Lb/ ETL
	Prerequ	uisite: Data s	structures o	concepts	&Python		2	0	(0/0	3/0	Lb
L : Lecture T : T	utorial	S.Lr : Superv	ised Learn	ing P:Pı	roject R:R	esea	rch C: Cr	edits				
Ty/Lb/ETL : The	eory/Lab/	Embedded	Theory and	Lab								
OBJECTIVES :												
Unders	stand vari	ious data re	presentatio	n techni	ques in the	real	world.					
Implen	nent linea	ar and non-l	inear data s	structure	s.							
Analyze	e various	algorithms	based on th	neir time	and space	com	plexity.					
Develo	p real-tin	ne applicatio	ons using si	litable da	ata structur	e.						
	y suitable	$\frac{1}{2}$	ure to solve	e various	computing	, pro	blems					
	Underst	US): (3-5)	and tast sim	nlo data	structuro	Sonce	onte ucin	a nuth	00 00	aram		
CO2	Evecute	Dython pro	and lest sin	soarchir	a & sorting		hniques	ig pyth	onpro	Jgrain.		
CO3	Lise can	acities for o	rganizing d	ata struc	ture conce	nts II	ising Pyt	hon nr	ngram	IS		
CO4	Student	s can Create	own pyth	on progra	am.		ising i ye		Serun	15.		
CO5	Classify	the basic da	ata type and	d structu	re in pytho	n pro	ogram					
Mapping of Co	urse Out	comes with	Program C	outcome	s (POs)		0					
COs/POs	PO1	PO2	PO3	PO4		5	PO6	F	PO7	PO8		2 09
CO1	3	3	1	2	1		3		3	1		2
CO2	3	2	3	2	2		3		3	1		3
CO3	3	3	1	2	1		2		3	2		2
CO4	3	2	1	1	1		3		2	1		2
CO5	3	3	1	1	1		2		3	2		3
COs / PSOs		PSO1			PSO2					PSO3		
CO1		3			2					1		
CO2		3			3					2		
CO3		2			2					1		
C04		3			1					1		
3/2/1 indicates	s Strengt	h of Correla	tion 3-Hi	gh. 2- M	edium. 1-Lo	ow.				1		
<i>57272</i> maleates				5,				t				
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter	Disciplinary/All ed	Skill Componen		Practical /Project/internsh	up Others	
										\checkmark		



Subject Code:	Subject Name : DATA STRUCTURE USING PYTHON LAB	C	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCF22L02	Prerequisite: Data structures concepts & Python	2	0	0/0	3/0	Lb

OBJECTIVES :

- Understand various data representation techniques in the real world.
- Implement linear and non-linear data structures.
- Analyze various algorithms based on their time and space complexity.
- Develop real-time applications using suitable data structure.
- Identify suitable data structure to solve various computing problems
- 1. Write Python programs for implementing the following searching techniques.

a. Linear search b. Binary search c. Fibonacci search

- 2. Write Python programs for implementing the following sorting techniques to arrange a list of integers in ascending order.
 - a. Bubble sort
 - b. Insertion sort
 - c. Selection sort
- 3. Write Python programs for implementing the following sorting techniques to arrange a list of integers in ascending order.
 - a. Quick sort
 - b. Merge sort
- 4. Write Python programs to
 - a. Design and implement Stack and its operations using List.
 - b. Design and implement Queue and its operations using List
- 5. Write Python programs for the following:
 - a. Uses Stack operations to convert infix expression into postfix expression.
 - b. Uses Stack operations for evaluating the postfix expression.
- 6. Write Python programs for the following operations on Single Linked List.

(i)Creation (ii) insertion (iii) deletion (iv) traversal

7. Write Python programs for the following operations on Double Linked List.

(i)Creation (ii) insertion (iii) deletion (iv) traversal

8. Write Python programs for the following operations on Circular Linked List.

(i)Creation (ii) insertion (iii) deletion (iv) traversal

Total Hrs: 45

EDUCATIONAL AND RESEARCH INSTITUTE	At NAAC
University with Graded Autonomy Status	
(An ISO 21001 : 2018 Certified Institution)	
Perivar E.V.R. High Road, Maduravoval, Chennai-95, Tamilnadu, India.	

Subject	t Code	e:	Subject N	ame: ALLI	ED LAB I - N	ЛАТНЕМАТ	ICS-I LAB	С	L	T/S.	P/R	Ty/Lb
			Prerequisit	te: Higher S	econdary N	Nathematic	S	2	0	0/0	3/0	Lb
L : Lect	ture T	: Tut	orial C: 0	Credits					<u> </u>		I	
OBJEC	TIVE	S										
• T • T • T • T • T • T • T • T • T • T	ry to sc ry to sc ry to sc ry to sc ry to sc SE OU ts com	olve th olve th olve th olve th olve th DITCC npleti Solvin Unde Expar	the problems the problems the problems the problems OMES (Co ting this co ting the problems the problems th	in Matrices in Trigonom in Integratio in Probabilit in Standard DS) DUISE WEIE ems of Rank plve the prob	and its opera letry n y Distributions able to matrices an lem of Expan in terms of	ations d Solving sin nsions of Sin Sines and Co	nultaneous eo nθ, Cos nθ ir psines of mult	quation n power tiples of	s . s of S θ and	inθ and d also p	Cosθ robler	n in
CO3	5 6	Learn parts Unde	how to solv , Definite In rstand the c	ve problems i tegrals , Prop concept of Ax	in Methods perties of De ioms of Pro	of Integratio finite Integra bability , Cor	on, Integratio als and Probl nditional prol	n by sul ems on pability	ostitu findir , Tota	tion , In ng Area I proba	tegrat bility	ion by Baye's
	·	Theor	em , Rando	, m variable	Probability m	ass function	, Probability	density	funct	tion.		
CO5	5	Analy	/Ses summa	ation of serie	s using Bind	omial, Expon	ential, Poisso	on and r	norma	al distrik	oution	
Mappir	ng of (Cour	se Outco	me with P	rogram O	utcome (I	POs)					
Cos/PO	s PO	01	PO2	PO3	PO4	PO5	PO6	PO7	7 PC	08		PO9
		3	2	3	3	3	2	1		2		3
	2	3	2	2	3	2	2	1		1		3
	1	2	2	3	2	3	2 1	1		2		2
100 100	5	23	2	3		3	2	2		2		2
	-	-		Ŭ		Ĭ	-	-	1			-
COs /P	SOs	P	SO1			PSO2			PS	603		
CO1	1		3			2				3	3	
CO2	2		3			2				2	2	
COS	3		3			2				2	2	
CO4	4		3			2				2	2	
COS	5		2			2				3	3	
3/2/1 Inc	dicates	s Stre	ength Of C	Correlation,	3 – High,	2- Mediun	n, 1- Low	(
					Onen	Skill	Inter	Skill	F	ractical	Ot	hers
Category	Progran Core	m	Program elective	Humanities and social Science	Elective	enhancing elective	Disciplinary /Allied	Compo	nent /. e	Project/2 rnship	int	



Sub.Code	Subject Name	С	L	T/S.Lr	P/R	Ty/Lb
HBMA22IL1	ALLIED LAB I - MATHEMATICS I : Lab	2	0	0/0	3/0	Lb

(Common to I yr / II semBCA /B.Sc [CS, Physics, Chemistry, ISCF, Electronics])

Experiments:

- **1.** Finding the Trace and, Determinantof a Matrix
- 2. Finding the Rank of a Matrix
- **3.** Solving Linear equations
- **4.** Solving Polynomials
- 5. Solving Elementary functions in Trigonometry
- 6. 2D and 3D plot
- 7. Solving Definite Integrals
- 8. Problems in Binomial distribution
- **9.** Problems in Poisson distribution
- **10.** Problems in Normal distribution

Open source MATH software: Scilab

Total Hrs: 45

EDUCATIONAL AND RESEARCH INSTITUTE	A+
(An ISO 21001 : 2018 Certified Institution)	

Subject	Su	Subject Name: SOFT SKILL II						CLT/P/RT/L/					
Code:	2									S.Lr		ETL	
TIDCCZZIU	P re	Prerequisite : Plus 2 English					1	0	0/0	2/0	IE		
L : Lecture T : Tutorial SLr : Supervised Learning P: Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory andLab													
OBJECTIVES													
1. Culti	1. Cultivate employability skills that they get employed even before they leave the university.												
2. Build self-esteem and a sense of self-worth to be good team members													
3. Cult 4 Evol	3. Cultivate empathy to think from others' point of view to be good team leaders.												
 4. Evolve as good global cluzens with insignts into social and professional etnics. 5. Develop lifelong learning skills to adapt in the multicultural context of workplaces 													
COURSE	OUTCO)MĔ	S (Cos)		L			-					
Students completing this course were able to													
C01	Culti	Cultivate employability skills that they get employed even before they leave the university											
CO2	Build	Build self-esteem and a sense of self-worth to be good team members											
CO3	Culti	Cultivate empathy to think from others' point of view to be good team leaders.											
CO4	Evolv	Evolve as good global citizens with insights into social and professional ethics											
CO5	Develop lifelong learning skills to adapt in the multicultural context of workplaces.												
Mapping o	f Cours	e Oı	itcome wi	ith Program	n Outcome	e (POs)							
PSO1	Understanding of the basic concepts of English language and literature.												
PSO2	Leaı	Learning through literature in English, diverse historical cultural and social ethics											
PSO3	App	Application of literary critical perspectives to generate original analysis of literature in English											
PSO4	Pror	notic	on of cultu	ral values a	nd real-life	skills throu	ıgh English l	anguag	e an	d literat	ure		
Cos/POs	P	D1	PO2	PO3	PO4	PO5	PO6	P07		PO8	P09		
CO1		3	3	3	1	2	2	1		2		3	
CO2		3	3	3	1	2	2	1		2		3	
CO3		3	3	3	1	2	2	1		2		3	
CO4		3	3	3	3	3	2	1		2		3	
CO5		3	3	3	3	3	2	1 2			3		
Cos/PSOs	PSC)1		PS02		PS03		PS04					
CO1		3			2		2	2					
CO2		2			2		2		2				
CO3		3			2		2		2				
CO4		3			2		2		2				
CO5			3		2		2	2					
3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1-													
Category	Program	F	Program	Humanities	Open	Skill	Inter	Skill	I	Practical	Others	3	
	Core	e	lective	and social	Elective	elective	/Allied	Compon	ent/ r	roject/1 iternship			
											1		


Subject	Subject Name: SOFT SKILL II	С	L	Τ/	P/R	T/L/
Code:				S.Lr		ETL
HBCC22I03	Prerequisite : Plus 2 English	1	0	0/0	2/0	IE

Prefatory Note

This paper aims to equip the advanced learners with skills essential for work place and global environment to which they will move on from the university, once they complete the course. As such, it covers a range of indispensable soft skills and values such as, self-esteem, empathy, public relations, positivity, reliability, professionalism, leadership and intercultural communication, interview skills, etc.. Together with the effective English communication in global contexts, these skills, if cultivated and strengthened, can immensely help the students become employable in the multinational companies as good global citizens abiding the social and professional ethics in cross-cultural diversity.

Course Objective

The students will be facilitated to

- 1. Cultivate employability skills that they get employed even before they leave the university.
- 2. Build self-esteem and a sense of self-worth to be good team members
- 3. Cultivate empathy to think from others' point of view to be good team leaders.
- 4. Evolve as good global citizens with insights into social and professional ethics.
- 5. Develop lifelong learning skills to adapt in the multicultural context of workplaces.

Unit -I

Conversational skills, Self-esteem skills, empathy, public relations

Unit -II

Positivity, reliability, professionalism

Unit -III

Leadership Problem solving

Unit -IV

Intercultural communication skills Global Manthra: Go local, Cultural sensitivity, Group behaviour Cultural intelligence : Low and High context, e mail and inter cultural communication

Unit -V

Group discussion &Interview skills

Course Outcome

On completion of the course the students willbe able to

- 1. cultivate employability skills that they get employed even before they leave the university.
- 2. build self-esteem and a sense of self-worth to be good team members
- 3. Cultivate empathy to think from others' point of view to be good team leaders.
- 4. Evolve as good global citizens with insights into social and professional ethics.
- 5. Develop lifelong learning skills to adapt in the multicultural context of workplaces.

B.Sc. (Information Science and Cyber Forensics)-Regulation 2022-2023



Suggested reading

- 1. S.P. Dhanavel, English and Soft Skills, Vol.2 Orient Blackswan Pvt. Ltd. 2010
- 2. P.D. Chaturvedi and M. Chaturvedi, Communication Skills , Pearson, 2012



Subject Code: HBEC22ID3	Subje	ect Name: ALLIED II		RONIC	CS		C	L	Т S.I	Y L r	P/R	Ty/ Lb/ ETL
	Prereq Compo	uisite : Bas onents and	ic Knowle electrom	edge of l lechanic	Electro cal produc	ts	3	3	0/	0	0/0	Ту
L: Lecture T:	Futorial	SLr : Sup	ervised L	earning	g P: Proje	ect R : Res	earc	h C: C	redits	s T/L/	ETL :	
Theory / Lab / I	Embedo	ded Theor	y and La	b	<i>,</i>							
OBJECTIVES												
To learn th	e basic c	oncepts of r	number sys	tems and	d characte	codes.						
To underst	and the o	concepts of	various Lo	gic gates,	, Boolean A	Igebra and [.]	Theor	ems.				
To implem	ent simp	le arithmeti	c circuits s	uch as Ha	alf and Full	Adders						
To learn ar	nd impler	nent sequer	ntial logic d	lesign								
To underst	and the o	different me	mory elem	nents of o	computer s	uch as RAM	/ROM					
COURSE OUT	COMES	S (Cos)										
Students complet	ing this o	course wer	e able to									
CO1	Be fa	amiliar with	the Numb	per Syste	ems							
CO2	Logic	c gates and	l Karnaug	h map s	implification	on						
CO3	Simp	le Arithmet	tic Circuits	and Pr	ocessing	Circuits						
CO4	Sequ	ential logic	design wi	th Conv	rerters							
CO5 Memory elements and disk cache												
Mapping of Cou	rse Outo	comes with	Progran	n Outco	mes (POs	s)						
COs/Pos	PO1	PO2	PO3	PO4	4 PC	D5 P	06	PC)7	PO8	P	09
CO1	3	2	2	2		3	2	2		3		3
CO2	2	2	3	3		2	2	3		2		3
CO3	2	3	2	2		2	3	3		1		2
CO4	2	2	3	3		3	2	2		2		3
CO5	3	3	1	3		3	3	3		2		3
COs / PSOs		PSO1			PSO2				P	PSO3		
CO1	2			3			3					
CO2	3			2			2					
CO3	3			3			3					
CO4	2			2			2					
CO5	3			2			3					
3/2/1 indicates St	rength	of Correla	tion 3-1	High, 2-	- Medium	, 1-Low						
ary	1 Core		es and ence	ctive	hancing	1ary/Alli		ent		internsh		
Catego	Program	Program elective	Humanitic social Sci	Open Elec	Skill er elective	Inter Disciplir ed		Skill Compon		Practical /Project/	Others	
						\checkmark						

SEMESTER III

Sub. Code **Subject Name** С **T**/ P/R Tv/ L S.Lr Lb/ ETL HBEC22ID3 **ALLIED-III ELECTRONICS** 3 3 0/0 0/0 Ty

EDUCATIONAL AND RESEARCH INSTITUTE

Unit – I

Number Systems: Number systems - Decimal, Binary, Octal, Hexadecimal - conversion from one to another. Characters and codes: ASCII code, Excess-3 code, gray code - binary addition, subtraction, multiplication and division - unsigned binary numbers - signed magnitude numbers complements in number systems.

Unit – II

Logic Gates: AND, OR, NOT, NOR & NAND gates, EX-OR gates. Boolean Algebra and Boolean laws and theorems: De Morgan's theorems - Duality theorem - simplification of sum of product and product of sum expressions - Karnaugh map and simplifications.

Unit –III

Simple arithmetic circuits: Half and Full adders - Binary adder/ subtracter - BCD adder Data processing circuits: Multiplexers - Demultiplexers -Encoders and Decoders.

Unit – IV

Sequential Logic Design: Flip-flops - RS, JK, D & T Flip flops - Master/Slave Flip flop - Shift Registers - Counters - Asynchronous and Synchronous Counters. Digital to Analog Converters -Analog to Digital converters.

Unit – V

Memory Elements: RAM - static RAM - Dynamic RAM - ROM - Magnetic Disk memories -Magnetic tape – Cache Memory – Error detection & Correction using Parity & Hamming code.

Total Number of Periods : 45

TEXT BOOK:

1. Digital Logic and Computer Design: M. Morris Mano 2nd Edition, Pearson Education, First Edition, 2008

REFERENCE BOOKS:

- 1. Virendra Kumar, "Digital Technology Principles and Practice", New Age International, New Delhi, 2015.
- 2. Donald P.Leach and Albert Paul Malvino, "Digital Principles and Application", Fifth Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 7th Edition, 2010.

B.Sc. (Information Science and Cyber Forensics)-Regulation 2022-2023

9 Hrs

9 Hrs

9 Hrs

9 Hrs



Subject Code: HBCF22004		COMP	Subject Na UTER NE	me TWORI	KS		С	L	S	T/ .Lr	P/R	Ty/ Lb/ ETL		
	Prerequ	isite: NIL					4	3	1	1/0	0/0	Ty		
L : Lecture T : 7	Futorial	S.Lr : Supe	rvised Lear	rning P	Project R	: Re	search	C: Cred	its			5		
Ty/Lb/ETL : Th	eory/Lab	/Embedded	Theory and	d Lab										
OBJECTIVES	: To buil	d and unde	rstand the c	concepts	of data con	nmur	nication	•						
	To ab	le to know a	about types	of netwo	orks and pro		ols							
	10 uli		Structure 0		III IICIWOIK	5								
COURSE OUT	COMES	5 (COs) : (3	3- 5)											
CO1	To unde	erstand the c	concepts of	Data Co	mmunicatio	on								
CO2	To know	w about the	Layering co	oncepts o	of different	Stan	dards							
CO3	To familiar about the Transporting and Routing mechanisms													
CO4	To learn	n about the e	error and Fl	ow contr	rol techniqu	les.								
CO5	To unde	erstand the o	perations of	of Differe	ent Networl	KS								
Mapping of Co	urse Out	tcomes with	Program	Outcom	les (POs)	-		D	07	DOG				
COS/POS	1 POI	PO2	P03	P04	+ PO	3	<u>PU6</u> 2	P	<u>0/</u> 1	2	•	<u>209</u>		
CO1	2	3	2	<u> </u>	2		2		<u>1</u> 2	2		2		
C03	3	3	1	1	2		1		<u>-</u> 1	1		2		
CO4	3	2	1	1	2		1		1	1		2		
CO5	3	3	1	2	1		1		1	2		2		
		-												
COs / PSOs		PSO1			PSO2					PSO3				
CO1		3			2					2				
CO2		3			2					1				
CO3		3			2					1				
CO4		3			2					2				
		3	· 2 U		2	T				2				
3/2/1 indicates	Strength	of Correla	tion 3- H	lign, 2- N	ledium, 1-	LOW	7							
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter	Disciplinary/Allied	Skill Component		Practical /Project/internship	Others			
	✓													

SUBJECT		С	L	T /	P/R	Ty/
CODE	SUBJECT NAME			S.Lr		Lb/
CODE						ETL
HBCF22004	COMPUTER NETWORKS	4	3	1/0	0/0	Τv
		•	2	1,0	0,0	± j

UNIT I

Introduction to computer networks and uses - Network: devices, topology, types - Reference model - Layered concepts, Protocols - Data communication - Transmission media. PSTN.

UNIT II

Data Link Layer Functions, Packets, Frames, Error detection and correction - HDLC - Channel access on links: TDMA - FDMA - CDMA - IEEE 802.3, 802.11, 802.16 - Bluetooth, MAC

UNIT III

Circuit switching - Packet switching - Virtual circuit switching-Routing algorithms - Congestion control algorithms - Internetworking- IPV6

UNIT IV

12 Hrs Transport protocols - Simple transport protocol - Internet transport protocols UDP, TCP - Flow Control -Congestion control - Congestion avoidance

UNIT V

Domain name system - Electronic mail - Introduction to World Wide Web: HTTP, SNMP, Telnet, FTP, RTP

TEXT BOOKS:

1. Peterson Davie (2012) Computer Networks - A System Approach (2nd ed.), Morgan Kauffman Harcourt Publishers.

2. James F. Kurose, Keith W. Ross Computer Networking: A Top-Down Approach / Edition 6, Pearson publication, 2012.

REFERENCE BOOKS:

1. Andrew S. Tanenbaum. David J. Wetherall ,"Computer Networks "5th Edition PHI, 2011

2. William Stallings," Data and computer communications", PHI, 2001

3. Forouzan B. A., "Data Communications and networking", TMH, 2003.

	Dr. M.G.R. EDUCATIONAL AND RESEARCH INSTITUTE DEEMED TO BE UNIVERSITY	At R
ALL	University with Graded Autonomy Status	
	(An ISO 21001 : 2018 Certified Institution)	
	Periyar E.V.R. High Road, Maduravoyal, Chennai-95. Tamilnadu, India.	

Total Hours: 60

12 Hrs

12 Hrs

12 Hrs



Subject Code:	Subje	ct Name :FU AND	JNDAMEN VULNERAJ	TALS OI BILITIES	F THREA S	TS	C	L	S	T/ .Lr	P/R	Ty/ Lb/
HBCF22005	Drorogu	igita NII					1	2	1	1/0	0/0	ETL Ty
L. Lesture T.	Tutorial	S Las Sur	a mail and T and	min a D	Ducient	D . D	4			1/0	0/0	Тy
L: Lecture I: $T_{\rm V}/I$ b/ETI · T	l utorial	S.Lr : Sup b/Embaddae	ervised Lea	arning P	: Project	K : K	esearch	C: Crea	itts			
	11001 y/La	0/ Linibeudet	i Theory a	iu Lau								
• The pri	i mary ohi	iective is to	protect info	rmation	accete and	inct t	hreats ar	d vulne	rahil	ities to s	which	the
organiz	zation's a	ttack surface	e may he ex	nosed	ussets age	inist t	incats ai		.14011	11105, 10 1	vincii	the
Goal to	o form CI	A triad(Cor	fidentialit	v. Integr	rity and A	vaila	bility)					
COURSE OU	ТСОМЕ	$\overline{\mathbf{S}(\mathbf{COs}):}$	3-5)	<i>J</i> , <u></u>								
CO1	Describ	e the compo	onents and s	security d	levelopm	ent lif	e cycle.					
CO2	Illustrat	e various th	reats and v	ulnerabil	ities.		2					
CO3	Discuss	ing on sever	al issues ir	n security	′ .							
CO4	To desi	gn proper pl	anning for	security.								
CO5	Using v	arious techr	ology and	tools to f	ace secur	ity rel	lated pro	blems.				
Mapping of C	ourse Ou	itcomes wit	h Program	n Outcon	nes (POs)							
COs/POs	PO1	PO2	PO3	PO4	4 P	05	PO6	P	07	PO8]	PO9
CO1	1	3	3	2		3	3		1	1		3
CO2	2	1	1	3		3	3		3	1		3
CO3	3	2	2	2		2	2		3	2		3
CO4	3	3	2	1		3	2		2	1		3
CO5	3	3	3	3		3	3		3	2		3
COs / PSOs		PSO1			PSO2					PSO3		
CO1		2			2					1		
CO2		3			3					3		
CO3		3			3					3		
CO4		3			3					1		
CO5		2			2					3		
3/2/1 indicates	Strengt	h of Correla	ation 3- I	High, 2- 1	<u>Medium,</u>	<u>1-Lo</u>	W					
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter	Disciplinary/Allied	Skill Component		Practical /Project/internship	Others	
	✓											

SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCF22005	FUNDAMENTALS OF THREATS AND	4	2	1/0	0/0	T_{V}
	VULNERABILITIES	4	3	1/0	0/0	Тy

Unit-I Introduction to Information Security

Security- Components of Information system- Security systems development life cycle- Security professionals and organization.

Unit-II Need for Security

Organizational security need- Threats- Attacks - Software development security.

Unit-III Issues in Information Security

Law in Information security- International laws and legal bodies- Ethics followed in Information security.

Unit-IV Planning for security

Security planning – Security policy, standards and practices- Security education, training and awareness – Continuity strategies.

Unit-V Security Technology and Tools

Intrusion detection and prevention systems- Honeypots, Honeynets- Scanning and Analysis tools-Biometric Access controls- Physical security- Physical access controls

Text Book:

1. Principles of Information Security by Michael E.Whitman and Herbert J.Mattord,4th Edition.

Reference Books:

1. Fundamentals of Information Systems Security by David Kim and Michael G.Solomon-Jones and Bartlett Learning

2. Handbook of Information Security Management by Tipton Ruthbe



12 Hrs

Total Number of Periods : 60

12 Hrs

12 Hrs

12 Hrs



Subject Code: HBCF22006	Subject INFOR	Name :INTI MATION S	RODUCTI ECURITY	ON TO		C		L	T/ S.Lr	P/R	Ty/ Lb/								
	D	· · · · · · · · · · · · · · · · · · ·						2	0.10	0.10	ETL								
	Prerequ	isite: NIL				- 3		5	0/0	0/0	Ту								
L : Lecture T :	Tutorial	S.Lr : Supe	rvised Lear	ming P:	Project R	: Rese	arch C	: Cre	edits										
Ty/Lb/ETL : T	heory/La	b/Embedded	Theory and	Lab	· · · · · ·	•,													
OBJECTIVES	• : I o und	lerstand the b	asic concep	ots of Inf	ormation Se	ecurity	/.												
	To ana	lyze and mar	age variou	s types o	of risk.														
COURSE OU	ГСОМЕ	S(COs):(3)	- 5)																
CO1	Underst	tand the basic	s of Inform	nation se	curity.														
CO2	Analyze	Analyze various threats and attacks																	
CO3	Analyze	e the various	types of ris	ks and th	nreats														
CO4	Underst	tand the secu	rity governa	ance, po	licy standa	rds an	nd prac	ctice	es										
CO5	Know a	bout access o	control met	hods															
Mapping of Co	ourse Ou	itcomes with	Program	Outcom	es (POs)	-	D O (DOG	DOG								
COs/POs	PO1	PO2	PO3		<u>4 PO</u>	5	<u>PO6</u>)	<u>P07</u>	<u>P08</u>	<u>PO9</u>								
		3	2	2	2		3		3	2	3								
	3	3	3	3	2		3		3		3		3		3		3		3
CO3	3	3	3	3	3		3		3		<u> </u>		3		3				
C04	3	3	3	3	3		<u> </u>		<u> </u>	2	3								
05	4	2	5	2	5		3		4	1	3								
COs / PSOs		PSO1			PSO2]	PSO3									
CO1		3			2					3									
CO2		3			3					3									
CO3		3			3					3									
<u>CO4</u>		3			2					3									
CO5		3			2	r				3									
3/2/1 indicates	Strengt	h of Correla	tion 3-H	igh, 2- N	ledium, 1-	Low		1											
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter Disciplinary/Allied	Discipilitaty/Allieu	Skill Component		Practical /Project/internship	Others								
	✓																		



SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCF22006	INTRODUCTION TO INFORMATION SECURITY	3	3	0/0	0/0	Ту

UNIT I OVERVIEW OF INFORMATION SECURITY

Overview of Information Security –Importance of Information Security - Components of an Information System – Information Classification -Secret, Confidential, Private and Public Security Systems Development Life Cycle.

UNIT II SECURITY ESSENTIALS

Information security – Threats: Frauds, Thefts, Malicious Hackers, Malicious Code, Denial-of-Services Attacks and Social Engineering - Vulnerability – Types -Compromises to Intellectual Property, Deliberate Software Attacks, Deviations in Quality of Service, Espionage or Trespass, Forces of Nature Human Error or Failure, Information Extortion, Missing, Inadequate, or Incomplete Organizational Policy Planning and controls, Technical Hardware and Software Failures.

UNIT III RISK ANALYSIS & MANAGEMENT

Overview of risk management – Identification – Risk Analysis Process - Asset Definition - Threat Identification - Determine Probability of Occurrence - Determine the Impact of the Threat - Controls Recommended - Risk Mitigation - Control Types/Categories - Cost/Benefit Analysis.

UNIT IV GENERAL & PHYSICAL SECURITY

Information security planning and governance- policy standards and practices- security blue print- Education, training and awareness - Identify Assets to be Protected - Perimeter Security - Fire Prevention and Detection - Safe Disposal of Physical Assets.

UNIT V SECURITY TECHNOLOGY

Access Control: Identification, Authentication, Authorization and Accountability – Firewalls: Processing modes, categories, architecture, configuring and maintaining, content filters.

TEXT BOOKS:

1. Michael G.solomon, Fundamentals of information systems security- Dividkim | - 3rd edition

REFERENCE BOOKS:

1. Stuart Mc Clure, Joel Scrambray, George Kurtz, "Hacking Exposed", Tata McGraw-Hill, 2003.

2. Matt Bishop, "Computer Security Art and Science", Pearson/PHI, 2002.

3. Michael E Whitman and Herbert J Mattord, "Principles of Information Security", Vikas Publishing House, New Delhi, 2003.

9 Hrs

9 Hrs

9 Hrs

9 Hrs

Total Number of Periods : 45

Inform



Subject Code: HBCF2200	07	Subje Prere	ect Name: JAVA P equisite : E	ROGRAM Basic Kno	MING wledge of	program	ming		C 3	L 3	T/ S.Lr	P/R	Ty/ Lb/ ETL		
L : Lecture	эТ:	Tutoria	al SLr : Su	pervised L	earning P	: Proiect R	: Researc	h C: (Credits	U	T/L/E	TL:	- 5		
Theory / La	ab /	Embe	dded Theo	ory andLab)						.,_,_				
OBJECTI	VES														
• Tou	inde	rstand	the impo	rtance of C	lasses & o	bjects alo	ng with cor	nstruc	tors and	d Arr	ays				
 Impl 	leme	ent Ob	oject Orie	nted prog	ramming	concept (using basic	: synt	axes of	f cor	ntrol S	Struct	ures,		
strin	ngs a	nd fun	iction.												
● Tou	inde	rstand	Java Swin	gs for desi	gning GUI	applicatio	ons.								
Disc	uss	the pr	inciples of	inheritan	ce, interfa	ice and pa	ickages and	d how	/ they r	elate	e to th	e abs	stract		
class	ses.														
• Tou	inde	rstand	importan	ce of Mult	i-threadin	g & differe	ent exception	on hai	ndling n	nech	anism	s.			
COURSE			ES (Cos)												
Students c		oleting	this cours	e were abl	le to										
CO1		Be fam	iliar with th	e concepts	of class an	d obiect									
CO2		Comp	Comprehend building blocks of oops language												
CO3		Design GUI using AWT and Swing													
CO4		Identify various concepts of oop and its concepts													
CO5		Deve	op multi thi	eading obje	ect oriented	programs									
Mapping of	of C	ourse	Outcome	with Prog	gram Outo	come (PO	s)								
Cos/POs		PO1	PO2	2 PO3	PO4	PO5	PO6	Р	07	Р	80	P	09		
CO1		3	2	2	2	3	2	2	2		3	2	2		
CO2		2	2	3	3	2	2	3	3		2	2	2		
CO3		1	3	2	2	2	3	3	3		1	2	2		
CO4		2	2	3	3	3	2	2	2		2	3	3		
CO5		3	3	1	3	1	3	3	3		2	:	3		
COs /PSO)s			PS01			PS02			P	<u>SO3</u>				
C01				3			3				3				
				<u> </u>			2				ა ე				
CO3				3 2											
CO4				2			2				2				
		3/	2/1 Indicat	es Strengt	h Of Corre	l elation, 3 -	- High, 2- N	/lediu	m. 1- I c	w	5				
Category	Dere			Lumonitie	Open	Skill	Inter	Sł	cill	Prac	tical	Others			
	Core	ram e	elective	and social Science	Elective	enhancing elective	Disciplinary ied	/All Co	omponent	t /Proj ernsł	ject/int hip				
	V														

Sub. Code Subject Name С L **T**/ P/R Ty/ S.Lr Lb/ ETL **HBCF22007 JAVAPROGRAMMING** 3 3 0/0 0/0Ty

UNIT: I

Introduction to Java - Features of Java - Object Oriented Concepts - Data Types - Variables -Arrays - Operators - Control Statements-Input and output-Scanner and System class-print(), println(), and printf() methods.

UNIT: II

Classes - Objects - Constructors - Overloading method - Access Control - Static and fixed methods -Inner Classes - String Class - Inheritance - Overriding methods - Using super- Abstract class - Type Wrapper classes for primitive types- Auto boxing and Auto Unboxing – Recursion.

UNIT: III

GUI components – Common GUI Event types and Listener Interfaces- JoptionPane – JLabel, JTextfield, JButton, JCheckBox, JTextarea, JComboBox, JList, JPannel - Mouse Event Handling -Adapter Classes- Key Event Handling.

UNIT: IV

Layout Managers – Flow Layout, Border Layout, Grid Layout - Graphics and Java 2D – Graphics contexts and Graphics objects - Color control - Font Control - Drawing Lines, Rectangles and Ovals - JSlider - Using menus with Frames.

UNIT: V

Packages - Access Protection - Importing Packages - Interfaces - Exception Handling - Throw and Throws - Thread - Synchronization - Runnable Interface - Inter thread Communication -Multithreading - I/O Streams - File Streams - Applets – Introduction to Java API Packages(java.lang and java.util)

TEXT BOOK:

1. Programming in Java – 2nd Edition by C.Muthu, TMH Publication, 2008.

REFERENCE BOOKS:

- 1. Java How to Program by Deitel & Deitel 6th Edition- PHI Publication 2005.
- 2. Object Oriented Programming through JAVA, P Radha Krishna, Universities Press, Feb 2011.

9 Hrs

Total Number of Periods : 45

EDUCATIONAL AND RESEA INSTITUTE



Subject Code: HBCF22L03	Subject I	t Name NFORN	: IATION	I SECI	URITY LA	В	С	L	-	T/ 5.Lr	P/R	Ty/ Lb/ ETL		
	Prereq	uisite:					2	0)	0/0	3/0	Lb		
L : Lecture T :	Tutorial	S.Lr :	Supervis	ed Lea	rning P:Pr	oject R:R	lesearc	h C:	Credit	S				
Ty/Lb/ETL : T	heory/La	b/Emb	edded Tł	eory a	nd Lab									
OBJECTIVES :		_												
	•	lo ui	nderstan	d the s	ecurity tech	nniques an	d secui	rity a	algorith	ims.				
		To st	udy abo	it the a	ipplication	of security	tools t	o se	ecure da	ata ti	ranstorma	ition.		
	TCOMES (COs) : (3- 5)													
	Under	stand t	he impl	omont	ation of va	prious tool	nique	ac ar	nd soci	irity	algorith	mc		
<u> </u>	Annly	Apply different tools used for secure data transmission and for creating digital signature										tal signature		
CO3	Under	ctand t	ho impl	omont	ation of va	arious tool	nique	or or		rity	algorith	me		
CO4	Apply	Apply different tools used for secure data transmission and for creating digital signature												
C04	Apply	mont th		useu		d cocurity		011 c		cie	ating uigi	tal signature		
Manning of C	of Course Outcomes with Program Outcomes (POs)													
	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9													
CO1	2	3	2	2	+ FOJ	3	r r	1		2		2		
CO2	3	2	3	2	2	2		3		2		3		
CO3	1	3	1	2	1	2		2		2		1		
CO4	3	2	1	1	1	2		2		2		2		
CO5	2	3	2	1	1	2		1		2		2		
			•			•			ľ					
COs / PSOs		PSC	1		F	PSO2					Р	SO3		
CO1		2				3						1		
CO2		3				3						2		
CO3		2				1						1		
CO4		3				2						1		
CO5														
3/2/1 indicat	licates Strength of Correlation 3- High, 2- Medium, 1-Low													
Category	Program Core		Pro gra m	Humanities	Coincos Open Elective	Skill enhancin g elective	Inter Disciplin	Disciplin Skill Compone nt /Project/i nternship Others						
								V						



SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCF22L03	INFORMATION SECURITY LAB	2	0	0/0	3/0	Lb

LIST OF EXPERIMENTS

- 1. Write a program to Implement the Substitution and Transposition Technique Caesar Cipher.
- 2. Write a program to Implement the Substitution and Transposition Technique Rail fence row & column transformation.
- 3. Write a program to Implement the Diffie Helman Key exchange mechanism using HTML and Java Script. Consider the end user as one of the party and Java Script application as other party.
- 4. Write a program to Implement Dictionary attack with sufficient steps.
- 5. Write a program to Implement Brute force attack with sufficient steps.
- 6. Write a program to perform Encryption / Decryption using Hill cipher Technique.
- 7. Write a program for DES algorithm to encrypt and decrypt the data.
- 8. Installation of Wire Shark and observe data transferred in client server communication.
- 9. Installation of rootkits and study about the variety of options.
- 10. Work with Trojans, Backdoors and sniffer for monitoring network communication.



(An ISO 21001 : 2018 C	Certified Institution)
Periyar E.V.R. High Road, Maduravoya	al, Chennai-95. Tamilnadu, India

Subject Code: HBEC22IL2	Subject ALL	Name : CIED LA	LAB	С		L	T/ S.Lr	P/R	Ty/ Lb/ ETL			
	Prereq Compo	uisite: Bas nents and	sic Know electron	ledge of nechanio	Electro	ts	2		0	0/0	3/0	Lb
L : Lecture T	: Tutoria	S.Lr : S	Supervis	ed Lear	ning P:P	roject F	R : Rese	earch	C: Cre	edits	I	
Ty/Lb/ETL : T	Theory/L	ab/Embe	dded Th	neory ar	nd Lab							
OBJECTIVES	:											
	•	 To understand the security techniques and security algorithms. 										
	 To study about the application of security tools to secure data transformation. 											
	To study about various attacks.											
		COMES (COs) : (3- 5)										
01	SOB an	d POS for	ying var mc	TOUS TOE	gic gates a	and impi	ement	ing t	ne lav	VS OF B	oolean a	igebra in
<u> </u>	Impler	nent vari		hinatio	nal logic (rircuits						
CO3	Desig	n and imp	lement	various	sequenti	al circuit	s like	flip-fl	lops. c	ounte	rs and rea	zisters
CO4	Design	Design and implement Analog to Digital and Digital to Analog converter circuits										
CO5	2 00.8											
Mapping of	f Course Outcomes with Program Outcomes (POs)											
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6		PO7	P	80	РС	9
CO1	3	3	2	3	3	3		3		3	3	•
CO2	3	3	3	2	2	2		3		2	2	
CO3	3	3	3	3	2	2		3		3	2	
CO4	3	3	3	3	2	2		3		3	2	2
CO5												
								1				
COs / PSOs		PSO1			P	502				P	SO3	
CO1		3				3					3	
CO2		3				3					3	
CO3		3				2					2	
CO4		3				2					2	
CO5												
3/2/1 indica	tes Strer	ngth of Co	orrelatio	on 3-1	High, 2- N	ledium,	1-Low					
Category	Program Core Program elective Humanities and			Humanities and social Science	Open Elective	Skill enhancing	elective Inter	Disciplinary/A	Skill Component		Practical	Others
											~	



Sub. Code	Subject Name	С	L	T/ S.L r	P/R	Ty/ Lb/ ETL
HBEC22IL2	ALLIED LAB II- ELECTRONICS LAB	2	0	0/0	3/0	Lb

NAME OF THE EXPERIMENT

- 1 Verification of Logic Gates –NOT, AND, OR, EX-OR, NAND& NOR
- 2 Implementation of Boolean functions using Logic Gates-SOP & POS form
- 3 Implementation of Adder & Subtractor circuits
- 4 Multiplexer & De-Multiplexer circuits
- 5 Encoder & Decoder circuits
- 6 Design and Implementation of Flip Flops-RS, JK, D and T flip-flops
- 7 Construction and Verification of Counters
- 8 Study of Registers
- 9 Digital to Analog Converters
- 10 Analog to Digital converters



Subject HBCC2	Code: 2I04		Subject I	Name: STA M	ATISTICA ETHODS	L AND NU LAB	J MERICAI	C	L	T/ S.Lr	P/R	Ty/ Lb/ ETL					
		Р	rerequisit	e: Higher S	econdary N	Mathematic	S	2	0	0/0	3/0	IE					
L : Lect Theory	ure T : / Lab /	Tuto Emb	orial SLr : bedded T	Supervise heory and	d Learning _ab	g P: Projec	xt R : Resea	arch C:	Credi	ts,TY/L	B/ETI	_:					
OBJEC	TIVES																
• To • To • To • To	o unders o unders o unders o unders	tand tand tand tand	the Basic of the Basic of the metho the basic of	concepts in N concepts in C ds of solving concepts in R	leasures of (orrelation a Algebraic a Programmin	Central Tend nd Regressio nd Transcen ng language	lency n dental equati	ons									
Student	s comp	oletir	ng this co	urse were	able to												
CO1	U	nders	stand the b	asic concept	s in Measure	es of Central	Tendency										
CO2	U	nders	stand the b	asic concept	s in Correlat	ion and Reg	ression										
CO3	Tr	Try to solve Algebraic equations															
CO4	O4 Try to solve system of Linear Equations																
CO5	Le	earn h	now to app	ly R program	ming to solv	ve Statistical	and Numeric	al proble	ems								
Mappin	g of C	ours	se Outco	me with P	rogram C	utcome (POs)										
Cos/PO	s PO	1	PO2	PO3	PO4	PO5	PO6	F	207	P08		PO9					
C01	3		2	3	3	2	2		1	2		3					
	2		2	2	<u> </u>	<u>১</u>	2		2	 1		3 2					
CO4	3		2	3	3	3	2		1	1		3					
CO5	2		2	3	3	2	1		1	2		2					
		1		II													
COs /PSOs			PSO1			PSO2				PSO3							
CO1			1			1				2							
CO2	2		2			1				2							
CO3			3			1				2							
CO4	•		3		2 2												
00	'		ۍ 3/2/1 Ind	icates Stre	nath Of C	ع orrelation	3 - High 2	- Medi	um 1.	∠ ⊥ow							
Category	Program Core	P	rogram lective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter Disciplinary Allied	Skill Compon	ent/Pro erns	ctical oject/int ship	Others						



SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCC22104	STATISTICAL AND NUMERICAL METHODS LAB	2	0	0/0	3/0	IE

UNIT I MEASURES OF CENTRAL TENDENCY & VARIABILITY

Mean, Median, Mode - Range, Quartile Deviation - Mean Deviation - Standard Deviation

UNIT II CORRELATION AND REGRESSION

Correlation Coefficient – Spearman's Rank Correlation – Linear Regression

UNIT III SOLUTION OF EQUATIONS

Solution of Algebraic and Transcendental equations – Method of false position – Iteration method – Newton-Raphson method –

UNIT IV SOLUTION OF LINEAR SYSTEM OF EQUATIONS

Solution of Linear system of equations – Gauss Elimination method – Gauss-Jordan method – Iterative methods – Gauss-Jacobi method – Gauss-Seidel method – Matrix Inversion by Gauss-Jordan method.

UNIT V PROGRAMMING IN R

Algorithm to find Mean, Median, Mode and Standard Deviation Using R, Algorithm to find Correlation coefficient using R, Algorithm to solve System of Equations.

Total Hrs: 45

REFERENCES

- 1) Veerarajan T., *Probability, Statistics and, Random Processes*, Tata McGraw Hill Publishing Co., (2008).
- 2) Gupta S.C., Kapoor V.K., Fundamentals of Mathematical Statistics, S.Chand& Co., (2007).
- 3) Sastry S.S., *Introductory Methods of Numerical Analysis*, Prentice Hall of India, (2012).
- 4) Kandasamy P., Thilagavathy, Gunavathy K., Numerical Methods (Vol.IV), S.Chand& Co., (2008).
- 5) Victor A. Bloomfield, Using R for Numerical Analysis in Science and Engineering, CRC Press, Taylor & Series Group(2014).

EDUCATIONAL AND RESEARCH INSTITUTE	At NAAC
(An ISO 21001 : 2018 Certified Institution)	

Subject (HBCC2	Code: 2105	Subject Na	C L T/ P/R TECHNIQUES - SOFT SKILL III C L S.Lr								Ty/ Lb/ ETL	
		Prerequisit	e: Higher S	Secondary N	Aathematic	8	1	0 0	0/0	2/0	IE	
L : Lectu	ire T : Tu	torial C: Cr	redits									
OBJEC	ΓIVES											
• T	o understa	and the Basi	c concepts i	n Logical F	Reasoning							
• T	o understa	understand the Basic concepts in Arithmetical Reasoning										
• T	understand the Basic concepts in Data Interpretation											
COURS	E OUTC	OUTCOMES (Cos)										
Students	completin	pleting this course were able to										
CO1	Unc	Understand the basic concepts of Logical Statements and Arguments										
CO2	Unc	derstand the concept of Logical conclusions										
CO3	Unc	erstand the Basic concepts in Number system										
CO4	Unc	Understand the basic concepts of Permutations and Combinations										
CO5	CO5 Learn how to analyze the data using Pictorial representation											
Mappin	g of Cou	Irse Outco	me with P	Program C	utcome (POs)						
Cos/PO	5 PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8		PO9		
CO	3	2	3	3	3	2	1	2			3	
CO2	2 2	3	2	3	3	2	1	2			2	
COS	3 3	2	3	2	3	1	2	1			3	
CO4	3	1	2	3	2	3	3	2			2	
CO	5 3	2	3	2	3	2	1	2			3	
COs /PSOs	P	501		PS	02			PSC	23			
CO1		2			-				-			
CO2		2			-				1			
CO3		-			-				1			
CO4		3			1				2			
CO5		2			1				1			
		3/2/1 Ind Low	icates Stre	ength Of C	orrelation,	3 – High, 2	2- Mediun	ז, 1-				
Category	Basic Science s	Engg.Science	Humanities & social Science	Progra m Core	Progra m Elective	Open Elective	Practical/Proje ct	Internsh Skills compor	nips/ nent	Inter dis	ciplinary	
								N				



SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCC22I05	QUALITATIVE AND QUANTITATIVE TECHNIQUES - SOFT SKILL III	1	0	0/0	2/0	IE

Common to II yr / III sem(ALL H&S Programmes)

UNIT 1 Logical Reasoning I

Logical Statements – Arguments – Assumptions – Courses of Action.

UNIT 2 Logical Reasoning II

Logical conclusions – Deriving conclusions from passages – Theme detection.

UNIT 3 Arithmetical Reasoning I

Number system – H.C.F & L.C.M – Problem on ages – Percentage – Profit & Loss – Ratio & Proportion – Partnership.

UNIT 4 Arithmetical Reasoning II

Time & Work – Time & Distance – Clocks – Permutations & Combinations – Heights & Distances – Odd man out and Series.

UNIT 5 Data Interpretation

Tabulation – Bar graphs – Pie graphs – Line graphs.

Total Hrs: 30

Reference Book:

1. R.S.Agarwal, A modern approach to Logical Reasoning, S.Chand& Co., (2017).

- 2. R.S.Agarwal, A modern approach to Verbal and Non verbal Reasoning, S.Chand& Co., (2017).
- 3. R.S.Agarwal, Quantitative Aptitude for Competitive Examinations, S.Chand& Co., (2017).
- 4. A.K.Gupta, Logical and Analytical Reasoning, Ramesh Publishing House, (2014).

5. B.S.Sijwali, Indusijwali, A new approach to Reasoning (Verbal and Non verbal), Arihant Publishers, (2014).



Subject Code: HBBT22ID4	Subje	ect Name :A	LLIED IV	- BIOINF	ORMA	TICS	C		L	T/ S.L	/ P/] .r	R	Ty/ Lb/ ETL
	Prerequ	isite: NIL					3		3	0/0) 0/0)	Ту
L : Lecture T :	Tutorial	S.Lr : Sup	ervised Le	arning P	: Projec	ct R	: Researc	ch C:	Crec	lits	1		
Ty/Lb/ETL : T	heory/La	b/Embeddee	d Theory a	nd Lab									
OBJECTIVE	S :												
To provide scientific foundations needed for the design, implementation, and evaluation of large scale biometric identification systems.													
COURSE OU	TCOME	CS (COs) : (3- 5)										
CO1	Underst	and the key	Biological	Database	s and Da	ata R	etrieval						
CO2	Analyze	e the knowle	edge of Pai	rwise Seq	uence A	lignr	nent						
CO3	Apply V	Apply Various approaches for MSA											
CO4	Evaluate	Evaluate Gene prediction methods											
CO5	Evaluat	valuate RNA Secondary Structure Prediction.											
Mapping of C	ourse Ou	itcomes wit	h Program	n Outcon	nes (PC) s)				~-			
COs/POs	PO1	PO2	PO3	PO4	•	<u>PO5</u>	5 PC)6	P	07	PO8		209
<u>CO1</u>	1	1	3	1		1				3	-		1
<u>CO2</u>	1	2	1	3		1	4	$\frac{2}{1}$ 1		1	1		2
<u>CO3</u>	1	1	2	1		2		-		2	-		2
<u>CO4</u>	3	3	3	2		3		5		3	1		2
<u>CO5</u>	3	3	3	3		3		5		3	-		2
		DCO1			DCC			-			DCOA		
COs / PSOs		PSOI			PSC	02					PS03		
CO1		3			1						1		
CO2		3			1						2		
CO3		3			2						1		
CO4		1			3			_			3		
<u>CO5</u>		1			3		_				3		
3/2/1 indicates	Strengt	h of Correl	ation 3-	High, 2-1	Mediur	n, 1-	Low						
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing elective		Inter Disciplinary/Allied		Skill Component		Practical /Project/internship	Others	
							\checkmark						

С P/R **T**/ L Tv/ **SUBJECT** SUBJECT NAME S.Lr Lb/ CODE ETL HBCF22ID4 3 3 0/0 0/0Ty **BIOINFORMATICS**

OBJECTIVES:

- > To learn nucleotide, protein and genome databases and know about the file formats .
- > To understand pairwise and multiple sequence alignment and the principle.
- > To gain knowledge on approaches for gene prediction methods in prokaryotes and eukaryotes

UNIT I: BIOLOGICAL DATABASES AND DATA RETRIEVAL

Nucleotide databases (Genbank, EMBL, DDBJ), Sequence submission Methods and tools (Sequin, Sakura, Bankit), Sequence retrieval systems (Entrez & SRS), Sequence File Formats and Conversion tools, Protein (Swiss-Prot, Tr-EMBL, PIR_PSD, Expasy), Genome (NCBI, EBI, TIGR, SANGER), Derived Databases (Prosite, PRODOM, Pfam, PRINTS), Metabolic Pathway DB (KEGG, EMP, EcoCyc, BioCyc and MetaCyc)

UNIT II: PAIRWISE SEQUENCE ALIGNMENT

Similarity, Identity and Homology, Global Alignment, Local Alignment, Visual Alignment, Dynamic Programming, Heuristic approach, Database Search methods & tools, Scoring Matrices and Affine Gap costs, Detailed method of derivation of the PAM & BLOSUM Matrices, Differences between Distance & Similarity Matrix

UNIT III:MULTIPLE SEQUENCE ALIGNMENT

Significance of MSA, Various approaches for MSA (Progressive & Iterative), Profile analysis, Block analysis, Pattern searching, Motif analysis. Statistical methods for aiding alignment – Expectation Maximization, MEME, Gibbs Sampling, Markov Chains, BaliBase-Scoring of MSA, PSI/PHI-BLAST

UNIT IV:GENE PREDICTION

Gene structure in Prokaryotes and Eukaryotes, Gene prediction methods, Neural Networks, Pattern Discrimination methods, Signal sites Predictions (Promoter, Splice, UTR, CpG-islands), Evaluation of Gene Prediction methods

UNIT V:RNA SECONDARY STRUCTURE PREDICTION

RNA secondary structure prediction methods and its limitations, mfold method of Zuker, RNAfold program, Tertiary structures of rRNA, Applications of RNA structure modeling Phylogenetic Analysis: Concept of dendrograms, Strings and Evolutionary trees, Ultrametric trees and Ultrametric distances, Additive - Distance trees.

Total no of Hours : 45

TEXT BOOKS

1. A. Lesk (2002) *Introduction to Bioinformatics*(3rd Ed), Oxford University Press **REFERENCE BOOKS**

- 1. D.E. Krane and M.L Raymer (2003)*Fundamental concepts of Bioinformatics* Pearson Education ISBN 81-297-0044-1
- 2. A.D. Baxevanis et. al., (2005) Current Protocols in Bioinformatics Wiley Publishers
- 3. Carlos Setubal, Joao Meidanis, (1997) Introduction to Computational Molecular Biology PWS Pub.

B.Sc. (Information Science and Cyber Forensics)-Regulation 2022-2023



9 Hrs

9 Hrs

9 Hrs

9 Hrs



Subject Code: HBCF22008	Subject DA	Subject Name : DATABASE MANAGEMENT SYSTEM						C	L	S	T/ .Lr	P/R	Ty/ Lb/ ETL
	Prerequ	isite: NIL						3	3	(0/0	0/0	Ту
L : Lecture T : Tuto	rial S.L	r : Supervi	sed Learni	ng P:P	roject	R : F	Resear	rch C:	Credi	ts			
Ty/Lb/ETL : Theory	y/Lab/En	nbedded Th	eory and L	Lab	-								
OBJECTIVES :													
• To learn the	efundame	entals of DI	BMS conce	epts and	techni	ques							
Able to dev	elop data	base applic	ations										
COURSE OUTCO	COMES (COs) : (3-5)												
CO1	Understanding the most fundamental DBMS concepts and techniques.												
CO2	Learn to	Learn techniques required for building, maintaining and quering database.											
CO3	Appling	Appling indexing and hashing functionalities.											
CO4	Plan an	Plan and implement transactional model.											
CO5	Design	database fo	or applicati	ons	(70.0)								
Mapping of Course	e Outcon	nes with Pi	cogram O	utcomes	<u>s (POs</u>))				~-			DOA
COs/POs	PO1	PO2	PO3	PO ²	1	<u>PO5</u>		<u>PO6</u>	P	07	PO	8	PO9
	3	2	2	2		2		1	-	1			
<u>CO2</u>	2	2	1	2		2		1		1			
<u>CO3</u>	3	3	3	2		1		2		2			
<u>CO4</u>	3	2	1			2		2		3			
05	2		2	2		I		2		I			
		DSO1			DS	02					DSO	2	
		1301			10	02					150	3	
<u>CO1</u>		3			2						1		
<u>CO2</u>		2									2		
<u>CO3</u>		2			-	5					2		
<u>CO4</u>		1									3		
	(1 6)	$\frac{2}{\alpha}$	<u> </u>		1	5 1 T					3		
3/2/1 indicates Stre	ength of	Correlation	n 3- Hig	n, 2- Me	eaium,	1-L0) W						
Category	 Program Core 	Program elective	Humanities and social Science	Open Elective	Skill enhancing elective		Inter Discinlinarv/Allied		Skill Component		Practical /Project/internship	Otherson of the second s	Otters
	v												

С L **T**/ P/R Tv/ SUBJECT SUBJECT NAME S.Lr Lb/ CODE ETL 3 0/0 0/0 **HBCF22008** 3 Τy DATABASE MANAGEMENT SYSTEM

UNIT: I

Fundamentals of Database – Purpose of database system-Data Abstraction-Overall System Structure - Entity Relationship Model - Mapping Constraints - Keys - E-R Diagrams - Relational Model – Structure-Relation calculus.

UNIT: II

Structured Query Language - Basic Structure - Set Operations - Aggregate Functions - Date, Numeric, and Character Functions - Nested Sub queries -Modification Of Databases - Joined Relations-DDL - Embedded SOL.

UNIT: III

Relational Database Design - Pitfalls - Normalization Using Functional Dependencies - First Normal Form-Second Normal Form-Third Normal Form-Fourth Normal Form And BCNF.

UNIT: IV

File structure, Indexing & Hashing - File and system structure – overall system structure file transaction – data dictionary – indexing and hashing basic concepts, static and dynamic hash functions.

UNIT: V

Transactions - Transaction Concept- Properties of a Transaction- A Simple Transaction Mode-Concurrent Executions- Schedules- Serial and Non Serial types-Serialization of schedules and views-locks based protocols-time based protocols.

TEXT BOOKS:

1. Abraham Silberschatz, H.F.Korth and S.Sudarshan-Database System Concepts McGraw Hill Publication., 6th Edition, 2013

2. Singh-Database systems: Concepts, Design & applications, Pearson Education, 2nd Edition, 2011

REFERENCE BOOKS:

1. Gerald V.Post - DBMS-Designing and Business Applications - McGraw Hill Publications

2. Michael Abbey and Michael J. Corey-Oracle- A Beginners guide TMH

Total Hours: 45

9 Hrs

9 Hrs

9 Hrs

9 Hrs

9 Hrs

AND RESE



Subject	Subject	Name : DI	GITAL FO	RENSI	CS		C	L	r	Γ/	P/R	Ty/
Code: HBCF22009									S.	.Lr		Lb/ ETL
	Prerequ	isite: NIL					4	3	1	1/0	0/0	Ту
L : Lecture T :	Tutorial	S.Lr : Sup	ervised Lea	arning P	: Project F	R : Resea	arch (C: Cred	lits			4
Ty/Lb/ETL : T	heory/La	b/Embedded	d Theory ar	nd Lab								
OBJECTIVES	:											
To learn	1 the comp	ne computer forensic fundamentals										
• To unde digital o	evices	e dasic digital	l forensics ai	na tecnnic	lues for cond	lucting ti	ne lore	ensic ex	amina	ation on	untere	nt
• To unde	erstand ho	w to examine	e digital evid	ences suc	h as the data	acquisit	tion, id	dentific	ation a	analysis.		
COURSE OU	ТСОМЕ	S (COs) : (<u>3-5)</u>				,					
CO1	Know he	ow to apply f	orensic anal	ysis tools	to recover in	nportant	evide	nce for	identi	fying co	mputer	crime.
CO2	To be we	ell-trained as	next-genera	tion comp	outer crime i	nvestigat	tors.					
CO3	The stud	lents have the	awareness	on digital	forensics fra	auds						
CO4	The stud	lents have the	e knowledge	on keep t	he data in se	cure mai	nner i	n the ne	twork	using ne	etwork	
C05	Students	understood l	how to prote	ct the dat	a or how to s	ecure the	eir nei	rsonal a	nd off	ficial dat	a in the	ir
005	compute	r.	low to prote				en per	isonai a			a m uk	/11
Mapping of C	Course Outcomes with Program Outcomes (POs)											
COs/POs	PO1	PO2	PO3	PO4	A PO	5 1	PO6	P	07	PO8		PO9
CO1	3	3	3	3	3		2		3	3		3
CO2	3	3	3	2	3		2		2	2		3
CO3	3	3	3	2	2		2		3	3		3
CO4	3	3	3	3	2		2		3	1		3
CO5	3	3	3	3	2		3		2	2		3
COs / PSOs		PSO1			PSO2			PSO3				
CO1		3			3					2		
CO2		3			3					3		
CO3		3			2					2		
CO4		3			2					3		
CO5		3			3					2		
3/2/1 indicates	Strengt	h of Correla	ation 3- I	High, 2-	Medium, 1	-Low						
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter Disciplinary/Allied		Skill Component		Practical /Project/internship	Others	
	✓											

Reference Books:

- 1. Warren G. Kruse II and Jay G. Heiser, "Computer Forensics: Incident Response Essentials", Addison Wesley, 2002.
- 2. Nelson, B, Phillips, A, Enfinger, F, Stuart, C., "Guide to Computer Forensics and Investigations, 2nd ed., Thomson Course Technology, 2006, ISBN: 0-619-21706-5.
- 3. Vacca, J, Computer Forensics, Computer Crime Scene Investigation, 2nd Ed, Charles River Media, 2005, ISBN: 1-58450-389.

12 Hrs

12 Hrs

12 Hrs

12 Hrs

12 Hrs

SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCF22009	Digital Forensics	4	3	1/0	0/0	Ту

Unit –I

Computer forensics fundamentals, Benefits of forensics, computer crimes, computer forensics evidence and courts, legal concerns and private issues.

Unit-II

Understanding Computing Investigations – Procedure for corporate High-Tech investigations, understanding data recovery work station and software, conducting and investigations.

Unit-III

Data acquisition- understanding storage formats and digital evidence, determining the best acquisition method, acquisition tools, validating data acquisitions, performing RAID data acquisitions, remote network acquisition tools, other forensics acquisitions tools.

Processing crimes and incident scenes, securing a computer incident or crime, seizing digital evidence at scene, storing digital evidence, obtaining digital hash, reviewing case.

Unit-V

Unit-IV

Current computer forensics tools- software, hardware tools, validating and testing forensic software, addressing data-hiding techniques, performing remote acquisitions, E-Mail investigations- investigating email crime and violations, understanding E-Mail servers, specialized E-Mail forensics tool.

Total Hours : 60



Subject Code: HBCF22L04	Subject DATA	Name : ABASE MA	NAGEMI	ENT SYS	STEM LA	В	С	L	S.	Γ/ .Lr	P/R	Ty/ Lb/ FTI
	Prerequ	isite: NIL					2	0	C)/0	3/0	Lb
L : Lecture T : Tuto	rial S.L	r : Supervis	sed Learn	ing P: H	Project R	: Rese	earch	C: Cree	dits			
Ty/Lb/ETL : Theory	/Lab/Em	bedded Th	eory and I	Lab	5							
OBJECTIVES :												
• To create a database and query using SQL.												
• Understand the significance of integrity constraints, referential integrity constraints,												
Triggers, assertions.												
COURSE OUTCOMES (COs) : (3-5)												
	Underst	Understanding the most fundamental DBMS concepts and techniques.										
CO2	Learn te	Learn techniques required for building, maintaining and quering database.										
CO4	Apping Dian and	Appling indexing and hashing functionalities.										
C04	Plan and implement dansactional model.											
UCS Design database for applications Manning of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1 $PO2$ $PO3$ $PO4$ PO						F	206	F	207	PO8	PO9
CO1	3	2	$\frac{103}{2}$	2		2		1	1	1	100	107
CO2	3	3	1	2		2		2		2	1	2
CO3	3	3	3	2		1		2		2	1	2
CO4	3	2	1	2		2		2		3	1	2
CO5	2	1	3	2		1		2		2	1	3
		1	- I								1	1
COs / PSOs		PSO1		PSO2				PSO3				
CO1		2			2					1		
CO2		3			2					2		
CO3		2			3					2		
CO4		1			2					3		
$\frac{\text{CO5}}{2/2/1} \cdot 1 \cdot 4 \cdot 54$	41 64	$\frac{2}{2}$	2 11.	1 2 14	3	T				3		
3/2/1 indicates Stre	ength of C	correlation	<u>1 3- Hig</u>	gn, 2- Me	edium, 1-	LOW						
Category	Program Core	Program elective	Humanities and socia Science	Open Elective	Skill enhancing elective	Inter	Disciplinary/Allied	Skill Component		Practical /Project/internship	Others	
										\checkmark		



SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCF22L04	DATABASE MANAGEMENT SYSTEM LAB	2	0	0/0	3/0	Lb

OBJECTIVES:

To create a database and query using SQL.

Understand the significance of integrity constraints, referential integrity constraints, Triggers, assertions.

I. Program to learn DDL and DML commands

- 1. Execution of data description language commands
- 2. Execution of data manipulation language commands
- 3. Execution of data control language commands
- 4. Execution of transaction control language commands
- 5. Select, from and where clause
- 6. Set operation [union, intersection, except]
- 7. String operations
- 8. Nested queries
- 9. Join operation
- 10. Modification of the database



Subject	C	ubject Nom			INKINCS			Τ/	D/	T/I /		
Code: HBCC22I06		ubject Nam			INKINGSF	XILL		S.Lr	R	ETL		
	Prerec	quisite: Ba	sic Know	edge in (Computer		1 0	0/0	2/0	IE		
L : Lecture	T : Tutor	ial SLr : Su	pervised L	earning F	P: Project F	R : Researc	h C: Cred	its	1			
T/L/ETL : 1	Theory / L	ab / Embeo	dded Theo	ry and La	b							
OBJECTI	VES											
1. Pron	note Critic	al Thinking a	is a Valuabl	e Process i	in the Work	place						
2. Use	Critical Thi	nking Skills	When Maki	ng Busines	ss Decisions	and Taking	Action					
3. Seleo	ct Specific	Tools to Use	e When Con	ducting Cr	itical Thinki	ng						
COURSE	OUTCOM	IES (Cos)										
Students c	completine	g this cours	e were ab	e to								
C01	Explaini	ng an Issue o	or Problem									
CO2	Employi	ng Evidence	/Informatio	n Effective	ely							
CO3	Analyzin	lyzing Contexts										
CO4	Describ	escribing Your and Others Perspectives										
CO5	Drawing	Logical Con	clusions									
Mapping of	of Course	e Outcome	with Prog	gram Out	come (PO	s)						
Cos/POs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	P09			
CO1	3	2	3	3	2	3	3	2		3		
CO2	2	2	3	1	2	3	1	2		3		
CO3	3	2	2	1	3	3	1	3		3		
CO4	3	3	3	2	1	3	2	1		3		
CO5	2	3	2	3	3	3	3	3		3		
Cos/PSOs		PS01	P	S02	P	'S0 3		PS04	4			
CO1		3		3		2		2				
CO2		2		2		1		3				
CO3		3		3		3		2				
CO4		3		3		2		3				
CO5		3		2		2		3				
	3 L	/2/1 Indica .ow	tes Streng	th Of Corr	relation, 3 ·	– High, 2- N	/ledium, 1	-				
Category	Program	Program	Humanities	Open	Skill	Inter	Skill	Practical	Other	S		
	Core	elective	and social Science	Elective	enhancing elective	Disciplinary /Allied	Component	/Project/i nternship				
							\checkmark					



SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCC22I06	CRITICAL THINKING SKILL	1	0	0/0	2/0	IE

- 1. Case Study Analysis of a Specific Computer Applications domain
 - a. System Requirements
 - b. Analysis
 - c. Design
 - d. Test Cases
- 2. Debugging program from Computer Applications Languages
- 3. Prediction of Output for Minimum 10 Problems



Subject	Subject	t Name :					С	L	Τ/	S.Lr	P/ R	Τ/	
Code:	DIG	TAL FORE	NSICS AN	D INVES	TIGATION							L/	
HBCF22I01			LAB									ETL	
	Prerequ	isite: Basic	concepts D	igital for	ensics		1	0	(0/0	2/0	IE	
	Techno	logies											
L : Lecture T :	Tutorial	S.Lr : Sup	ervised Le	arning P	: Project R	: Re	search	C: Crea	lits				
Ty/Lb/ETL : T	heory/La	b/Embedded	1 Theory a	nd Lab									
OBJECTIVES		vigital form	ion Toohn										
• 0v	erview L	ngital loren	sics recim	doorgentio	n taabniqua	0							
• Da	understa	nd the conc	puoli allu o	ansic tool	li technique	8							
COURSE OUTCOMES (COs) : (3-5)													
COURSE OC	1 Understand concept of forensics technologies.												
CO2	To find	To finding the email frauds											
CO3	Will be	Will be able to understand the problem and recovering digital evidence											
CO4	To tracing the email and IP address												
CO5	Will be able to know the Mobile forensics												
Mapping of Course Outcomes with Program Outcomes (POs)													
COs/POs	PO1	PO2	PO3	PO4	A PO	5	PO6	P	07	PO	8	PO9	
CO1	3	2	2	1	1		1		2	1		2	
CO2	3	3	2	3	2		1		2	1		2	
CO3	3	2	2	2	2	2			1	1		3	
CO4	3	3	2	3	2		2		2	1		2	
CO5	3	2	1	2	2	1			3	1		2	
COs / PSOs		PSO1		PSO2				PSO3					
CO1		3			2			1					
CO2		3			1					1			
CO3		3			1					1			
CO4		2			2					1			
CO5		3			1					1			
3/2/1 indicates	Strengt	h of Correl	ation 3-	High, 2- 1	Medium, 1	-Low	7						
					gu		e			ip			
	e		р		nci		All	nen		nsh			
~	Cor		s an nce	ive	nha		ary/	iodi		nter			
gor	m	Я.,	itie	lect	e e	;	lina	Con		cal ct/ii			
ate	gra	ran tive	al S	υE	ctiv	er.	šcip	U II		lictic ojec	3400		
	Prc	Prog	Hun	Dpe	Ski ele	Int	d Di	Ski		Prê /Pr	Ē	5	
		цо	LI S							\checkmark			



Subject Code: HBCF22I01	Subject Name : DIGITAL FORENSICS AND INVESTIGATION LAB	С	L	T / S.Lr	P/ R	T / L/ ETL
	Prerequisite: Basic concepts Digital forensics Technologies	1	0	0/0	2/0	IE

- 1. Computer Hardware Discovery.
- 2. Photo Morphing
- 3. Mobile Forensics

4. Working in Windows and Linux Environment: Study of various commands in Linux like Encryption and Decryption, message digest etc.

5. MAC Dates and Times.

6. Tracing E-mail-Finding senders IP Address of received e-mail, tracing route of e-mail received using tools available on internet using Visual Trace Route.

- 7. Exploring Encase software.
- 8. Evidence Tags and Logs.

9. WinHex : Cloning a Disk, Recovering Digital Evidence, Analyzing Digital Evidence, Documenting Digital Evidence.

10. Locate a deleted mail using Forensic Tool Kit.



SEMESTER V



Subje Code:	ct	Subject N EVIDEN	Name : IN	FORMA' AGEMEN	FION (NT	C	L	T/S.Lr	P/R	Ty/Lb/ET L				
HBCH	22010	Prerequis	site: NIL					4	3	1/0	0/0	Ту		
L: Lect	ure T: Tu	torial S. Lr: S	Supervised Le	arning P: Pr	oject R:	Research C: (Credits Ty/Lb/ET	L: Theory/	Lab Emb	bedded Theo	ory & Lat)		
OBJI	ECTIVE	ES: This co	ourse											
•	To un Mana To ga Study	derstand the gement in Knowle of Digital	he Basic Co dge about I Evidence a	oncept of information and Invest	Inform on Gath igation	ation Gathe	ering and Pros	, Cons& curity	Ethical	issues in	Informa	ation		
COU	RSE OU	UTCOME	S (COs) : (3- 5)										
CO1	Relate Inform	the basic on the basic of the b	concepts an agement.	d Informa	tion Ga	athering, E	thical and Prac	tical Gui	delines	s used in t	he field	of		
CO2	To Un	derstand a	bout Inform	nation Gat	hering	Technique	s.							
CO3	Outlin	e the role of	of the ethica	al, social,	and sec	curity issue	s of informatio	on securit	y.					
CO4	To Un	derstand about Digital Evidence												
CO5	To gai	n knowled	ge about Di	igital For	ensics	and Investi	gation							
Марр	oing of (Course Ou	itcomes wit	th Progra	m Out	comes (PC)s)							
COs/	POs	PO1	PO2	PO3	P	04 I	PO5 P	06	PO7	PO	8	PO9		
CO1		3	2	2		3	3	2	1	1		2		
CO2		2	3	3		2	3	2	2	-		1		
CO3		3	2	3	,	2	3	2	1	3		2		
CO4		3	3	3		3	3	2	2	2		1		
CO5		3	3	3		2	3	2	2	1		1		
COs /]	PSOs		PSC	01			PSO2			PSO3				
CO1			3				2				1			
CO2			3				2				2			
CO3			2				3				2			
C04			3				3				1			
3/2/1	indicate	s Strongtl	of Correl	ation 3.	High	2- Mediu	<u>2</u> n 1-Low				1			
5/2/1	mulcatt			ation 5-	· mgn,	2- Meului	II, 1-LUw			1				
	ategory	Program Core	Pro gra m	Humaniti s and	Open Elective	Skill enhanci ng	Inter Discipli nary/All ied	Skill Compor ent	Practica	/Project/ internsh P	Others			
	0	✓												
			1			1	1		1		1			

SUBJECT С L T/S.Lr P/R **Fv/Lb/ET** SUBJECT NAME CODE **INFORMATION GATHERING AND EVIDENCE** HBCF22010 4 3 1/00/0 Ty MANAGEMENT 12Hrs

UNIT I: Introduction to Information Gathering

Information –Types of Information –Information Gathering – Pros and Cons of Information gathering – Overview Ethics- Key Considerations in information gathering- Ethical Questions and Practical Guidelines -Ethics in Context of Information Management

UNIT II: Information Gathering Techniques

Traditional Method: Passive - Active; Open source Information Gathering; Advanced Technique: Foot printing – Scanning – Enumerating; Information Gathering Tools

UNIT III: Information Security

Information Security - The Need for Security- Legal, Ethical, and Professional Issues in Information Security-Planning for Security-Implementing Information Security-Information Security Maintenance

UNIT IV: Introduction to Digital Evidence

Digital Evidence - Challenges of Digital Evidence - Digital Evidence in Courtroom - Investigative Reconstruction with Digital Evidence-Violent Crime and Digital Evidence- Digital Evidence as Alibi-

UNIT V: Digital Evidence and Investigation

Digital Forensics Profession and Investigation - Email and Social Media Investigation - Data Acquisition -Processing Crimes and Incident Scenes – Report Writing for High-Tech Investigations – Expert Testimony in Digital Investigations – Ethics for the Expert Witness

Text Books

- 1. Katie Schenk, Jan Williamson (2005), Ethical Approaches to Gathering Information from Children and Adolescents in International Settings: Guidelines and Resources
- 2. Michael E. Whitman, Herbert J. Mattord (2018), Principles of Information Security, Cengage Learning
- 3. Eoghan Casey (2011), Digital Evidence and Computer Crime, Academic Press

References

- 1. Katherine O'Keefe, Daragh O Brien (2018), Ethical Data and Information Management: Concepts, Tools and Methods, Kogan Page Limited
- 2. Harsh Bothra(2019), Mastering Hacking: The Art of Information Gathering & Scanning, KhannaBook Publication Co. (P) LTD
- 3. Bill Nelson, Amelia Phillips, Christopher Steuart (2016), Guide to Computer Forensics and Investigations: Processing Digital Evidence, Cengage Learning
- 4. Angus M. Marshall (2008), Digital Forensics: Digital Evidence in Criminal Investigation, Wiley-Blackwell
- 5. Eoghan Casey 2010), Handbook of Digital Forensics and Investigation, Elsevier Academic Press

B.Sc. (Information Science and Cyber Forensics)-Regulation 2022-2023

12Hrs

Total Hrs: 60

12Hrs

12Hrs

12Hrs

INSTITUTE AND RESEARCH



Subject Code: HBCF22011	Subject N	Name : D	ata Priva	су		С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL	
	Prerequis tags	site: Basic	c knowled	lge in HTM	IL 🛛	3	3	0/0	0/0	Ту	
L : Lecture T	: Tutorial	S.Lr : S	upervised	d Learning	P : Projec	ct R :	Resea	rch C: Cr	redits		
Ty/Lb/ETL : 7	Theory/La	b/Embedo	ded Theo	ry and Lab	0						
OBJECTIVE	S:										
1. Re	alize the n	leed for da	ata privac	cy and the r	elated tec	hnolo	gies				
2. Co	mprehend	the conce	epts of D	ata privacy	and Prote	ection	mecha	inisms.			
COURSE OUTCOMES (COs) : (3-5)											
CO1	To recog	Γo recognize the need of data privacy.									
CO2	To catego	To categorize the statistical and computational techniques needed to share data, with a									
	primaryf	primaryfocus on the social, behavioral and health sciences.									
CO3	To formu	Γο formulate architectural, algorithmic and technological foundations for the									
	maintena	nce of the	eprivacy	of individua	als, the co	onfide	ntiality	of organ	izations, a	nd the	
	protectio	n of sensi	tive info	rmation.							
CO4	Demonst	rate the p	rotection	mechanism	ns against	sever	al data	related a	ittacks		
CO5	CO5 Design enhanced privacy protection methods by envisioning the basic attacks to happen										
Mapping of Course Outcomes with Program Outcomes (POs)											
COs/POs	PO1	PO2	PO3	PO4	PO5	P	06	PO7	PO8	PO9	
CO1	3	3	2	2	2		3	1	2	2	
CO2	3	2	1	1	3		3	3	1	2	
CO3	3	3	3	2	2		3	2	2	2	
CO4	3	3	3	3	1		2	1	2	2	
CO5	3	2	2	2	1		3	3	2	2	
COs / PSOs		PSO1			PSO2				PSO3		
<u>CO1</u>		3			3				3		
<u>CO2</u>		3			2				3		
<u>CO3</u>		3			3				3		
<u>CO4</u>		3			2				2		
<u>CO5</u>		3			3				3		
3/2/1 indicate	s Strengt	h of Corr	elation	3- High, 2	- Mediur	<u>n, 1-I</u>	20W				
Category	Program Core Program elective Humanities and social Science			Open Elective	Skill enhancing elective	Inter Disciplinary/All		Skill Component	Practical /Project/interns	Others	
	\checkmark										
SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL					
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HBCF22011	DATA PRIVACY	3	3	0/0	0/0	Ту					

UNIT: I

Introduction to Data : Introduction- What is data Privacy and why Is It Important? -Methods of Protecting Data-Need for Sharing Data-Importance of Balancing data Privacy and Utility.

UNIT: II

Static Data Anonymization on Multidimensional Data – Introduction: Classification of Privacy Preserving Methods. Classification of Data in a Multidimensional Data Set -Group-Based Anonymization: k-Anonymity, l-Diversity, t-Closeness.

UNIT: III

Static Data Anonymization on Complex Data Structures : Introduction - Privacy Preserving Graph Data- Privacy Preserving Time Series Data-Privacy Preservation of Longitudinal Data-Privacy Preservation of Transaction Data

UNIT: IV

Static Data Anonymization on Threats to Anonymized Data - Threats to Anonymized Data - Threats to Data Structures - Threats by Anonymization Techniques

UNIT: V

Privacy Preserving Data Mining: Introduction -DataMining: Key Functional Areas of Multidimensional Data-Association Rule Mining- Clustering

Total Number of Periods : 45

TEXT BOOK:

1.NatarajVenkataramanan, AshwinShriram, Data Privacy: Principles and Practice, Taylor Fran- cis, 2016. (ISBN No.: 978-1-49-872104-2).

REFERENCE BOOK:

- 1. George T. Duncan. Mark Elliot, Juan-Jose Salazar-GonZalez, Statistical Confidentiality: Principle and Practice. Springer, 2011. (ISBN No.: 978-1-44-197801-1).
- 2. Aggarwal, Charu C., Yu, Philip S., Privacy-Preserving Data Mining : Models and Algorithms, Springer, 2010. (ISBN No.: 978-0-38-770991-8).

AND RESEA

9 Hrs

9 Hrs

9 Hrs

9 Hrs



Subject Code: HBCC220	02	Subje	ect Nam Dl	e: ENTRE EVELOPN	PRENEU IENT	JRIAL		С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
	Pr de	erequisite velopmen	: Basic t	knowledge	in entrep	reneurial		3	3	0/0	0/0	Ту
L : Lectu T/L/ETL	re, T : Tu :Theory	ıtorial,SLı / Lab / En	: Super	vised Learn Theory and	ning, P: Pı d Lab	roject, R	: Resear	rch, C : 0	Credits,		·	
OBJECT	FIVES											
 To eni appro To rea busir To ide calcu 	rich the st baches to cognize the ness develophing the state the contify the contify the	udents tov attain the he value o lopment. key factor c-taking ar	wards the goals of f proble rs and be rd oppoint	e knowledg f the busine m solving, e able to ap rtunity reco	ge of entre ess. effective ply the ke ognition to	epreneuri business by entrep busines	al skills manage reneurial s develo	and to r ment an process pment.	nake the d entrep s – comr	students reneuria	s underst l thinkin l control	and the g to
COURSI Students	E OUTCO completi	DMES (Cong this con	os) urse wei	re able to	0			L				
CO1	Prov	vide inform	nation re	elated to en	trepreneu	rship						
CO2	Mak	e students	state th	e importan	ce of entre	epreneur	ial devel	opment				
CO3	State	e the impo	rtance c	of business	idea gener	rations						
CO4	Gair	h knowled	ge on va	arious EDP	organized	l by Gov	ernment	Sectors				
CO5	Prov grov	vide them with.	the natu	re of econo	mic devel	lopment	and entro	epreneu	rial			
Mapping	of Cours	e Outcom	e with F	Program Ou	tcome (P	Os)						
Sem					Coursec	ode: HB	CC2200)2				
VI					Program	meOutc	omes(Po	DS)				
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	3	3	2	-	-	2
CO2	3	3	3	2	3	3	3	3	3	2	-	-
<u>CO3</u>	2	2	3	3	3	3	2	3	3	3	2	2
CO4	3	3	3	$\frac{2}{2}$	3	3	2	2	$\frac{2}{2}$	2	1	3
3/2/1 Inc	licates	3 Strengt	h Of C	orrelatio	<u> </u>	igh, 2-	2 Mediu	 m, 1- L	_ow		2	2
Catego	ry Prog Core	ram Progra	am ve	Humanitie s and social Science	Open Elective	Skill enhanci elective	Inter ng Discip ary/A	Skil olin Con llied	l ponent	Practical /Project/i nship	nter Othe	rs
						1						

Subject Code:	Subject Name: ENTREPRENEURIAL DEVELOPMENT	C	L	T/ S.Lr	P/R	Ty/ Lb/ ETI
1100022002	Prerequisite : Basic knowledge in entrepreneurial development	3	3	0/0	0/0	Ту

UNIT-I-ENTREPRENEURSHIP

Concept of Entrepreneurship – Meaning – Types – Qualities of an Entrepreneur – Classification of Entrepreneurs– Factors influencing Entrepreneurship–Functions of Entrepreneurs.

UNIT-II ENTREPRENEURIAL DEVELOPMENT

Entrepreneurial Development – Agencies – Commercial Banks – District Industries Centre– National Small Industries Corporation–Small Industries Development Organisation – Small Industries Service Institute. All India Financial Institutions– IDBI–IFCI–ICICI–IRDBI.

UNIT-III BUSINESS IDEA GENERATION

Project Management- Business idea generation techniques-identification of Business Opportunities- Feasibility study- Marketing, Finance, Technology & Legal Formalities- Preparation of Project Report Tools of Appraisal.

UNIT-IV EDP

Entrepreneurial Development programmes (EDP)-their role, relevance, and achievements -Role of Government in organizing EDPs-critical evaluation

UNIT-V ENTREPRENEURIAL GROWTH

Economic development and entrepreneurial growth- Role of Entrepreneur in economic growth – Strategic approaches in the changing economic scenario for small scale Entrepreneurs–Networking Nicheplay, Geographic Concentration, Franchising/ dealership –Development of Women Entrepreneurship.

REFERENCE BOOKS:

- 1. SrinivasanN.P.–Entrepreneurial Development
- 2. Saravanavel-Entrepreneurial Development
- 3. VasantDesai-Project Management
- 4. JayashreeSuresh–Entrepreneurial Development
- 5. Holt–Entrepreneurship–New Venture Creation

9 Hrs

9 Hrs

.

Total Hrs: 45

9 Hrs

9 Hrs





Subject Code: HBCF22L05	Subject IN	Name : IFORMATIC M/	ON GATHER ANAGEMEI	ING & E\ NT LAB	/IDENCE		C	L	T/ S.Lr	P/R	Ty/ Lb/ ETL		
	Prerequ	isite: NIL					2	0	0/0	3/0	Lb		
L : Lecture T : T	utorial	S.Lr : Superv	/ised Learn	ing P:Pr	oject R : Re	esear	rch C: Cr	edits					
Ty/Lb/ETL : The	eory/Lab/	Embedded	Theory and	l Lab									
OBJECTIVES :													
To Trai	n the the	students ho	ow to use t	he Netwo	orking Tools	and	Scannin	ig Oper	ations				
 To gain 	N Knowled	lge about N	etwork Vul	Inerabili	ties and O	/erflo	ow Atta	cks					
To trai	in studer	ts how to	Recover Lo	ost Data	and Delete	ed D	ata.						
COURSE OUTC		JS): (3-5)	- (· · · · · · · · · · · · · · · · · · ·								
C01	Demons	strate the us	sage of ne	twork re	connaissai	nce t	loois						
CO2	Perform	OS Fingerp	orinting,Ping	g Scan &	Port Scan								
03	To Unde	erstand abo	ut Network	Vulnera	abilities								
CO4	To creat	te forensic	disk image	e & Reco	ver files fro	om e	external	al hard drive					
CO5	Underst	anding how	to Recove	r Encrypt	ed Data, Pa	SSWC	ord, Lost	st and Deleted Files					
Mapping of Co	urse Out	comes with	Program C	Outcomes	s (POs)								
COs/POs	PO1	PO2	PO3	PO4	PO:	5	PO6	P	07	PO8	PO9		
CO1	2	3	1	2	1		3		3	1	2		
CO2	2	2	3	2	2		3		3	1	3		
CO3	2	3	1	2	1		2		3	-	2		
CO4	2	2	1	1	1		2		2	-	2		
CO5	3	3	1	1	1		2		3	-	3		
COs / PSOs		PSO1			PSO2					PSO3			
CO1		3			2					1			
CO2		3			3					2			
CO3		2			2					1			
CO4		3			1					1			
CO5		3			1			1					
3/2/1 Indicates	s Strengti	n of Correla	tion 3- Hi	ign, 2- ivi	eaium, 1-Lo	ow I		<u> </u>					
Category	Program Core	Progra m electiv	Humanities and social Science	Open Elective	Skill enhancing elective	Inter	Disciplinary /Allied	Skill Component	Others				
				-						\checkmark			



SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCF22L05	Information Gathering & Evidence Management Lab	2	0	0/0	3/0	Lb

LIST OF EXPERIMENTS

- 1. Study the use of network reconnaissance tools like WHOIS, dig, traceroute, nslookup to gather information about networks and domain registrars.
- 2. Use tools like wireshark, ethereal, tcpdump etc. Use Packet sniffer tools like wireshark, ethereal, tcpdump to do the following
 - a. Observer performance in promiscuous as well as non-promiscous mode.
 - b. Show that packets can be traced based on different filters.
- 3. Use nmap to scan open ports, perform OS fingerprinting, do a ping scan, tcp port scan, udp port scan, etc.
- 4. Detect ARP spoofing using open source tool ARPWATCH.
- 5. Use the Nessus tool to scan the network for vulnerabilities.
- 6. Implement a code to simulate buffer overflow attack.
- 7. Install IDS (e.g. SNORT) and study the logs.
- 8. Create a forensic disk image
- 9. Recover files from external hard drive
- 10. Recover encrypted data
- 11. Recover password
- 12. Recover lost, modified and deleted file

Total Hrs: 45



Subject Code: HBCF22I02	Subject	Name : CRYP NERABI	FOGRAP LITY AS	PHY AN SESSMI	ND ENT LAI	3	С	L	S	T/ 5.Lr	P/R	Ty/ Lb/ ETL
	Prerequ	isite: NIL					1	0	(0/0	2/0	IE
L : Lecture T : T	utorial	S.Lr : Super	rvised Lear	ning P:	Project R	: Res	earch C	: Credit	ts			
Ty/Lb/ETL : The	eory/Lab/	Embedded '	Theory and	l Lab								
OBJECTIVES	:			1.0								
• To unde	erstand b	asics of Cr	yptograph	iy and Se	ecurity.				•			
• To be a	ble to see	cure a mess	sage over	insecure	channel u	ISINg	variou	s secur	ity n	neasures.		
• To unde	erstand v	arious prot	cocols for i	network	security to	o pro	otect ag	ainst th	ne thr	eats in th	ne	
	$\frac{1}{1}$	$\frac{\text{prement.}}{(CO_{2}) \cdot (2)}$	5)									
COURSE OUT	Under	(COS): (3 stand vario	- 5) us Crypto	graphic '	Technique	20						
CO^2		various Bl	ock ciphe	graphic rs and er	acryption of	zs stand	larde ue	ing iau	/9			
CO3	Implem	various Dr	s public k	ev crypt	ography te	chn	ianes us	ing jav	'a.			
CO4	Implei	ment $SH\Delta$	Digital Si	onature	technique	s	iques					
C05	Impler	nent AFS	Des in nro	oram	teeninque	3						
Manning of Cor	irse Out	comes with	Program	Outcom	es (POs)							
COs/POs	PO1	PO2	PO3	PO4	$\frac{1}{4} \qquad PO$	5	PO6	Р	07	PO8	P	PO9
CO1	1	3	3	2	3	-	3		1	1		1
CO2	2	1	1	3	3		3		3	1		2
CO3	3	2	2	2	2		2		3	1		3
CO4	3	3	2	1	3		2		2	1		3
CO5	3	3	3	3	3		3		3	1		3
		DCO1			DCOA					DCO1		
COs / PSOs		PSOI			PS02					PS03		
		$\frac{2}{2}$			2					$\frac{1}{2}$		
C02		3			1					2		
CO4		3			1					3		
C05		2			2					3		
3/2/1 indicates S	Strength	of Correlat	ion 3-H	igh, 2- M	ledium, 1-	Low						
					ß							
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhanci elective	Inter	Disciplinary/Allied	Skill Component		Practical /Project/internship	Others	
										V		



Sub. Code	Subject Name	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCF22I02	CRYPTOGRAPHY AND VULNERABILITY ASSESSMENT LAB	1	0	0/0	2/0	IE

CRYPTOGRAPHY

Using Cryp Tool Portal perform the following the following Encryption TEchniques

- 1. Symmetric Encryption
 - Ceaser Cipher
 - Playfair Cipher
 - Hill Cipher
 - Vigenère Cipher
- 2. Block Ciphers and Data Encryption Standards
 - o DES
 - Triple DES
 - AES
- 3. Hash Functions
 - o SHA
 - \circ MD5
- 4. Implementation of Digital Signature and PKI
- 5. Cryptanalysis of algorithms
 - o Vigenère
 - o RSA
 - o AES

VULNERABILITY ASSESSMENT

- 6. Network Mapping & Target Identification
- 7. Interpreting Tool Output Interpreting output from port scanners, network sniffers and other network enumeration tools.

Total Hrs: 30



Sub. Code	Subject Name	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBFL22IXX	FOREIGN LANGUAGE	1	0	0/0	2/0	IE

Foreign language is introduced in the curriculum to make the students globally employable. Students should select and register for any one of the foreign languages from the given list. At the end of the course students should be able to read, write and converse the language in the basic level. At the end of the semester the assessment will be done through internal examination by the examiner duly appointed by the head of the department

S.NO	COURSE CODE	COURSE NAME
1	EBFL22I01/HBFL22I01	FRENCH
2	EBFL22I02/ HBFL22I02	GERMAN
3	EBFL22I03/ HBFL22I03	JAPANESH
4	EBFL22I04/ HBFL22I04	ARABIC
5	EBFL22I05/ HBFL22I05	CHINESE
6	EBFL22I06/HBFL22I06	RUSSIAN
7	EBFL22I07/HBFL22I07	SPANISH



Sub. Code	Subject Name	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCC22I07	NCC / NSS / INTERNSHIP	1	0	0/0	2/0	IE

INTERNSHIP

Students are supposed to undergo internship in related Industries for a minimum period of 15days cumulatively during the semester. They have to prepare a report on the Internship with a certificate in proof from competent authority in the industry. At the end of the semester Viva-Voce examination will be conducted by the Examiners duly appointed by the Head of the department and the students will be evaluated.



SEMESTER VI

Subject	Subject	Name :		ID ETU			С	L	T/	P	/ R	Ty/
HBCF22012		CIDEK	LAWSAN	DEIN					S.Lr			LD/ ETI
	Prerequ	isite: NIL		$4 3 1/0 0/0 T_{\rm W}$								
I · Lecture T ·	Tutorial	$\frac{SIr \cdot Supe}{SIr}$	rvised Lea	rning P	· Project R	· Res	earch (Credi	1/U	U	/0	1 y
Tv/Lb/ETL : T	heory/La	b/Embedded	Theory an	d Lab	. Hojeet K	. Kes		. cicui	.15			
OBJECTIVES	S:		,									
• To exa	amine ho	w the onlin	e digital v	vorld has	s been infli	icted	with no	ew cyt	ercrime	s, imp	olica	ations
for soc	ciety and	law enforce	ement res	ponse ar	nd investig	ating	how th	ne com	puter an	d eleo	ctroi	nic
device	s have d	lo for crimi	nal activit	y								
COURSE OU	ГСОМЕ	S(COs): (3)	8-5)							_		
CO1	Analyze Investig	e various type ations	es of cyber	crime an	d formulate	proc	edures f	for real	world cy	ber cı	rime	
CO2	Resolv	e challenges	s posed to	law enf	orcement a	igent	s, polic	y mak	ers and p	rose	cuto	rs
CO3	Find so	lutions in c	ybercrime	e investig	gations, ev	idenc	e and a	applica	ble law	for re	al w	vorld
	case stu	udies										
CO4	Use and	d Analyze tl	ne softwar	re tools a	and metho	ds cu	rrently	availa	ble for fi	nding	g ille	egal
	activiti	es on comp	uter disks	and in c	omputer n	etwo	rks.					
CO5	Analyz	e the crimin	al activity	y on the	Internet an	d pro	opose a	vailab	le tools t	o pre	vent	t such
	activity	·.		<u> </u>								
Mapping of Co	ourse Ou	tcomes with	Program	Outcom	nes (POs)	-	DO		- D C			
COs/POs	POI	PO2	PO3	PO	94 PO	5	PO6	PO	7 PC	8	P	09
CO1	3	2	1	1	1		2	1	1			3
CO2	2	2	2	1	1		1	1	1			3
<u>CO3</u>	2	2	2	2	1		1	1	1			3
<u>CO4</u>	2	2	2	2			3					3
05	2	2	1				2	2				3
COs / PSOs		PSO1			PSO2				PS	03		
CO1		3			1				2)		
CO2		3			1				3	6		
CO3		2			3				2			
<u>CO4</u>		1		1 2								
$\frac{CO5}{2/2/1}$ in diagter	Streen at	l of Comolo	4 am 2 T	<u> </u>								
3/2/1 indicates	Strengti	1 of Correla	tion 3- F	11gn, 2- 1	viedium, 1-	LOW	. [
Category	Program Cor	Progra m elective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter	Disciplinary/ Allied	Allied Skill Component Practical /Project/inter nship Others				
	✓											

SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCF22012	CYBER LAWS AND ETHICS	4	3	1/0	0/0	Ту

UNIT: I

Cyber laws and rights in today's digital age; IT Act, Threats to information resources, including military and economic espionage, communications eavesdropping, computer break-ins, denial-of-service, destruction and modification of data, distortion and fabrication of information, forgery, control and disruption of information-Countermeasures, intrusion detection, firewalls -limitations of those countermeasures- Information warfare policy-ethical Issues.

UNIT: II

The Cyberspace – Protection of Copyrights of Cyber Space – Rights of Software Owners – Infringement of Copyright – remedies for infringement of Copyright on Cyberspace –liabilities of an Internet Service Provider (ISP) in Cyberspace – Cyberspace and the Protection of Patents in India.

UNIT: III

An Overview of Cyber Crimes – Indian Evidence Act – Examiner of Electronics Act – Amendments Introduced in Indian Evidence Act, 1872 – IT Act as Amended upto 2008 –Digital Signatures, Cryptographic Algorithm, Public Cryptography, Private Cryptography, Electronic Governance, Legal Recognition of Electronic Records, Legal Recognition of Digital Signature, Certifying Authorities, Cyber Crime and Offences, Network Service Providers Liability, Cyber Regulations Appellate Tribunal, Penalties and Adjudication

UNIT: IV

IT (Certifying Authorities) Rules, 2000 – Ministerial Order on Blocking of Websites – The IT (Use of Electronics Records and Digital Signatures) Rules 2004-Cyber Appellate tribunal - Its Function and Powers under IT Act – Obscenity and pornography on Cyberspace – Hacking on Cyberspace on Internet – Other Offences

UNIT: V

Violation of the Right of Privacy on Cyberspace / Internet – Punishment for violation of Privacy, Breach of Confidentiality and Privacy under the IT Act – Terrorism on Cyberspace / Internet- Ethics in Cyber Space-ethical values in digital space

Total Number of Periods : 60

TEXT BOOK:

1. Text Book on Cyber Law by PavanDuggal, Second edition-2016

REFERENCE BOOKS:

- 1. Cyber Laws and it Protection Paperback 2012 by Harish Chander
- 2. Understanding Laws- Cyber Laws And Cyber Crimes Paperback Jun 2014 by

12 Hrs

12 Hrs

12 Hrs

12 Hrs





Subje	ct C	ode :	:	Su	Subject Name UNIVERSAL HUMAN					N		C	L	T/SLr	P/R	Ty/Lb
							VAL	UES								/ETL
HBC	C22	ET1				Pr	erequisi	ite : Non	е			3	2	0/0	2/0	ETL
L : Lect	ure	T : T	utor	ial :	SLr : S	Sup	ervised	Learnin	g P : Proj	jeo	ct R:	Resea	rch C: C	redits	1	
T/L/ETI	L : T	heor	'y / L	.ab /	/ Emb	ed	ded The	eory and	Lab							
OBJECT	ΓIVE	S :														
\rightarrow	 Describe meaning, purpose, and relevance of universal human values. Understand the importance of values in individual social career, and national life 															
	 Understand the importance of values in individual, social, career, and national life. Learn from lives of great and successful people who followed and practiced human values and 															
	achieved self-actualization.															
\triangleright	Understand and practice professional ethics with the goal for the universal wellness															
COURS	ΕO	UTC	OME	S (C	:(os											
Studen	ts completing the course were able to															
CO1		Become conscious practitioners of values														
CO2		Realize their potential as human beings and conduct themselves properly in the ways of the world.														
CO3	Develop integral life skills with values															
CO4		Incu	lcate	e an	d pra	cti	ce them	conscio	usly to b)e	good	huma	n beings			
CO5		Prac	tice	pro	fessio	ona	l ethics	with the	goal for	r tl	he uni	iversa	l wellnes	s		
Mappir	ng o	of Cou	urse	Out	com	es v	with Pro	gram Ou	utcomes	(P	POs)					
COs/	Ρ	01	РС)2	PO	3	PO4	PO5	PO6		PO7	PO8	PO9	PSO1	PSO2	PSO3
POs																
CO1		2	1		1		1	1	1	1		3	1	1	1	1
CO2		2	2		1		1	1	1	1	-	3	1	1	1	1
CO3		2	2		1		1	1	1	1	-	3	1	1	1	1
CO4		2	1		1		1	1	1	1	-	3	1	1	1	1
CO5		2	1		1		1	1	1	1	-	3	1	1	1	1
Categor	у	Prog m Co	ra ore	Pro m ele e	ogra ctiv	H ie so So	umanit s and ocial cience	Open Electi ve	Skill enhanci ng elective	:	Inter Disci ry/Al	nter Skill Practical Disciplina Comp /Project/internsl y/Allied onent p				Others



SUBJECT CODE	SUBJECT NAME	С	L	T/SLr	P/R	Ty/Lb/E TL
HBCC22ET1	UNIVERSAL HUMAN VALUES	3	2	0/0	2/0	ETL
Jnit 1 :	•		-	•	9	Hrs

Love and Compassion: Love and its forms: love for self, parents, family, friend, spouse, community, nation, humanity, nature and other beings—living and non-living. Love and compassion and inter-relatedness, Individuals who are remembered in history for love and compassion and what will learners gain if they practice love and compassion

Related activities: Sharing learner's individual and/or group experience(s), community outreach program to manifest love and compassion toward people and nature, Simulated Situations, Case studies

UNIT 2:

Truth and Righteousness: Universal truth, truth as value (artha), truth as fact (satya), veracity, sincerity, honesty among others. Understanding righteousness, Righteousness and dharma, righteousness and propriety, Individuals who are remembered in history for practicing truth and righteousness and what will learners gain if they practice Truth and Righteousness

Sharing learner's individual and/or group experience(s), exercises on ease with truth can be recalled consistently, Simulated Situations, Case studies

Unit 3:

Non-Violence and Peace; pre-requisites for non-violence- Love, compassion, empathy, and sympathy, Ahimsa as non-violence and non-killing, the impact of practicing non-violence-Peace, harmony and balance, Individuals and organizations that are known for their commitment to non- violence and peace, and what will learners gain if they practice non-violence and work towards peace

Sharing learner's individual and/or group experience(s), Simulated Situations, Case studies

Unit 4:

Renunciation (Sacrifice) Tyaga: Renunciation and sacrifice, developing a balance between enjoyment and sacrifice, Bhoga(enjoyment) with tyagabhava and tyaga (Sacrifice) with bhogabhava is the root of all human and literary values, enjoying life and freedom with responsibility and What will learners learn/gain if they practice renunciation and sacrifice

Social outreach programs for sharing and caring experience, expressing gratitude, Sharing learner's individual and/or group experience(s), Simulated Situations, Case studies

B.Sc. (Information Science and Cyber Forensics)-Regulation 2022-2023

9 Hrs

9 Hrs



Unit 5:

9 Hrs

Professional Ethics: Understanding Acceptance of human values and Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Developing Competence in professional ethics and practicing it, to utilize the professional competence for augmenting universal human order and create people friendly eco-friendly identify the scope and characteristics of people friendly and eco-friendly systems for the wellness of the universe as a whole.

Exercises to propagate people friendly eco-friendly activities both creative and functional, Brain storming, Sharing learner's individual and/or group experience(s), Simulated Situations, Case studies

Total Hrs: 45

References and Suggested Readings:

Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi

Basham, A.L. 1954. The Wonder That Was India. London: Picador Press.

Basu, D.D. 2015. Workbook on the Constitution of India, Paperback Edition. Nagpur: Lexisnexis.

Ghosh, Sri Aurobindo. 1998. The Foundations of Indian Culture. Pondicherry: Sri Aurobindo Ashram.

Joshi, Kireet. 1997. Education for Character Development. Delhi: Dharam Hinduja Centre of Indic Studies.

Milton, Rokeach. 1973. The Nature of Human Values. New York: The Free Press.

Mookerji, Radha K. 1989. Ancient Indian Education. Delhi: Motilal Banarasidass

Saraswati, Swami Satyananda .2008. Asana Pranayama Mudra Bandha. Munger, India: Bihar School of Yoga.



Indef 222.00 S.Lr Lb/ETI Prerequisite: NIL 9 0 0/0 18 Lb L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab 0 0/0 18 Lb OBJECTIVES : • • The objective of the Main Project is to culminate the academic study and provide an opportunity to explore a problem or issue , address through focused and applied research under the direction of a faculty mentor. The project demonstrates the student's ability to synthesize and apply the knowledge and the student's ability to synthesize and apply the knowledge and the student's ability to synthesize and apply the knowledge and the student's ability to synthesize and apply the knowledge and the student's ability to synthesize and apply the knowledge and the student's ability to synthesize and apply the knowledge and the student's ability to synthesize and apply the knowledge and the student's ability to synthesize and apply the knowledge and the student's ability to synthesize and apply the knowledge and the student's ability to synthesize and apply the knowledge and the student's ability to synthesize and apply the knowledge and the student's ability to synthesize and apply the knowledge and the student's ability to synthesize and apply the knowledge and the student's ability to synthesize and apply the knowledge and the student's ability to synthesize and apply the knowledge and the student's ability to synthesize and apply the knowledge and the student's ability to synthesize and apply the knowledge and the student's ability to synthesize and apply the knowledge and the student's ability to synthesize and apply the knowledge and the student'											
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 Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab OBJECTIVES : The objective of the Main Project is to culminate the academic study and provide an opportunity to explore a problem or issue, address through focused and applied research under the direction of a faculty mentor. The project demonstrates the student's ability to synthesize and apply the knowledge and him and the student's ability to synthesize and apply the knowledge and him and the student's ability to synthesize and apply the knowledge and him and the student's ability to synthesize and apply the knowledge and him and the student's ability to synthesize and apply the knowledge and him and the student's ability to synthesize and apply the knowledge and him and the student's ability to synthesize and apply the knowledge and him and the student's ability to synthesize and apply the knowledge and him and the student's ability to synthesize and apply the knowledge and him and the student's ability to synthesize and apply the knowledge and him and the student's ability to synthesize and apply the knowledge and him and the student's ability to synthesize and apply the knowledge and him applied to student's ability to synthesize and apply the knowledge and him applied to student's ability to synthesize and apply the knowledge and him applied to student's ability to synthesize and apply the knowledge and him applied to student's ability to synthesize and apply the knowledge and him applied to student's ability to synthesize and apply the knowledge and him applied to student's ability to synthesize and apply the knowledge and him applied to student's ability to synthesize and apply the knowledge and him applied to student's ability to synthesize and apply the knowledge and him applied to student's ability to synthesize and apply the knowledge and him applied to student's ability to synthesize and apply the knowledge and him applied to student's ability to synthesize and apply the knowledge and him applied to student's ability to synt											
 OBJECTIVES : The objective of the Main Project is to culminate the academic study and provide an opportunity to explore a problem or issue, address through focused and applied research under the direction of a faculty mentor. The project demonstrates the student's ability to synthesize and apply the knowledge and have the direction of the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesize and apply the knowledge and have the student's ability to synthesi applice and have the student's ability to synthesize and have											
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explore a problem or issue, address through focused and applied research under the direction of a faculty mentor. The project demonstrates the student's ability to synthesize and apply the knowledge and											
faculty mentor. The project demonstrates the student's ability to synthesize and apply the knowledge and											
skills acquired to real-world issues and problems. This project affirms the students to think critically and											
creatively find an optimal solution make ethical decisions and to present effectively											
COURSE OUTCOMES (COs) : (3- 5)											
CO1 To explain the functionality of the system											
CO2 To express proficiency in handling the technologies											
CO3 To support the societal problems											
CO4 To summarize the innovative ideas with good documentation											
CO5 To validate the implementation of the software/Hardware system											
Mapping of Course Outcomes with Program Outcomes (POs)											
COs/POsPO1PO2PO3PO4PO5PO6PO7PO8PO9											
CO1 3 3 3 2 3 3 1 1											
CO2 3 3 3 3 3 1 2											
CO3 3 3 3 3 3 1 1											
CO4 3 2 3 3 3 2 1 2											
CO5 1 2 2 2 2 3 1 1											
COs / PSOsPSO1PSO2PSO3											
CO1 3 3 2											
CO2 3 3 3											
CO3 3 3 3											
CO4 2 2 2 2											
CO5 3 2 2											
3/2/1 indicates Strength of Correlation 3- High, 2- Medium, 1-Low											
b b cia											
shi ent Alli hh ce c											
and terr e e and cti ore											
Image: Section of the											
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Dth Provide State State State State											



Sub. Code	Subject Name	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCF22L06	PROJECT	9	0	0/0	18	Lb

Students are expected to carry out the following:

- (i) Implement the Design using suitable technologies.
- (ii) Generate the test cases.
- (iii) Demonstrate the solution with suitable user interface.
- (iv) Prepare a project report consolidating the phase-I and II activities.



PROGRAMME ELECTIVE –I



Subject Code HBCF22E01	Subjec	et Name : OPE	RATING	SYSTEM	M SECURI	ΙΤΥ	,		(L	T/ S.Lr	P/R	Ty/ Lb/ ETL
	Prerea	misite								L	3	1/0	0/0	Tv
L : Lecture T	: Tutoria	al S.Lr :	Supervis	sed Lear	rning P:	Pr	oiect R :	: Re	esearch	C: Cr	edit	s	0/0	19
Ty/Lb/ETL : 7	Theory/I	Lab/Embe	dded The	eory and	d Lab		J							
OBJECTIVE	S :			•										
The student	should	be made t	0:											
1. Under	stand th	e concept	of Operation	ating Sy	stem and	l ne	etwork se	ecu	ırity.					
2. Study	about v	irus, worn	ns and m	alicious	s software	e.								
3. Learn	about a	uthenticat	ion meth	ods.	-	~								
4. Learn	4. Learn about File, Directory and Shared Resources Security COURSE OUTCOMES (COs) :													
COUKSE OL	Have	IES (COS): anding o	f tha m	inciples	$\frac{1}{2}$		0.01	naratin	T eveto	m			
	1 ave a		anung 0	n me pr	merpies (л	securing a	a Uj	perating	s syste	111			
CO2	Have l	knowledge	e of secu	rity pol	icies and	me	ethods in	op	erating	systen	ns			
CO3	Under	stand acco	ount base	ed secur	ity in ope	erat	ting syste	em						
CO4	Have i	insight int	o method	ls for se	ecurity the	rou	igh authe	nti	cation a	and end	cryp	otion		
CO5	Have knowledge of file security													
Mapping of Course Outcomes with Program Outcomes (POs)														
COs/POs	PO1	PO2			PO4	P	<u>(10s)</u> 205	Р	206	PO7		PO8	PO	9
CO1	1	102		2	1		1		1	2		2		3
CO2	1	1		2	2		1		1	2		2		2
CO3	1	1	[2	2		3		1	2		2		2
CO4	1	1		2	2		3		1	2		2		3
CO5	1	1		2	2		3		1	2		2		2
COs / PSOs		PSC)1				PSO2					PSO	3	
CO1		1					3					1		
CO2		1					3					1		
<u>CO3</u>		1					3					1		
CO4		1					3					1		
	C1		1.4.		T. I. O. I	л	$\frac{3}{11}$	т				1		
3/2/1 Indicate	s Stren	gth Of Co	orrelatio	<u>)n, 3 – I</u>	<u>lign, 2-</u> r	vie	aium, 1-		ow					
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing	elective	Inter Disciplinary/A	IIICA	Skill Component		- - -	Practical /Project/intern ship	Others	
		1		_	<u>, </u>									



SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCF22E01	OPERATING SYSTEM SECURITY	4	3	1/0	0/0	Ту

UNIT I	INTRODUCTION	12 Hrs
Operating System	and Network Security Definition – Why security is necessary – T	ypes of attacks
UNIT II	VIRUS, WORMS AND MALICIOUS SOFTWARE	12 Hrs
How Viruses, wor an operating syste	ms and Trojan horses spread – Typical Methods used by Malicio em from Malicious Software	us Software – Protecting
UNIT III	SECURITY THROUGH AUTHENTICATION AND ENCRPTIO	N 12 Hrs
Encryption – Auth	nentication Methods	
UNIT IV	ACCOUNT BASED SECURITY	12 Hrs
Account Naming a Logon Security – I	and Security Policies, Creating User Accounts, Setting Account Po Jsing Global Access Privileges	olicies and Configuring
UNIT V F	ILE, DIRECTORY AND SHARED RESOURCES SECURITY	12 Hrs
Directory, folder a	and file security, Shared Resource Security, Using Security Group	S
		Total Hrs: 60
ТЕХТ ВООК		

Guide to Operating Systems Security by Michael Palmer and Michael Walters, CENGAGE Publisher

REFERENCES

- 1. Operating System Security by Trent Jaeger, Morgan & Claypool Publishers
- 2. Guide to operating System by Greg Tomsho, CENGAGE Publisher, Sixth Edition



Subject Code: HBCF22E02	Subject]	Name : CLC	OUD COM	PUTING	ŕ	C	L	T/ S.Lr	P/R	Ty/ Lb/ ETL			
	Prerequi	site: NIL				4	3	1/0	0/0	Ту			
L : Lecture T :	Tutorial	S.Lr : Sup	ervised Lea	arning P	: Project R	: Research	C: Cred	its					
Ty/Lb/ETL : T	heory/Lab	/Embeddeo	l Theory a	nd Lab									
OBJECTIVES	S:		0										
• To lear	n Cloud c	omputing i	nfrastructu	re and ser	vices, to aco	Juire knowl	edge ab	out cloud	storage.	to			
understand cloud computing security and to test web application in cloud platform.													
COURSE OU	Define the Basic concepts of cloud computing (Level 1)												
C01	Differen	ciate the cl	oud Comp	ting serv	ices (Lev	2)							
CO2	Develop	velop Cloud Implementation using Phython (Level 6)											
CO4	Demons	trate the Ke	ev compon	ents of W	eh Services	in cloud (I	evel 3)						
CO5	Design a	Design an efficient and flexible cloud applications. (Level 6)											
Mapping of Course Outcomes with Program Outcomes (POs)													
COs/POs	PO1	PC)2	PO3	PO4	PO5		PO6	PC)7			
CO1	2	2	2	3	3	3		3	1	L			
CO2	3		3	3	2	2		1	1	l			
CO3	2	2	2	3	3	3		3	1				
CO4	3		3	3	2	2		1	1	\$			
CO5	3		3	3	2	2		1	1	L			
COs / PSOs		PSO1			PSO2			PS	03				
CO1		3			3		3						
CO2		3			3			2					
CO3		3			3			2					
CO4		3			3			2					
CO5		3			3	_		3					
3/2/1 indicates	Strength	of Correl	ation 3-1	High, 2- 1	Medium, 1-	Low	1						
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter Disciplinary/Allied	Skill Component	Practical	/Project/internship Others				
		√											

du. India С L **T**/ P/R Ty/ **SUBJECT** SUBJECT NAME S.Lr Lb/ CODE FTI **HBCF22E02 CLOUD COMPUTING** 4 3 1/00/0Ty

INSTITUTE

UNIT I **CLOUD COMPUTING INTRODUCTION**

EDUCATIONAL AND RESEARCH

Characteristics – cloud models – cloud services – cloud based services and applications – virtualization – Load balancing - deployment - replication - monitoring - MapReduce - Identity and Access management.

UNIT II **CLOUD SERVICES**

Compute services - storage services - database services - application services - content delivery services analysis services – Deployment & management services – identity and Access management services.

CLOUD PLATFORMS& APPLICATION DESIGN UNIT III

open source private cloud software - Hadoop Map Reduce job execution - Hadoop schedulers - Hadoop cluster setup- Design consideration for cloud applications – reference architecture for cloud applications – cloud application design methodologies - data storage approaches.

UNIT IV **CLOUD APPLICATION DESIGN - PYTHON**

Python data types & data structures – control flow – functions – modules – packages – file handling – classes.

UNIT V CLOUD APPLICATION DEVELOPMENT

Python for Amazon web services – Google cloud platform – windows Azure – packages of Internet – JSON – XML – HTTPLib and URLLib – Web application framework – Django – design approaches – image processing App – document storage app – MapReduce app.

TEXT BOOKS:

- 1. Arshdeep Bahga et al, "Cloud computing a hands-on approach" Universities press 2014
- 2. Anthony T.Velte et al, "Cloud Computing A Practical Approach" Tata McGraw-Hill 2013
- 3. Zaigham Mahmood et al, "Cloud Computing Concept Technology Architecture" Pearson, 2014.

REFERENCE BOOKS:

- 1. Barrie Sosinsky, "Cloud Computing Bible" Wiley India Publication 2011
- 2. Rishabh Sharma "Cloud Computing Fundamentals, Industry Approach and Trends" Wiley 2015. David Crookes "Cloud Computing in easy steps" McGraw Hill – 2012

12 Hrs

12 Hrs

Total Hours: 60

12 Hrs

12 Hrs



Subject		S	ubject N	Vam	e	(2	I		T/	P/R	Tv/		
Code:		WEB TEC		GY				_	S	5.Lr		Lb/		
HBCF22E03	Prereau	isite: NII		_			1	3		1/0	0/0	Tv		
L:LectureT:Tu	torial S.I	r: Superv	ised Lea	rnin	g P:Project R:F	ResearchC:	Crea	dits		1/0	0/0	Тy		
					0									
OBJECTIVE:		<u> </u>	•	•	•									
The stu	udents wi	ll have kn	owledge	e of	designing station	c web page	s us	sing HTM	L tags a	and C	SS			
Use Jav	/a script f	^f or dynam	ic effect	s ar	nd validate forn	n input ent	ry							
Analyz	e and Us	e appropr	iate clie	nt-s	ide or Server-s	ide applica	tion	is						
Learn a	Learn about the server side Programming using JSP													
COURSEOUT	OMES(C	Os):(3-5)												
CO1	Students will be able to develop a static webpage by the use of HTML Tags.													
CO2	Students will create web pages using HTML and Cascading Style Sheets.													
CO3	Students	tudents will be able to build dynamic web pages using JavaScript (Client side programming).												
CO4	Students	will analy	ze and o	desi	gn real time we	eb applicati	ions	5						
CO5	Students will be able to write a server side java application called JSP to catch form data sent													
from client and store it in database.														
Mapping of Course Outcomes with Program Outcomes (POs)														
COs/POs	PO1	PO2	PO3		PO4	PO5	F	PO6	PO7		PO8	PO9		
CO1	3	2	2		3	3		3	3		3	2		
CO2	3	1	2		3	1		3	3		3	2		
CO3	3	1	3		3	2		3	3		3	2		
CO4	3	2	1		3	3		2	3		3	2		
CO5	3	2	1		3	3		3	3		3	3		
COs/PSOs		PSO1			PSO	2				PSO3				
CO1		3			3					2				
CO2		3			2					3				
CO3		3			2					3				
CO4		3			1					2				
CO5		3			3					3				
3/2/1Indicate	sStrengt	hOfCorrel	ation,3-	-Hig	h,2-Medium,1-	Low								
					ng	lie	It		лі.					
	e		pr o		nci	/AI	nei		rnsl					
	Co		s ai ince	tive	nha	ary	npc		nte					
	am	E O	itie Scie	llec	,e ei	olin	Con		cal ct/i		\$			
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		е н V	H S	\cup										
		-												

SUBJECT CODE	Subject Name	С	L	T/ S.Lr	P/R	Ty/Lb/ ETL
HBCF22E03	WEB TECHNOLOGY	4	3	1/0	0/0	Ту

Unit:1

Introduction :The Internet-Basic Internet Protocols -The World Wide Web-HTTP request message-response message-Web Clients Web Servers. Markup Languages: An Introduction to HTML-Structure of HTML, HTML Tags : Paragraphs, Lists, Formatted and Unformatted Text, Hyperlink and its type, Font, Image and Frame Set Unit:2 12 Hrs

Style Sheets: CSS-Introduction to Cascading Style Sheets-Style Rule Cascading and Inheritance-Text Properties- CSS properties for manipulating texts, background, colors -Box Model. Tables and nested tables, Forms - Textbox element - Password element - Button element - Checkbox element - Radio element – Text Area element – Select and Option elements, Interactive Form tags.

Unit:3

Client-Side Programming: Introduction to VB Script and Javascript – Advantages of Javascript – Javascript syntax - Data type -Variable - Array - Operator & Expression - Looping - control structures - Constructor Function – user defined function Dialog Box

Unit:4

Advance JavaScript: JavaScript DOM: JSS DOM - understanding objects in HTML - browser objects - web page object hierarchy - Built-in Objects - Event handlers - Form validations-AJAX: Introduction, How AJAX Works?, Life without AJAX, AJAX Coding, Life with AJAX.

Unit:5

Server-Side Programming: Introduction to ASP and JSP - JavaServer Pages Overview, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Scripting Components, Custom Tag Libraries, Using Cookies and session tracking, connecting to database in JSP.

TEXTBOOKS:

- 1. Wendy G.Lehnert, "Internet 101 A Beginners Guide to the Internet and the World Wide Web", Addison Wesley, 1999
- 2. Harvey M. Deitel, Paul J. Deitel and Tem R. Nieto, "Internet and World Wide Web : How to Program", Pearson Education, Second Edition, 2001

REFERENCEBOOKS:

- 1. Kogent Solutions Inc., "Web Technologies Black Book", Dreamtech press, 2009.
- 2. Ivan N. Bayross, "Web enabled Commercial Application Development using HTML, JavaScript, DHTML and PHP", 4th Revised Edition, BPB Publications, New Delhi, 2010.
- 3. Chuck Musciano & Bill Kennedy, "HTML The Definitive Guide", Shroff Publishers & Distributors Pvt. Ltd., Calcutta - 1999.
- 4. Raj Kamal, "Internet and Web Technologies", TMH, New Delhi, 2002.

12 Hrs

TotalHours:60

12 Hrs

12 Hrs





Subject Code: HBCE22E04	Subject	Name : M	OBILE SEC	URITY		C		L	S.	Γ/ .Lr	P/R	Ty/ Lb/	
	Dreregi	uisito: NII				4		2	1	/0	0/0		
I · Lecture T · T	iutorial	S Ir · Sunen	vised Learn	ning D·D	roject R·F	esearch	$\frac{1}{C \cdot Cr}$	odits	1	/0	0/0	Тy	
Tv/Ib/FTI · The	orv/Lab	/Fmbedded	Theory and	ning roor d Lab		(esearch	C. Ch	cuits					
OBJECTIVES :	201 97 2007	Embedded	Theory and										
• To mal	e the sti	idents unde	rstand abo	out the m	obile secur	itv issues	and	develo	onme	nt strat	egies		
Be fam	iliar with	the security	y provided	by vario	us mobile o	perating	syste	ems	pine				
• Be fam	iliar with	files, permi	ssions and	encrypti	ons provide	ed in vari	ous n	nobile	oper	ating sy	/stems		
Know a	Know about the security policy enforcements in mobile devices												
COURSE OUTC	OMES (C	Os) : (3- 5)											
CO1	To unde	erstand the	mobile sec	urity issu	les								
CO2	To unde	erstand the	security pe	rmission	s and acces	s control	ls ava	ilable i	in vai	rious m	obile		
	operati	ng systems											
CO3	To learr	to learn now data is stored securely in mobile devices											
CO4	To learr	n about secu	irity policy	enforcer	nents in va	rious mol	bile C)S					
Mapping of Co	f Course Outcomes with Program Outcomes (POs)												
COs/Pos	PO1	PO2	PO3	PO4	PO:	5 P	06	PC)7	PO8		PO9	
CO1	3	2	1	2	2		1 2		2	2		1	
CO2	3	2	3	2	2		0	3	3	1		0	
CO3	3	2	1	2	2		0 2		2	1		0	
CO4	3	2	1	1	2		0	2	2	1		0	
COs / PSOs		PSO1			PSO2					PSO3			
CO1		3			2					1			
CO2		3			2					1			
CO3		2			2					2			
CO4		3			1					1			
3/2/1 indicates	s Strengt	h of Correla	tion 3-H	ligh, 2- M	ledium, 1-L	ow							
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter Disciplinary/Allie	5	Skill Component		Practical /Project/internship	Others		
		V											

SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCF22E04	MOBILE SECURITY	4	3	1/0	0/0	Ту

TITUTE

Unit I - Top mobile issues and development strategies

Physical Security- Secure data storage - Strong authentication with poor key boards - multiple user support with security - safe browsing Environment - Virus, worms, Trojans, spyware and malware - Multifactor authentication.

Unit II - Android security

Development and Debugging on Android - Android's Securable IPC Mechanisms - Android's Security Model - Android Permissions Review – Creating new manifest permissions – Android security tools

Unit III – Iphone Security

Security testing – buffer overflows, integer overflows, format string attacks, double frees, static analysis – Permissions and user controls – local data storage – files, permissions and encryptions, iphoe keychain storage

Unit IV – Windows Mobile security

Introduction to platform – kernel architecture – Development and Security Testing – Permissions and user controls – Local Data Storage – Networking

Unit V – Enterprise Security on Mobile OS

Device security options - PIN, Remote Wipe - Secure local storage - Security Policy Enforcement

Text Book

Mobile Application Security, Himanshu Dviwedi, Chris Clark and David Thiel, 1st Edition, McGraw Hill

REFERENCE BOOKS:

1. Security of Mobile Communications, Noureddine Boudriga, 2009.

12 Hrs

12 Hrs

12 Hrs

12 Hrs

12 Hrs

Total Number of Periods : 60



Subject Code:	Subject	Name :				С	L	Τ/	P	/ R	Ty/		
HBCF22E05		F COM			S.L	r		Lb/					
		E COM		JECUNI							ETL		
	Prerequ	isite: NIL	4	3	1/0	C)/0	Ту					
L : Lecture T : T	T: Tutorial S.Lr: Supervised Learning P: Project R: Research C: Credits												
Ty/LD/ETL: Theory/Lab/Embedded Theory and Lab													
• To discuss the basic security principles, as well as the issues policy and standards particular to													
• 10 uise e-based	e-based applications.												
To intro	 To introduce the technology, concepts, issues and principles for the design and implementation of 												
secure e	secure e-based system.												
To enable	 To enable to evaluate and critique the security and performance of security algorithms and protocols. 												
and e -	and e - commerce systems.												
COURSE OUT	FCOME	S (COs) : (3	3- 5)										
CO1	Describ	e security fe	atures nee	ded for ar	n e- based sy	/stem.			_				
CO2	Identify	and assess c	lifferent ty	pes of se	curity breac	hes and pos	sible so	lutions	for a ro	obust	e-		
CO3	Describ	e the inner-v	vorkings o	f pavmen	t protocols.	file transfe	r protoc	ols. and	related	1			
	algorithms												
CO4	Analyze	the vulnera	bilities of	a given sy	ystem and m	nake recom	mendati	ons for	making	g the			
C05	Describ	e remedies f	or various	existing	security bre	aches in e-h	ased sv	stems a	nd to st	nw	the		
005	method	ologies requi	ired to mal	ke future	systems less	s prone to s	ecurity f	ailures	and ou	tside	ene e		
	attack.	0			,	r	J						
Mapping of Co	ourse Ou	tcomes with	Program	Outcom	es (POs)								
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	P	07	PO8]	PO9		
CO1	3	2	1	2	2	3		3	1		1		
CO2	3	2	2	1	3	2		3	1		$\frac{1}{2}$		
<u>CO3</u>	3	3	3	2	1	3		2	1		3		
C04	$\frac{2}{2}$	3	2	2	2	2		2	$\frac{2}{2}$		3		
COs / PSOs	2	PSO1	5	2	PSO2			<u> </u>	2 SO3		5		
CO1		3			2		3						
CO2		2			2				3				
CO3		3			3				2				
CO4		2			3				1				
CO5		2			2				3				
3/2/1 indicates	Strength	of Correlat	<u>tion 3- H</u>	High, 2- N	/Iedium, 1-	Low	T						
	ore		anc	ve		/k	ft		ter				
~	n C		ies ien	scti	ng	inai	nen	-	u /ini				
gory	çrar	ve ve	Sc	El	l tive	ilqi bć	l _i	11.09	p p	STS			
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		\checkmark											

SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCF22E05	E COMMERCE SECURITY	4	3	1/0	0/0	Ту

UNIT I

E-BASED SYSTEM/ECOMMERCE SECURITY: Evolution of Commerce – Ecommerce vs. Mcommerce - Architectural Framework of E-Commerce - Cloud Security - Web Commerce Security Requirements - E-Commerce Security – Risk Driven Security – Cryptography Access Control

UNIT II

ELECTRONIC PAYMENT SECURITY: Overview of Electronic Payments – Payment

Gateway – Online/Mobile Payments – Emerging Financial Instruments – E-Commerce Laws – Secured Online shopping and payment - Threats and Attacks Accreditation process for Web commerce Applications

UNIT III

E-LEARNING SECURITY: Introduction – Real E-Learning Scenarios – Massive Online Open Courses (MOOC) – Trustworthiness for Secure Collaborative Learning Model – Security Attacks in E-Learning – Modeling Security Services – Secure Learning Management Systems

UNIT IV 12 HRS E-HEALTHCARE SECURITY: Introduction – Breaches of Privacy and Confidentiality in E-Healthcare – IT Security Challenge for securing e-Healthcare information – Elements of Security and Privacy in E-Healthcare Information systems - Human Factors in evaluating e-Healthcare Information Security and Privacy UNIT V

E-GOVERNANCE SECURITY: Introduction – E-Government Architecture - Issues and Challenges in E-Governance – Key components of E-Governance – DoS Attacks on E-Government Issues – Anonymous and Accurate E-Polling

TEXT BOOKS:

1. Web Commerce Security: Design and Development. Indianapolis: H. Nahari and R. L. Krutz, Wiley, John Sons, 2011

REFERENCE BOOKS:

2. K. Stanoevska-Slabeva, Towardsthe e-Society: e-Commerce, e-Business, and e-Government. Kluwer Academic Publishers, 2001.

12 HRS

12 HRS

Total Hours: 60

12 HRS

12 HRS





PROGRAMME ELECTIVE –II



Subject Code:	Subject	t Name				С	L	Τ/	P/R	Ty/Lb/ETL		
HBCE22E06	DIGIT	AL IMAG	CESSIN			S.Lr						
IIDCI 22E00	Prerequ	uisite: NIL			3	3	0/0	0/0	Ту			
L : Lecture T : '	Tutorial	S.Lr : Suj	pervised I	Learning	g P : Proje	ct R : Re	esearch	C: Crec	lits			
Ty/Lb/ETL : Tl	neory/La	b/Embedde	d Theory	and La	0							
OBJECTIVES	5:											
To learn	n fundame	entals of im	age proce	ssing								
 To learn about Contrast enhancement, segmentation and compression techniques 												
COURSE OUTCOMES (COs) : (3- 5)												
CO1 Ability to understand the fundamental concepts of image processing												
CO2	Operate	e on images	using the	e techniq	ues of smo	othing, sl	narpenin	g and e	nhance	ment.		
CO3	Unders	tand the Ir	nage Enha	ncemer	nt in Frequ	iency Dor	nain	5				
CO4	Ability	to underst	and the T	echniqu	es of Segn	nentation						
CO5	Unders	tand the te	chniques	of Imag	e Compres	ssion						
Mapping of Co	ourse Ou	itcomes wi	th Progr	am Out	comes (PO	Os)						
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		PO9		
CO1	3	2	2	3	2	3	3	1		2		
CO2	2	3	2	2	3	3	3	1		2		
CO3	2	3	2	2	2	2	2	2		2		
CO4	2	2	3	3	2	3	2	1		3		
CO5	3	2	3	3	2	3	2	1		3		
COs / PSOs		PSO1			PSO2				PSO3			
CO1		3			3				2			
CO2		2			2				2			
CO3		2			3				2			
CO4		2			2		_		3			
CO5		3			2				2			
3/2/1 indicates	Strengt	h of Corre	lation 3	- High,	2- Mediu	m, 1-Lov	V					
		e	social		nhancing	Jlied	ent		ship			
Category	Program Core	Program electiv	Humanities and Science	Dpen Elective	Skill er elective	Inter Disciplinary/A	Skill Compone	Decotion	/Project/interns	Others		
		v V										

137

orm,	Discrete	Fourier	Transform	(DFT)
eque	ncy doma	in filteri	ng.	

UNIT 4 Image Segmentation

SUBJECT

CODE

HBCF22E06

Introduction, Detection of isolated points, line detection, Edge detection, Edge linking, Region based segmentation- Region growing, split and merge technique, local processing, regional processing, Hough transform, Segmentation using Threshold.

UNIT 5 Image Compression

Introduction, coding Redundancy, Inter-pixel redundancy, image compression model, Lossy and Lossless compression, Huffman Coding, Arithmetic Coding, LZW coding, Transform Coding, Subimage size selection, blocking, DCT implementation using FFT, Run length coding.

TEXT BOOKS:

1. Rafael C. Gonzalez, Richard E. Woods, _Digital Image Processing', Pearson, Third Edition, 2010.

2. Anil K. Jain, _Fundamentals of Digital Image Processing', Pearson, 2002.

REFERENCES

- 1. Kenneth R. Castleman, _Digital Image Processing', Pearson, 2006.
- 2. S. Sridhar, Digital Image Processing, Oxford University Press, 2nd Ed, 2016
- 3. William K. Pratt, Digital Image Processing', John Wiley, New York, 2002
- 4. Fundamentals of Digital Image Processing- Anil K. Jain, 2nd Edition, Prentice Hall of India.

B.Sc. (Information Science and Cyber Forensics)-Regulation 2022-2023

UNIT 1 Digital Image Processing Introduction

Light, Brightness adaption and discrimination, Pixels, coordinate conventions, Imaging Geometry, Perspective Projection, Spatial Domain Filtering, sampling and quantization. Applications of Image Processing: Medical imaging, Robot vision, Character recognition, Remote Sensing.

UNIT 2 Image Enhancement in the Spatial Domain

Some Basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic/Logic Operations, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

UNIT 3 Image Enhancement in Frequency Domain

Introduction, Fourier Transfe , properties of DFT, Discrete Cosine Transform (DCT), Fre

9 Hrs

Total Hours:45 hrs

9 Hrs

9 Hrs

P/R Ty/Lb/ETL

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3

EDUCATIONAL AND RESEARCH INSTITUTE

SUBJECT NAME

DIGITAL IMAGE PROCESSING

9 Hrs



Subject Code:	SUBJE	CT NAME				С	L	Τ/	P/R	Ty/L			
HBCF22E07		PRINCIPLE	S OF SECU			S.Lr		b/ET I					
	Prerequ	isite: NIL		3	3	0/0	0/0	Ty					
L : Lecture T : T	utorial	S.Lr : Super	vised Lear	ning P:H	Project R	: Research	n C: Cre	dits	1				
Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab													
OBJECTIVES :													
• To und	• To understand the secure software development lifecycle												
• To expl	To explain about the secure coding techniques COUPSE OUTCOMES (COs) : (3, 5)												
COURSE OUTCOMES (COs) : (3- 5)													
CO1	Understand the secure software development lifecycle												
CO2	Unders	stand the sec	cure coding	techniqu	es								
CO3	Demoi	nstrate the th	nreat model	ing proce	ss and ber	nefits							
CO4	Descri	be the datab	ase and we	bspecific	issues								
CO5 Identify the key analysis of Testing secure applications													
Mapping of Course Outcomes with Program Outcomes (POs)													
COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	POS	}	PO9			
CO1	3	2	2	3	2	3	3	2		3			
CO2	2	3	2	2	3	3	3	1		3			
CO3	3	3	2	2	2	2	2	2		1			
CO4	2	2	3	3	3	3	2	1		2			
CO5	3	2	3	3 2 3				2 2 2					
COs / PSOs		PSO1			PSO2			P	SO3				
CO1		3			3				2				
CO2		2			2				2				
CO3		2			3				2				
CO4		2			2				3				
CO5		3			2	_			2				
3/2/1 indicates S	Strength	of Correlat	ion 3- Hi	gh, 2- Mo	edium, 1-	Low							
Category	Program Core Program Core		Humanities and social Science	Open Elective	Open Elective Skill enhancing elective		Skill Component	Practical	/Project/internship	Others			
		\checkmark											

С **T**/ P/R Ty/Lb/ETL **SUBJECT** L SUBJECT NAME S.Lr CODE PRINCIPLES OF SECURE CODING **HBCF22E07** 3 3 0/0 0/0 Тy

EDUCATIONAL AND RESEARCH INSTITUTE

UNIT 1: Need for secure systems

Need for secure systems: Proactive Security development process, Secure Software Development Cycle (S-SDLC), Security issues while writing SRS, Design phase security, Development Phase, Test Phase, Maintenance Phase, Writing Secure Code- Best Practices SD3 (Secure by design, default and deployment), Security principle sand Secure Product Development Timeline, authorization.

UNIT 2: Threat modeling process and its benefits

Threat modeling process and its benefits: Identifying the Threats by Using Attack Trees an drating threats using DREAD, Risk Mitigation Techniques and Security Best Practices. Security techniques, authorization. Defense in Depth and Principle of Least Privilege.

UNIT 3: Secure Coding Techniques

Secure Coding Techniques: Protection against DoS attacks, Application Failure Attacks, CPU Starvation Attacks, Insecure Coding Practices In Java Technology.ARP Spoofing and its counter measures. Buffer Overrun- Stack overrun, Heap Overrun, Array Indexing Errors, Format String Bugs. Code Injection Attacks, Canary based counter measures using Stack Guard and Pro police. Socket Security, Avoiding Server Hijacking, Securing RPC.

UNIT 4: Database and Web-specific issues

Database and Web-specific issues: SOL Injection Techniques and Remedies, Race conditions, Time of Check Versus Time of Use and its protection mechanisms. Validating Input and Inter process Communication, Securing Signal Handlers and File Operations.XSS scripting attack and its types-Persistent and Non persistent attack XSS Counter measures and By passing the XSS Filters.

UNIT 5: Testing Secure Applications

Testing Secure Applications: Security code overview, secure software installation. The Role of the Security Tester, Building the Security Test Plan. Testing HTTP-Based Applications, Testing File-Based Applications, Testing Clients with Rogue Servers

Text Book

4. Writing Secure Code, Michael Howard and David LeBlanc, MicrosoftPress, 2ndEdition, 2004 **Reference Books**

- 1. ProgrammingPHP,RasmusLerdorfandLevinTatroe,O Reilly,2002
- 2. CorePythonProgramming,WesleyJ.Chun, PrenticeHall,2001
- 3. Perl:TheComplete Reference,2ndEdn,MartinC. Brown,TMH, 2009

4. MySQL:TheComplete Reference,2ndEdn,VikramVaswani,TMH,2009

RelatedOnlineContents(MOOC,SWAYAM,NPTEL,Websitesetc)

https://onlinecourses.swayam2.ac.in/aic20 sp06/preview https://onlinecourses.swayam2.ac.in/arp19_ap79/preview

9 Hrs

9 Hrs

Total Hrs: 45

9 Hrs

9 Hrs



Subject	Subje	ct Nam	e :					С	L	Τ/	P/R	Ty/Lb/ETL	
Code:	DATABASE SECURITY								S.Lr		-		
HBCF22E08	Prerequisite: NIL								3	0/0	0/0	Ту	
L : Lecture T :	: Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits												
Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab													
OBJECTIVES :													
To pro	To provide a foundation in database security												
• Unders	 Understand the various database vulnerabilities Learn to audit the databases 												
• Learn to audit the databases.													
COURSE OU	OUTCOMES (COs) : (3-5)												
	Able	to defin	differen	ndamer	tals of s	ecurity pro	ocess.	Inorohil	ition	in oner	oting	watom	
C02	Disco	ver the	ameren		loase per	$\frac{1}{1}$	and vu	meraon	nues	in oper	ating s	system	
<u>CO3</u>	Descr	1be the	security	policie	es and te	chniques		10.000		al:			
C04	Under	rstand +	he vario	us Aut	abasa A	on and Pa	in South	u Secur	ny p	oncy le			
Manning of C	ourse	Dutcon	ne valio nes with	Progr	abase Aj am Out	comes (Pf		Juinty IV	Toue	15			
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	<i>JS)</i>	PO7	PC)8	PO9		
CO1	3	2	1	2	3	3		1		2	107	3	
CO2	3	2	3	2	3	3		2		2		3	
CO3	3	2	2	2	3	3		2		2	3		
CO4	3	3	3	2	3	3		1		2		3	
CO5	3	3	2	2	3	3		2		2		3	
COs / PSOs		PSO1			PS	02				P	SO3		
CO1		2				3					3		
CO2		2				3			3				
CO3		2				3		3					
CO4		3				3		3					
CO5		3				3					3		
H/M/L indicat	tes Stre	ength o	f Corre	lation	H- Hig	gh, M- Me	edium,	L-Low	V				
						live	lie						
			cial			lect	/AI			d			
		ē	SO			60	ary	ent		shij			
ory	ore	ctiv	and	e cin _i l cin									
teg	u C	ele	ies		sctiv han								
Ca	gran	am	unit ce	Ele [en]				Ŭ		tica ject		SIG	
	rog	ogr	1m2 ien		Den	lkill	ntei	kill		Pro)thé	
	러	Pr	Hu Sc	(¹ O	S	I	S		Ρ		0	
		\checkmark											

С **T**/ P/R Tv/Lb/ETL L S.Lr SUBJECT CODE SUBJECT NAME DATABASE SECURITY 3 3 0/0 0/0 **HBCF22E08** Ту

UNIT I 9 Hrs Security Architecture & Operating System Security Fundamentals

Security Architecture: Introduction-Information Systems- DBMS-Information Security Architecture-Database Security-Asset Types and value-Security Methods Operating System Security Fundamentals: Introduction-Operating System Overview-Security Environment - Components- Authentication Methods-User Administration-Password Policies-Vulnerabilities-E-mail Security.

Administration of Users, Profiles, Password Policies UNIT II

Administration of Users: Introduction-Authentication-Creating Users, SQL Server User-Removing, Modifying Users-Default, Remote Users-Database Links-Linked Servers-Remote Servers-Practices for Administrators and Managers-Best Practices Profiles, Password Policies, Privileges and Roles: Introduction-Defining and Using Profiles-Designing and Implementing Password Policies

UNIT III **Database Application Security Models**

Introduction-Types of Users-Security Models: Access Matrix model, Access mode model- Application Types: Client/Server Applications, Web Applications, Data ware house applications- Application Security Models-Data Encryption.

UNIT IV Authentication and Password Security

Choosing an appropriate authentication option-Understanding system administration privileges- Choosing strong passwords, Implementing account lockout after failed loginattempts-Creating and enforcing password profiles- Using passwords for all database component-Understand and secure authentication back doors

Virtual Private Databases UNIT V

Virtual Private Databases: Introduction-Overview of VPD-Implementation of VPD using Views, Application Context in Oracle-Implementing Oracle VPD-Viewing VPD Policies and Application contexts using Data Dictionary, Policy Manager Implementing Row and Column level Security with SQL Server.

TEXT BOOK:

1. Hassan A. Afyouni, 2009 "Database Security and Auditing", Third Edition, Cengage Learning.

REFERENCE BOOKS:

- 1. Charu C. Aggarwal, Philip S Yu, 2008, "Privacy Preserving Data Mining": Models and Algorithms, Kluwer Academic Publishers.
- 2. Ron Ben Natan, 2005, "Implementing Database Security and Auditing", Elsevier Digital Press.

9 Hrs

Total Hours: 45

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9 Hrs

9 Hrs



Subject	Subject	Name :				С	L	T/	P/R	Ty/Lb/ETL			
Code: HBCE22E00		WIR	ELESS SI	CURIT	Y			5.Lr					
	Prerequ	isite: NIL			3	3	0/0	0/0	Ту				
L : Lecture T :	Tutorial	S.Lr : Su	upervised l	Learning	P: Project	R : Resear	ch C: Crea	lits					
Ty/Lb/ETL : T	Theory/La	ab/Embedd	led Theory	and Lab									
OBJECTIVE	OBJECTIVES :												
• Mobi	• Mobile wireless security is the protection of smart phones, tablets, laptops and												
other	other portable computing devices, and the networks they connect to, from threats												
and vulnerabilities associated with wireless computing.													
COURSE OUTCOMES (COs) : (3- 5)													
CO1	A wide	explanatio	on on Data	Commun	ications Sy	stem and it	s compone	ents					
CO2	Design	and imple	ment wirel	ess netwo	ork environ	ment for an	y applicati	on using	g lates	st wireless			
	protoco	ols and stan	idards.										
CO3	Implem	ent differe	ent type of	applicatio	ons for smar	rt phones a	nd mobile	devices	with l	latest			
	networ	k strategies	S. 1 (1 1	•		1 4 1 1							
C04	underst	and Indepe	endently b	asic com	puter netwo	rk technolo	ogy						
LUS Monning of C	Unders	tand the co	ncepts of	$\frac{v o p sec}{o m O v t o}$	urity)							
COs/POs	DUISE O	$\frac{1}{PO2}$	PO3		Diffes (PUS) PO6	PO7	PO8		POQ			
$\frac{COS/10S}{CO1}$	2	3	105	2	103	2	3	100		109			
CO_2	2	2	1	2	3	2	2						
CO3	3	2	2	2	3	3	3						
CO4	3	3	2	3	3	3	3						
CO5	3	4	3	3	3	3	3						
COs / PSOs		PSO1			PSO2			PS	603				
CO1		3			3				3				
CO2		2			2				3				
CO3		2			2				2				
<u>CO4</u>		1			3				3				
CO5	C1	$\frac{2}{1}$	1.4		3	1 1			3				
3/2/1 indicates	s Streng	th of Corr	elation 3	- High, 2	- Medium,	1-LOW							
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter Disciplinary/Allied	Skill Component	Practical /Project/internship	Others				
		~											

Subject С L **T**/ P/R Ty/Lb/ETL Subject Name : S.Lr Code: WIRELESS SECURITY **HBCF22E09** Prerequisite: NIL 3 3 0/0 0/0

UNIT I INTRODUCTION

Mobility of Bits and Bytes -Wireless The Beginning - Mobile Computing - Dialogue Control -Networks - Middleware and Gateways - Application and services- Developing Mobile computer Applications – security in mobile computing – Standards _ Why is it necessary – Standard bodies. Mobile Computing Architecture: History of computers and Internet - Architecture for mobile computing – Three-tier architecture – Design considerations for mobile computing – Mobile computing through Internet – Making exiting applications mobile enabled.

UNIT II MOBILE COMPUTING THROUGH TELEPHONY

Evaluation of telephony – Multiple access procedures – Mobile computing through telephone – IVR Application – Voice XML – TAPI.

UNIT III WIRELESS TECHNOLOGIES

Blue Tooth – RFID – WiMAX – Mobile IP – IPv6 – Java Card. GSM : Global System for mobile communications - GSM Architecture - GSM Entities - Call routing in GSM - PLMN Interfaces -GSM Addresses and Identifiers –Network Aspects in GSM – GSM Frequency allocations – Authentications and Security, SMS.

UNIT IV CDMA and 3G

Spread spectrum technology - Is 95 - CDMA vs GSM - Wireless Data - Third generation networks - Applications on 3G WIRELESS LAN: Wireless LAN advantages - IEEE 802.11 standards -Architecture – Mobile in Wireless LAN – Deploying wireless LAN – Mobile adhoc networks and sensor networks - Wireless LAN Security - WiFi vs 3G.

UNIT V VOIP SECUITY

Streaming in 3rd generation mobile architecture, Voice and Video over IP (Media over IP), Session Initiation Protocol (SIP) and its use in Media Over IP, Skype as a case study. Security in VoIP. Attacks against the VOIP network, Challenges against implementing VOIP network, WEP (Wired Equivalent Privacy), Effects of using WEP in VOIP networks, Concepts of WPA and WPA2.

Books for References:

1. Jochen Schiler, "Mobile Communication", Addison Wesley, 2003..

2. B.A. Forouzan, "Cryptography & Network Security", Tata McGrawHill, 2007.

3. Honeyman P Huston L.B, "Communications and Consistency in Mobile FileSystems", IEEE Personal communication 2(6), 1996.

4. Asoke K Talukder, Roopa R Yavagal, "Mobile Computing", TMH, 2nd Edition, 2017.

5. Biplob k Sikdar, Sipra dasbit, "Mobile Computing", Printice Hall India, 2009.

EDUCATIONAL AND RESEARCH INSTITUTE



9 Hrs

9 Hrs

9 Hrs

Total: 45 Hours

9 Hrs

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Subject	Subject	Name : AR	TIFICIA	L INTEI	LLIGENC	E C	L	T/ SIr	P/R	Ty/Lb/ETL			
HBCF22F10								5. L1					
	Prerequ	isite: NIL				3	3	0/0	0/0	Ту			
L : Lecture T :	Tutorial	S.Lr : Su	pervised L	earning	P : Project	R : Resear	ch C: Cre	lits		· ·			
Ty/Lb/ETL : T	heory/La	b/Embedde	d Theory	and Lab	5								
OBJECTIVE	S :												
• The stu	udents wi	ll be able to	solve pro	blems us	sing AI tech	iniques .							
To dev	elop new	projects us	sing AI teo	chniques	•								
 To gui 	de the pro	ocess of dec	lucing inf	ormation	in a compu	tational ma	anner.						
COURSE OU	TCOME	CS (COs) : ((3-5)										
CO1	Illustrat	e different	types of A	I agents a	and searchi	ng strategi	es CO2 CO	D3 CO4	CO5				
CO2	Ability	to inference	e the know	ledge an	d plan effec	ctively							
CO3	Discuss	the technic	ues used :	for game	playing usi	ng various	searching	algorit	hms.				
CO4	Analyze	lyze various types of planning to create effective AI applications											
CO5	Learns	irns how artificial intelligence supports robotics.											
Mapping of C	ourse Ou	itcomes wi	th Progra	m Outco	omes (POs))							
COs/POs	PO1	PO1PO2PO3PO4PO5PO6PO7											
CO1	3	2		3	3	3	3			2			
CO2	2	1		2	2	1	2			1			
CO3	1	2		3	2	3	1			2			
CO4	2	3		1	2	2	2			2			
CO5	3	2		2	2	3	2			3			
									~~~				
COs / PSOs		PSO1			PSO2			P	<b>SO</b> 3				
CO1		2			2				2				
CO2		3			3				3				
<u>CO3</u>		2			2				3				
<u>CO4</u>		2			2				2				
<u>CO5</u>	Ct t	$\frac{2}{1}$			$\frac{2}{1}$	4.7			2				
3/2/1 indicates	s Strengt	h of Correl	ation 3	- High, 2	- Medium,	1-Low	Γ						
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter Disciplinary/Allied	Skill Component	Practical /Proiect/internship					
		$\checkmark$											

SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/Lb/ETL
HBCF22E10	ARTIFICIAL INTELLIGENCE	3	3	0/0	0/0	Ту

#### **Unit-I Introduction and Problem Solving**

Introduction- Intelligent agent - Types of agents - Agent Structure - Problem solving agents -Problem Formulation - Uninformed search strategies.

#### **Unit-II Informed Search Methods**

Informed search Strategies – A* Heuristic function – Hill Climbing search – Constraint Satisfaction problem – Pruning.

#### **Unit-III Knowledge and Reasoning**

Knowledge based agent - First-order logic -Building a Knowledge base - Properties of Good and Bad Knowledge bases – Forward and backward chaining algorithm.

#### **Unit-IV Planning**

Planning-Simple planning agent-Planning with state space search-Partial order planning– Planning and Acting – Conditional Planning – Fully Integrated planning and execution.

### **Unit-V Uncertain Knowledge Reasoning And Learning**

Non-monotonic reasoning- Probabilistic reasoning- Use of certainity factors- Fuzzy logic- Neural networks.

### **Total Number of Periods : 45**

### **TEXT BOOKS**

1. Stuart R. Peter N. (2010) Artificial Intelligence A modern Approach, Prentice Hall.

2. Elaine R. Kevin K. (2008) Artificial Intelligence Tata McGraw Hill.

#### REFERENCES

1. Tim Jones M. (2008) Artificial Intelligence, A System Approach (Computer Science)

2. Ben Coppin (2004) Artificial intelligence illuminated, Jones and Bartlett Learning.



# 9 Hrs

9 Hrs

9 Hrs

#### 9 Hrs



# **PROGRAMME ELECTIVES III**



Subject Code:	Subject N	Name :				С	L	ſ	7	P/R		Ty/Lb/	
HBCF22E11		CR	YPTOL	OGY				<b>S.</b> ]	Ĺr			ETL	
	Prerequis	ite: NIL	,			3	3	0/	0	0/0		Ту	
L: Lecture T: Tutor	ial S. Lr: Sup	ervised L	earning P: I	Project R: Rese	arch C: Cre	edits Ty/L	b/ETL:	Theory	/Lab I	Embed	ded T	heory & Lab	
OBJECTIVES	: This cour	se											
• Understandir	ng the over	view of	the princi	iples and pra	actices of	cryptog	raphy	•					
• presents diffe	erent techn	iques an	d proced	ures that ena	ble them	to impl	ement	DNA	com	puting	g in		
Cryptograph	у.	1	1			1			,				
• focuses main	ly on the I	DNA cor	nputing t	echniques to	store sei	nsitive in	nform	ation c	or trar	nsmit	it ac	ross	
	COMES	(COs):	(3-5)										
	Students	loorn rov	ot of orun	tography on	d Modor	n Crunto	aranh	<b>X</b> 7					
	Judents	donto to		ious Moder		tion took	niaua	y G					
C02	Helps stu	s students to learn various Modern Encryption techniques											
C03	Students	ents will gain an understanding of the Authenticated Encryption and its Applications											
C04	Students	dents will gain an understanding of the DNA Computing in Cryptography											
	Students	will exp	lain and p	properly imp	Diement L		mputi	ng to s	ecure	e infoi	rmati	ion	
Mapping of Co	urse Outc	omes w	ith Progr	ram Outcon	nes (POs	)						[	
COs/POs	PO1	PO2	PO3	PO4	PO5	PO	6	PO'	7	PC	)8	PO9	
CO1	2	1	3	2	2	2		1		-		2	
	2	1	3	2	2	2		2		-		2	
	2	1	3	2	2	2		2				2	
C04	2	1	3	2	2	2		2		2		2	
COs / PSOs		PSO1			PSO2					PS	03	5	
CO1		2			1						2		
CO2		3			3						2		
CO3		2			2						1		
CO4		3			3						2		
CO5	3 2 2												
3/2/1 indicates	Strength of Correlation 3- High, 2- Medium, 1-Low												
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ateg	rog 02r3	ectiv	uma d so	pen	unha elect	Disc //All	kill	Com	Pract	rnst	Othe		
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SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCF22E11	CRYPTOLOGY	3	3	0/0	0/0	Ту

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#### **UNIT I: Introduction to Cryptography**

Caveman Cryptography, Greek Cryptograph, Viking Cryptography, Monalphabetic Substitution Ciphers, Simple Progression to an Unbreakable Cipher, Transposition Ciphers, Matrix Encryption

#### UNIT II: Modern Cryptography

Claude Shannon, Data Encryption Standard, Public Key Cryptography, Attacking RSA, Stream Ciphers, Quantum Cryptography, DNA Computing

#### **UNIT III: Modern Encryption**

Encryption – Block Ciphers - Stream Ciphers – Hash Functions – Keyed Hashing - Authenticated Encryption – RSA- Diffie-Helman – Elliptic Curves

#### **UNIT IV:DNA Computing in Cryptography**

DNA Computing – Benefits of DNA computing – Applications of DNA computing –Introduction to DNA Computing in Cryptography – Symmetric-Key Cryptosystem with DNA technology – Asymmetric DNA Encryption and Decryption - DNA Based Elliptic Curve algorithm –DNA Based Cryptography based on Dynamic DNA

#### **UNIT V: DNA Cryptography in Security**

Application of DNA Computing in the Cloud Computing Environment – Taxonomy of Security Attacks in DNA Computing – DNA Computing Algorithm – Data Security using DNA Cryptography - DNA Cryptography for Secured Image – Secured Communication using DNA Cryptography -Applications and Future Trends of DNA Computing

#### **Text Books**

- 1. Craig P. Bauer (2013), Secret History The Story of Cryptography, CRC Press Taylor and Francis Group
- 2. Suyel Namasudra, Ganesh Chandra Deka (2019), Advances of DNA Computing in Computing, CRC Press Taylor and Francis Group
- 3. Jean-Philippe Aumasson (2018), Serious Cryptography A Practical Introduction to Modern Encryption, No Starch Press, Inc

#### References

- 1. Gheorghe Paun , Grzegorz Rozenberg , Arto Salomaa (1998), DNA Computing: New Computing Paradigms, Springer
- 2. Mark Stamp & Richard M. Low (2007), Applied Cryptanalysis: Breaking Ciphers in the Real World, Wiley –Interscience A John Wiley & Sons Inc. Publications
- 3. Jeffrey Hoffstein, Jill Pipher, Joseph H. Silverman (2008), An introduction to mathematical cryptography, Springer Science+Business Media,

## 9 Hrs

Total Hrs: 45

### 9 Hrs

9 Hrs

9 Hrs



Subject Code: HBCF22E12	Subject	Name : MALV	VARE A	NALYS	IS	С	L	T/ S.L	r P	2/ <b>R</b>	Ty/ Lb/ ETL				
	Prerequ	isite: NIL				3	3	0/0	) (	)/0	Ту				
L : Lecture T : Tu	utorial	S.Lr : Super	vised Lear	ning P:	Project R :	Research C	: Credi	ts							
Ty/Lb/ETL : The	ory/Lab/	Embedded 7	Theory and	l Lab											
<b>OBJECTIVES</b> :	_														
• The purp	ose of m	alware analy	sis is to o	btain and	provide the	information	n neede	ed to re	ctify a	netw	ork or				
system in	Trusion.	$(\mathbf{CO}_{\mathbf{c}}) \cdot (2$	5)												
COURSE OUT	Student	$(UUS) \cdot (J)$	e to know	about the	e details abo	ut the malu	vare fun	damer	tale						
CO2	Student	s will be abl	e to know	about Ra	ndom ware	s and can id	dentify	the fak	ewares						
CO3	Student	s will be abl	e to know	about the	e lab setun a	nd learn to	interfer	e with	the net	work	cing				
	systems			Loout in	- ue setup u			• ,, itil	ine net	., 011					
CO4	Student	s will be abl	e to know	about the	e operating s	system and	program	ramming							
CO5	Student	s will be abl	e to know	to handle	e the files w	ith malware									
Mapping of Cou	rse Outo	comes with	Program	Outcome	es (POs)										
COs/POs	PO1	PC	)2	PO3	PO4	PO5		PO6	06 PO7						
CO1	2	1		3	3	3	2			3					
CO2	3	3		3	3	3		3		3					
CO3	2	3		3	3	3		3		3					
CO4	3	2		2	2	3		2		3					
<u>CO5</u>	3	3		3	3	3		2		3					
COs / PSOs		PSO1			PSO2			J	PSO3						
CO1		2			2				2						
CO2		3			2				2						
CO3		3			2				2						
CO4		2			1				2						
CO5		3			3				3						
3/2/1 indicates S	trength	of Correlati	ion 3-H	igh, 2- M	ledium, 1-L	ωW									
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter Disciplinary/Allied	Skill Component	Skill Component Practical /Project/internship Others							
		$\checkmark$													

С L **T**/ P/R Ty/ **SUBJECT** S.Lr SUBJECT NAME Lb/ CODE ETL MALWARE ANALYSIS **HBCF22E12** 3 3 0/0 0/0 Ту

### UNIT 1

Introduction-Fundamental Theory of Malware Analysis - Types of Malware Analysis - Purpose of Malware Analysis - Limitations of Malware Analysis - Malware Analysis Process - Effective Malware Analyst - Unpacking, Decryption, and Deobfuscation

### UNIT 2

Understanding Kernel-Mode Rootkits - Malware Taxonomy - Malware Classes: Infectors, Images Network worms, Images Trojan horses, Images Backdoors, Images Remote-access Trojans, Images Information stealers, Images Ransomware, Images Scareware, Images Fakeware, Images Greyware

### UNIT 3

Malware Analysis Lab Setup - Malware Deployment - Malware infection vectors- types : Physical media, Images E-mails, Instant messaging and chat, Social networking, Universal resource locator (URL) links - File shares - Software vulnerabilities- Malware Components and Distribution

### UNIT 4

Persistence Mechanisms - States of malware: static, dynamic- Static mechanism: Entry-point obscuring, Basic malware encryption, Polymorphism, Metamorphism, Anti-reversing- Dynamic Mechanism: Anti-debugging: Anti-sandboxing, Environment lock, Anti-AV scanning, Network behaviour protection - Malware Payload Dissection and Classification

### UNIT 5

Debugging Tricks for Unpacking Malware - Malware Dependencies - Dependency types: Environment: Operating system, System settings, Virtualization – Program – Timing- Event- User: Compromise accomplice, Roles and access- File - Fileless, Macros, and Other Malware Trends

### **TEXT BOOKS:**

- 1. Christopher Elisan, "Advanced Malware Analysis", McGraw-Hill, 2015
- 2. Alexey Kleymenov, Amr Thabet, "Mastering malware analysis" The complete malware analyst's guide to combating malicious software, APT, cybercrime, and IoT attacks, 2019, Packt Publishing.

### **REFERENCE BOOKS:**

- 1. "Practical Malware Analysis" Michael Sikorski; Andrew Honig, No Starch Press, 2012.
- 2. Abhijit Mohanta, Anoop Saldanha, "Malware Analysis and Detection Engineering", 2020, Apress.
- 3. Digit Oktavianto, Iqbal Muhardianto, "Cuckoo Malware Analysis", Packt Publishing, 2013

# 9 hrs

9 hrs

### 9 hrs

### Total Hrs: 45



# 9 hrs

9 hrs



Subject Code: HBCF22E13	Subject Na	me : DPEN S	OURCE S	SOFTWA	RE	С	L	s	T/ 5.Lr	P/R	Ty/ Lb/			
	Duono autoiti	. NIII				2	2		0/0	0/0				
I · Lecture T ·	Tutorial S	$\frac{1}{1}$ INIL	ervised Le	arning P	· Project R	· Research	$\frac{3}{C \cdot Crec}$	lite	0/0	0/0	Ty			
$Tv/Lb/ETL \cdot T$	heory/Lab/E	nbedded	Theory a	nd Lab	. Hojeet K	. Research	C. CICC	1115						
OBJECTIVES	S:	needded	i incorj u	lu Luo										
• To exp	ose students	to free o	pen source	e software	environme	nt and intro	duce th	em to	use or	en sou	rce			
packag	es		r						r					
• To und	lerstand the d	ifference	e between	open sour	ce software	and comm	ercial so	oftwa	re					
To den	nonstrate diff	erent op	en source t	echnolog	ies like LIN	UX, PHP a	nd MyS	SQL v	with dif	ferent				
packag	es			C			2	-						
• To use	the open sou	rce softw	ware in ope	erating sys	stems, Progi	ramming a	nd web	frame	work i	n appro	baching			
real tin	ne application	ıs.	-		-	-					-			
COURSE OU	TCOMES (	<b>IES</b> (COs) : ( 3- 5)												
CO1	Understand	the sign	ificance of	f open sou	irce practice	and guide	ines	S						
CO2	Identify, In	stall and	run Linux	Operatin	g System									
CO3	Install and	manage a	applicatior	IS										
CO4	Identify, in	stall oper	n source w	eb techno	logies Apac	he, MySql	, PHP.							
CO5	Implement	Web pro	ogramming	with PH	P									
Mapping of C	ourse Outco	mes wit	h Progran	1 Outcom	nes (POs)									
COs/POs	PO1	PC	)2	PO3	PO4	PO5		PO	5	PO	)7			
CO1	2	1		2	2	2		3		2	\$			
CO2	2	2		1	2	3		2			\$			
CO3	3	2		2	1	3		2		2	2			
CO4	3	2		3	2	2		3		2	2			
CO5	2	1		2	3	2		3			;			
		<b>-</b>												
COs / PSOs		PSOI			PSO2				<b>PSO</b> .	3				
CO1		3			2				2					
CO2		2			3				3					
CO3		3			2				2					
CO4		3			3				3					
CO5		3			2				3					
3/2/1 indicates	Strength of	Correla	ation 3-1	High, 2- <b>N</b>	Medium, 1-	Low	-							
Category	Program Core	elective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter Disciplinary/Allied	Skill Component		Practical /Project/internship					
	<b>√</b>													

SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCF22E13	<b>OPEN SOURCE SOFTWARE</b>	3	3	0/0	0/0	Ту

AND RESEA

#### **UNIT I**

OPEN SOURCE: Introduction - Open Source vs. Commercial Software - Need for open sources -Application of Open Sources – Open Source History – Principles and Methodologies – Open Source **Operating Systems** 

#### **UNIT II**

LINUX: Introduction - Linux Kernel - Linux Distributions - Linux Essential Commands - File System Concept - Standard Files - Vi Editor - Shell Introduction - Installing Application -Switching Users – Accessing Linux from Command Line Interface

#### **UNIT III**

**MYSQL:** Introduction – Setting up account – Starting, Terminating and writing own SQL Programs - The Show Database and Table Command - The USE Command - Working with Strings - Sorting Query Results – Generating Summary – MySQL and Web 9 Hrs

#### **UNIT IV**

APACHE: Introduction - Apache Explained - Starting, Stopping, and Restarting Apache -Modifying the Default Configuration - Securing Apache - Set User and Group - Consider Allowing Access to Local Documentation - Apache control with .htaccess

### UNIT V

**PHP:** Introduction – General Syntactic Characteristics – PHP Scripting – Primitives, Operations and Expressions – Variables – Data types – Functions – Arrays – String Manipulation – File Handling and Data Storage – Basic Form Processing – PHP and SQL Database – PHP Connectivity – Sending and Receiving Emails – Debugging and Error Handling – Security – Templates

#### **TEXT BOOK:**

1. "Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP", James Lee and Brent Ware,", Dorling Kindersley(India) Pvt. Ltd, 2008.

### **REFERENCE BOOKS:**

1. Beginning Linux Programming, R. Stones, N. Matthew, 2011, 4th Edition, Wiley India Pvt. Ltd.-New Delhi.

2. "Learning PHP, MySQL, Java Script, CSS and HTML5", Robin Nixon, O'Reilly Publications, 3rd Edition, 2014.

### 9 Hrs

9 Hrs

9 Hrs

### 9 Hrs

**Total Hours: 45** 



Subject Code: HBCF22E14		S EVIDEN	ubject Nan CE MAN	ne : : AGEMI	ENT	C	L	T/ S.Lr	P/R	Ty/ Lb/ ETL				
	Prerequ	isite: JAVA	PROGRA	MMING		3	3	0/0	0/0	Ty				
L : Lecture T : T	utorial	S.Lr : Super	vised Lear	ning P:	Project R :	Research (	C: Credit	S						
Ty/Lb/ETL : The	eory/Lab	/Embedded	Theory and	l Lab	-									
OBJECTIVES	:													
Develop	a basic u	inderstandin	g of evider	nce-based	l practices f	or solving r	nanageri	al problen	ns.					
COURSE OUT	COMES	(COs): (3-	- 5)											
CO1	Acquire	e the knowle	dge on dig	ital evide	ence.									
CO2	Acquire	e knowledge	on basic in	nvestigati	ve process.									
CO3	Acquire	e knowledge	on advanc	ed Equiv	ocal Forens	sic Analysis								
CO4	Apply t	he knowledg	ge in advan	ced digit	al evidence	in the cour	troom.							
CO5	Design	and apply th	e cyberstal	lking and	evidence h	andling.								
Mapping of Cou	arse Out	comes with	Program	Outcome	es (POs)			07 PO8 PO9						
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	7 PO8		<u>PO9</u>				
<u>CO1</u>	1	1	2	2	1	2	2	2		2				
<u>CO2</u>	2	1	2	3		2	3	2						
<u>CO3</u>	3	2	3	3	2	3	3			2				
CO4	3	2	3	3	2	3	3							
05	3	3	3	3	3	3	3	1		1				
		PSO1			PSO2			PSO	3					
CO1		2002			2			200	-					
		$\frac{2}{2}$			3			3						
C02		2			3			3						
C03		3			3			3						
C05		3			3			3						
3/2/1 indicates S	Strength	of Correlat	ion 3- Hi	igh, 2- M	ledium, 1-I	LOW		-						
	0				50									
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancin elective	Inter Disciplinary/Allied	Skill Component	Practical /Proiect/internship	Others	)				
		*												

Subject Code: HBCF22E14	Subject Name : :	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
	EVIDENCE MANAGEMENT	3	3	3/0	0/0	Ту

#### UNIT I **DIGITAL EVIDENCE AND COMPUTER CRIME**

Digital evidence- increasing awareness - challenging aspects- following and challenging cyber trail-Computer crime investigation- evolution of investigative tools language of computer crime- role of computers in crime

#### UNIT II **INVESTIGATIVE PROCESS**

Role of digital evidence- Investigative methodology: accusation or incident alert, assessment of worth, incident crime scene protocols, identification or seizure, preservation, recovery, harvesting, reduction, organization and search, analysis, reporting, persuasion and testimony

#### UNIT III **INVESTIGATIVE RECONSTRUCTION**

Equivocal Forensic Analysis: temporal, relational and functional analysis-Victimology-crime scene characteristics-evidence dynamics and introduction of error- reporting

#### **DIGITAL EVIDENCE IN THE COURTROOM** UNIT IV

Admissibility- authenticity and reliability certainty scale- best evidence direct versus circumstantial evidence- hearsay-scientific evidence- presenting digital evidence

#### UNIT V CYBERSTALKING AND EVIDENCE HANDLING

Cyberstalkers operation- investigating cyberstalking- digital evidence as alibi- Digital evidence handling: handling guidelines, examination guidelines

**TEXT BOOK:** 

1. 'Digital Evidence and Computer Crime Forensic science, Computers and Internet' - EoghanCasey -Elsevier Academic Press – Third Edition

#### **REFERENCE BOOKS:**

1. A Electronic Discovery and Digital Evidence in a Nut Shell-Shira A Scheindlin, Daniel J Capra, The Sedona Conference-Academic Press-Third Edition

9 Hrs

9 Hrs

9 Hrs

9 Hrs

### 9 Hrs

**Total Hrs: 45** 



Subject Code:		S	ubject Nan	ne : :		С	L	Τ/	P/R	Ty/					
HDCF22E15	IN			MANAG	FMFNT			S.Lr		Lb/					
								0.10	0.10	ETL					
I. I. I. a star m. T. T.	Prerequ	Isite: NIL			Duck D	<u>3</u>	3	0/0	0/0	Ту					
L: Lecture I: I $T_{\rm W}/I$ b/ETI : Th	utorial	S.Lr : Super	Vised Lear	ning P:	Project R:	Research C	Credits								
	• •	Lindeudeu	Theory and	Lau											
• To expos	• se the Ke	v Concents (	of Informat	tion Secu	ritv Vulner	ahility Thre	at and A	ttacks							
<ul> <li>Understa</li> </ul>	and the I	ncident Resr	oonse and	Handling	Process	uomey, me									
Develop	a basic u	inderstandin	g of evider	ice-based	practices f	or solving r	nanageri	al probler	ns.						
COURSE OUT	COMES	(COs): (3)	- 5)		r			F							
CO1	Definin	g an inciden	t relating to	o cyber s	ecurity.										
CO2	Recogn	izing an Incid	dent	•	•										
CO3	Protoco	otocols for first on crime scene investigations.													
CO4	Govern	ment approv	ved handlir	ng of com	nputer crim	e scenarios	rios								
CO5	Develo	oing Skills in	Incident R	esponse ⁻	Teams		, 								
Mapping of Co	urse Out	comes with	Program	Outcome	es (POs)										
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7 PO8 PO9								
CO1	1	1	2	2	1	2	2	2		2					
CO2	2	1	2	3	1	2	3	2		1					
CO3	3	2	3	3	2	3	3	1		2					
<u>CO4</u>	3	2	3	3	2	3	3	1		1					
CO5	3	3	3	3	3	3	3	1		1					
COs / PSOs		PSO1			PSO2			PSO	3						
CO1		2			2			1							
CO2		2			1			2							
CO3		3			1			3							
CO4		3			1			3							
CO5		3			1			3							
3/2/1 indicates S	Strength	of Correlat	ion 3-Hi	igh, 2- M	ledium, 1-I	LOW	1								
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter Disciplinary/Allied	Skill Component Practical /Project/internship Others								
		$\checkmark$													

Subject Code: Subject Name : : С L T/P/R Ty/ S.Lr Lb/ INCIDENT RESPONSE MANAGEMENT ETL **HBCF22E15** 3 0/0 0/0 Prerequisite: NIL 3 Ty

#### Module-I:

Cyber Incident Statistics, Computer Security Incident, Information as Business Asset, Data Classification, Information Warfare, Key Concepts of Information Security, Vulnerability, Threat and Attacks, Types of Computer Security Incidents, Examples of Incidents, Incidents Categorization, Low Level Incident, Mid Level Incident, High Level Incident

#### Module-II:

Incident Prioritization, Incident Response, Incident Handling, Disaster Recovery, Technologies and Impacts, Virtualization and Impacts, Estimated Cost of an Incident, Incident Reporting Organizations, Vulnerability Reports, Incident Identification, Need for Incidents Response, Goals for Incident Response,

#### Module-III:

Incident Response Process; Step 1: Identification; Step 2: Incident Recording; Step 3: Initial Response; Step 4: Communicating the Incident; Step 5: Containment; Step 6: Formulating a Response Strategy; Step 7: Incident Classification; Step 8: Incident Investigation;

#### **Module-IV:**

Incident Handling Process: Step 9: Data Collection; Step 10:Forensic Analysis, Step 11: Evidence Protection; Step 12: Notify External Agencies; Step 13: Eradication; Step14: System Recovery; Step15: Incident Documentation; Step16:Incident Damage and Cause assessment; Step 17: Review and Update the Response Policies

#### Module-IV:

Incident Response Team development, Security Awareness and Training Checklist, Incident Management, Purpose of Incident management, Incident management process, Incident management team, Incident Response Team and Members, Member Goals and Responsibilities, Developing Skills in Incident Response Personnel, Incident Response Team Structure, Team Dependencies and Services.

Total Hrs: 45

Text&References:

CERT-InGuidelines

# AND RESEA

# 9 Hrs

9 Hrs

9 Hrs

### 9 Hrs



# **OPEN ELECTIVE – I & II**



Subject Code: HBCF22OE1	Subject I	Name : <b>RODUC</b> I	TION TO	DATAS	CIENCE	C	L	T/ S.Lr	P/R	I I E	`y/ .b/ TL		
	Prerequi	site: NIL				3	3	0/0	0/0		Гу		
L : Lecture T :	Tutorial	S.Lr : Sup	pervised L	earning	P : Project	R : Resear	ch C: Cre	edits					
IY/LD/EIL:I	heory/Lab	/Embedde	d Theory	and Lab									
OBJECTIV	<b>ES</b> : To a	make stude	ents able t	0									
<b>1.</b> Lea	rn the fun	damental	concepts o	of datasci	ience								
2. Kno	ow the var	rious doma	in and ve	rtices of c	latascience								
<b>3.</b> Lea	rn the usa	ige and app	plication of	of datascie	ence								
COURSE OU	TCOMES	$\overline{S(COs):}$	(3-5)										
CO1	Understa	and the key	y differend	ce betwee	en various a	us areas of datascience.							
CO2	Understa	and the fur	damental	algorithr	ns available	ein Artifici	al Intellig	telligence.					
CO3	Understa	and the fur	ndamental	concepts	of tool and	l technique	s availab	ilable in datascience.					
CO4	Understa	and the key	y algorithi	ns availa	ble in datar	nining	les available in datascience.						
CO5	Understa	and the key	y algorithi	ns availa	ble in mach	ine learnin	ing.						
Mapping of Co	ourse Out	tcomes wi	th Progra	am Outco	omes (POs)	)	iing.						
COs/POs	PO1	PC	02	PO3	PO4	PO5	PO6	PO	<b>)7</b>	PO8	<b>PO9</b>		
CO1	1	1		3	3	3	3	1	1	-	3		
<u>CO2</u>	1	2		3	3	3	3	2	2	-	3		
<u>CO3</u>	1	3		3	2	3	3	2	2	1	3		
<u>CO4</u>	1	3		2	3	2	3		5	1	3		
	1	3		3	3	3	3		,	I	3		
COs / PSOs		PSO1			PSO2			P	<b>SO3</b>				
CO1		3			3				3				
		3			3				3				
<u>CO3</u>		3			2				3				
C04		3			3				$\frac{3}{2}$				
3/2/1 indicates	Strength	of Correl	ation 3	- High, 2	- Medium.	1-Low							
					50	2 2011							
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancin, elective	Inter Disciplinary/Allied	Skill Component	Practical /Proiect/internship	Others	000012			
				~									

#### С L **T**/ P/R Ty/ **SUBJECT** S.Lr Lb/ SUBJECT NAME CODE ETL HBCF22OE1 3 3 0/00/0Тy INTRODUCTION TO DATASCIENCE

#### **UNIT I : Introduction to DataScience**

Foundation of Data science, Area and Scope of Data Science, Steps of Data Science Process: Data collection, Pre-processing, training, and testing. Use cases in various domain such Image, Natural Language, Audio and Video.

#### **UNIT II : Introduction to Artificial Intelligence :**

Introduction Artificial Intelligence, The Foundations of AI, AI Technique, Production system characteristics, Production systems: 8-puzzle problem. Searching: Uniformed search strategies - Breadth first search, depth first search. 9 Hrs

#### UNIT III **Searching Algorithms and Learning:**

Local Search Algorithms: Generate and Test, Hill climbing, simulated annealing search, Constraint satisfaction problems, Greedy best first search, A*search, AO*search.

Self-Learning: Propositional logic-syntax & semantics Game Playing: Overview, Minimax algorithm, Alpha-Beta pruning, Additional Refinements.

#### **UNIT IV Introduction to DataMining**

Introduction to Data Mining, Prediction vs Classification v/s Clustering .Association Rule Mining, classification and regression techniques ,clustering, Scalability and data management issues in data mining algorithms, measures of interestingness

#### **UNIT V Introduction to Machine Learning:**

Introduction to Machine Learning, Supervised, Unsupervised and Reinforcement learning, Deep Learning.

#### **TEXT BOOKS:**

- 1. RachelSchutt, CathyO'Neil, "DoingDataScience:StraightTalkfromtheFrontiline" bySchroff/O'Reilly, 2013.
- 2. S.RussellandP.Norvig.ArtificialIntelligenceAModern Approach,2ndEdition.PearsonEducation,2007.

#### **REFERENCE BOOKS:**

1. JohnW.Foreman, "DataSmart:UsingdataSciencetoTransform InformationintoInsight"byJohnWiley&Sons,2013.

2. IanAyres, "SuperCrunchers: WhyThinking-by-NumbersIs the

NewWaytoBeSmart"IstEditionbyBantam,2007.

3. EricSeigel, "PredictiveAnalytics: The Powerto Predict who Will Click, Buy, Lie, or Die", 1stEdition, byWiley,2013.

- 4. MatthewA.Russel, "Mining the Social Web: Datamining Facebook, Twitter, Linkedln, Goole+,
- 5. IanWitten, Eibe Frank, Chris Paland Mark Hall DataMining: Practical

MachineLearning Tools and Techniques.

9 Hrs

9 Hrs

9 Hrs

### 9 Hrs

### **Total Hours: 45**





Subject Code: HBCF22OE2	Subject N	lame : DA	TA MI	NING				L	T/ S.Lr	P	P/R	Ty/ Lb/
												ETL
	Prerequis	ite: NIL				3	3	3	0/0	(	0/0	Ту
L : Lecture T : Tut	orial S.Lı	r : Superv	vised Lea	rning	P : Project	R : Rese	earc	h C: C	redits			
Ty/Lb/ETL : Theorem	ry/Lab/Em	bedded T	heory an	ld Lab								
<b>OBJECTIVES</b> :		6.1										
Provide an	overview	of the me	thodolog	gies and	approache	es to data	a mi	nıng	11.			
Gain insign	nt into the (	challenge	es and lin	nitation	s of data m	ining tee	chni	ques a	nd data	ware	ehousing	
• Applying C		$\frac{1}{2}$ solution	s using c	commo	n data mini	ng tools						
COURSE OUTCO	Identify 1	<b>JS)</b> : ( <b>J-</b>	<u>5)</u> ionality (	of the v	arious data	mining	and	data w	arehou	ing	compon	ent
$CO^2$	Appreciat	te the st	renoths	and lir	nitations o	f variou	us di	ata mi	ning a	nd d	ata war	ehousing
002	models	te the st	renguis	und m		i vanoa	is u	utu III	ining u	ia a	utu wu	enousing
CO3	Explain the	he analyz	ing tech	niques	of various of	lata						
CO4	Describe	different	methodo	ologies	used in dat	a mining	g and	d data v	ware ho	usin	g.	
CO5	Compare	differen	nt appro	aches	of data w	are hou	ising	g and	data 1	ninir	ng with	various
	technolog	gies.										
Mapping of Cours	se Outcom	es with l	Program	Outco	omes (POs)	)				~ -		-
COs/Pos	PO1	PO	2 P	203	PO4	<u>PO5</u>		<u>PO6</u>	P P	<u>)7</u>	PO8	PO9
				3	3	3		1		2		
CO2 CO3	3	3		3	3	3		1		2		2
C03	3	3		3	2	3		<u> </u>		2		2
C04	2	3		3	3	2				2	1	
05	<u>_</u>	3		3	3	2		2		3	1	2
COs / PSOs		PSO1			PSO2					PSC	03	
CO1		1			3					2		
CO2		3			3					3	1	
CO3		3			2					2		
CO4		2			3					2		
CO5	4 60	3		<b>T</b> ¹ 1 A	3	1 1				2		
3/2/1 indicates Str	ength of C	orrelati	on 3-1	11gh, 24	- Medium,	1-Low						
Category	Program Core Program elective Humanities and social Science Skill enhancing elective linter Disciplinary/Allia d Skill Component Skill Component d Others											
				~								

SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/ Lb/ ETL
HBCF22OE2	DATA MINING	3	3	0/0	0/0	Ту

#### **UNIT-I**

DATA WAREHOUSING: Introduction - What is a Data Warehousing-Definition- Data Warehouse Vs Database – Advantage and Disadvantage of Data Warehousing - Data Warehousing Architecture – Dimensional Modelling – Categorization of Hierarchies – Aggregate Function.

#### **UNIT-II**

OLAP: OLAP Operations - Data Cube: A Multidimensional Data Model - OLAP Server - ROLAP - MOLAP - Cube Computation.

#### UNIT-III

DATA MINING: Introduction – What is a Data Mining- Definition-KDD vs Data Mining- DBMS vs DM-Other Related Areas-DM Techniques-Other Mining Problems-Issues and Challenges in DM-DM Application areas.

#### **UNIT-IV**

ASSOCIATION RULES: Introduction-What is an Association Rule-Methods to discover Association Rules- APriori Algorithm- DECISION TREES: What is a Decision Tree-Tree Constructing Principle- Best Split-Decision Tree Construction Algorithm-CART-ID3-C4.5.

### **UNIT-V**

WEB MINING: Introduction-Web Mining -Web content Mining- Web Usage Mining- Text Mining- Unstructured Text.

#### **Total Number of Periods : 45**

#### **TEXT BOOK:**

1. Arun K Pujari, Data Mining Techniques, Universities Press, Fourth Edition 2017.

#### **REFERENCE BOOKS:**

- 1. Insight Into Data Mining Theory And Practice By K.P.Soman Shyam Diwakar V.Vijay, PHI, Publication.
- 2. Data Warehousing, Data Mining And Olap By Alex Berson And Stephen J.Smith, TMH Publication.

EDUCATIONAL AND RESEARCH INSTITUTE	At NAAC
University with Graded Autonomy Status	
(An ISO 21001 : 2018 Certified Institution)	
Periyar E.V.R. High Road, Maduravoyal, Chennai-95. Tamiinadu, India.	

9 Hrs

# 9 Hrs

### 9 Hrs

9 Hrs



Subject Code: HBCF22OE3	Subject	Name : INTR	ODUCTIO	N TO Io1	г		C	L	S	T/ .Lr	P/R	Ty/ Lb/ ETI
	Prerequ	isite NII					3	3		0/0	0/0	
L : Lecture T :	Tutorial	S.Lr : Sup	ervised Le	arning P	: Project I	R : Resea	rch C	C: Cred	its	0/0	0/0	Ty
Ty/Lb/ETL : T	heory/La	b/Embedded	d Theory a	nd Lab	5							
OBJECTIVES	5:											
• To study f	fundamei	ntal concepts	s of IoT.									
• To unders	tand role	s of sensors	in IoT									
• To learn	different	protocols us	sed for IoT	design	1							
• To be fan	niliar wit	h data hand	ling and an	alytics to	ols in lol							
• 1 o unders	tand the	$\frac{10111}{15}$	$\frac{1}{2}$ $\frac{1}{5}$	iomains o	of Industry.							
	Unders	tand the vari	<u>3-3)</u> ious concei	nts termi	nologies ar	nd archite	ecture	e of Io	Γ svs	tems		
CO2	Use ser	sors and act	tuators for	design of	ToT	ia areina	Jeture	01 101	595	terris.		
CO3	Unders	tand and apr	olv various	protocol	s for design	of IoT s	svster	ns				
CO4	Use var	ious technic	jues of data	a storage	and analyti	cs in IoT						
CO5	Unders	tand APIs to	connect I	oT related	technolog	ies						
Mapping of Co	urse Out	comes with	Program	Outcome	s (POs)	·						
COs/POs	PO1	PO2	PO3	PO4	PO	5 F	<b>PO</b> 6	P	07	POS	3	PO9
CO1	3	2	2	2	1		2		1	1		2
CO2	3	2	3	2	1		2	1		3		3
CO3	3	2	3	2	3		3		2	2		3
CO4	3	2	3	2	2		3		3	2		3
CO5	3	2	2	2	2		3		2	2		3
COs / PSOs		PSO1			PSO2					PSO3		
CO1		2			2					1		
CO2		3			3					3		
CO3		3			3					3		
CO4		3			3					3		
CO5	<u> </u>	3			3	-				3		
3/2/1 indicate	s Strengt	n of Correla	ition 3-F	lign, 2- IV	ledium, 1-l	.ow						
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter Disciplinary/Allie	q	Skill Component		Practical /Project/internship	Others	
				~								

С L **T**/ P/R Ty/ Subject Code: Subject Name : S.Lr Lb/ETL HBCF22OE3 **INTRODUCTION TO IOT** 3 0/0 3 0/0Тy 9 HRS

#### **UNIT I: Fundamentals of IoT**

History of IoT-Introduction, Characteristics of IoT- Architecture of IoT, Physical & Logical Design of IoT-Enabling Technologies in IoT-IoT frameworks.

#### **UNIT II: Sensors Networks**

Definition-Types of Sensors-Types of Actuators, Examples and Working-IoT Development Boards: Arduino IDE and Board Types-RaspberryPi Development Kit-RFID Principles and components-Wireless Sensor Networks: History and Context, The node, Connecting nodes, Networking Nodes.

#### **UNIT III: Wireless Technologies for IoT**

WPAN Technologies for IoT: IEEE 802.15.4, Zigbee, HART, NFC, Z-Wave, BLE, Bacnet, Modbus-IP Based Protocols for IoT IPv6, 6LowPAN, RPL, REST, AMPQ, CoAP, MQTT-Edge connectivity and protocols.

#### **UNIT IV: Data Handling& Analytics**

Introduction-Types of data-Characteristics of Big data-Data handling Technologies-Flow of data-Data acquisition-Data Storage-Introduction to Hadoop-Introduction to data Analytics-Types of Data analytics-Local Analytics-Cloud analytics.

#### **UNIT V: Applications of IoT**

Home Automation-Smart Cities- Energy- Retail Management- Logistics-Agriculture-Health and Lifestyle-Legal challenges- IoT design Ethics-IoT in Environmental Protection.

#### **TEXT BOOK :**

1. Hakima Chaouchi, — "The Internet of Things Connecting Objects to the Web" ISBN : 978-1-84821-140-7, Wiley Publications

Total no. of Hours: 45

2. Olivier Hersent, David Boswarthick, and Omar Elloumi, - "The Internet of Things: Key Applications and Protocols", WileyPublications

3. Vijay Madisetti and ArshdeepBahga, — "Internet of Things (A Hands-on-Approach)", 1 st Edition, VPT, 2014.

4. J. Biron and J. Follett, "Foundational Elements of an IoT Solution", O'Reilly Media, 2016.

5. Keysight Technologies, "The Internet of Things: Enabling Technologies and Solutions for Design and Test", Application Note, 2016.

#### **REFERENCE BOOK:**

1. Daniel Minoli, — "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications

2. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press

# 9 Hrs

#### 9 Hrs

#### 9 Hrs

# 9 Hrs

# **EDUCATIONAL AND RESEA** INSTITUTE



Subject Code: HBCF220F4	Sul	bject Name	: INTR BIG DA	RODUCT TA	TION TO	C	L	S	T/ .Lr	P/I	R T I	Гу/ b/
											E	TL
	Prerequ	uisite: NIL				3	3	(	0/0	0/0	) '	Ту
L : Lecture T :	Tutorial	S.Lr : Su	pervised L	earning	P : Project	R : Resear	rch C:	Cred	its			
Ty/Lb/ETL : T	heory/La	ab/Embedde	ed Theory	and Lab								
OBJECTIVES	CTIVES : To study the basic technologies that forms the foundations of Big Data											
• To stu	udy the basic technologies that forms the foundations of Big Data.											
To und	lerstand	the specialized	zed aspect	s of big d	lata includii	ng big data	appli	cation	i, and	big d	ata analy	ytics.
COURSE OU	TCOM	ES (COs) :	(3-5)	6	1 . 11	• •						
COI	Describe big data and use cases from selected business domains											
CO2	Explain	n NoSQL bi	ig data ma	nagemen	t							
CO3	Install,	contigure,	and run H	adoop an	a HDFS							
CO4	Pertorn	n map-redu	ce analyti	cs using l	Hadoop.	duo	f		d a 4 -			
CO5	Use Ha	idoop relate	d tools su	ch as HB	ase, Cassan	dra, and H	ive to	r big	data a	inalyti	ICS	
Mapping of Co	ourse O	utcomes wi	th Progra	m Outco	omes (POs)				-	D07	DOP	DOO
COS/POS			02	<u>PO3</u>	P04 2	P05				<u>PO/</u>	P08	PO9 1
	3	3	)	3	2	3		<u> </u>		1	1	1
CO2	3	2		2	3	3		3		1	1	2
C03	3	2		3	3	2		<u> </u>		2	1	2
C04	3		,	3	3	2		2		2	1	3
	5		,	3	3	4		5		4		3
COs / PSOs		PSO1			PSO2				1	<b>PSO3</b>		
CO1		1			3					3		
CO2		1			3					3		
CO3		2			2					3		
CO4		3			3					2		
CO5		3			3					3		
3/2/1 indicates	Strengt	th of Corre	lation 3	- High, 2	- Medium,	1-Low						
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter Disciplinary/Allied	Skill Component		Practical	/Project/internship	Others	
				~								

С **T**/ P/R L Ty/ **SUBJECT** S.Lr Lb/ SUBJECT NAME CODE ETL HBCF22OE4 INTRODUCTION TO BIG DATA 3 3 0/00/0 Ty

#### **UNIT I – INTRODUCTION**

What is big data, why big data, convergence of key trends, unstructured data, industry examples of big data, web analytics, big data and marketing, fraud and big data, risk and big data, credit risk management, big data and algorithmic trading, big data and healthcare, big data in medicine, advertising and big data, big data technologies, introduction to Hadoop, open source technologies, cloud and big data, mobile business intelligence, Crowd sourcing analytics, inter and trans firewallAnalytics

#### UNIT II – NoSQL

Introduction to NoSQL, aggregate data models, aggregates, key-value and document data models, relationships, graph databases, schemaless databases, materialized views, distribution models, sharding, master-slave replication, peer-peer replication, sharding and replication, consistency, relaxing consistency, version stamps, map-reduce, partitioning and combining, composing map-reduce calculations.

#### **UNIT III : Hadoop**

Data format, analyzing data with Hadoop, scaling out, Hadoop streaming, Hadoop pipes, design of Hadoop distributed file system (HDFS), HDFS concepts, Java interface, data flow, Hadoop I/O, data integrity, compression, serialization, Avro, file-based data structures

#### **UNIT IV : Map Reduce**

Map Reduce workflows, unit tests with MRUnit, test data and local tests, anatomy of Map Reduce jobrun, classicMap-reduce, YARN, failures inclassicMap-reduce and YARN, jobscheduling, shuffleand sort, task execution, Map Reduce types, input formats, output formats.

#### UNIT V Big data Analysis

Hbase, data model and implementations, Hbase clients, Hbase examples, praxis. Cassandra, Cassandra data model, Cassandra examples, Cassandra clients, Hadoop integration, Hive, data types and file formats, HiveQL data definition, HiveQL data manipulation, HiveQL queries.

#### **TEXT BOOKS:**

- 1. Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning, Raj kamal, Preeti Saxena, McGraw Hill, 2018.
- Big Data, Big Analytics: Emerging Business intelligence and Analytic trends for Today's Business, Michael Minelli, Michelle Chambers, and AmbigaDhiraj, John Wiley & Sons, 2013

### **REFERENCE BOOKS:**

- 1. Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013
- 2. Hadoop: The Definitive Guide, Tom White ,Third Edition, O'Reilley, 2012.
- 3. Hadoop Operations, Eric Sammer, O'Reilley, 2012.
- 4. Programming Hive, E. Capriolo, D. Wampler, and J. Rutherglen, O'Reilley, 2012.
- 5. HBase: The Definitive Guide, Lars George, O'Reilley, 2011.
- 6. Cassandra: The Definitive Guide, Eben Hewitt, O'Reilley, 2010.
- 7. Programming Pig, Alan Gates, O'Reilley, 2011.

#### B.Sc. (Information Science and Cyber Forensics)-Regulation 2022-2023

# 9 Hrs

9 Hrs

### 9 Hrs

**Total Hours: 45** 

9 Hrs

#### 9 Hrs s of big





Subject Code: HBCF22OL1		Subject Nai	ne DATA S	SCIENCI	E LAB	C	L	T/ S.Lr	P/R	Ty/ Lb/			
							_			ETL			
I. J. a star a T. T.	Prere	equisite: NIL			Destant D - I	2	0	0/0	6/0	Lb			
Ty/I b/FTI · Theo	toriai ww/Lal	S.Lr : Supe	Theory and	ning P∶F ∐ab	Toject R : I	Researc	n C: C	realts					
OBJECTIVES :	л у/ Ца	J/ Linocuucu	Theory and	Lau									
The course shou	ıld en:	able the stu	dents to:										
Unders	tand t	he R Progra	amming La	nauade.									
Exposu	ire on	Solving of a	data scienc	ce proble	ms.								
<ul> <li>Underst</li> </ul>	and T	he classific	ation and F	Rearessia	on Model								
COURSE OUTC	OURSE OUTCOMES (COs) : ( 3- 5)												
CO1	Mak	te use of the	R Program	nming ar	plications	for dat	a scie	ence					
CO2	Perf	orm descrip	tive Statis	tics on th	e benchma	rk data	sets.						
CO3	Rea	ding and W	riting Diffe	erent type	es of Datas	ets							
CO4	Pres	ent and inte	erpret data	using vis	visualization packages								
CO5	Perf	orm correlat	tion and re	gression	analytics o	n stand	lard d	lata sets					
Mapping of Cour	rse Ou	tcomes with	Program	Outcomes	s (POs)								
COs/POs	PO	PO2	PO3	PO4	PO5	P	06	<b>PO7</b>	PO8	PO9			
	1												
<u>CO1</u>	2	2	3	2	2		2	3	2	3			
<u>CO2</u>	2	1	2	3	2		1	3	2	1			
<u>CO3</u>	$\frac{2}{2}$	2	2	$\frac{2}{2}$	1		1	3	1	2			
<u>CO4</u>	2	2	3	3			<u>1</u> 2	3		2			
105	2	<u>L</u>	3	3	<u> </u>		2	3	1	3			
COs / PSOs		PSO1			PSO2				PSO3				
CO1		3			1				2				
CO2		3			1				2				
<u>CO3</u>		3			2				2				
<u>CO4</u>		3			2				$\frac{2}{2}$				
CU5 3/2/1 indicator St	nonath	3 of Corrola	tion 2 U	ah 2 M	J June 1 L				3				
5/2/1 mulcates St	rengu	I OI COTTEIA		ign, 2- Mie		JW							
Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter Disciplinary/Allied		Skill Component	Practical /Project/internship	Others			
									•				



SUBJECT CODE	SUBJECT NAME	С	L	T/ S.Lr	P/R	Ty/Lb/ ETL
HBCF22OL1	DATASCIENCE LAB	3	3	0/0	0/0	Ту

#### LIST OF EXPERIMENTS

#### 1. R AS CALCULATOR APPLICATION

a. Using with and without R objects on console

b. Using mathematical functions on console

c. Write an R script, to create R objects for calculator application and save in a specified location in disk.

#### 2. DESCRIPTIVE STATISTICS IN R

a. Write an R script to find basic descriptive statistics using summary, str, quartile function on mtcars & cars datasets.

b. Write an R script to find subset of dataset by using subset (), aggregate () functions on iris dataset**3. READING AND WRITING DIFFERENT TYPES OF DATASETS** 

a. Reading different types of data sets (.txt, .csv) from Web and disk and writing in file in specific disk location.

b. Reading Excel data sheet in R. c. Reading XML dataset in R.

#### 4. VISUALIZATIONS

a. Find the data distributions using box and scatter plot.

b. Find the outliers using plot.

c. Plot the histogram, bar chart and pie chart on sample data.

#### 5. CORRELATION AND COVARIANCE

a. Find the correlation matrix.

b. Plot the correlation plot on dataset and visualize giving an overview of relationships among data on iris data.

c. Analysis of covariance: variance (ANOVA), if data have categorical variables on iris data.

#### 6. REGRESSION MODEL

Import a data from web storage. Name the dataset and now do Logistic Regression to find out relation between variables that are affecting the admission of a student in a institute based on his or her GRE score, GPA obtained and rank of the student. Also check the model is fit or not. Require (foreign), require (MASS). Total Hrs: 45

**Reference Books:** Yanchang Zhao, "R and Data Mining: Examples and Case Studies", Elsevier, 1st Edition, 2012

Web References: 1.http://www.r-bloggers.com/how-to-perform-a-logistic-regression-in-r/

2.http://www.ats.ucla.edu/stat/r/dae/rreg.htm

3.http://www.coastal.edu/kingw/statistics/R-tutorials/logistic.html

4. http://www.ats.ucla.edu/stat/r/data/binary.csv

SOFTWARE AND HARDWARE REQUIREMENTS : SOFTWARE: R Software , R Studio Software HARDWARE: Intel Desktop Computers with 4 GB RAM



Subject Code:	S	Subject Nan	ne DATAM	NING LA	B	С	L	T /S	P 7	「y Lb/ET		
HBCF22OL2								.L	RI	-		
	Drorogu	igito, NII				2	0	r	6/0 I	h		
I · Locture T ·	Tutorial	$\frac{11}{5}$ S I r · Sup	orvised Lee	rning D	Drojact D	• <b>D</b> or	U U	0/0	0/0	-0		
$T_{\rm V}/I_{\rm b}/FTI_{\rm c}$	heory/La	b/Embedded	1 Theory ar	uning 1. nd I.ab	. Hoject K		search	. Cicuits				
OBJECTIVES	$\frac{11001 \text{ y/La}}{\text{S}}$	io/ Linoeddee	1 Theory an									
On successful	completi	on of the co	urse the st	udent sho	ould have to	o get	hands o	n experien	ce in dev	eloping		
applications using data mining tool												
COURSE OU	TCOME	ES (COs) : (	3- 5)									
CO1	To understand Preprocessing, Data Transformation and Filtersusing WEKA Tool											
CO2	To Sel	ect the Attr	ibutes on g	given dat	taset using	WE	KA					
CO3	To imp	plement the	Multilaye	r Percep	tron Algor	rithm	& Bay	es algorith	m to sol	ve		
	classif	classification problem										
CO4	To use	Cluster Al	gorithm to	solve U	nsupervise	ed Te	echniqu	es				
CO5	To sele	ect the featu	res on giv	en datase	et to impro	ove th	ne mode	eling				
Mapping of C	Course Outcomes with Program Outcomes (POs)											
COs/POs	<b>PO1</b>	PO2	PO3	PO4	PO5		PO6	<b>PO7 PO8 PO9</b>				
CO1	1	2	2	2	2		2	3	2	1		
CO2	1	1	2	3	2		1	3	2	1		
CO3	2	2	2	2	1		1	3	1	3		
CO4	2	1	3	3	1		1	3	1	3		
CO5	2	2	3	3	2		2	3	1	3		
		DCO1			DCO1				DCO2			
COS/PSOS		P501			PS02				PS03			
<u>CO1</u>		3			1				2			
<u>CO2</u>		3			1				2			
<u>CO3</u>		3			2				2			
<u>CO4</u>		3			2				2			
3/2/1 indicates	s Strengt	J h of Correls	ation 3- F	Tigh, 2- N	Jedium, 1.	-Low			3			
or an a marcutes					50		_					
gory	m Core	_	ties and soci	ective	enhancing		inary/Allied	omponent	al t/internship			
Cate	Progra	Program elective	Humani Science	Open El	Skill elective	Inter	Discipl	Skill C		Others		
									~			



SUBJECT CODE	SUBJECT NAME	С	L	T /S.Lr	P/R	Ty /Lb/ETL
HBCF22OEL02	DATA MINING LAB	2	0	0/0	6/0	Lb

**Objective :** On successful completion of the course the student should have to get hands on experience in developing applications using data mining tool

- Preprocessing

   A. Data type conversion
   B. Data Transformation
- Filters

   A. Replace Missing Values B. Add Expression
- 3. Feature Selection Select attributes A. Filter B. Wrapper C. Dimensionality Reduction
- Supervised Techniques Classifier A. Function Multilayer Perceptron
- 5. Classifier Bayes
  - A. Native Bayers Rule
  - B. ZeroR
- 6. UnSupervised Techniques Classifier
  - A. Partitioned Algorithm
  - B. Hierarchical Algorithm
  - C. Supervised Algorithm
- 7. Dataset Based Test Algorithm
- 8. Knowledge Flow
  - A. Feature Selection
  - B. Clustering
- 9. Knowledge Flow Classification

**Total Hrs: 45** 



# HONORS DEGREE SEMESTER VII



Subje	ct Code :	Subject Na RE	ame : SEAR(	CH ME	гноро	DLOGY		С	L	T/SL	r P/R	Ty/Lb /ETL/ EVL	
HBCC	22003	Prerequisi	te : Noi	ne				3	3	0/0	0/0	Ту	
L : Lectu	ire T : Tuto	rial SLr : Su	pervise	d Learni	ng P : Pr	oject R :	Resea	rch C: Cre	dits				
T/L/ETL	: Theory /	Lab / Embe	dded Tł	neory ar	nd Lab								
OBJECT	IVES :												
• Des	ign and foi	mulation o	f resea	rch pro	blem.								
• Ana	lyze resea	rch related	inform	ation a	nd statis	stical me	thods	in resear	ch.				
Carr	y out rese	arch proble	em indi	vidually	in a pe	rfect scie	entific	method	ماريمة				
Cop	yright, and	l Trademar	ent app ks	nication	s proce:	sses, Pa	lient S	earch, an	a vanc		S OF IPR,		
COURSE		S (Cos) : (3	– 5)										
Student	completing the course were able to												
CO1	Design and Formulation of research problem.												
CO2	Analyze research related information and statistical methods in research.												
CO3	Carry out research problem individually in a perfect scientific method												
CO4	Understar	nd Patent Fi	ling app	lication	Process.								
CO5	Patent Se	arch and va	rious to	ols used									
Mappin	g of Course	Outcomes	with Pr	ogram (	Dutcome	es (POs)							
COs/P	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PSO1	PSO2	PSO3	
Os													
CO1	3	3	3	3	2	2	3	3	3	3	3	2	
CO2	3	2	1	3	3	1	1	1	1	1	1	2	
CO3	3	3	2	1	2	2	3	3	3	1	2	2	
CO4	3	3	2	2	1	2	2	2	2	2	-	2	
CO5	3	3	3	3	3	2	3	3	3	2	1	2	
Category	Program Core	rogr m lecti ad social cience brancing enhancing elective fractical Practical /Project/i nternship							nternship	Others			
			- <u>-</u>									<u> </u>	

Subject Code :	Subject Name :	С	L	T/SLr	P/R	Ty/Lb
HBCC22003	RESEARCH METHODOLOGY				-	/EIL/EVL
	Prerequisite : None	3	3	0/0	0/0	Ту
L : Lecture T : Tutori	al SLr : Supervised Learning P : Project R : Rese	arch C	: Credit	:S		
T/L/ETL : Theory / La	ab / Embedded Theory and Lab					

#### **Course objective:**

- Learn the meaning of interpretation, techniques of interpretation, precautions is to be taken in interpretation for research process,
- Application of statistical methods in research.
- Learn intellectual property rights and its constituents.

#### Unit 1

Introduction to research, Definitions and characteristics of research, Types of Research, Research Process, Problem definition, Objectives of Research, Research Questions, Research design, Quantitative vs. Qualitative Approach ,Building and Validating Theoretical Models, Exploratory vs. Confirmatory Research, Experimental vs. Theoretical Research, Importance of reasoning in research.

#### Unit 2

Problem Formulation, Understanding Modeling & Simulation, Literature Review, Referencing, Information Sources, Information Retrieval, Indexing and abstracting services, Citation indexes, Development of Hypothesis, Measurement Systems Analysis, Error Propagation, Validity of experiments, Statistical Design of Experiments, Data/Variable Types & Classification, Data collection, Numerical and Graphical Data Analysis: Sampling, Observation, Interpretation of Results.

#### Unit 3

Statistics: Probability & Sampling distribution, Estimation, Measures of central Tendency, Arithmetic mean, Median, Mode, Standard deviation, Co efficient of variation (Discrete serious and continuous serious), Hypothesis testing & application, Correlation & regression analysis, Orthogonal array, ANOVA, Standard error, Concept of point and interval estimation, Level of significance, Degree of freedom, Analysis of variance, One way and two way classified data, 'F'test.

#### Unit 4

Preparation of Dissertation and Research Papers, Tables and illustrations, Guidelines for writing the abstract, introduction, methodology, results and discussion, conclusions sections of amanuscript. References, Citation and listing system of documents.

#### Unit 5

Intellectual property rights (IPR) patents copyrights Trademarks Industrial design geographical indication. Ethics of Research Scientific Misconduct Forms of Scientific Misconduct. Plagiarism, Unscientific practices in thesis work, Ethics in science.

#### **Text Book:**

- 1. K. S. Bordens, and B. B.Abbott, "Research Design and Methods A Process Approach", 8th Edition, McGraw Hill,2011.
- 2. C. R. Kothari, "Research Methodology Methods and Techniques", 2nd Edition, New Age International Publishers

#### B.Sc. (Information Science and Cyber Forensics)-Regulation 2022-2023

# 9 Hrs

# 9 Hrs

#### 9 Hrs

#### 9 Hrs

9 Hrs

### **Total Hrs: 45**



Subject Cod HBCF2201	le: 3	Sub ADV	Subject Name :CLT/S.LrP/RTyADVANCED DIGITAL FORENSICSCLT/S.LrP/RTy									Ty/Lb/ETL			
/HMCF220	02	Prer	equisite:	NIL						4	3	1		0	Ту
L : Lecture	Γ : Tuto	orial S	Lr : Su	pervised	Learnin	P:P	rojec	t R : R	esearcl	h C:	Cred	its			
Ty/Lb/ETL	: Theor	y/Lab/l	Embedde	ed Theor	y and La	ab	5								
OBJECTIV	<b>ES</b> :	•		•	•										
• To 1	understa	and fore	ensic sof	tware an	d hardw	vare									
• To 1	understa	and the	window	s and lin	ux file s	ystems									
• To §	gain ins	ight da	ta recove	ery tools		5									
COURSE O	RSE OUTCOMES (COs) : ( 3- 5)														
CO1	CO1 Learns data acquisition techniques and data retrieval techniques in a forensically sound manner so that the evidence can be presented in court.														
CO2	Students will learn different techniques and procedures that enable them to perform a digital investigation, analysis of physical storage media and perform volume analysis and acquisition of artifacts that reside in hard disks and random access memory														
CO3	Apply forensi	the skill c evider	ls to perf nces and a	orm foren analyze W	sic disk vindows	image a event log	nalys gs to	is and re answer c	porting ritical o	and quest	exantions.	nining w	vindo	ws reg	istry to uncover
CO4	CO4 students will be able to perform live analysis, capture volatile data, make images of media, analyze files systems, analyze network traffic, analyze files, perform memory analysis, and analyze malware all on a Linux system														
CO5	Learn t	ools tha	t are used	d for data	recovery	T									
Mapping of	f Cours	e Outc	omes wi	ith Prog	ram Ou	tcomes	(PC	s)							
COs/Pos	P	01	PO2	P	03	PO4		PO5	P	06	P	07	PO	<b>)8</b>	PO9
CO1		3	1		1	1							-	-	2
CO2			3		2	2		2		2			-	-	3
CO3			2		3			2		3		3	1	1	
CO4			3		3	3		2		3		3		3	
CO5 Monning of	Course	<u>3</u> Outeen		Duagnam	 Specifie					3			-	-	3
COs/PSOs	Course	<u>Uutcon</u> I	PSO1	Frogram	specific	Outcon	PS	02						PSO3	
CO1			3					1						1	
CO2								3						2	
CO3								3						3	
CO4					1										
CO5			3				-	-						1	
3/2/1 indicat	es Stren	gth of (	Correlati	on 3-H	ligh, 2- N	Aedium,	, 1-L	ow2							
ategory	5	Program Core	Pro gra	Humanitie	Open Elective	Skill enhanci	ng	Inter Disciplin	ary/Allie d	Skill	Compon	Practical /Project	/interns	hip	Others
	$\checkmark$	,													

Subject Code:	Subject Name	С	L	T/S. Lr	P/R	Ty/Lb/ ETL
HMCF220137 HMCF22002	ADVANCED DIGITAL FORENSICS	4	3	1	0	Ту

TITUTE

#### **Unit I - Digital Forensics**

Forensic Software and Hardware - Analysis and Advanced Tools - Forensic Technology and Practices -Forensic Ballistics and Photography, Face, Iris and Fingerprint Recognition, Audio Video Analysis.

#### Unit II - Disk and file system analysis

Media analysis concepts - the sleuth kit - partitioning and disk layouts - special containers - hashing carving – forensic imaging

#### Unit III - Windows systems artifacts

Windows file systems - Registry - event logs - prefetch files - shortcut files - windows executables

#### Unit IV - Linux systems artifact

linux file systems - linux boot process and services - linux system organization and artifacts - user accounts - home directories - logs - scheduling tasks

#### Unit V - Overview of various Tools and Data Recovery

Overview of tools that are used for recovery of deleted files and deleted partitions – tools used in the industry and Best Practices

#### **TEXT BOOKS:**

- 1. Cory Altheide, Harlan CarveyDigital Forensics with Open Source Tools: Using Open Source Platform Tools for Performing Computer Forensics on Target Systems: Windows, Mac, Linux, Unix, etc, Syngress; 1 edition (29 March 2011)
- 2. The basics of Digital Forensics by John Sammons, 2nd Edition, Elsevier Publication, 2012
- 3. Windows Forensics Analysis Tool kit by Harlan Carvey, 3rd Edition, Syngress Publication, 2007

#### **REFERENCE BOOKS:**

- 1. Kevin Mandia, Chris Prosise, Matt Pepe, "Incident Response and Computer Forensics", Tata McGraw -Hill, New Delhi, 2006.
- 2. "Understanding Forensics in IT ", NIIT Ltd, 2005.

12 Hrs

#### 12 Hrs

**Total Hrs: 60** 

### 12 Hrs

12 Hrs



Subject Code HBCF22014	le: Subject Name : A/ NETWORK TROUBL AND SECURITY				OOTING	r	С	L	T/S.Lr	P/R	Ty/Lb/ETL			
HMCF22003	3 Pre	requisite:	NIL				4	3	1	0	Ту			
L : Lecture T Ty/Lb/ETL :	: Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits y/Lb/ETL : Theory/Lab/Embedded Theory and Lab													
<ul> <li>OBJECTIVES :</li> <li>To prepare student in finding, isolating, and troubleshooting network faults in the fastest way possible.</li> <li>To impart the functionality of layered network architecture.</li> <li>Explain students how to design networks and protocols for diverse situations</li> </ul>														
COURSE O	UTCON	IES (COs	):(3-5)						1 1					
CO1	Analyse the requirements for a given organizational structure and select the most appropriate networking architecture and technologies													
CO2	Analyse, specify and design the topological and routing strategies for an IP based networking infrastructure													
CO3	Underst	tand variou	is protocol	s for ne	etwork see	curity to	protec	ct again	st the thre	ats in 1	the networks.			
CO4	Compare and contrast technologies in networking and security designed to solve similar problems													
CO5	CO5 Students will know how to administer a small, medium, or large network infrastructure including server and node management													
Mapping of	Course	Outcomes	with Prog	gram (	<b>Jutcomes</b>	(POs)								
COs/POs	PO1	PO2	<u>PO3</u>	PO	<u>PO4</u> PO5		<u>206</u>	PO7	<b>PO8</b>		PO9			
		3	3		3		3		1	_				
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C03	3	Z	2	2			2				3			
C04 C05			3	3			3							
CO5 Manning of	Course	 Outcomes	 with Proc	Trom S	- necific ()	utcome	ן איג ( <b>דור</b>	<u>ງ</u> ຄ)						
COs/PSOs	Course	PSO1	with 110g		PSO2	ucom		<b>J</b> S)	PSC	)3				
CO1								2						
			3											
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CO2 CO3		3			3				2					
CO3 CO4		 3 			3  3				2  2 					
CO2 CO3 CO4 CO5		 3  3			3  3 				2  2  3					
CO2 CO3 CO4 CO5 3/2/1 indicat	es Stren	 3  3 gth of Co	rrelation	3- Hiş	3  3  gh, 2- Me	dium, 1	-Low		2  2  3					
CO2 CO3 CO4 CO5 3/2/1 indicat	es Stren Program Core	 3  3 gth of Con gth of Con	Humanities and social Science	Open Elective	Skill  gh, 2- Me	Inter Disciplinary/A <b>t</b>	-Low	component	Practical /Project/inter	Others				

Subject Code:	Subject Name	С	L	T/S.L r	P/ R	Ty/Lb/E TL
HBCF22014 / HMCF22003	NETWORK TROUBLE SHOOTING AND SECURITY	4	3	1	0	Ту

#### **Unit I – Introduction**

Seven layers in action –Troubleshooting Layer 3 Problems- Network security model classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition Techniques, steganography).– Topology – Cabling - Networking Industry Standards IEEE - Ethernet topology.

Troubleshooting Network Performance Issues -Baseline Network Performance-Collect Network Device Performance Metrics - Switch/Router CPU Utilization - Switch/Router Memory Utilization - Interface/Bandwidth Utilization.

#### Unit II - TCP/IP Basics & Routing

Introduction to MAC address - Introduction to IP address - Classes of IP address - Need for subnetting -Basics of IPV6 - Static IP addressing, Dynamic IP addressing, Special IP addresses - Tools for Troubleshooting IP Problems -How routers work - Routing tables - Network Address Translation - Dynamic routing – distance vector, link state – EIGRP – OSPF - Troubleshooting Hot Standby Router Protocol (HSRP)-Dynamic routing – Working with routers - Connecting to routers, basic router configuration, router problems.

Troubleshooting Bandwidth and Traffic - NetFlow -Applications-Protocols-Troubleshooting Configuration Issues-Tools for Network Troubleshooting.

#### **Unit III - Packet Switched Connection**

Types of connections – Circuit switched, Packet switched - Why packet switched is preferred - Types of protocols and need for protocols - Packet switched Protocols - TCP/ IP - RSA Algorithm - Knapsack Algorithm - Blowfish Algorithm - General IP Troubleshooting Theory and Suggestions

#### **Unit IV - TCP/IP Applications**

Origins of TCP/ IP and evolution of Internet - IP Layers Vs OSI - IP number concepts - Network address -Classes of Networks-Subnet masking - Static and dynamic IP numbers - UDP - Establishing a TCP session (Three way handshake) - Troubleshooting Physical Connectivity Problems-Name to address translation -Domain Name System - Transport layer protocols –TCP, UDP, ICMP, IGMP – the power of port numbers registered ports, connection status, rules for determining good vs. bad communications – Common TCP/IP applications - the world wide web, Telnet, Email, FTP, Internet applications

#### **Unit V - Network Naming**

Introduction to Domains and Work Groups - Network naming - DNS - how DNS works, DNS servers

B.Sc. (Information Science and Cyber Forensics)-Regulation 2022-2023

### 12 Hrs

#### 12 Hrs

#### 12 Hrs

12 Hrs

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Troubleshooting DNS – WINS – Configuring WINS clients, Troubleshooting WINS – Diagnosing TCP/IP Networks - Introduction to ADS (Active Directory Service) - File sharing within network - Understanding DHCP - Introduction to Mail Exchange server and ISA server - Network operating system - Client Server applications - Peer to Peer Applications - Measuring performance - Monitoring tools.

#### **TEXT BOOKS:**

#### **Total Hrs: 60**

- 1. Mike Meyers, "CompTIA Network+ Certification All-in-One Exam Guide", McGraw Hill Education; 5th edition, ISBN-10: 125902553, 2017
- 2. Dr. William Stallings, "Cryptography and Network Security", 7th Edition, Pearson Education Publication, 2017
- 3. Tanenbaum, "Computer Networks", 5e (5th Edition), Pearson Education India; 5 edition (2013)

#### **REFERENCE BOOKS:**

- 1. Todd Lammle, "Comptia Network+ Study Guide"; Wiley, Third edition, ISBN-10: 8126556412, 2015
- 2. Todd Lammle, "CCNA Routing and Switching Complete Study Guide", Wiley; Second edition (2016)
- 3. Wm. Arthur Conklin, Chuck Cothren, Roger Davis, Dwayne Williams, Greg White, "CompTIA Security+ All-in-One Exam Guide", McGraw-Hill Education; 4 edition (16 December 2014)
- 4. William Stallings, "Cryptography and Network Security", Pearson Education, 6 th Edition, SBN 10: 0133354695, 2013.
- 5. AtulKahate, "Cryptography and Network Security", McGraw Hill Education India (Pvt Ltd),2nd edition, ISBN 10: 0070151458, 2009.
- 6. Charlie Kaufman, Radia Perlman, Mike Speciner, "Network Security: Private Communication in a Public World", Prentice Hall, 2 nd edition, ISBN 10: 0130460192, 2002. 4. Charles Pfleeger, Shari Lawrence Pfleeger "Security in computing", Prentice Hall,4th Edition, ISBN 10: 0132390779



Subject Code	:: Subject Name :					C		т	T/SIr	D/D	Tv/I b/FTI	
HBCF22015	S / SECURITY OF CLOUD COMPUTING					C		L	1/5.L1	I/N	IY/LU/EIL	
HMCF2200	4 Prerequisite: NIL					4		3	1/1	0	Ту	
L : Lecture T	L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits											
Ty/Lb/ETL :	//Lb/ETL : Theory/Lab/Embedded Theory and Lab											
OBJECTIV	ES :											
• To g	ive stude	ents an over	view of th	ne field of	f Cloud Co	nputing,	its ena	ablin	g technol	ogies,	main building	
bloc	K 	1		1 1	.1							
<ul> <li>To be familiar with the lead players in cloud</li> </ul>												
COURSEO		$\frac{1}{4} \frac{1}{4} \frac{1}{1} \frac{1}$	$\cdot (3-5)$		u.							
Understand core cloud computing concepts and fundamental principles including standard												
CO1	deliver	v models an	d service	designs.	concepts c	ind Tunid	ament	ur p	rineipies,	meru	ung stundurd	
CO2	Understand standard cloud security network designs and architecture models.											
CO3	Understand the key security and compliance challenges of cloud computing											
CO4	Introduces the various levels of services that can be achieved by cloud											
COT	Unders	tand the res	gulatory re	auireme	nts needed	to secure	data i	in th	e cloud a	nd the	difficulties in	
005	meeting	g those requ	irements.	1								
Mapping of	Course	Outcomes	with Prog	gram Ou	tcomes (PC	Ds)						
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO	7	PO8		PO9	
CO1	3			1					1		2	
CO2	3			2					1		2	
CO3		3	3	2		3	3					
<u>CO4</u>	3										2	
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	<u> </u>				1							
CO2		3		1				3				
CO4								2				
C05		5		2				2				
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EDUCATIONAL AND RESEARCH INSTITUTE DEEMED TO BE UNIVERSITUTE UNIVERSITUTE (An ISO 21001 : 2018 Certified Institution) Perfore Lifek Maduravoya, Chennard-95, Tamilinadu, India.

Subject Code:	Subject Name	С	L	T/S.Lr	P/R	Ty/Lb/ ETL
HBCF22015 HMCF22004	SECURITY OF CLOUD COMPUTING	4	3	1/0	0	Ту

#### **UnitI** - Introduction

Cloud Computing – Network-Centric Computing and Network-Centric Content – Cloud Delivery Models and Defining Attributes – Ethical Issues in Cloud Computing – Cloud Vulnerabilities – Cloud Computing Delivery Models and Services - Amazon Web Services - Evolution of AWS – Google Clouds – Azure and Online Services – Cloud Storage Diversity and Vendor Lock-in – Cloud Computing Interoperability – Service Level Agreements and Compliance Level Agreements – Responsibility Sharing between a User and the CSP – Software Licensing – Major Challenges faced by Cloud Computing – Evolution of Storage Technologies – Storage Models, File Systems and Databases – Distributed File System – General Parallel File System – Google File System - OLTP – Bigtable – Megastore – Storage Reliability at Scale – Disk Locality vs Data Locality – Virtualization – Peer-to-Peer Systems -

#### **UnitII** - Architecture and Process

Data, Thread and Task-Level Parallelism – Parallel Architectures – SIMD Architectures; Vector Processing and Multimedia Extensions – Graphic Processing Units – Speedup, Amdhal's Law and Scaled Speedup – Multicore Processor Speedup – Distributed Systems – Soft Modularity vs Enforced Modularity – Layering and Architecture – Concurrency and Cloud Computing – Communication and Concurrency in Computing – Computational Models – Model for Multicore Computing – Process State – Communication Protocols and Process Coordination – Communication, Logical Clocks and Message Deliver Rules – Runs and Cuts – Threads and Activity Coordination – Critical Sections, Locks, Deadlocks and Atomic Actions – Consensus Protocols – Load Balancing – Transformation of Internet - Interconnection Networks for Computer Clouds – Multistage Interconnection Network – Infiniband and Myrinet – Network Resource Management algorithms – Content Delivery Networks – Vehicular Ad Hoc Networks

#### **Unit III - Cloud Computing Security Fundamentals**

Cloud Delivery Models - Cloud Deployment Models - Cloud Information Security Objectives - Cloud Security Services - Cloud Security Design Principles - Secure Cloud Software Requirements - Cloud Security Policy Implementation - Secure Cloud Software Testing - Cloud Penetration Testing - Cloud Computing and Business Continuity Planning/Disaster Recovery - The CIA Triad - Privacy and Compliance Risks - Common Threats and Vulnerabilities - Cloud Access Control Issues - Cloud Service Provider Risks - Security Policy Implementation - Computer Security Incident Response Team - Virtualization Security Management - Architectural Considerations - Trusted Cloud Computing - Identity Management and Access Control - Access Control - Autonomic Security

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#### 12 Hrs

#### 12 Hrs
# BORA DA BERGARCH INSTITUTE DEMED TO BE UNIVERSITY University with Graded Autonomy Status (An ISO 21001 : 2018 Certified Institution) Priyar EV.R. High Road, Maduravoyal, Chennal-95. Tamilinadu, India.

#### **Unit IV Cloud Computing Security**

Understanding Cloud Computing - The IT Foundation for Cloud - Roots of Cloud Computing - A Brief Primer on Security - Security Architecture - Cloud Is Driving Broad Changes - Cloud Computing: Security Concerns - Assessing Your Risk Tolerance in Cloud Computing - Legal and Regulatory Issues - Security Requirements for the Architecture - Security Patterns and Architectural Elements - Cloud Security Architecture - Planning Key Strategies for Secure Operation - Overview of Data Security in Cloud Computing - Data Encryption: Applications and Limits - Cloud Data Security: Sensitive Data Categorization -Cloud Lock-in

#### **Unit V – Securing Cloud**

Overall Strategy: Effectively Managing Risk - Overview of Security Controls - The Limits of Security Controls - Best Practices - Security Monitoring - Private Clouds - Security Criteria for Ensuring a Private Cloud - Selecting a CSP: Overview of Assurance - Overview of Risks - Security Criteria - Evaluating Cloud Security - Checklists for Evaluating Cloud Security - Metrics for the Checklist - From Architecture to Efficient and Secure Operations - Security Operations Activities

#### **Total Hrs: 60**

#### **TEXT BOOKS:**

- 1. Vic (J.R.) Winkler ,"Securing the Cloud Cloud Computer Security Techniques and Tactics", Syngress is an imprint of Elsevier, ISBN: 978-1-59749-592-9, 2011
- 2. Dan C. Marinescu, "Cloud Computing Theory and Practice", Morgan Kaufmann Elsevier Inc, ISBN: 978-0-12-812810-7, 2018.
- 3. Ronald L. Krutz Russell Dean Vines, "Cloud Security A Comprehensive Guide to Secure Cloud Computing", Wiley Publishing, Inc, ISBN: 978-0-470-58987-8, 2010.

#### **REFERENCE BOOKS:**

- 1. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly
- 2. James E. Smith, Ravi Nair, "Virtual Machines: Versatile Platforms for Systems and Processes", Elsevier/Morgan Kaufmann, 2005.
- 3. Katarina Stanoevska-Slabeva, Thomas Wozniak, SantiRistol, "Grid and Cloud Computing A Business Perspective on Technology and Applications", Springer.
- 4. Ronald L. Krutz, Russell Dean Vines, "Cloud Security A comprehensive Guide to Secure Cloud Computing", Wiley India, 2010.
- 5. RajkumarBuyya, Christian Vecchiola, S.ThamaraiSelvi, 'Mastering Cloud Computing'', TMGH, 2013.GautamShroff,

#### 12 Hrs

#### 12 Hrs



Subject Code:	Subject Name	С	L	T/S.Lr	P/R	Ty/Lb/ ETL
HBCF22I03	MINI PROJECT	2	0	0/0	4/0	IE

Students will have an opportunity to expose their knowledge and talent to make an innovative project. Students are supposed to do innovative projects useful to industries/society in the area of relevant field, inter and multi-disciplinary areas, under the guidance of a staff member. They have to prepare a project report and submit to the department.

At the end of the semester Viva-Voce examination will be conducted by the internal Examiner duly appointed by the Head of the department and the students will be evaluated.



Subject Code:	Subject Name	С	L	T/S.Lr	P/R	Ty/Lb/ ETL
HBCF22I04	INTERNSHIP	1	0	0/0	2/0	IE

Students are supposed to undergo internship in related Industries for a minimum period of 30days cumulatively during the semester. They have to prepare a report on the Internship with a certificate in proof from competent authority in the industry. At the end of the semester Viva-Voce examination will be conducted by the Examiners duly appointed by the Head of the department and the students will be evaluated.



### **SEMESTER VIII**

Subjec Code:	t 2004	Subj	ect Nan	ne: STA	RT UP	STRA	ATAGI	ES	С	L		T/SLr	P/R	Ty/Lb /ETL/EV L
IIDCC2	2004	Prer	equisite	: Nil					3	3		0/0	0/0	Ту
T/L/:T	heory	/LabL:	Lectur	eT:Tuto	rialP:F	Practic	al/Proje	ctR:Re	search	C:Cre	dits			
OBJE	CTIV	E: .		_			_		_		_			
To und	erstan	d new v	venture	creation	opportu	inities,	its resou	irces and	d requi	remen	ts fo	r		
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COUR	SEOU			tort up E	ntorpris	o with	Big Ide	u 2 Gener	ation					
CO1		Dev	ciop a s	tart-up E	merpris	se with	Dig lue		ation.					
CO2		Ana	lyze sta	rt-up cap	ital req	uireme	nt by an	alyzing	legal f	actors.				
CO3		Interpret feasibility Analysis towards funding issues.												
CO4		Access growth stages in new venture and reasons for scaling ventures.												
CO5		Eval	uate fin	ancial st	ability a	and dec	cide on e	expansio	on poss	ibilitie	s.			
Mappi	ng of	Course	e Outco	omes wit	h Prog	ram O	utcome	s(POs)						
COs/P	Os	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO	•	PSO1	PSO2	PSO3
CO1		2	3	3	2	2	3	3	3	3		2	1	2
CO2		2	2	3	2	2	3	3	2	2		2	1	2
CO3		1	2	3	2	1	3	3	3	2		-	2	1
CO4		1	2	3	2	1	3	3	2	2		-	2	2
CO5		1	2	3	2	2	3	3	2	2		-	-	2
1/2/3in	dicate	esStren	gth ofC	orrelati	on1-Hi	gh,2-M	ledium,	3-Low						
Category	/ Basic Sciences Engg.Scie nce Engg.Science Science Science Science Program Core Elective Program Core Elective Program Core Elective Project		Practical Internshi /Project Skill compon		sernships/ Skill Skill	Inter disciplinary								
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Subject Code:	Subject Name: START UP STRATAGIES	С	L	T/SLr	P/R	Ty/Lb /ETL/E VL						
HBCC22004	Prerequisite: Nil	3	3	0/0	0/0	Ту						
T/L/:	T/L/:Theory/LabL:LectureT:TutorialP:Practical/ProjectR:ResearchC:Credits											

#### **Unit I: Start-up opportunities:**

The New Industrial Revolution - The Big Idea -Generate Ideas with Brainstorming- Business Start-up -Ideation- Venture Choices - The Rise of the startup Economy- The Six Forces of Change - The Start-up Equation- The Entrepreneurial Ecosystem- Entrepreneurship in India. Government Initiatives.

#### Unit II: Startup Capital Requirements and Legal Environment:

Identifying Startup capital Resources requirements- Estimating startup cash requirements- Develop financial assumptions- Constructing a Process Map- Positioning the venture in the value chain- Launch strategy to reduce risks- Startup financing metrics- The Legal Environment- Approval for New Ventures- Taxes or duties payable for new ventures.

#### Unit III: Startup Financial Issues: Feasibility Analysis-

The cost and process of raising capital- Unique funding issues of a high- tech ventures – Funding with Equity-Financing with Debt-Funding Startup with bootstrapping- crowd funding- strategic alliances.

#### **Unit IV: Startup survival and Growth:**

Stages of growth in a new venture- Growing with the market- Growth within the industry- Venture life patterns- Reasons for new venture failures- preparing for change- Leadership succession. Support for the growth and sustainability of the venture.

#### Unit V: Planning for Harvest and Exit:

Dealing with Failure: Bankruptcy, Exit Strategies- Selling the Business- Cashing out but staying in being-Going Public (IPO)- Liquidation. **Total Hrs: 45** 

#### **Reference Books:**

- 1. Kathleen R Allen, Launching New Ventures, An Entrepreneurial Approach, Cengage Learning 2016.
- 2. Anjan Raichaudhuri, Managing New Venture Concepts and Cases, Prentice Hall International 2010.
- 3. S. R. Bhowmika& M. Bhowmik, Entrepreneurship, New Age International, 2007.
- 4. Steven Fisher, Ja-nae Duane, The Startup Equation- A Visual Guidebook for Building your Startup, Indian Edition, Mc Graw Hill Education India Pvt. Ltd, 2016.
- 5. Donald F Kuratko, Jeffrey S. Hornsby, New Venture Management: The Entrepreneur's Road Map, 2e, Routledge, 2017.
- 6. Vijay Sathe, Corporate Entrepreneurship, le, Cambridge, 2009

B.Sc. (Information Science and Cyber Forensics)-Regulation 2022-2023



9 Hrs

9 Hrs

9 Hrs

9 Hrs

9 Hrs



Subject Code: HBCC22005	: S	ubject Name : PRINCIPLES OF DIGITAL MARKETINC							C	L	T/SLr	P/R	Ty/Lb /ETL/EVL
			1	MARE	<b>ETIN</b>	G							
	P	rerequisi	ite: Nil						3	3	0/0	0/0	Ту
L : Lecture T	: Tuto	rial S.	Lr : Sup	ervised	l Learni	ng P:	Project	R : Re	searcl	n C:	Credits		
Ty/Lb/ETL : '	Theor	y/Lab/Ei	nbedde	d Theor	ry and I	Lab							
OBJECTIVE	ES :												
• This course helps the students to understand the fundamental principles of Digital													
marketing, the past, present and tuture potential of Digital marketing.													
• At the end of the course students will be able to identify the role of e-marketing in the										ting in the			
	pre	sent CC	mext	and d	evelop	an e-	-шагке	ung p		with	appropr	iate e	marketing
Strucgios.													
COURSE OUTCOMES (COs) $\cdot$ (3-5)													
CO1 Understand the concepts and uses of Digital Marketing													
CO2	1	Develop Strategic Planning for the Market											
CO3	1	Evaluate the Ethical and Legal Values											
CO4		Predict t	he Marl	ceting 7	rends	v urace	,						
Mapping of (	Cours	e Outco	mes wit	th Prog	ram O	utcome	es (POs	;)					
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	<b>PO8</b>	PO	9	PSO1	PSO	2 PSO3
CO1	3	2	2	1	1	1	3	1	1		1	1	2
CO2	3	2	1	2	2	2	3	2	1		1	1	1
CO3	2	2	2	1	2	2	3	3	2		1	2	2
CO4	2	2	2	3	3	2	3	1	2		1	1	1
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#### **Course Title Course Code** С L T/SLr P/R

PRINCIPLES OF DIGITAL MARKETING

EDUCATIONAL AND RESEARCH

**OBJECTIVES:** 

HBCC22005

This course helps the students to understand the fundamental principles of Digital • marketing, the past, present and future potential of Digital marketing.

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At the end of the course students will be able to identify the role of e-marketing in the present context and develop an e-marketing plan with appropriate e-marketing strategies.

#### **UNIT I: INTRODUCTION**

Digital-Marketing Past, Present & Future – Digital-Marketing Landscape, Digital-marketing's Past - Web 1.0, Digital Marketing Present - Web 2.0, Future -Web 3.0, Strategic Digital-Marketing, and Digital -Business Models – Online Revenue Models, Value Models, and Strategic Digital-Business Models.

### **UNIT II: DIGITAL MARKETING PLAN**

Process, Creating a Digital-Marketing Plan, Seven Steps -Situation Analysis, Strategic Planning, Objectives, Digital-Marketing Strategies - Product, Price, Distribution, Communication, Relationship Management; Implementation plan, Budget, Evaluation.

#### **UNIT III: DIGITAL -MARKETING ENVIRONMENT**

Overview of Digital-Marketing Environment, Global Digital -Markets, Wireless Internet Access, Digital divide, Building inclusive Digital markets, social networking, Ethical and Legal Issues - Overview, Digital Property, Emerging issues.

### **UNIT IV:DIGITAL-MARKETING MANAGEMENT**

Online offer - Creating customer value online, Product Benefits, Digital Marketing enhanced product development, Payment options, Pricing Strategies; Internet as distribution, Digital Marketing Communication - Owned Media, Paid media, Earned Media.

#### **UNIT V: EMERGING TRENDS**

Emerging trends in Digital-marketing, Content Marketing, Social Media Marketing, Email Marketing, Affiliate Marketing, Video Marketing, Mobile Marketing, Interactive advertising, International Online Marketing, Search Engine Marketing, Online Partnership, Viral Marketing, E-CRM, E-Business, E-Tailing.

#### **TEXT BOOK:**

1. Strauss Judy, Frost Raymond (2013), E-Marketing, 7/e; New Delhi: Prentice Hall.

### **REFERENCE BOOKS:**

- 1. Chaffey Dave and Smith PR (2013), Emarketing Excellence: Planning and Optimizing your Digital Marketing; 4/e; Routledge.
- 2. Ryan Damian, (2014), Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation, 3/e; Kogan Page Limited.

B.Sc. (Information Science and Cyber Forensics)-Regulation 2022-2023



#### 9 Hrs

### 9 Hrs

9 Hrs

## 9 Hrs

Ty/Lb

/ETL/EVL

Ty

9 Hrs

### **Total Hours: 45**



Subject Code: HBCC22006	Subject Name: INTELLECTUAL PROPERTY RIGHTS AND PATENT	С	L	T/SLr	P/R	Ty/Lb /ETL/ EVL					
	Prerequisite: Nil	3	3	0/0	0/0	Ту					
T/L/:Theory/Lal	T/L/:Theory/LabL:LectureT:TutorialP:Practical/ProjectR:ResearchC:Credits										

### **OBJECTIVE:** .

To introduce fundamental aspects of Intellectual property Rights to students who are going to play a major role in development and management of innovative projects in industries.

To develop expertise in the learners in IPR related issues and sensitize the learners with the emerging issues in IPR and the rationale for the protection of IPR.

COURS	EOU	JTCO	MES(C	Os):The	studen	ts will	be able	to					
CO1		Iı	nbibe th	e knowle	dge of	Intellec	tual Pro	operty a	nd its	protectior	n through	various la	aws.
CO2		aj	pply the	knowled	ge of IF	PR for p	profession	onal dev	velopn	nent			
CO3		d k	evelop a nowledg	platform e	n for pro	otection	and co	mplianc	ce of I	ntellectua	l Property	y Rights &	Z
CO4		C	reate awa	ate awareness amidst academia and industry of IPR and Copyright compliance									
CO5		d	deliver the purpose and function of IPR and patenting										
Mapping of Course Outcomes with Program Outcomes(POs)													
COs/PO	S	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO	8 PO9	PSO1	PSO2	PSO3
CO1		3	3	2	2	2	3	3	2	2	1	-	1
CO2		3	3	1	2	3	2	2	2	3	1	-	1
CO3		3	3	2	2	3	3	2	3	2	1	1	-
CO4		3	3	2	3	2	2	2	1	2	-	-	1
CO5		3	2	1	2	2	2	3	2	2	1	2	-
1/2/3ind	icate	sStre	ngth ofC	Correlati	on1-Hi	gh,2-M	edium,	3-Low					
Category	Category Basic Science s		Engg.Science Humanities social Scier		nities & Science	Program Core		Program Elective		Open Electiv e	Practical/ Project	Internships/ Skills component	Inter disciplinary
						$\checkmark$							

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#### **Subject Code:** Subject Name: INTELLECTUAL Ty/Lb С L T/SLr P/R /ÉTL/ HBCC22006 PROPERTY RIGHTS AND PATENT EVL Prerequisite: Nil 3 3 0/0 0/0 Τy T/L/:Theory/LabL:LectureT:TutorialP:Practical/ProjectR:ResearchC:Credits

TITUTE

#### UNIT – I

UNIT – II

Introduction to IPRs, Basic concepts and need for Intellectual Property - Meaning and practical aspects of Patents, Copyrights, Geographical Indications, IPR in India and Abroad. Nature of Intellectual Property, Industrial Property, technological Research, Inventions and Innovations – Important examples of IPR.

Intellectual Property Rights. The IPR tool kit, Patents, the patenting process, Patent cooperation treaties: International Treaties and conventions on IPRs: Trade Related Aspects of Intellectual Property Rights Agreement, Patent Cooperation Treaty, Patent Act of India, Patent Amendment Act, Design Act, Trademark Act, Geographical Indication Act.

Intellectual Property Protections IPR of Living Species, protecting inventions in biotechnology, protections of traditional knowledge, biopiracy and documenting traditional knowledge, Digital Innovations and Developments as Knowledge Assets - IP Laws, Cyber Law and Digital Content Protection. Case studies: The basmati rice issue, revocations of turmeric patent, revocation of neem patent.

Exercising and Enforcing of Intellectual Property Rights Rights of an IPR owner, licensing agreements, criteria for patent infringement. Case studies of patent infringement, IPR - contract, unfair competitions and control, provisions in TRIPS,

Role of Patents in Product Development & Commercialization Recent changes in IPR laws impacting patents and copy rights, intellectual cooperation in the science and allied industry. Patentable and non-patentable research. Case studies .

**Total hours:45** 

9 Hrs

9 Hrs

9 Hrs

9 Hrs

9 Hrs

UNIT-V

UNIT – III

UNIT-IV

BOR- M.G.R.
EDUCATIONAL AND RESEARCH INSTITUTE
DEMONSTRATEMENT
MINISTRATEMENT
MARKAN AND RESEARCH INSTITUTE
DEMONSTRATEMENT
MARKAN AND RESEARCH INSTITUTE

#### Text book:

- 1. Nithyananda, K.V. (2019). Intellectual Property Rights : Protection and Management. India, IN: Cengage Learning India Private Limited.
- 2. Neeraj, P., & Khusdeep, D. (2014). Intellectual Property Rights. India, IN: PHI learning Private Limited.

#### **References**:

1.P.B. Ganguli, Intellectual Property Rights: Unleashing the Knowledge Economy. Tata Mc Graw Hill, 2001. Steve Smith, The Quality Revolution.1st ed., Jaico Publishing House, 2002.

2. Kompal Bansal and Praishit Bansal. Fundamentals of IPR for Engineers, 1st Edition, BS Publications, 2012.

3. Prabhuddha Ganguli. Intellectual Property Rights. 1st Edition, TMH, 2012.

4.R Radha Krishnan & S Balasubramanian. Intellectual Property Rights. 1st Edition, Excel Books, 2012.

5. M Ashok Kumar & Mohd. Iqbal Ali. Intellectual Property Rights. 2nd Edition, Serial Publications, 2011. VinodV. Scople, Managing Intellectual Property. Prentice Hall of India PvtLtd, 2012.

6.Deborah E. Bouchoux. Intellectual Property: The Law of Trademarks, Copyrights, Patents and Trade Secrets. Cengage Learning, 3rd ed. Edition, 2012.

7. Prabuddha Ganguli. Intellectual Property Rights: Unleashing the Knowledge Economy. McGraw Hill Education, 2011. Edited by Derek Bosworth and Elizabeth Webster. The Management of Intellectual Property. Edward Elgar Publishing Ltd., 2013.

8. Wadhera (2004), Intellectual Property Rights, Universal Law Publishing Co.

9. Ramappa (2010), Intellectual Property Rights Law in India, Asia Law House

#### **E-resources:**

1.Subramanian, N., & Sundararaman, M. (2018). Intellectual Property Rights – An Overview. Retrieved from <u>http://www.bdu.ac.in/cells/ipr/docs/ipr-eng-ebook.pdf</u>

2.World Intellectual property Organisation. (2004). WIPO Intellectual property Handbook. Retrieved from <u>https://www.wipo.int/edocs/pubdocs/en/intproperty/489/wipo_pub_489.pdf</u> **Reference Journal:** 

1.Journal of Intellectual Property Rights (JIPR): NISCAIR Useful Websites:

1.Cell for IPR Promotion and Management (http://cipam.gov.in/)

2.World Intellectual Property Organisation (<u>https://www.wipo.int/about-ip/en/</u>)

3.Office of the Controller General of Patents, Designs & Trademarks (http://www.ipindia.nic.in/)

B.Sc. (Information Science and Cyber Forensics)-Regulation 2022-2023



Subject Code: HBCF22L07	Subject Name	С	L	T/S.Lr	P/R	Ty/Lb/ ETL
	MAJOR PROJECT	6	0	0/0	12/12	Lb

To make the students to make use of the knowledge and skill developed during their four years of study and to apply them for making an innovative product/process for the development of society and industries.

Students are expected to do a Project work either in an Industry or at the University in the field of relevant field /inter-disciplinary /multi-disciplinary area . The work to be carried out in Phase II should be continuation of Phase I. Each student will be allotted a guide based on the area of Project work. In case of industrial Project external guide has to be allotted from Industry. Inter disciplinary/multi-disciplinary project can be done with guidance of relevant department. Monthly reviews will be conducted during the semester to monitor the progress of the project by the project review committee. Students have to submit the Project thesis at the end of the semester and appear for the Project Viva-Voce examination conducted by the examiners duly appointed by the Controller of Examination. In case of industrial project certificate in proof has to be included in the report along with the bonafide certificate.



Subject Code:	Subject Name	С	L	T/S.Lr	P/R	Ty/Lb/ ETL
HBCF22I05	<b>RESEARCH PUBLICATION</b>	2	0	0/0	0/4	IE

Students are supposed to prepare and publish the article based on his/her area of research in peer reviewed referred journal. Code of research publication ethics should be followed. After publishing the article students should present a seminar in presence of department faculties and PG students. At the end of semester viva examination will be conducted by the examiners appointed by the Head of the department.