CURRICULUM & SYLLABUS

(For the students admitted from 2024-2025)

B.Sc Data Science

DEPARTMENT
OF
INFORMATION TECHNOLOGY

DECLARATION

I, **Dr. N. Kanya**, Head of Computer Science and Engineering Department, hereby declare that this copy of the syllabus (**B.Sc.Data Science-2022 Regulation**) from Pg. No 1 to 143 is the final version which is being taught in the class and uploaded in our university website. I assure that the Syllabi available in our university website is verified and found correct. The Curriculum and Syllabi have been ratified by our Academic Council / Vice Chancellor.

Date: **Signature**

VISION

To create technology proficient and ethically enriched IT professionals through holistic and state of art curriculum.

MISSION

- To update the IT skills of students and faculty adapting recent technology developments in the curriculum as recommended by academicians, industry experts and alumni.
- To establish equipped laboratories to present excellent education in the conventional and modern vicinity of Information Technology.
- To create responsible IT professionals with ethical values and social responsibilities.
- To stimulate entrepreneurial mind-set among the students and enhance competency through regular industrial exposure.
- To utilize the family of alma mater through strong interaction and networking making them instrumental for development of academic and industrial linkage.

`

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

PO1: **Disciplinary knowledge**	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of the undergraduate programme of study.
PO2: **Communication Skills**	Ability to understand and express thoughts and ideas effectively in writing and orally; to present complex information in a clear and concise manner to different groups.
PO3: **Critical thinking and Problem solving**	Capability to analyze and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development and apply their competency to solve different kinds of problems andapply to real life situations.
PO4: **Analytical and Scientific reasoning**	Ability to analyze, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.
PO5: **Research-related skills**	Ability to recognize cause-and-effect relationships, define problems, 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: **Team work and Leadership qualities**	Function effectively as an individual, and as a team member or leader in diverse teams, and in multidisciplinary environment.
PO7: **Information/digital literacy**	Capability to use ICT tools in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data and further presentation.
PO8: **Moral and ethical awareness**	Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple 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: **Lifelong learning:**	Ability to update knowledge and skills, participating in learning activities 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
PEO1	3	3	3	3	2	2	3	2
PEO2	3	3	2	1	1	1	3	3
PEO3	2	3	3	3	3	2	3	2
PEO4	1	2	3	2	2	3	3	2
PEO5	2	2	1	3	3	2	2	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

SEMESTER: 1

COURSE CODE	COURSE TITLE	C	L	T/SLr	P/R	Ty / Lb/ ETP/IE
HBTA22001/ HBHI22001/ HBFR22001	LANGUAGE (TAMIL-I/HINDI-I /FRENCH-I)	3	3	0	0	Ty
HBEN22001	LANGUAGE (ENGLISH – I)	3	3	0	0	Ty
HBMA22ID1	ALLIED-I MATHEMATICS – I	4	3	1	0	Ty
HBDS24001	PROGRAMMING IN C	4	3	1	0	Ty
HBCC22001	ENVIRONMENTAL STUDIES	3	3	0	0	Ty

PRACTICAL:

HBCC22L01	COMPUTERSOFTWARE LAB	2	0	0	3	Lb
HBCF22L01	C PROGRAMMING LAB	2	0	0	3	Lb
HBCC22I02	SOFT SKILL I(English)	1	0	0	2	IE

Credits Sub Total:22

SEMESTER: 2

COURSE CODE	COURSE TITLE	C	L	T/SLr	P/R	Ty / Lb/ ETP/IE
HBTA22002/ HBHI22002/ HBFR22002	LANGUAGE (TAMIL-II/ HINDI-II /FRENCH-II)	3	3	0	0	Ty
HBEN22002	LANGUAGE (ENGLISH – II)	3	3	0	0	Ty
HBMA22ID2	ALLIED-II MATHEMATICS – II	4	3	1	0	Ty
HBCF22002	PYTHON PROGRAMMING	4	3	1	0/0	TY
HBCF22003	DATA STRUCTURES	4	3	1	0/0	TY

PRACTICAL

HBCF22L02	DATA STRUCTURES USING PYTHON LAB	2	0	0/0	3/0	LB
HBCC22I03	SOFT SKILL –II(English)	1	0	0/0	2/0	IE

Credits Sub Total: 21

6

SEMESTER: 3

THEORY:

COURSE CODE	COURSE TITLE	C	L	T/ SLr	P/R	Ty / Lb/ ETP/IE
HBEC22ID3	ALLIED-IIIELECTRONICS	3	3	0	0/0	Ty
HBCF22004	COMPUTER NETWORKS	4	3	1	0/0	Ty
HBCF22007	JAVA PROGRAMMING	4	3	1	0/0	Ty
HBCS22007	OPERATING SYSTEM	3	3	0	0/0	Ty
HBCS22009	DATABASE MANAGEMENT SYSTEM	4	3	1	0/0	Ty

PRACTICAL:

HBCF22L04	JAVA PROGRAMMING LAB	2	0	0/0	3/0	Lb
HBCS22L04	DATABASE MANAGEMENT SYSTEM LAB	2	0	0/0	3/0	Lb
HBCC22I05	SOFT SKILL-III (Qualitative and Quantitative Skill)	1	0	0	2/0	IE

Credits Sub Total: 23

SEMESTER: 4

THEORY:

COURSE CODE	COURSE TITLE	C	L	T/ SLr	P/R	Ty / Lb/ ETP/IE
HBDS24002	BUSINESS INTELLIGENCE	4	3	1	0	Ty
HBDS24003	DATA MINING	4	3	1	0	Ty
HBCS22E09	ARTIFICIAL INTELLIGENCE	4	3	1	0/0	Ty
HBXX22OEX	OPEN ELECTIVE – I	3	3	0	0/0	IE
HBDS24EXX	PROGRAMME ELECTIVE – I	4	3	1	0/0	Ty

PRACTICAL:

HBDS24L01	DATA MINING LAB	2	0	0	3	Lb
HBDS24I01	CORE SKILL–ISTATISTICAL ANALYSIS TOOL LAB	1	0	0	2	IE
HBFL22IXX	FOREIGN LANGUAGE	1	0	0	2	IE

Credits Sub Total: 23

SEMESTER: 5

THEORY:

COURSE CODE	COURSE TITLE	C	L	T/SLr	P/R	Ty / Lb/ ETP/IE
HBDS24004	R PROGRAMMING	4	3	1	0/0	Ty
HBDS24005	MACHINE LEARNING TECHNIQUES	3	3	0	0/0	Ty
HBDS24EXX	PROGRAM ELECTIVE -II	4	3	1	0/0	Ty
HBXX22OEX	OPEN ELECTIVE - II	3	3	0	0/0	IE
HBCC22002	ENTREPRENURSHIP DEVELOPMENT	3	3	0	0/0	Ty

PRACTICAL:

HBDS24L02	R PROGRAMMING LAB	2	0	0	3/0	Lb
HBDS24I02	CORE SKILL–IIDATA VISUALIZATION LAB	1	0	0	2/0	IE
HBCC22I07	NCC/NSS/INTERNSHIP	1	0	0	2/0	IE

Credits Sub Total: 21

SEMESTER: 6

THEORY:

COURSE CODE	COURSE TITLE	C	L	T/SLr	P/R	Ty / Lb/ ETP/IE
HBDS24006	SOCIAL NETWORK ANALYTICS	4	3	1	0/0	Ty
HBDS24EXX	PROGRAMME ELECTIVE – III	4	3	1	0/0	Ty
HBCC22ET1	UNIVERSAL HUMAN VALUES	3	2	0	2/0	ETP

PRACTICAL:

HBDS24L03	PROJECT	9	0	0	18	Lb

Credits Sub. Total: 20

CREDIT SUMMARY

Semester: 1   : 22
Semester: 2   :21
Semester: 3   : 23
Semester: 4   : 23
Semester: 5   : 21
Semester: 6   : 20

TOTAL CREDITS   : 130

PROGRAM ELECTIVE - I

COURSE CODE	COURSE TITLE	C	L	T/SLr	P/R	T/L/ETP
HBDS24E01	CLOUD COMPUTING FOR DATASCIENCE	4	3	1	0	Ty
HBDS24E02	COMPUTER VISION TECHNIQUES	4	3	1	0	Ty
HBDS24E03	INFORMATION RETRIEVAL AND PROCESSING	4	3	1	0	Ty

PROGRAMELECTIVE - II

COURSE CODE	COURSE TITLE	C	L	T/SLr	P/R	T/L/ETP
HBDS24E04	BUSINESS AND FINANCIAL ANALYTICS	4	3	1	0	Ty
HBDS24E05	NEURAL NETWORKS AND DEEP LEARNING	4	3	1	0	Ty
HBDS24E06	NATURAL LANGUAGE PROCESSING	4	3	1	0	Ty

PROGRAMELECTIVE –III

COURSE CODE	COURSE TITLE	C	L	T/SLr	P/R	T/L/ETP
HBDS24E07	USER INTERFACE DESIGN	4	3	1	0	Ty
HBDS24E08	DATA SECURITY AND COMPLIANCE	4	3	1	0	Ty
HBDS24E09	IOT AND ITS APPLICATIONS	4	3	1	0	Ty

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**

LIST OF OPEN ELECTIVE-2022 REGULATION.

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
PHYSICS	3.	Theory	HBPH22OE1	Fundamentals of Optics and Sound
	4.	Theory	HBPH22OE2	Every day Physics
	5.	Lab	HBPH22OL1	Basic Physics lab
COMPUTER SCIENCE	6.	Theory	HBCS22OE1	Office Automation
	7.	Theory	HBCS22OE2	Fundamentals of Computer and Internet
	8.	Lab	HBCS22OL1	Multimedia lab
ECONOMICS	9.	Theory	HBEM22OE1	Indian Economy
	10.	Theory	HBEM22OE2	Gender Economics
CHEMISTRY	11.	Theory	HBCH22OE1	Chemistry in our Daily Life
	12.	Theory	HBCH22OE2	Food Chemistry
	13.	Lab	HBCH22OL1	General Chemistry Lab
ENGLISH	14.	Theory	HBEN22OE1	English For Media
	15.	Theory	HBEN22OE2	Creative Writing
GEOLOGY	16.	Theory	HBGE22OE1	Disaster Mitigation and Management
	17.	Theory	HBGE22OE2	Remote Sensing and GIS
	18.	Lab	HBGE22OL1	Remote sensing and GIS lab
PSYCHOLOGY	19.	Theory	HBPY22OE1	Health & Yoga
	20.	Theory	HBPY22OE2	Organizational Behavior
	21.	Lab	HBPY22OL1	Understanding Self & Others

FASHION DESIGN	22.	Theory	HBFD22OE1	Applications of Textiles
	23.	Theory	HBFD22OE2	Introduction to Fashion
	24.	Lab	HBFD22OL1	Embroidery Practical Lab
COMPUTER APPLICATIONS	25.	Theory	CBCA22OE1	Web design
	26.	Theory	CBCA22OE2	E-Commerce
	27.	Lab	CBCA22OL1	Web Designing Laboratory
FOOD SCIENCE NUTRITION AND DIETETICS	28.	Theory	HBFS22OE1	Principles of Nutrition
	29.	Theory	HBFS22OE2	Food Safety and Quality Control
	30.	Lab	HBFS22OL1	Community Nutrition Practical
HOTEL MANAGEMENT AND CATERING TECHNOLOGY	31.	Theory	HBHM22OE1	Fundamentals of Food Production and Patisserie
	32.	Theory	HBHM22OE2	Bakery and Confectionery Basics
	33.	Lab	HBHM22OL1	Fundamentals Front office operation practical
DEFENSE AND STRATEGIC	34.	Theory	HBDS22OE1	Independent India
	35.	Theory	HBDS22OE2	Human Rights
FINANCIAL PLANNING	36.	Theory	MBFP22OE1	Marketing of Financial Services
	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	43.	Theory	HBPE22OE1	Rule of Games and Sports
	44.	Theory	HBPE22OE2	Health and Fitness
HUMAN RESOURCE	45.	Theory	HBHR22OE1	Workplace Counseling
	46.	Theory	HBHR22OE2	Corporate Social Responsibility
INFORMATION	47.	Theory	HBCF22OE1	Introduction to Data Science

SCIENCE AND 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
DATA SCIENCE	55.	Theory	HBDS24OE1	Fundamental Concepts ofMatlab
	56.	Theory	HBDS24OE2	Satellite Communication and Satellite Technology
	57.	Theory	HBDS24OE3	Industrial Robotics & Expert System
	58.	Theory	HBDS24OE4	Business Process Management
	59.	Theory	HBDS24OE5	Smart Product Development
	60.	Theory	HBDS24OE6	Software Project Management

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

Components of Curriculum and Credit Distribution

B.Sc Data Science

S. No	CATEGORY	Description	No. of Courses	Credits	Total	Credit Weightage	Contact hours
1	CORE COURSES	CoreTheory	13	50	62	48	750
		CoreLab	6	12			180
2	ELECTIVE COURSES	Department Electives/ Skill enhancement electives	3	12	12	9	180
3	OPENELECTIVES	Open Elective theory	2	6	6	5	90
4	INTER DISCIPLINARY /ALLIED COURSES	Theory	3	11	11	8	165
5	HUMANITIES &SOCIAL SCIENCES, LIFE SKILLS & SOFT SKILLS	Language1&2	2	6	27	21	90
		English 1& 2	2	6			90
		SoftSkills	3	3			45
		LifeSkill	1	2			30
		ForeignLanguage	1	1			15
		Environmental Studies	1	3			45
		Management Papers	-	-			-
		Entrepreneurship Development	1	3			45
		Universal Human values	1	3			45
		Entrepreneurship	-	-			-
6	ECTS/INTERNSHIP/ ESKILL	Project	1	9	12	9	135
		CoreSkills	2	2			30
		Internship / NSS / NCC	1	1			15
7	RESEARCH COMPONENT	Research me theology, Publication, IPR and Patents etc.	-	-	-	-	-
8	ANYOTHER		-				-
Total			**43**	**130**	**130**	**100**	**1950**

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

I Semester

Subject Code: **HBTA22001**	Subject Name: **TAMIL PAPER - l**		**T / L/ ETL**	**L**	**T / S.Lr**	**P/ R**	**C**
	Prerequisite: Knowledge of Tamil in Higher Secondary level		**Ty**	**3**	**0**	**0**	**3**

C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical
R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation

OBJECTIVE:
- Understand the aims and objectives of teaching Tamil.
- Understand the rational for learning Tamil.
- To motivate and stimulate the students to overcome their inferiority complex and improve fluency in the language.
- Learn significance of spoken skill.
  The relationship between language &culture and the implications for language teaching.

COURSE OUTCOMES (COs): After Completing the course, the student can be able to

CO1	Tamil students are actively engaged in learning Tamil language and culture in a meaningful setting
CO2	Focus on applying the language in real life situations.
CO3	Use proficiency descriptors to motivate learners to progress to the next stage of learning. .
CO4	Lessons are customized to arouse students interest and ignite the joy of learning Tamil language.
CO5	Develop a strong foundation in listening & speaking skills.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	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	2
CO5	3	3	3	3	3	3	2	2	3

COs / PSOs	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3
CO2	2	2	3	3
CO3	3	3	3	2
CO4	2	2	3	3
CO5	3	2	2	3

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

Category	Program Core	Program elective	Humanities and Social Sciences	Open Electives	Skill enhancing elective	Inter Disciplinary/Allied	Skill Component	Practical /Project/internship	Others			
			✔									

HBTA22001Subject Name: **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.மாணவர்களின்கவிதை,கட்டுரையெழுதும்திறன்வளர்த்தல்

2. தமிழில் பிழையின்றி பேசும் எழுதும் திறன்வளர்த்தல்

அலகு - 1	11 மணிநேரம்

அ) மரபுக்கவிதை

1.செந்தமிழ்நாடு–மகாகவிபாரதியார்

2.தமிழின்இனிமை, இன்பத்தமிழ், எங்கள்தமிழ், சங்கநாதம்- பாரதிதாசன்

3.தமிழ்வளர்க்கசபதம்–நாமக்கல்கவிஞர்வெ.இராமலிங்கம்பிள்ளை

4. கோயில்வழிபாடு, வாழ்க்கைத்தத்துவங்கள்–கவிமணிதேசிகவிநாயகம்பிள்ளை

5.கும்மிப்பாடல்–சுத்தானந்தபாரதியார்

6. தமிழ்த்தாய்வாழ்த்து–மனோன்மணியம்பெ.சுந்தரம்பிள்ளை

7.விடுதலைவிளைத்தஉரிமை–கவியரசர்கண்ணதாசன்

8. அன்பெனும்பிடியுள்… … …, முரசறைத்தல்–வள்ளலார்இராமலிங்கஅடிகள்

ஆ) புதுக்கவிதை

1.பாட்டாளிகளின்குரல்–பட்டுக்கோட்டைகலியாணசுந்தரம்

2. மகாத்மாகாந்தியடிகள்–கவிஞர்வாலி

3. காகிதப்பூக்கள் - நா.காமராசு

4.வள்ளுவர்வழங்கும்விடுதலை–ஈரோடுதமிழன்பன்

5. உலகம் – வைரமுத்து

6. இன்னமுதமாமழை - பேரா. முனைவர்பொற்கோ

7.தமிழ்ப்பற்று – மீரா,

8.ஐந்தாம்வகுப்புஅபிரிவு - நா.முத்துக்குமார்

அலகு – 2	7 மணிநேரம்

நாட்டுப்புறஇலக்கியம்

1. பொதுஅறிமுகம்

2. நாட்டுப்புறஇலக்கியவகைகள்

3.நாட்டுப்புறக்கலைகள்

அலகு – 3

<div align="right">

12 மணிநேரம்

</div>

அ) சிறுகதைகள்

1. தேங்காய்த்துண்டுகள் (மு.வரதராசனார்),

2. அறம் (மாலன்)

3. நாற்காலியும் நான்குதலைமுறைகளும் (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. மதுரைமாநகரம் (ரா.பி.சேதுப்பிள்ளை)

அலகு – 4

<div align="right">

6 மணிநேரம்

</div>

1. புதுக்கவிதை–தோற்றமும் வளர்ச்சியும்

2. உரைநடை- தோற்றமும் வளர்ச்சியும்

3. சிறுகதை- தோற்றமும் வளர்ச்சியும்

அலகு – 5

அ) இலக்கணம்   **9 மணிநேரம்**

1. வழக்கு

2. தொகாநிலைத்தொடர்

3. எழுத்துப்போலி

4. பதவியல்

ஆ) மொழிப்பயிற்சி

1. தன்வினை – பிறவினை

2. ஒருமைபன்மைமயக்கம்

3. பிறமொழிச்சொற்களைநீக்குதல்

4. விண்ணப்பம் எழுதுதல்

Subject Code: **HBHI22001**	Subject Name: **HINDI I**		T / L/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite:Knowledge of Hindi		Ty	3	0	0	3

L: Lecture, T: Tutorial,SLr: Supervised Learning, P: Project, R: Research, C: Credits, T/L/ETL:Theory / Lab / Embedded Theory and Lab

OBJECTIVE:
- To Understand the Hindi Literature, culture and the usage of language in the various streams
- To Build up the Confidence in conversing in Hindi language.
- To acquire Knowledge of the usage of Hindi language in the various Government Offices Learn significance of spoken skill.

COURSE OUTCOMES (COs): After Completing the course, the student can be 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 understand philosophical methods of Hindi Literature.
CO4	Evaluate the concept of Hindi from past to present and to study the society closely through Literature
CO5	Understand the importance of Hindi in the contemporary world.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	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

COs / PSOs	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	1	1	1
CO3	1	1	1
CO4	1	1	1
CO5	1	1	1

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

Category	Program Core	Program elective	Humanities and Social Sciences	Open Electives	Skill enhancing elective	Inter Disciplinary/Allied	Skill Component	Practical /Project/internship	Others			
			✔									

Subject Code:	Subject Name: **HINDI I**	Ty/Lb /ETL	L	T/S. Lr	P/R	C
HBHI22001	**Prerequisite:**Knowledge of Hindi	TY	3	Ty	0/0	3

UNIT: I Prose –Understanding the secret of the culture and how to draft the letters in Government offices, technical terms

1. Sabhyataka Rahasya
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 an A/C
4. Demi Official Letter
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 Oorjaevam Khadya Padarth Sanrakshan
2. Transfer of an A/C
3. Missing of Pass Book   / Cheque Leaf
4. Official Memo
5. Administrative Terminology English to Hindi (25 Words)

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

1. Yougyataaur Vyavasayka Chunav
2. Complaints
3. Ordering for Books
4. Notification
5. Official Noting Hindi to English (25 words)

REFERENCE:

1. Prayojan Moolak Hindi: Dr. Syed Rahamathulla, Poornima Prakashan
4/7, Begum III Street, Royapettah, Chennai – 14
2.Hindi Gadhya Mala Dr. Syed Rahamathulla, Poornima Prakashan

Subject Code: **HBFR22001**	Subject Name: **FRENCH I**		T / L/ ETL	L	T/S.Lr	P/ R	C
	Prerequisite: Nil		Ty	3	0	0	3

L: Lecture, T: Tutorial,SLr : Supervised Learning, P: Project, R : Research, C : Credits, T/L/ETL :Theory / Lab / Embedded Theory and Lab

OBJECTIVE:

- The students will acquire a different perspective of their own culture in relation to the French culture
- The students will discover new attitudes towards familiar practices
- The students will acquire a sense of the French language, its music and rhythms and basic usage.
- The students will acquire a comprehensive view of the European Union and the member states

COURSE OUTCOMES (COs): After Completing the course, the student can be able to

CO1	Identify the French language from other European language and to show and tell French words and expression
CO2	Understand how the language works discovering the pronunciation
CO3	Start writing short dialogues of greetings 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 affairs Analyze ideas in the content of short paragraphs, paintings etc., and everyday contexts. Appreciate the culture and uniqueness of France. Discuss in English various aspects of France and a new cultural event and compare with current scenario
CO5	Develop enough confidence to introduce oneself and ask others simple questions about personal details. Interact as long as other person speaks slowly and clearly
CO6	Plan a rendezvous, a casual meeting by Interacting with basic sentences and expressions as long as the person to with whom he/she speaks can help to reformulate the sentences
CO7	Write a simple message can fill a simple questionnaire. writeone's names, nationality, address etc. on a hotel registration card /passport etc.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
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
CO4	3	3	3	2	2	2	2	3	3
CO5	2	2	2	3	3	2	3	2	3
CO6	3	3	2	2	3	3	3	3	3
CO7	3	3	2	2	3	3	3	3	3

	PSO1	PSO2	PSO3	PSO4
CO1	1	2	1	
CO2	1	2	1	
CO3	1	2	1	
CO4	2	3	2	
CO5	1	2	1	
CO6	1	2	1	
CO7	1	2	1	

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

Category	Program Core	Program elective	Humanities and Social Sciences	Open Electives	Skill enhancing elective	Inter Disciplinary/ Allied	Skill Component	Practical /Project/internship	Others			
			✔									

Subject Code: **HBFR22001**	Subject Name: **FRENCH – I LANGUAGE-I**	Ty/Lb/ETL	L	T/S.Lr	P/R	C
	Prerequisite: Nil	Ty	3	0/0	0/0	3

UNIT I :   **9 Periods**

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

1.Se Présenter, 2. La langue française, 3. La Graphie – écrire L'alphabet, L'abécédaire

4.Les Accents et les Ponctuations, 5. L'interaction de base.

- **Clips 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 :   **9 Periods**

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.

➢ **Clips 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 :   **9 Periods**

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.

➢ **Clips 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 :   **9 Periods**

Lire et prononcer Le française

- Les sons français, les voyelles françaises, les sons nasaux, les consonné, Quelque sons uniques.
- Les syllabus français, Les Rythme de la langue française.

➢ **Clips 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 :   **9 Periods**

Observer et Comprendre

- La vie de la France quotidienne, En cas d'urgence.
- La grammaire initiale
➢ **Clips 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 Periods: 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

Subject Code: **HBEN22001**	Subject Name: **ENGLISH I** (Common to all UG Courses under H&S)	T / L/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite – English Language	Ty	3	0/0	0/0	3

L: Lecture, T: Tutorial,SLr: Supervised Learning, P: Project, R: Research, C: Credits, T/L/ETL:Theory/ Lab / Embedded Theory and Lab

Course Objectives

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.

Course Outcomes (COs)

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. Analyze 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.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	3	3	3	3	3	3	1	3
CO2	3	3	3	3	3	3	3	1	3
CO3	3	3	3	3	3	3	3	1	3
CO4	3	3	3	3	3	3	3	1	3
CO5	3	3	3	3	3	3	3	1	3

	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3
CO2	3	3	3	3
CO3	3	3	3	3
CO4	3	3	3	3
CO5	3	3	3	3

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

Category	Program Core	Program elective	Humanities and Social Sciences	Open Electives	Skill enhancing elective	Inter Disciplinary/Allied	Skill Component	Practical /Project/internship	Others			
			✔									

Sub.Code **HBEN22001**	Subject Name: **ENGLISH I** (Common to all UG Programs under H&S)	C	L	T/S Lr	P/R	Ty/Lb/ ETL
	Prerequisite – English Language	3	3	0/0	0/0	Ty

Unit I: Prose   **9 Periods**
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   **9 Periods**
1. On Killing a Tree
2. The Road Not Taken
3. Anthem for Doomed You

Unit III: Short Story   **9 Periods**
1. Portrait of a Lady
2. The Connoisseur

Unit IV: Drama   **9 Periods**
1. The Never-Never Nest
2. Frederick Douglass

Unit V: Functional Grammar – Charts & LSRW Development   **9 Periods**
    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- concord- conditional sentences – question tags - Common errors – PunctuationVocabulary 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 Periods: 45

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

Sub Code **HBMA22ID1**	Subject Name: **ALLIED-I MATHEMATICS-I**		T / L/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: Knowledge of Tamil in Higher Secondary level		Ty	3	1	0	4

C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical
R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation

OBJECTIVE:
- To understand the concepts in Matrices and its operations
- 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

COURSE OUTCOMES (COs): After Completing the course, the student can be able to

CO1	Tamil students are actively engaged in learning Tamil language and culture in a meaningful setting
CO2	Focus on applying the language in real life situations.
CO3	Use proficiency descriptors to motivate learners to progress to the next stage of learning. .
CO4	Lessons are customized to arouse students' interest and ignite the joy of learning Tamil language.
CO5	Develop a strong foundation in listening & speaking skills.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	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	2
CO5	3	3	3	3	3	3	2	2	3

COs /PSOs	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3
CO2	2	2	3	3
CO3	3	3	3	2
CO4	2	2	3	3
CO5	3	2	2	3

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

Category	Program Core	Program elective	Humanities and Social Sciences	Open Electives	Skill enhancing elective	Inter Disciplinary/Allied	Skill Component	Practical /Project/internship	Others			
						✔						

Sub Code: **HBMA22ID1**	Subject Name: **ALLIED- I MATHEMATICS I**	T / L/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: Knowledge of Tamil in Higher Secondary level	Ty	3	1	0	4

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

UNIT I : MATRICES   12 Periods

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

UNIT II: TRIGONOMETRY   12 Periods

Expansions of Sin $n\theta$, Cos $n\theta$ in powers of Sinθ and Cosθ – Expansion of Tan $n\theta$ – Expansions of $Sin^n\theta$ and $Cos^n\theta$ in terms of Sines and Cosines of multiples of θ – Hyperbolic functions – Separation into real and imaginary parts.

UNIT III: INTEGRATION   12 Periods

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   12 Periods

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   12 Periods

Binomial – Poisson –Exponential –Normal distributions.

Total Periods: 60

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).

Subject Code: **HBDS24001**	SubjectName: **PROGRAMMING IN C**	Ty/Lb/ETL/IE	L	T /S.Lr	P/R	C
	Prerequisite:+2ComputerScience	Ty	3	1	0/0	4

L: Lecture T : Tutorial SLr : Supervised Learning P: Project R : Research C : Credits
Ty/Lb/ETL:Theory/Lab/Embedded Theory and Lab

OBJECTIVES

- Identify basic C program components: constants, variables, data types, and operators.

- Differentiate decision-making and looping statements: if, switch, for, while.

- Explain arrays, functions, and parameter passing mechanisms.

- Understand structures, pointers, and pointer manipulation.

- Describe file processing techniques and error handling in C

COURSEOUTCOMES(COs) Studentscompletingthiscoursewereableto

CO1	Understand and apply sequential and random-access file processing methods in C
CO2	Manage files efficiently using file pointers and various file operations
CO3	Implement command line arguments to enhance program functionality.
CO4	Handle errors effectively during I/O operations to ensure robust file management.
CO5	Demonstrate comprehensive file handling skills including reading, writing, and modifying files.

Mappingof CourseOutcomewithProgramOutcome (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	2	1	2	1	2	1	1	2
CO2	3	2	1	2	2	2	2	1	2
CO3	2	3	1	2	1	1	2	1	2
CO4	2	2	1	2	2	2	1	1	2
CO5	3	2	1	3	3	2	2	1	2

COs/PSOs	PSO1	PSO2	PSO3
CO1	2	3	1
CO2	2	3	1
CO3	1	2	2
CO4	2	2	1
CO5	2	3	2

3/2/1IndicatesStrength ofCorrelation, 3 –High,2-Medium,1-Low

Category	Program Core	Program Elective	Humanities andSocialScience	OpenElective	SkillEnhancing Elective	InterDisciplinary/ Allied	SkillComponent	Practical /Project /Internship	Others
	✔								

Subject Code: **HBDS24001**	Subject Name: **PROGRAMMING IN C**	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
	Prerequisite:+2ComputerScience	Ty	3	1	0/0	4

UNIT: I Introduction 12 Periods

Basic Structure of Cprogramme- Constants, Variables and data types, Keywords, Identifiers- Operators and expressions- executing a C Program

UNIT: II Decision making statements and looping statements 12 Periods

Decision making with if statement, Simple if statement, else-if statement, Nesting if-else statement, the else if ladder,the switch statement, the goto statement, the while statement,the do while statement, the for statement, jumps in loops

UNIT III: Arrays and Functions 12 Periods

Introduction to Arrays- One dimensional arrays, two-dimensional array, and Multidimensional array- Introduction to Functions- calling a function, category of functions- arguments with return values, argument with no return values- parameter passing Mechanism: Call by Value and Call by Reference. Recursion.

UNIT IV: Structures& Pointers 12 Periods

Structures definition, giving values to members, Structure initialization, comparison of structure variables, Structure within structures,understanding pointers, accessing the address of the variable, declaring and initializing pointer, accessing a variable through its pointer and arrays

UNIT V:FILE PROCESSING 12 Periods

File Management in C– Types of file processing: Sequential access, Random access – Sequential access file – Random access file – Command line arguments -Error Handling during I/O Operation.

Total Periods:60

TEXT BOOKS:
1. E.Balaguruswamy, Programming in ANSI C
2. Padma Reddy, Computer Concepts & 'C' Programming
3. Shobha Hangirke, Computer Application for Business

REFERENCE BOOK
1. Paul Deitel and Harvey Deitel, -C How to Program, Seventh edition,Pearson Publication
2. Juneja, B.L and Anita Seth, - Programming in C, CENGAGE Learning India pvt Ltd, 2011
3. Pradip Dey, Manas Ghosh, - Fundamentals of Computing and Programming in C, First Edition, Oxford University Press, 2009

Subject Code **HBCC22001**	Subject Name: **ENVIRONMENTAL STUDIES**	Ty/Lb/ ETL	L	T/ S.Lr	P/R	C
	Prerequisite: NIL	TY	3	0/0	0/0	3

L: Lecture T: Tutorial   P: Project   C: Credits

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 know about Environment and Ecosystem & Biodiversity
CO2	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 resourcesand environmental problems associated with climate change, global warming, acid rain, ozone layer depletion etc., and explain possible solution.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	2	1	1	1	2	1	1	2	2
CO2	2	1	1	1	2	1	2	2	2
CO3	2	1	1	1	2	1	1	2	2

COs/PSOs	PSO1	PSO2	PSO3
CO1	1	2	1
CO2	2	2	2
CO3	1	1	1

3/2/1Indicates Strength of Correlation, 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 Code: HBCC22001	Subject Name: **ENVIRONMENTAL STUDIES**	Ty/Lb/ ETL	L	T/ S.Lr	P/R	C
	Prerequisite: NIL	TY	3	0/0	0/0	3

UNIT: I ENVIRONMENT AND ECOSYSTEMS   9 Periods

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   9 Periods

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   9 Periods

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   9 Periods

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   9 Periods

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 Periods :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 Mc Graw Hill,New Delhi, (2006).

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

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

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 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 applicationsof Word, Excel, Powerpoint, Paint and Internet.

COURSE OUTCOMES (COs):(3- 5)

CO1	Demonstrate the usage of various operations in MS Word
CO2	Perform calculations in Microsoft Excel using both manually inputting formulas and built-in functions.
CO3	Develop dynamic slide presentations with animation, narration, images, and much more, digitally and effectively.
CO4	To create drawings to include clipart, color, shape, size, text, enhance text
CO5	Understanding how to search specific website, sending mails etc

Mapping of Course Outcomes with Program Outcomes (POs)

COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
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 Correlation   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 Code: HBCC22L01	Subject Name: COMPUTER SOFTWARE LAB (WORD, EXCEL, POWERPOINT, PAINT, INTERNET)	Ty/Lb / ETL	L	T/ S.Lr	P/R	C
	Prerequisite: NIL	Lb	0	0/0	3/0	2

UNIT1:

OFFICEAPPLICATIONS–IMS OFFICE: MS-WORD

UNIT2:

OFFICEAPPLICATIONS-II MSOFFICE:MS-EXCEL

UNIT3:

OFFICEAPPLICATIONS-IIIMSOFFICE:MS-POWERPOINT

UNIT 4:

MICROSOFT PAINT EXERCISES - IV

UNIT 5:

INTERNET& ITS APPLICATIONS- V

Total Periods: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.

2. Preparing a newsletter:
   To prepare a newsletter with borders, two columns text header and footer and inserting a graphic image and page layout.

3. 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.

4. 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 forms calculations viz. To telling the column.

5. Creating numbered lists and bulleted lists
   To create numbered list with different form ats (with numbers, alphabets, roman letters)
   To create bulleted list with different bullet characters.

6. 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 mail in labels.

7. Using the special features of word

8. To find and replace the text
   To spell check and correct.
   To generate table of contents for a document
   To prepare index for a document.

9. Create an advertisement Prepare are sume.

UNIT2: MS OFFICE: MS-EXCEL

1. Using formul as and functions: prepare a Work sheets howing the mon the sales of a company indifferent branch offices (Showing Total Sales, Average Sales).
   Prepare a Statement for preparing Result of 10students in 5subjects (using formula to get Distinction, A Grade, B Grade, C Grade and Fail under Result column against a chstudent).

2. Operating on the sheets: Finding, deleting and adding records, for matting columns, row height, merging, splitting columns etc. Connecting the Work sheets and enter the data.

3. Creating a Chart: To create a chart for comparing the monthly sales of accompanies indifferent 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 amount budgeted for– say, department office expenses.

5. Sorting Data, Filtering Data and creation of Pivot tables.

UNIT3: MS OFFICE: MS-POWER POINT

1 Creating a new Presentation based on a template – using Auto content wizard, design templateandplainblankpresentation.

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 and outs.

UNIT4: 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 center, 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 website / 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 practicing on some important applications (Uc Browser, Skype) - operating on internet – creating and sending messages /mails using the applicationslike WhatsApp and WeChat - downloading text and media files and video conferencing using Skype.

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

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

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 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.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Demonstrate the usage of various operations in MS Word
CO2	Perform calculations in Microsoft Excel using both manually inputting formulas and built-in functions.
CO3	Develop dynamic slide presentations with animation, narration, images, and much more, digitally and effectively.
CO4	To create drawings to include clipart, color, shape, size, text, enhance text
CO5	Understanding how to search specific website, sending mails etc

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	3	1	2	1	2	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
CO5	3	1	1

3/2/1 indicates Strength of Correlation   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
								✔	

35

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

Write a C program for the following:

1. Finding Biggest number among SSSS 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 Periods:45

Subject code: **HBCC22I02**	Subject Name: **SOFT SKILL I (English)**	Ty/Lb/ETL	L	T/S.Lr	P/R	C
	Prerequisite: Plus 2 English	IE	0	0/0	2/0	1

OBJECTIVES:
1. Become good listeners to get engaged in interactive communication for effective team building.
2. Develop assertive and adaptive behavior 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.

Course Outcomes (Cos)

CO1	Become good listeners to get engaged in interactive communication for effective team building.
CO2	Develop assertive and adaptive behavior to be leaders
CO3	Develop peer interaction for a successful lifelong learning.
CO4	Learn skills necessary for a cooperative living in academic and professional environments
CO5	Use soft skills for the purposes of research and follow ethics in society and profession

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	POs	PO2	PO3	PO4	PO5	PO6	PO7	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	2	3

COs / PSOs	PSO1	PSO2	PSO3		
CO1	3	2	2		
CO2	2	2	2		
CO3	3	2	2		
CO4	3	2	2		
CO5	3	2	2		

H/M//L Indicates Strength of Correlation: H- High; M- Medium; L- Low

Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skill enhancing elective	Inter Disciplinary/ Allied	Skill Component	Practical /Project/ internship	
							✔		

Subject Code: **HBCC22I02**	Subject Name: **SOFT SKILL - I (English)**	Ty/Lb/ETL	L	T/S.Lr	P/R	C
	Prerequisite: Plus 2 English	IE	0	0/0	2/0	1

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, storytelling, writing assignments etc.,

Unit -I
Listening, Speaking, Reading and Writing skills (LSRW)

Unit -II
Team works 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

Total Periods: 30

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

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

II Semester

Subject Code: **HBTA22002**	Subject Name: **TAMIL PAPER - II**		T / L/ **ETL**	**L**	T / **S.Lr**	**P/ R**	**C**
	Prerequisite:Knowledge of Tamil		**Ty**	**3**	**0**	**0**	**3**

C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical
R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation

OBJECTIVES:

- Communicating with friends from around the world via social networking opportunities.
- To develop 21st century learners who love & appreciate Tamil language.
- Learn significance of spoken skill.
- The relationship between language &culture and the implications for language teaching
- Travelling to other countries and learning about other cultures.

COURSE OUTCOMES (COs): After Completing the course, the student can be able to

CO1	Strengthen literacy skills
CO2	Engage in learning Tamil language and culture in a meaningful setting
CO3	Engross in independent and life-long learning
CO4	Develop a strong foundation in listening & speaking skills.
CO5	Arouse studentsinterest and ignite the joy of learning Tamil language.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	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	2
CO5	3	3	3	3	3	3	2	2	3

COs / PSOs	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3
CO2	2	2	3	3
CO3	3	3	3	3
CO4	2	2	3	3
CO5	3	3	3	2

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

Category	Program Core	Program elective	Humanities and Social Sciences	Open Electives	Skill enhancing elective	Inter Disciplinary/Allied	Skill Component	Practical /Project/internship	Others			
			✔									

40

பொதுத்தமிழ்
இளநிலை மாணாக்கருக்கு
B.A/B.Sc/B.Com/B.B.A/B.C.A/B.PES
முதலாம் ஆண்டு- இரண்டாம் பருவம்
HBTA22002
கற்றல் நோக்கம்: 1.தமிழர்பண்பாட்டினைஅறியச்செய்தல்
2.கடிதம்எழுதும்திறன்வளர்த்தல்
3.தமிழ்இலக்கியவரலாற்றினைஅறிதல்

அலகு - 1 சங்கஇலக்கியம்   9 மணிநேரம்

1. புறநானூறு - பா.எண் - 183,184,192
2. குறுந்தொகை - பா. எண் 2,40,167
3. நெடுநல்வாடை - 1 முதல் 44 வரிகள்வரை
4. கலித்தொகை - பா.எண் 102,133

அலகு - 2 காப்பியம்9 மணிநேரம்

1. சிலப்பதிகாரம் - வழக்குஉரைகாதைமுழுவதும்

அலகு - 3 நீதி இலக்கியம்   9 மணிநேரம்

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 (10பாடல்கள்)
3. ஆசாரக்கோவை - 20,23,25,76,96 (5 பாடல்கள்)
4. திரிகடுகம்- 7,12,27,31,38,(5 பாடல்கள்)

அலகு - 4 தமிழ்இலக்கியவரலாறு   9 மணிநேரம்

1. பக்திஇலக்கியம்
2. சிற்றிலக்கியம்

அலகு - 5 இலக்கணம்   9 மணிநேரம்

1. வல்லினம்மிகும்இடங்கள்
2. வல்லினம்மிகாஇடங்கள்
3. வினாவகைகள்
4. விடைவகைகள

மொழிப்பயிற்சி

1. கடிதம்எழுதும்முறை
2. செய்வினை – செயப்பாட்டுவினை
3. மயங்கொலிப்பிழையைநீக்குக

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

Subject Code: **HBHI22002**	Subject Name: **HINDI II**		T / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: Knowledge of Hindi		Ty	3	0/0	0/0	3

L: Lecture, T:Tutorials: Supervised Learning, P: Project, R: Research, C: Credits, T/L/ETL: Theory / Lab / Embedded Theory and Lab

OBJECTIVES:

- To Understand the Ancient Hindi plays and its aspects.
- To understand the medical stories and well-known novels
- To know the techniques in writing Annotation and Translation

COURSE OUTCOMES (COs): After Completing the course, the student can be able to

CO1	Introduce students to the real-world situation with the help of Plays and stories written by various poets and writers.
CO2	Understand the Literature in broader areas than merely confined to the subject
CO3	Evaluate the concept of Hindi from past to present and to study the society closely through Literature.
CO4	Make the best use of Hindi language in various streams.
CO5	Helps in their Career acquiring knowledge in a language

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	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	2	2	2	3	3

COs / PSOs	PSO1	PSO2	PSO3	
CO1	1	1	1	
CO2	1	1	1	
CO3	1	1	1	
CO4	1	1	1	
CO5	1	1	1	

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

Category	Program Core	Program elective	Humanities and Social Sciences	Open Electives	Skill enhancing elective	Inter Disciplinary/Allied	Skill Component	Practical /Project/internship	Others			
			✔									

SubjectCode: **HBHI22002**	Subject Name: **HINDI II**	T / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: Knowledge of Hindi	Ty	3	0/0	0/0	3

UNIT – I: One Act Play – novel and translation of hindi language)   **9 Periods**
1.   Auranzeb ki AakhiriRaat
2.   Mukthidhan
3.   Practice of Annotation Writing
4.   Practice of Summary and Literary evaluation Writing

UNIT – II: One Act Play – novel and translation of hindi language)   **9 Periods**
1.   Laksmi kaSwagat
2.   Mithayeewala
3.   Practice of Annotation Writing
4.   Practice of Summary and Literary evaluation Writing

UNIT-III: One Act Play – novel and translation of Hindi language)   **9 Periods**
1.   Basant Ritu kaNatak
2.   Seb Aur Dev
3.   Practice of AnnotationWriting
4.   Practice of Summary and Literary evaluationWriting

UNIT-IV: One Act Play – novel and translation of hindilanguage)   **9 Periods**
1.   Bahut BadaSawal
2.   Vivah ki Teen Kathayen
3.   Practice of Annotation Writing
4.   Practice of Summary and Literary evaluation Writing

UNIT-V:(**Translation of Hindi Lanaguage to English language-paragraph,**

technical terms)   **9 Periods**

1. Translation Practice. (English to Hindi)

                                                                        Total Periods:45

REFERENCES:

1.   AathEkanki, Edited by Devendra Raj Ankur, Mahesh Anand Vaaniprakashan, 4695, 21- A Dariyagunj, New Delhi-110002
2.   Swarna Manjari, Edited by Dr.Chitti Annapurna, Rajeshwari Publications 21/3, Mothilal street, (opp.Ranganthan Street) T.Nagar, Chennai-600017
3.   Prayojan Mulak Hindi :Dr.SyedRahmathullah, Poornima Prakashan, 4/7, Begum III street, Royapettah, Chennai-14
4.   Anuvad Abhyas Part III Dakshin Hindi Prachar Sabha, T.Nagar ,Chennai -17

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

Subject Code: HBFR22002	Subject Name: FRENCH II		T / Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: French I		Ty	**3**	0/0	0/0	**3**

L: Lecture, T:Tutorials: Supervised Learning, P: Project, R: Research, C: Credits, T/L/ETL: Theory / Lab / Embedded Theory and Lab

OBJECTIVES:

- Students will be able to understand the familiar words and expressions when someone talks slowly and distinctly.
- The students will be able to reads; he/she will be able to understand the posters, advertisements or catalogues.
- The students will be able to communicate and ask and reply to simple questions on familiar subjects
- The students will be able to use expressions and write simple sentences without faults to describe their living spaces

COURSE OUTCOMES (COs): After Completing the course, the student can be able to

CO1	Repeating the basics learnt and memorizing new a factor like the conjugations
CO2	Understanding very frequent expressions and vocabulary concerning immediate surrounding and what concerns the speaker. Also understand simple announcements and clear message.
CO3	Can read, understand and act upon on short announcements classified in papers or catalogues, menu cards, timings and personal shot and messages
CO4	Can utilize a series of sentences or expressions to describe in simple terms family living conditions studies and actual and recent professional activities
CO5	Can communicate simple and direct exchange originating from simple habitual tasks on familiar activities and subjects.
CO6	Can communicate simple and direct exchanges originating from simple habitual tasks on familiar activities and subjects

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	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
CO5	2	2	2	1	1	1	1	2	1
CO6	1	1	2	2	1	1	1	1	1
CO7	1	1	2	2	1	1	1	1	1

COs / PSOs	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	1	1	1
CO3	1	1	1
CO4	1	1	1
CO5	1	1	1
CO6	1	1	1
CO7	1	1	1

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

Program Core	Program elective	Humanities and Social Sciences	Open Electives	Skill enhancing elective	Inter Disciplinary/ Allied	Skill Component	Practical /Project/ internship	Others		
		✔								

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

SubjectCode:	Subject Name:	T / Lb/	L	T /	P/ R	C
HBFR22002	**FRENCH– II**	ETL		S.Lr		
	Prerequisite: French I	Ty	**3**	0/0	0/0	**3**

UNIT I : 9 Periods

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 : 9 Periods

Compétences communicatives, phonologiques, linguistiques, 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 : 9 Periods

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 :   9 Periods
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 :   9 Periods

Compétences communicatives, phonologiques, linguistiques, grammaticales et culturelles Planifier des vacances, parler des concours, du sport, du temps qu'il fait, s'exprimer au comparatif
- 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 Periods: 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

Subject Code: **HBEN22002**	Subject Name: **LANGUAGE II - ENGLISH II**					**Ty/Lb/ ETP**	**L**	**T/ S.Lr**	**P/R**	**C**
	Prerequisite – English Language					Ty	3	0/0	0	3

L: Lecture T: Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits
Ty/Lb/ETL: Theory/Lab/Embedded Theory and Lab

OBJECTIVES:
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.

Course Outcomes (COs)

CO1	Develop four language skills appropriate to the level of education.
CO2	Demonstrate knowledge of vocabulary and sentence construction in appropriate contexts.
CO3	Express diverse forms of knowledge in different social and cultural contexts.
CO4	Attain a comprehensive knowledge of communication skills to use ethically.
CO5	Develop organized academic and business writing for professional careers

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	3	3	3	3	3	3	1	3
CO2	3	3	3	3	3	3	3	1	3
CO3	3	3	3	3	3	3	3	1	3
CO4	3	3	3	3	3	3	3	1	3
CO5	3	3	3	3	3	3	3	1	3

COs/PSOs	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3
CO2	3	3	3	3
CO3	3	3	3	3
CO4	3	3	3	3
CO5	3	3	3	3

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

Category	H&S	Program core	Program Elective	Open Elective	Interdisciplinary/ Allied	Skill enhancing Elective	Skill component	Practical	Project	Internship	Others
	✔										

Subject Code: **HBEN22002**	Subject Name: **LANGUAGE-II: ENGLISH II**	**Ty/Lb/ ETP**	**L**	**T/ S.Lr**	**P/R**	**C**
	Prerequisite – English Language	Ty	3	0/0	0/0	3

UnitI: **9 Periods**
1. All the World's a Stage – William Shakespeare
2. Speech of Barack Obama
3. The Verger- Somerset Maugham

UnitII: **9 Periods**
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

UnitIII: **9 Periods**
1. Night of the Scorpion-Nissim Ezekiel
2. On Running after one's hat- G.K.Chesterton
3. The Last Leaf – O. Henry

UnitIV: **9 Periods**
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

UnitV: **9 Periods**
Functional English: Letter Writing (Formal, Informal, Email)
1. Resume
2. Précis
3. Reading Comprehension, Developing the hints

                                                                   Total Periods:45

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 withJ.Hull &S. Proctor, Interchange, Level3, Cambridge University Press,2021.
- MarkHancock, English Pronunciation inUse,CUP,2016.
- M.ChandrasenaRajeswaran&R. Pushkala, Communication LabWorkbook2022.
- M.Chandrasena Rajeswaran,R. Pushkala &S.Bhuvaneswari Pinnacle: ASkillsIntegratedText,2022
- Dutt,K,Rajeevan,G&Prakash,,*ACourseonCommunicationSkills,*1stedn,CUP,Chennai,2008

Suggested Links:

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

Subject Code: **HBMA22ID2**	Subject Name: **ALLIED - II MATHEMATICS-II**		Ty/Lb/ ETL	L	T/ S.Lr	P/R	C
	Prerequisite: Higher Secondary Mathematics		Ty	3	1/0	0/0	4

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 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

COURSE OUTCOMES (Cos) Students completing this course were able to

CO1	Understand the basic concept First order differential equations – Second and higher order linear differential equations with constant coefficients.
CO2	Understand how to solve the Problem in Partial derivatives, Jacobians, Maxima and Minima of functions of two variables and Lagrange's multipliers.
CO3	Learn how to solve problems in Cartesian and Polar Co-ordinates (Double and Triple integral) and change of order of integration.
CO4	Understand the concept inFormulation of LPP, Standard form of LPP, Graphical method and Simplex method.
CO5	Learn to solve problems in Transportationusing MODImethod and Assignment problem using Hungarian method.

Mapping of Course Outcome with Program Outcome (POs)

Cos/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	2	3	3	2	1	2	2	1
CO2	3	2	2	3	3	2	1	2	3
CO3	3	2	3	2	3	2	2	1	3
CO4	3	3	2	3	2	2	2	1	2
CO5	3	2	3	1	3	2	3	2	3

COs/POSs	PSO1	PSO2	PSO3
CO1	3	2	3
CO2	3	2	2
CO3	3	2	2
CO4	3	2	2
CO5	2	2	3

3/2/1 Indicates Strength of Correlation, 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/interns hip	Others
						✔			

Subject Code: HBMA22ID2	Subject Name: **ALLIED - II MATHEMATICS-II**	Ty/Lb/ ETL	L	T/ S.Lr	P/R	C
	Prerequisite: Higher Secondary Mathematics	Ty	3	1/0	0/0	4

UNIT I: ORDINARY DIFFERENTIAL EQUATIONS   12 Periods

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   12 Periods

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

UNIT III: MULTIPLE INTEGRALS   12 Periods

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   12 Periods

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

UNIT V: TRANSPORTATION AND ASSIGNMENT   12 Periods

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 Periods: 60

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).

Subject Code: **HBCF22002**	Subject Name: **PYTHON PROGRAMMING**			**Ty/Lb/ETL**	**L**	**T/ S.Lr**	**P/R**	**C**
	Prerequisite: C, C++			Ty	3	1/0	0/0	4

L: Lecture T: Tutorial   S.Lr : Supervised Learning P : Project R : Research C: Credits
Ty/Lb/ETL: Theory/Lab/Embedded Theory and Lab

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 programmi*n*g in a variety of different disciplines—especially as it relates in engineering.

COURSE OUTCOMES (COs):(3- 5) Students completing this course were able to

CO1	Remember the syntax and semantics of python programming.
CO2	Will understand how functional and operations are to be utilized.
CO3	Reproduce a working knowledge of concepts and terminology related to programming language by developing student's creativity.
CO4	Students will analyse the problem and provide solutions for the problem.
CO5	Will able to incorporate the knowledge for various problems.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	3	2	2	2	3	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	PSO2	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 Strength of Correlation   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 Code: **HBCF22002**	Subject Name: **PYTHON PROGRAMMING**	Ty/Lb/ ETL	L	T/ S.Lr	P/R	C
	Prerequisite: C, C++	Ty	3	1/0	0/0	4

UNIT I INTRODUCTION

12 Periods

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, OPERATORS AND CONTROL FLOW   12 Periods

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   12 Periods

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   12Periods

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

UNIT V OBJECT ORIENTED PROGRAMMING OOP IN PYTHON   12Periods

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

Total Periods: 60

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.

Subject Code: **HBCF22003**	Subject Name: **DATA STRUCTURES**		Ty/Lb/ETL	L	T/S.Lr	P/R	C
	Prerequisite: Basic knowledge of C. C++		Ty	3	1/0	0/0	4

L: Lecture T: Tutorial   S.Lr : Supervised Learning P : Project R : Research C: Credits
Ty/Lb/ETL: Theory/Lab/Embedded Theory and Lab

OBJECTIVES:

- Develop skills to design and analyze simple linear and nonlinear data structures.
- To Understand basic concepts about stacks, queues, lists, trees and graphs
- To introduce various techniques for representation of the data in the real world

COURSE OUTCOMES (COs):(3- 5) Students completing this course were able to

CO1	Learn fundamentals of data structures and their applications essential for programming/problem solving.
CO2	Analyze and apply linear data structures: Stack, Queues, lists to solve problem
CO3	Understand the working principles of Linked List
CO4	illustrate and compare various techniques for searching and sorting
CO5	Implement and analyze graph data structure

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	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
CO1	3	3	2
CO2	3	3	1
CO3	2	2	3
CO4	2	2	3
CO5	3	3	2

3/2/1 indicates Strength of Correlation   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 Code: HBCF22003	Subject Name: DATA STRUCTURES	Ty/Lb/ ETL	L	T/ S.Lr	P/R	C
	Prerequisite: Basic knowledge of C. C++	Ty	3	1/0	0/0	4

UNIT: I 12 Periods

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 12 Periods

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 12 Periods

Linked List

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

UNIT: IV

Tree & Graph 12 Periods

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 12 Periods

Searching and sorting

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

Total Periods: 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.

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

L: Lecture T : Tutorial   S.Lr : Supervised Learning P : Project R : Research C: Credits
Ty/Lb/ETL: Theory/Lab/Embedded Theory and Lab

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

COURSE OUTCOMES (COs):(3- 5) Students completing this course were able to

CO1	Understand, write and test simple data structure concepts using python program.
CO2	Execute Python programs with searching & sorting techniques.
CO3	Use capacities for organizing data structure concepts using Python programs.
CO4	Students can Create own python program.
CO5	Classify the basic data type and structure in python program

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
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
CO4	3	1	1
CO5	2	1	1

3/2/1 indicates Strength of Correlation   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 Code: **HBCF22L02**	Subject Name: **DATA STRUCTURES USING PYTHON LAB**	**Ty/Lb/ ETL**	**L**	**T/ S.Lr**	**P/R**	**C**
	Prerequisite: Data structures concepts &Python	Lb	0	0/0	3/0	2

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 Periods:45

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

Subject Code: **HBCC22I03**	Subject Name: **SOFT SKILL – II(ENGLISH)**		T/Lb/ ETL	L	T / S.Lr	P/R	C
	Prerequisite: Plus 2 English		IE	0	0/0	2/0	1

L: Lecture T: Tutorial SLr : Supervised Learning P: Project R : Research C: Credits
T/L/ETL: Theory / Lab / Embedded Theory andLab

OBJECTIVES:

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

COURSE OUTCOMES (Cos) Students completing this course were able to

CO1	Cultivate employability skills that they get employed even before they leave the university
CO2	Build self-esteem and a sense of self-worth to be good team members
CO3	Cultivate empathy to think from others' point of view to be good team leaders.
CO4	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.

Cos/POs	PO1	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	PS01	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- 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 Code: **HBCC22I03**	Subject Name: **SOFT SKILL – II(ENGLISH)**	T/Lb/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite : Plus 2 English	IE	0	0/0	2/0	1

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.

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 behavior
Cultural intelligence: Low and High context, e mail and inter cultural communication

Unit -V

Group discussion &Interview skills

Total Periods: 30

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

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

III Semester

Subject Code: **HBEC22ID3**	Subject Name: **ALLIED-III ELECTRONICS**		T/Lb/ETL	L	T / S.Lr	P/R	C
	Prerequisite: Basic Knowledge of ElectroComponents and electromechanical products		Ty	3	0/0	0/0	3

L: Lecture T: Tutorial SLr: Supervised Learning P: Project R: Research C: Credits T/L/ETL:Theory / Lab / Embedded Theory and Lab

OBJECTIVES:
- To learn the basic concepts of number systems and character codes.
- To understand the concepts of various Logic gates, Boolean Algebra and Theorems.
- To implement simple arithmetic circuits such as Half and Full Adders
- To learn and implement sequential logic design
- To understand the different memory elements of computer such as RAM/ROM

COURSE OUTCOMES (Cos) Students completing this course were able to

CO1	Be familiar with the Number Systems
CO2	Logic gates and Karnaugh map simplification
CO3	Simple Arithmetic Circuits and Processing Circuits
CO4	Sequential logic design with Converters
CO5	Memory elements and disk cache

Mapping of Course Outcomes with Program Outcomes (POs)

COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
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	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 Strength of Correlation   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
						✓			

SubjectCode: HBEC22ID3	Subject Name: **ALLIED-III ELECTRONICS**	T/Lb/ ETL	L	T / S.Lr	P/R	C
	Prerequisite: Basic Knowledge of ElectroComponents and electromechanical products	Ty	3	0/0	0/0	3

Unit – I   **9 Periods**
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   **9 Periods**
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   **9 Periods**
Simple arithmetic circuits: Half and Full adders - Binary adder/ subtracter - BCD adder **Data processing circuits:** Multiplexers - Demultiplexers -Encoders and Decoders.
                                                                                                           9 Periods
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   **9 Periods**
Memory Elements: RAM - static RAM - Dynamic RAM - ROM - Magnetic Disk memories - Magnetic tape – Cache Memory – Error detection & Correction using Parity & Hamming code.

Total 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.

Subject Code: **HBCF22004**	Subject Name: **COMPUTER NETWORKS**	T/Lb/ ETL	L	T / S.Lr	P/R	C
	Prerequisite: Basic Knowledge of network	Ty	3	1/0	0/0	4

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 build and understand the concepts of data communication.
- To able to know about types of networks and protocols
- To understand the structure of different networks

COURSE OUTCOMES (COs) : (3- 5)

CO1	To understand the concepts of Data Communication
CO2	To know about the Layering concepts of different Standards
CO3	To familiar about the Transporting and Routing mechanisms
CO4	To learn about the error and Flow control techniques.
CO5	To understand the operations of Different Networks

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	1	3	2	2	1	2	1	2	2
CO2	2	3	2	1	2	2	2	2	2
CO3	3	3	1	1	2	1	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
CO5	3	2	2

3/2/1 indicates Strength of Correlation   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 Code: **HBCF22004**	Subject Name: **COMPUTER NETWORKS**	**T/Lb/ ETL**	**L**	**T / S.Lr**	**P/R**	**C**
	Prerequisite: Basic Knowledge of network	Ty	3	1/0	0/0	4

UNIT I   **12 Periods**

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

UNIT II   **12 Periods**

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   **12 Periods**

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

UNIT IV   **12 Periods**

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

UNIT V   **12 Periods**

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

Total Periods: 60

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.

Subject Code: **HBCF22007**	Subject Name: **JAVA PROGRAMMING**		Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
	Prerequisite: Basic Knowledge of programming		Ty	3	1/0	0/0	4

L: Lecture T: Tutorial SLr : Supervised Learning P: Project R : Research C: CreditsT/L/ETL :Theory / Lab / Embedded Theory andLab

OBJECTIVES:
- To understand the importance of Classes & objects along with constructors and Arrays
- Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function.
- To understand Java Swings for designing GUI applications.
- Discuss the principles of inheritance, interface and packages and how they relate to the abstract classes.
- To understand importance of multi-threading& different exception handling mechanisms.

COURSE OUTCOMES (Cos) Students completing this course were able to

CO1	Be familiar with the concepts of class and object
CO2	Comprehend building blocks of oops language
CO3	Design GUI using AWT and Swing
CO4	Identify various concepts of oops and its concepts
CO5	Develop multi-threadingobject-oriented programs

Mapping of Course Outcome with Program Outcome (POs)

Cos/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	2	2	2	3	2	2	3	2
CO2	2	2	3	3	2	2	3	2	2
CO3	1	3	2	2	2	3	3	1	2
CO4	2	2	3	3	3	2	2	2	3
CO5	3	3	1	3	1	3	3	2	3

COs /PSOs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	3	2	3
CO3	3	3	3
CO4	2	3	2
CO5	3	2	3

3/2/1 Indicates Strength of Correlation, 3 – High, 2- Medium, 1- Low

Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skillenhancing elective	Inter Disciplinary/Allied	Skill Component	Practical /Project/internship	Others
	✔								

Subject Code: **HBCF22007**	Subject Name: **JAVA PROGRAMMING**	Ty/ Lb/ ETL	L	T/ S.Lr	P/R	C
	Prerequisite: Basic Knowledge of programming	Ty	3	1/0	0/0	4

UNIT: I   **12 Periods**
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   **12 Periods**
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   **12 Periods**
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   **12 Periods**
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   **12 Periods**
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)

Total Periods: 60

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.

Subject Code: **HBCS22007**	SubjectName: **OPERATING SYSTEM**		**Ty/ Lb/ ET L/IE**	**L**	**T / S.Lr**	**P/R**	**C**
	Prerequisite: Data Structures		Ty	3	0/0	0/0	3

L: Lecture T: Tutorial SLr : Supervised Learning P: Project R : Research C: CreditsT/L/ETL : Theory / Lab / Embedded Theory andLab

OBJECTIVES:

- I/O manager and methods used to implement the different parts of OS. To understand the main components of an OS & their functions.
- Tostudytheprocessmanagementandscheduling.
- UnderstandtheprocessmanagementpoliciesandschedulingofprocessesbyCPU.
- TounderstandtheconceptsandimplementationMemorymanagementpoliciesandvirtualmemory.
- Tounderstandtheworkingofan OSas aresourcemanager,filesystemmanager,processmanager, memory manager

COURSEOUTCOMES(COs) Studentscompletingthiscoursewereableto

CO1	BefamiliarwiththeconceptsofOperatingSystems.
CO2	ProcessmanagementandSchedulingAlgorithms.
CO3	MemoryManagementandPageschedulingAlgorithm.
CO4	InformationmanagementwithDiskscheduling.
CO5	FamiliarwiththebasicsofLinuxsystemandMobileOSlikeIosandAndroid.

Mapping of Course Outcome with Program Outcome (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	2	2	3	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	2	3	3	2	3

COs/PSOs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	2	2	3
CO3	3	3	3
CO4	2	3	2
CO5	3	2	3

3/2/1IndicatesStrength ofCorrelation,3–High,2-Medium,1-Low

Category	Program Core	Program Elective	Humanities and Social Science	OpenElective	Skill Enhancing Elective	Inter Disciplinary/ Allied	Skill Component	Practical/ Project / Internship	Others
	✔								

Subject Code: **HBCS22007**	Subject Name: **OPERATING SYSTEM**	Ty/ Lb/ ET L/IE	L	T / S.Lr	P/R	C
	Prerequisite:Data Structures	Ty	3	0/0	0/0	3

UNIT I   **9 Periods**

Operating System Overview: Objectives and functions - Evolution of Operating System – Types of OS – Multiprogramming system and Batch system – Time sharing system - Computer System Organization Operating System Structure and Operations- System Calls, System Programs.

UNIT II   **9 *Periods***

Process Management: Processes - Process Concept, Process Scheduling, Operations on Processes, Inter-process Communication; CPU Scheduling - Scheduling criteria, Scheduling algorithms, Threads- Overview, Multithreading models, Threading issues; Process Synchronization - The critical-section problem, Classic problems of synchronization, Deadlock - Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.

UNIT III   **9 *Periods***

Storage Management: Main Memory – Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with paging, Virtual Memory –Background, Demand Paging, Page Replacement, Allocation, Thrashing; Allocating Kernel Memory, OS Examples.

UNIT IV   **9 *Periods***

File Systems and I/O Systems: Mass Storage system – Overview of Mass Storage Structure, Disk Structure, Disk Scheduling and Management, File concept, Access methods, Directory Structure, Directory organization, File Sharing and Protection; File System Implementation- File System Structure, Directory implementation, Allocation Methods, Free Space Management, Recovery; I/O Systems – I/O Hardware.

UNIT V   **9 *Periods***

Case Study: Linux System - Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, Input-Output Management, File System, Inter-process Communication; Mobile OS - iOS and Android - Architecture and SDK Framework, Core OS Layer, File System.

          Total periods: 45

TEXT BOOK:

    1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, ―Operating System Concepts‖, 9th Edition, John Wiley and Sons Inc., 2012.

REFERENCES:

          1. Ramaz Elmasri, A. Gil Carrick, David Levine, ―Operating Systems – A Spiral Approach‖,Tata McGraw Hill Edition, 2010.
          2. Achyut S.Godbole, Atul Kahate, ―Operating Systems‖, McGraw Hill Education, 2016.
          3. Andrew S. Tanenbaum, ―Modern Operating Systems‖, Second Edition, PearsonEducation, 2004.
          4. Gary Nutt, ―Operating Systems‖, Third Edition, Pearson Education, 2004.

SubjectCode: **HBCS22009**	Subject Name: **DATABASE MANAGEMENT SYSTEM**			**Ty/Lb/E TL /IE**	**L**	**T/ S.Lr**	**P/R**	**C**
	Prerequisite: Data Structures			Ty	3	1/0	0/0	4

L : Lecture T : Tutorial SLr : Supervised Learning P: Project R : Research C :
Credits Ty/Lb/ETL:Theory/Lab/Embedded Theory and Lab

OBJECTIVES:

- To describe the features of data base management systems and Relational database.
- To introduce the concepts of basic SQL as a Data base language.
- Create the constraints and keys, using SQL.
- Analyze the existing design of a data base schema and apply concepts of normalization to design an optimal database.
- To demonstrate the principles behind systematic database design approaches by covering conceptual design, Logical design through normalization

COURSEOUTCOMES(COs) Students completing this course were able to

CO1	Understand the purpose of database
CO2	Classify the different SQL queries
CO3	Able to design Relational Database
CO4	Understand different Indexing and Hashing Techniques
CO5	Understand about XML Schemas

Mapping of Course Outcome with Program Outcome (POs)

COs /POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	2	2	3	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	2	3	3	2	3

COs/PSOs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	2	2	3
CO3	3	3	3
CO4	2	3	2
CO5	3	2	3

3/2/1Indicates Strength of Correlation,3–High,2-Medium,1-Low

Category	ProgramCore	ProgramElective	HumanitiesandSocialScience	Open Elective	SkillEnhancing Elective	InterDisciplinary/ Allied	SkillComponent	Practical /Project /Internship	Others
	✔								

SubjectCode: **HBCS22009**	Subject Name: **DATABASE MANAGEMENT SYSTEM**	Ty/Lb/ETL /IE	L	T/ S.Lr	P/R	C
	Prerequisite: Data Structures	Ty	3	1/0	0/0	4

UNIT: I   **12 Periods**

Introduction to Databases and Transactions-What is database system – Purpose of database System-View of data–Mapping Constraints-Relational databases-Database architecture -Transaction management

UNIT: II   **12 Periods**

Database design, ER Model and SQL: Overview - ER-Model - Constraints - ER-Diagrams - ERD Issues - Weak entity sets - **Structured Query Language** - Aggregate Functions - Null Values - Nested Sub queries – Modification of Databases -Joined Relations-DDL-Triggers

UNIT: III   **12 Periods**

Relational Database design - Features of good relational database design - Normalization (1NF, 2NF, 3NF, BCNF)-**RelationalAlgebra**: Selectionandprojection-SetOperations-Renaming-Joins-Division-Syntax
- Semantics-Operators-Grouping and Ungrouping

UNIT: IV   **12 Periods**

Transaction management and Concurrency control - ACID properties - Serializability and concurrent cycontrol - Lock based concurrency control (2PL, Deadlocks) - Time stamping methods - Optimistic methods – Database recovery management

UNIT: V   **12 Periods**

Data Fragmentation - Replication - XML Databases - XML Schema - NOSQL Database: Characteristics - Types of No SQL Data stores: Column Oriented, Document, Key-Value and Graph Types – Applications – Current Trends.

                                               Total periods: 60

TEXTBOOKS:

1. ASilberschatz, HKorth, S Sudarshan, ―Database System and Concepts‖, fifth Edition McGraw–
Hill,Rob,Coronel,―DatabaseSystems‖,SeventhEdition,CengageLearning
2. Singh-Databasesystems: Concepts, Design&applications, PearsonEducation,2ndEdition,2011

REFERENCEBOOKS:

1. GeraldV.Post-DBMS-Designing and Business Applications –Mc Graw Hill Publications

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

Subject Code:	Subject Name : **JAVA PROGRAMMING LAB**		Ty/Lb/ETL	L	T/ S.Lr	P/R	C
HBCF22L04	**Prerequisite**: Basic Knowledge of programming		Lb	0	0/0	3/0	2

L : Lecture T : Tutorial   S.Lr : Supervised Learning P : Project R : Research C: Credits
Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVES :
- Understand the basic concepts and techniques which form the object-oriented programming concepts.
- Create a secured programming language.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Understanding about Object Oriented Programming concepts and basic characteristics of Java.
CO2	Imparting the principles of packages, inheritance and interfaces.
CO3	To define exceptions and use I/O streams.
CO4	Developing a java application with threads and generics classes.
CO5	Designing and building simple Graphical User Interfaces.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	2	3	2	2	1	3	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

COs / PSOs	PSO1	PSO2	PSO3
CO1	2	3	1
CO2	3	3	2
CO3	2	1	1
CO4	3	2	1
CO5	2	1	1

3/2/1 indicates Strength of Correlation   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 Code: **HBCF22L04**	Subject Name: **JAVA PROGRAMMING LAB**	**Ty/Lb/ ETL**	**L**	**T/ S.Lr**	**P/R**	**C**
	Prerequisite: Basic Knowledge of programming	Lb	0	0/0	3/0	2

LIST OF EXPERIMENTS

1. Finding area and Perimeter of a circle. Use Scanner class.

2. Determining the order of numbers generated randomly using Random Class.

3. String Manipulation (Substring removal, string replacement etc.

4. Drawing Rectangles, Ovals etc using Applet.

5. Implementing Thread based applications & Exception Handling.

6. Application using synchronization such as Thread based, Class based and synchronized statements.

7. Implementing GUI based applications using swing components (JLabel, JButton, and JTextfield)

8. Implementing GUI based application using Layout managers and menus.

9. Application using file streams (sequential file)

10. Application using file streams (Random file)

Total Periods:45

SubjectCode: **HBCS22L04**	SubjectName: **DATABASE MANAGEMENT SYSTEM LAB**		Ty/Lb/ET L/IE	L	T /S.Lr	P/R	C
	Prerequisite:Data Structures		Lb	0/0	0/0	3	2

L : Lecture T : Tutorial SLr : Supervised Learning P: Project R : Research C : Credits
Ty/Lb/ETL:Theory/Lab/Embedded Theory and Lab

OBJECTIVES:

- Toexplainbasicdatabaseconcepts,applications,data models,schemasand instances.
- Toemphasizetheimportanceof normalization indatabases
- Usethe basics of SQLandconstruct queriesusingSQLindatabasecreationandinteraction
- StudentsgetpracticalKnowledgeonDatabase
- LearnSQLbasicsfordatadefinition anddata manipulation

COURSEOUTCOMES(COs) Students completing hiscoursewereableto

CO1	MasterthebasicsofSQLandconstruct queriesusingSQL.
CO2	Demonstratetheirunderstandingofkeynotionsofqueryevaluation
CO3	DesignDatabasetable storepresentsimple database applicationscenarios
CO4	PerformtheQueriesforTriggeroperation
CO5	ImplementtheRelationalAlgebraQueries

Mappingof CourseOutcomewithProgramOutcome (POs)

COs /POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	2	3	3	3	2	2	2	3	3
CO2	2	2	3	3	2	2	3	2	3
CO3	2	3	2	3	2	3	3	1	2
CO4	2	2	3	3	2	3	2	2	3
CO5	3	3	1	3	2	3	3	2	3

COs/PSOs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	2	2	3
CO3	2	3	2
CO4	2	3	2
CO5	3	2	3

3/2/1IndicatesStrength ofCorrelation,3–High,2-Medium,1-Low

Category	Program Core	Program Elective	Humanities And Social Science	Open Elective	SkillEnhancing Elective	Inter Disciplinary/ Allied	Skill Component	Practical /Project /Internship	Others
								✔	

SubjectCode: **HBCS22L04**	SubjectName: **DATABASE MANAGEMENT SYSTEM LAB**	Ty/Lb/ET L/IE	L	T /S.Lr	P/R	C
	Prerequisite: Data Structures	Lb	0/0	0/0	3	2

List of Experiments

1) Design a Database and creature quirked tables. Fore.g. Bank, College Database

2) Write a Sql statement for implementing ALTER,UPDATE and DELETE

3) Perform the Execution of DDL Commands

4) Write relational algebra queries for a given set of relations.

5) Perform the Modification of Database

6) Write the queries to implement the joins

7) Write the query for implementing the following functions: MAX (), MIN (), AVG (), COUNT ()

8) Perform the queries for triggers

Total Periods:45

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

Subject Code: **HBCC22I05**	Subject Name: **QUALITATIVE AND QUANTITATIVE SKILL - SOFT SKILL III**	Ty/Lb/ ETL/IE	L	T/ S.Lr	P/R	C
	Prerequisite: Higher Secondary Mathematics	IE	0	0/0	2/0	1

L : Lecture T : Tutorial SLr : Supervised Learning P: Project R : Research C : Credits
Ty/Lb/ETL:Theory/Lab /Embedded Theory and Lab

OBJECTIVES:

- To understand the Basic concepts in Logical Reasoning
- To understand the Basic concepts in Arithmetical Reasoning
- To understand the Basic concepts in Data Interpretation

COURSE OUTCOMES (Cos) Students completing this course were able to

CO1	Understand the basic concepts of Logical Statements and Arguments
CO2	Understand the concept of Logical conclusions
CO3	Understand the Basic concepts in Number system
CO4	Understand the basic concepts of Permutations and Combinations
CO5	Learn how to analyze the data using Pictorial representation

Mapping of Course Outcome with Program Outcome (POs)

Cos/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	2	3	3	3	2	1	2	3
CO2	2	3	2	3	3	2	1	2	2
CO3	3	2	3	2	3	1	2	1	3
CO4	3	1	2	3	2	3	3	2	2
CO5	3	2	3	2	3	2	1	2	3

COs /PSOs	PSO1	PSO2	PSO3
CO1	2	-	-
CO2	2	-	1
CO3	-	-	1
CO4	3	1	2
CO5	2	1	1

3/2/1 Indicates Strength of Correlation, 3 – High, 2- Medium, 1- Low

Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/Project	Internships/ Skills component	Inter disciplinary
								✔	

Subject Code: **HBCC22I05**	Subject Name: **QUALITATIVE AND QUANTITATIVE SKILL - SOFT SKILL III**	Ty/Lb/ ETL/IE	L	T/ S.Lr	P/R	C
	Prerequisite: Higher Secondary Mathematics	IE	0	0/0	2/0	1

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: ArithmeticalReasoning 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.

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).

Total Periods:30

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

IV Semester

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

Subject Code: **HBDS24002**	SubjectName: **BUSINESS INTELLIGENCE**	Ty/Lb/ETL /IE	L	T /S.Lr	P/R	C
	Prerequisite: basic business knowledge	Ty	3	1/0	0/0	4

L : Lecture T : Tutorial SLr : Supervised Learning P: Project R : Research C : Credits Ty/Lb/ETL:Theory / Lab/Embedded Theory and Lab

OBJECTIVES:

- Learn the basic concepts and uses of Business Intelligence, focusing on OLTP, OLAP, and data warehousing.
- Understand the basics of data integration, including information and application integration techniques
- Learn the ETL process with SSIS, emphasizing data quality, mining, and transformation.
- Explore multi-dimensional data modeling, including dimensions, facts, schemas, and cube creation with SSAS.
- Understand the concepts and implementation of enterprise reporting, including dashboards, scorecards, and SSRS architecture

COURSEOUTCOMES(COs) Studentscompletingthiscoursewereableto

CO1	Understand the basic concepts of Business Intelligence, including OLTP, OLAP, and data warehousing.
CO2	Explain data integration techniques, focusing on information and application integration.
CO3	Demonstrate the ETL process using SSIS, with emphasis on data quality and transformation.
CO4	Apply multi-dimensional data modeling, including dimensions, facts, and schemas with SSAS
CO5	Design enterprise reporting solutions with SSRS, using dashboards and scorecards for monitoring.

Mappingof CourseOutcomewithProgramOutcome (POs)

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	2	3	2	2	1	2	1	1
CO2	2	3	2	2	2	2	2	2	1
CO3	2	2	3	3	3	2	1	1	1
CO4	1	2	2	3	2	3	2	2	2
CO5	2	2	2	2	2	1	3	3	2

COs/PSOs	PSO1	PSO2	PSO3
CO1	3	2	1
CO2	2	3	2
CO3	3	2	2
CO4	2	3	3
CO5	1	2	3

3/2/1IndicatesStrength ofCorrelation, 3 –High,2-Medium,1-Low

Category	ProgramCore	Program Elective	Humanities and Social Science	OpenElective	Skill Enhancing Elective	Inter Disciplinary/ Allied	Skill Component	Practical /Project /Internship	Others
	✔								

Subject Code: **HBDS24002**	SubjectName: **BUSINESS INTELLIGENCE**	Ty/Lb/ETL /IE	L	T /S.Lr	P/R	C
	Prerequisite: basic business knowledge	Ty	3	1/0	0/0	4

UNIT: 1 INTRODUCTION TO BUSINESS INTELLIGENCE 12 Periods

Introduction to OLTP and OLAP, BI Definitions & Concepts, Business Applications of BI, BI Life Cycle, BI Framework, Role of Data Warehousing in BI, BI Infrastructure Components – BI Process, BI Technology, BI Roles &Responsibilities, BI Data Governance and Security.

UNIT: II BASICS OF DATA INTEGRATION 12 Periods

Information integration, Enterprise Application integration, Web services-Management Issues Parallelism-Granularity-Dependence, Data Enhancement-Incremental Enhancement- Batch Enhancements-Standardization.

UNIT: III EXTRACTION TRANSFORMATION LOADING 12 Periods

Introduction to ETL using SSIS, Data quality-Data Cleansing-data profiling - Knowledge Discovery and Data Mining-Public Data-Unstructured Data-Data Resources-Data Lineage and Impact Analysis Source data transformation-Reconciliation-ETL Testing.

UNIT: IV INTRODUCTION TO MULTI-DIMENSIONAL DATA MODELING 12 Periods

Introduction to data and dimension modelling, multidimensional data model, ER Modelling vs. multi-dimensional modelling, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema, introduction to business metrics and KPIs, creating cubes using SSAS.

UNIT: V BASICS OF ENTERPRISE REPORTING 12 Periods

Introduction B enterprise reporting, concepts of dashboards, balanced scorecards, introduction to SSRS Architecture, enterprise reporting using SSRS

TotalPeriods:60

TEXTBOOKS
1. David Loshin ,"Bussiness Intelligence",First edition,2003.
2. Mike Biere, "Bussiness Intelligence for the enterprise", Pearson Publication, First Edition

REFERENCES
1. Larissa Terpeluk Moss, shakuyAtre,"Business intelligence roadmap",First Edition.
2. CindiHowson."Successful Business Intelligence: Secretsto making Killer BI Appliocations"McGraw-Hill Education, Second Edition,2013.
3. Brian,Larson,"Delivering business intelligence with Microsoft SQL server-2008",McGraw-Hill Education,2008.
4. Lynn Langit,"Foundations of SQL Server 2005 Business Intelligence",2007.

Subject Code: **HBDS24003**	Subject Name: **DATA MINING**	Ty/Lb/ ETL	L	T/S. Lr	P/R	C
	Prerequisite: data structure	Ty	3	1/0	0/0	4

L: LectureT: Tutorial S.Lr : Supervised Learning P:Project R: Research C:Credits
Ty/Lb/ETL:Theory/Lab/Embedded Theory and Lab

OBJECTIVES:

- Provide a never view of theme theologies and approaches to data mining
- Gain insight in to the challenges and limitations of data mining techniques and data ware housing
- Applying data mining solutions using common data mining tools

COURSEOUTCOMES(COs):(3-5)

CO1	Identify the functionality of the various data mining and data ware housing component
CO2	Appreciate the strengths and limitations of various data mining and data ware housing Models
CO3	Explain the analyzing techniques of various data
CO4	Describe different methodology issued in data mining and data ware housing.
CO5	Compare different approaches of data ware housing and data mining with various technologies.

Mapping of Course Out comes with Program Outcomes (POs)

COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	2	1	2	1	2	2	2	1	1
CO2	2	1	2	2	2	2	1	1	1
CO3	3	2	3	2	2	2	2	1	1
CO4	3	1	2	3	2	2	1	1	1
CO5	3	1	2	2	3	2	1	1	1

COs /PSOs	PSO1	PSO2	PSO3
CO1	2	2	2
CO2	2	2	2
CO3	3	2	3
CO4	3	3	2
CO5	3	3	2

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

Category	ProgramCore	Program Elective	Humanities and Social Science	Open Elective	Skill Enhancing Elective	Inter Disciplinary/ Allied	Skill Component	Practical /Project /Internship	Others
	✔								

SubjectCode HBDS24003	Subject Name: **DATA MINING**	Ty/Lb/ ETL	L	T/S. Lr	P/R	C
	Prerequisite: data structure	Ty	3	1/0	0/0	4

UNIT-I   **12 Periods**

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   **12 *Periods***

OLAP: OLAP Operations – Data Cube: A Multidimensional Data Model – OLAP Server – ROLAP

– MOLAP – Cube Computation.

UNIT-III   **12 Periods**

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   **12 Periods**

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   **12 Periods**

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

                                                                                          Total Periods: 60

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.

Subject Code: **HBCS22E09**	SubjectName: **ARTIFICIAL INTELLIGENCE**		Ty/Lb/L/IE	L	T /S.Lr	P/R	C
	Prerequisite: Basic Knowledge of Electronics		Ty	3	1/0	0/0	4

L: Lecture T: Tutorial SLr: Supervised Learning P: Project R: Research C: Credits
Ty/Lb/ETL:Theory/Lab/Embedded Theory and Lab

OBJECTIVES:
- To learn the overview of artificial intelligence principles and approaches.
- To understand about fundament alareas of Local Search Algorithms, Adversarial Searching and Neural Networks.
- Represent knowledge using logic and infer new facts from that Knowledge.
- To develop a basic understanding of the building blocks of AI as presented in term so fintelligentagents.
- To understand the various Artificial Intelligence application.

COURSE OUTCOMES (COs) Students completing this course were able to

CO1	Artificial intelligence principle and approaches.
CO2	Be familiar with various algorithms and searching techniques.
CO3	Knowledge representation.
CO4	Dealing with un certainties and inconsistencies.
CO5	AIapplication.

Mapping of Course Outcome with Program Outcome (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	2	3	2	2	3	3	2	3
CO2	2	2	2	3	2	3	2	2	3
CO3	1	3	3	2	2	3	3	1	3
CO4	2	3	2	2	3	2	3	2	3
CO5	3	2	2	2	1	3	2	3	3

COs/PSOs	PSO1	PSO2	PSO3
CO1	3	2	3
CO2	2	2	3
CO3	3	3	2
CO4	3	3	3
CO5	2	3	3

3/2/1 Indicates Strength of Correlation, 3 –High,2-Medium,1-Low

Category	Program Core	Program Elective	Humanities andSocialScience	Open Elective	SkillEnhancing Elective	Inter Disciplinary/ Allied	Skill Component	Practical /Project /Internship	Others
	✔								

Subject Code: **HBCS22E09**	Subject Name: **ARTIFICIAL INTELLIGENCE**	Ty/Lb/E TL/IE	L	T /S.Lr	P/R	C
	Prerequisite: Basic Knowledge of Electronics	Ty	3	1/0	0/0	4

UNIT-I 12 Periods

IntroductiontoArtificialIntelligence-Definition–FutureofArtificialIntelligence-BackgroundandApplications-Turing Test and Rational Agent approaches to AI - Introduction to Intelligent Agents- their structure, behavior and environment.

UNIT–II 12 Periods

Search Strategies-Uninformed–Informed–Heuristics–Local Search Algorithms and Optimization Problems–hill climbing algorithm–mean send analysis–Adversarial search–Alpha– Beta Pruning.

UNIT-III

12 Periods

Introduction to First Order Predicate Logic- Prolog Programming – Unification- Resolution Principle-forward and backward chaining-Semantic Nets-Conceptual Dependencies-Frames–Scripts-Production Rules.

UNIT- IV

12 Periods

Truth Maintenance System -Default Reasoning- Probabilistic Reasoning- Bayesian Probabilistic Inference-Possible World Representations-Software Agents–Architecture for Intelligent Agents–Agent Communication.

UNIT–V

12 Periods

AI Applications – Language Models – Information Retrieval – Information Extraction – Natural Language Processing – Machine Translation – Speech Recognition – Robot: Hardware – Perception – Planning –Moving.

Total periods: 60

TEXTBOOKS:

1. Deepak Khemani―Artificial Intelligence‖, Tata Mc Graw Hill Education2013.
2. Bratko, ―Prolog: Programming for Artificial Intelligence‖, Fourth edition,
3. Addison Wesley Educational Publishers Inc., 2011.

REFERENCEBOOKS:
1. S. Russell and P.Norvig,―Artificial Intelligence: A Modern Approach‖, Prentice Hall, Third Edition 2009
M. Tim Jones, ―Artificial Intelligence: A Systems Approach (Computer Science) ‖, Jones and Bartlett Publishers, Inc.;First Edition, 2008

Subject Code: **HBDS24L01**	Subject Name: **DATA MINING LAB**		Ty/Lb/ ETL	L	T/ S.Lr	P/R	C
	Prerequisite: NIL		Lb	0	0/0	3/0	2

L: Lecture T: Tutorial   S.Lr : Supervised Learning P : Project R : Research C: Credits
Ty/Lb/ETL: Theory/Lab/Embedded Theory and Lab

OBJECTIVES:
- Develop Proficiency in Data Mining Tools and Techniques
- Master Core Data Mining Methods
- Apply Data Mining Techniques to Real-World Problems

COURSE OUTCOMES (COs):(3- 5)

CO1	Effectively use Weka and Rattle for data exploration, preprocessing, and analysis
CO2	Clean and transform data through handling missing values, normalization, and feature selection.
CO3	Implement and evaluate classification, regression, and clustering algorithms, and interpret results.
CO4	Conduct complete data mining projects, from data preprocessing to applying techniques and deriving insights using CRISP-DM

Mapping of Course Outcomes with Program Outcomes (POs)

COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	2	3	2	2	1	1	2	1	1
CO2	2	2	3	2	2	1	2	1	1
CO3	3	2	3	3	2	2	3	1	1
CO4	3	3	3	3	3	2	3	1	1

COs / PSOs	PSO1	PSO2	PSO3
CO1	2	2	2
CO2	2	2	2
CO3	3	3	3
CO4	3	3	3

3/2/1 indicates Strength of Correlation   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
								✔	

Dr. M.G.R.
EDUCATIONAL AND RESEARCH INSTITUTE
DEEMED TO BE UNIVERSITY
University with Graded Autonomy Status
(An ISO 21091 : 2018 Certified Institution)
Periyar E.V.R. High Road, Maduravoyal, Chennai-95, Tamilnadu, India.

Subject code: **HBDS24L01**	Subject Name: **DATA MINING LAB**	**Ty/Lb/ ETL**	**L**	**T/ S.Lr**	**P/R**	**C**
	Prerequisite: NIL	Lb	0	0/0	3/0	2

LIST OF EXPERIMENTS

1.Introduction to Weka

- Explore Weka's interface and functionalities.
- Load and explore sample datasets.
- Understand basic data mining tasks.

2.Introduction to Rattle

- Load datasets into Rattle.
- Perform basic data exploration and visualization.
- Generate summary statistics.

3.Data Preprocessing in Weka

- Handle missing values, outliers, and noisy data.
- Apply normalization and standardization.
- Feature selection and extraction.

4.Data Cleaning and Transformation using Rattle

- Perform data imputation and outlier detection.
- Execute feature engineering and transformation tasks.

5.Basic Classification with Weka

- Apply decision trees, k-Nearest Neighbors (k-NN).
- Evaluate models using accuracy, precision, recall, and F1-score.

6.Advanced Classification Techniques in Weka

- Implement Naïve Bayes, Support Vector Machines (SVM).
- Analyze model performance and adjust parameters.

7.Regression Analysis using Rattle

- Implement linear regression and polynomial regression.
- Evaluate models using metrics such as Mean Absolute Error (MAE) and R-squared.

8.Regression Techniques in Weka

- Objective: Apply regression models in Weka.
- Activities:Conduct regression analysis and model evaluation.

9.Clustering with Weka

- Implement k-Means and Hierarchical Clustering.
- Evaluate clustering results using metrics such as Silhouette Score.

10.Advanced Clustering Techniques

- Apply DBSCAN and other advanced clustering algorithms.

Total Periods :45

Subject Code: **HBDS24I01**	Subject Name: **STATISTICAL ANALYSIS TOOL LAB**	TY/Lb/ ETL/IE	L	T / S.Lr	P/R	C
	Prerequisite: Basic Knowledge in Computer	IE	0	0/0	2/0	1

L: Lecture T: Tutorial SLr : Supervised Learning P: Project R : Research C: Credits
T/L/ETL: Theory / Lab / Embedded Theory and Lab

OBJECTIVES:

- Get familiar with the Jamovi interface and basic functions.
- Perform and interpret various hypothesis tests using Jamovi.
- Explore relationships between variables through correlation and regression.
- Learn data manipulation and cleaning techniques within Jamovi
- Apply more advanced statistical techniques to explore complex datasets.

COURSE OUTCOMES (Cos) Students completing this course were able to

CO1	Proficient Use of Jamovi for Basic Statistical Analysis
CO2	Data Visualization and Descriptive Statistics Proficiency
CO3	Data Transformation, Manipulation, and Cleaning Techniques
CO4	Advanced Statistical Analysis and Hypothesis Testing
CO5	Proficient Use of Jamovi for Basic Statistical Analysis

Mapping of Course Outcome with Program Outcome (POs)

Cos/POs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	P09
CO1	2	2	1	2	1	1	1	1	1
CO2	3	2	2	3	2	2	2	2	2
CO3	2	2	2	2	2	2	2	2	2
CO4	2	2	2	3	2	2	3	1	2
CO5	2	2	1	2	1	1	1	1	1

Cos/POs	PS01	PS02	PS03
CO1	1	1	1
CO2	2	2	2
CO3	2	2	2
CO4	2	3	2
CO5	1	1	1

3/2/1 Indicates Strength of Correlation, 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 Code **HBDS24I01**	Subject Name: **STATISTICAL ANALYSIS TOOL LAB**	TY/Lb/ ETL/IE	L	T / S.Lr	P/R	C
	Prerequisite: Basic Knowledge in Computer	IE	0	0/0	2/0	1

1. Introduction to Jamovi

    Calculation of simple probability, joint probability and conditional probability

2. Data Visualization (Graphs in Jamovi)

    o   Generate histograms for numerical variables.
    o   Create bar plots for categorical variables.
    o   Produce a scatter plot to visualize relationships between two numerical variables

3. Compute descriptive statistics and create visualizations for a given dataset

4. Transforming Data in Jamovi - Use any data set to compute a data variable and transforming a data variable

5.Data Manipulation and Cleaning in jamovi

6. Subgroups in Jamovi-Use any data set to do grouping, splitting ad filtering.

7. One Sample t-test in Jamovi- Perform one sample T-test for a given dataset.

8. Paired Sample t-test inJamovi- Perform paired sample T-test for a given dataset.

9. Hypothesis Testing - Perform hypothesis tests to compare groups and interpret the results for a given dataset(Independent T-test, Paired T-test, Chi-Square Test)

10. Correlation and Regression Analysis in jamovi - Compute pearson correlation coefficient & perform linear regression analysis.

Total Periods: 30

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

V Semester

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

Subject Code: **HBDS24004**	SubjectName: **R PROGRAMMING**				Ty/Lb/ETL /IE	L	T /S.Lr	P/R	C
	Prerequisite: Basic knowledge of C program				Ty	3	1/0	0/0	4

L: Lecture T: Tutorial SLr : Supervised Learning P: Project R : Research C :
Credits Ty/Lb/ETL:Theory/Lab/Embedded Theory and Lab

OBJECTIVES:

- Learn Fundamentals of R.
- Covers how to use different functions in R, how to read data in to R, accessing R packages, writing R functions, debugging, and organizing data using R functions.
- CovertheBasics ofstatisticaldataanalysis with examples.
- The whole syllabus will give an idea to collect, compile and visualize data using statistical functions.

COURSEOUTCOMES(COs) Students completing this course were able to

CO1	Students will use R and RStudio for basic operations, including package management and I/O.
CO2	write and debug R code with data types, operators, and control structures.
CO3	Create functions, manipulate strings, and use data structures like vectors and matrices.
CO4	Students can manage and manipulate data frames and handle data from CSV and Excel files.
CO5	Perform statistical analysis and create visualizations to interpret data.

Mapping of Course Outcome with Program Outcome (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	2	2	1	2	1	1	2	3	1
CO2	3	2	2	2	1	1	2	3	1
CO3	3	2	3	3	2	1	3	3	1
CO4	3	2	2	3	2	1	3	3	1
CO5	3	3	3	3	3	2	3	3	2

COs/PSOs	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	2	2	2
CO3	2	2	2
CO4	2	2	2
CO5	3	3	3

3/2/1 Indicates Strength of Correlation, 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 Code: **HBDS24004**	SubjectName: **R PROGRAMMING**	Ty/Lb/ETL /IE	L	T /S.L r	P/R	C
	Prerequisite: Basic knowledge of C program	Ty	3	1/0	0/0	4

UNIT I   **12 Periods**

Introduction to R: What is R? – Why R? – Advantages of R over Other ProgrammingLanguages - R Studio: Rcommand Prompt, R script file, comments – Handling Packages in R: Installing a R Package, few commands to get started :installed. Packages (),package Description(), help(), find. package (), library () - Input and Output – Entering Data from keyboard– Printingfewerdigitsormoredigits–Special Values functions: NA, Inf and –inf.

UNIT II   **12 Periods**

R Data Types: Vectors, Lists, Matrices, Arrays, Factors, Data Frame – **R - Variables:**Variable assignment, Data types of Variables, Finding Variable ls (), Deleting Variables – **ROperators**:ArithmeticOperators,RelationalOperators,LogicalOperator,AssignmentOperators,Miscella neous Operators-**R Decision Making:** if statement, if – elsestatement, if– else if statement, switch statement – **R Loops:** repeat loop, while loop, for loop – Loopcontrolstatement: breakstatement, next statement.

UNIT III   **12 Periods**

R-Function :functiondefinition,Built in functions: mean(), paste(), sum(), min(), max(),seq(),user-definedfunction,callingafunction,callingafunctionwithoutanargument,calling a function with argument values -**R-Strings**-**R Vectors–**Sequence vector, repunction, vectoraccess, vectornames, vectormath, vector recycling**,** vectorelementsorting **-RList-**Converting List to Vector - **R Matrices –R Arrays:** NamingColumns and Rows, Accessing Array Elements, Manipulating Array Elements, CalculationAcrossArrayElements - **R Factors** –creating factors, generating factor levelsg l().

UNIT IV   **12 Periods**

Data Frames –Create Data Frame, Data Frame Access, Understanding Data in Data Frames:dim(), nrow(), ncol(), str(), Summary(), names(), head(), tail(), edit() functions - Extract Datafrom Data Frame, **Expand Data Frame**: Add Column, Add Row - Joining columns and rowsin a Data frame rbind() and cbind() – Merging Data frames merge() – Melting and Castingdatamelt(), cast().

Loading and handling Data in R: Getting and Setting the Working Directory – getwd (),setwd(), dir() - **R-CSV Files-** Input as a CSV file, Reading a CSV File, Analyzing the CSVFile: summary(), min(), max(), range(), mean(), median(), apply() - Writing into a CSV File –**R-ExcelFile**– Readingthe Excel file.

UNIT V   **12 Periods**

Descriptive Statistics: Data Range, Frequencies, Mode, Mean and Median: Mean Applying Trim Option, Applying NA Option, Median- Mode**- Standard Deviation–Correlation-Spotting Problems in Data with Visualization:** visually Checking Distributions for a single Variable**- R –Pie Charts**: Pie Chart title and Colors– Slice Percentages and Chart Legend, 3D Pie Chart – **R Histograms** – Density Plot - **R – Bar Charts**: Bar Chart Labels, Title and Colors.

Total Periods:60

REFERENCES

1. SandipRakshit,RProgrammingforBeginners,McGrawHillEducation(India),2017,ISBN: 978-93-5260-455-5.
2. Seema Acharya, Data Analytics using R, McGrawHill Education (India), 2018, ISBN:978-93-5260-524-8.
3. TutorialsPoint(I)simplyeasylearning,OnlineTutorialLibrary(2018),*RProgramming*,Retrievedfro mhttps://www.tutorialspoint.com/r/r_tutorial.pdf.Andrie de Vries, Joris Meys, R for Dummies A Wiley Brand, 2nd Edition, John Wiley and Sons, Inc, 2015,ISBN: 978-1-119-05580-8

Subject Code:	Subject Name: **MACHINE LEARNING TECHNIQUES**		Ty/Lb/ETL /IE	L	T /S.Lr	P/R	C
HBDS24005	**Prerequisite:** Basic knowledge of C program		Ty	3	0/0	0/0	3

L: Lecture T: Tutorial SLr : Supervised Learning P: Project R : Research C : Credits Ty/Lb/ETL:Theory/Lab/Embedded Theory and Lab

OBJECTIVES:
- To understand the need form a chine learning for various problem solving
- To studythe various supervised, semi-supervised and unsupervisedlearning algorithms in machinelearning
- To understand the latest trends in machine learning
- To design appropriate machine learning algorithms for problem solving

COURSE OUTCOMES (COs) Students completing this course were able to

CO1	Differentiate between supervised, unsupervised, semi-supervised machine learning approaches
CO2	Discuss the decision tree algorithm an indent it and overcome the problem of overfitting
CO3	Discuss and apply the back propagation algorithm and genetically gorithms to various problems
CO4	Applythe Bayesianconceptsto machinelearning
CO5	Analyse and suggest appropriate machine learning approaches for various types of problems

Mapping of Course Outcomes with Program Outcome (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	2	2	3	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	2	3	3	2	3

COs/PSOs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	2	2	3
CO3	3	3	3
CO4	2	3	2
CO5	3	2	3

3/2/1 Indicates Strength of Correlation, 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 Code: **HBDS24005**	Subject Name: **MACHINE LEARNING TECHNIQUES**	Ty/Lb/ETL /IE	L	T /S.L r	P/R	C
	Prerequisite: Basic knowledge of C program	Ty	3	0/0	0/0	3

UNIT- I   9 **Periods**

INTRODUCTION

Introduction to ML- Reinforcement Learning- Unsupervised Learning- Supervised Learning- Linear Regression- Multivariate Regression- Partial Least Squares- Linear Discriminant Analysis

UNIT- II   9 **Periods**

NEURAL NETWORKS AND GENETIC ALGORITHMS: What are Neural Networks? Human Brain- Models of a Neuron -Neural Networks viewed as Directed Graphs- Network Architectures- Learning Processes - Reinforcement Learning and Unsupervised Learning- Learning Tasks

UNIT- III   9 **Periods**

BAYESIAN AND COMPUTATIONAL LEARNING

Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

UNIT- IV   9 **Periods**

INSTANT BASED LEARNING

K- Nearest Neighbour Learning – Locally weighted Regression – Radial Basis Functions – Case Based Learning. Decision Trees – Univariate Trees, Classification Tree, Regression Trees, Pruning, Rule Extraction from Trees, Learning Rules from Data, Multivariate Trees

UNIT- V   9 **Periods**

SUPPORT VECTOR MACHINES

Introduction, Optimal Hyper-plane for Linearly Separable Patterns and Non-separable Patterns- SVM viewed as a Kernel Machine- Design of SVMs-XOR problem-Linear Classifiers: Introduction- Linear Discriminant Functions and Decisions -Hyper-planes- The Perceptron algorithm- Least Square Methods- Nonlinear Classifiers.

Total Periods: 45

TEXT BOOK:
Tom M. Mitchell, ―Machine Learning, McGraw-Hill Education (India) Private Limited, 2013.

REFERENCES:
Ethem Alpaydin, ―Introduction to Machine Learning (Adaptive Computation and Machine Learning), The MIT Press 2004.
Stephen Marsland, ―Machine Learning: An Algorithmic Perspective, CRC Press, 2009. Edition, Pearson Education, 2004.

SubjectCode:	SubjectName: **ENTREPRENURSHIP DEVELOPMENT**	Ty/Lb/ETL /IE	L	T /S.Lr	P/R	C
HBCC22002	**Prerequisite:** Basic knowledge in entrepreneurship development	Ty	3	0	0	3

L: Lecture T: Tutorial SLr : Supervised Learning P: Project R : Research C : Credits
Ty/Lb/ETL:Theory/Lab /Embedded Theory and Lab

OBJECTIVES:
- To enrich the students towards the knowledge of entrepreneurial skills and to make the students understand the approaches to attain the goals of the business.
- To recognize the value of problem solving, effective business management and entrepreneurial thinking to business development.
- To identify the key factors and be able to apply the key entrepreneurial process – command and control, calculate drisk-taking and opportunity recognition to business development

COURSEOUTCOMES(COs) Students completing this course Will be able to

CO1	Provide information related to entrepreneurship
CO2	Make students state the importance of entrepreneurial development
CO3	State the importance of business side generations
CO4	Gain knowledge on various EDP organized by government Sectors
CO5	Provide them the nature of economic development and entrepreneurial growth.

Mapping of Course Outcomes with Program Outcome (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	2	3	2	3	3	3	3	2	3
CO2	3	3	3	3	3	3	3	3	3
CO3	3	2	3	3	2	3	3	3	2
CO4	2	3	2	3	3	3	3	2	3
CO5	3	3	3	3	2	3	2	3	3

COs/PSOs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	2	2	3
CO3	3	3	2
CO4	3	3	3
CO5	3	2	3

3/2/1 Indicates Strength of Correlation, 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
		✔							

SubjectCode: **HBCC22002**	SubjectName: **ENTREPRENURSHIPDEVELOPMENT**	Ty/Lb/ETL/IE	L	T/S.Lr	P/R	C
	Prerequisite: Basic knowledge in entrepreneurship development	Ty	3	0	0	3

UNIT I: Concept of Entrepreneurship   9 Periods

Entrepreneurship - Meaning - Types - Qualities of an Entrepreneur - Classification of Entrepreneurs – FactorsinfluencingEntrepreneurship-Functions ofEntrepreneurs.

UNIT II: Entrepreneurial Development Agencies.   9 Periods

CommercialBanks-DistrictIndustriesCentre-NationalSmall IndustriesCorporation

Small Industries Development Organization - Small Industries Service Institute. All India Financial Institutions. SIPCOT and its objectives. MSME Sector and its coverage Objectives of Ministry of MSME.Roleand, Functions of MICRO Small and Medium Enterprises - Development Organization (MSME - DO) -Objectives of SIDCO - Functions of Tamil Nadu SIDCO - IRBI and its Role. NABARD and its role in the Rural Development of India-Introduction to Micro Units Development Refinance Agency (MUDRA)

UNIT III: Project Management   9 Periods

Business idea generation techniques - Identification of Business opportunities – Feasibility study - Marketing,Finance,Technology&LegalFormalities   -Preparation   of   ProjectReport-Toolsof Appraisal.

UNIT IV- Entrepreneurial Development Programmes   9 Periods

Entrepreneurial Development Programmes (EDP) - Role, relevance and achievements – Role of Government in organizing EDPs – Critical evaluation

UNIT V- Economic Development and Entrepreneurial growth   9 Periods

Role of Entrepreneur in Economic growth - Strategic approaches in the changing Economicscenario for smallscale Entrepreneurs - Networking, Niche play, Geographic Concentration, Franchising / Dealership -Development of Women Entrepreneurship. Self-help groups andempowerment of Women in India – FinancingSHG and their role in Micro-financing.Financial inclusion and its penetration in India, Challenges and Government role in financial inclusion–PradhanMantriJan-DhanYojana-SixPillarsofitsMissionobjective

Total periods: 45

TEXT BOOK:
1. Saravanavel, P. Entrepreneurial Development, Principles, Policies and Programmes, EssPee Kay PublishingHouse-1997, Chennai.
2. Tulsian, P.C & Vishal Pandey, Business Organization and Management, PearsonEducation India, 2002,Delhi.

REFERENCES:
1. Janakiram, B, and Rizwana, M, Entrepreneurship Development, Text and Cases, ExcelBooks India, 2011,Delhi.
2. Arun Mittal & Gupta, S.L - Entrepreneurship Development, International Book HousePvt. Ltd, 2011,Mumbai.
3. Anil Kumar, S, Poornima, S, Abraham, K, Jayashree, K - Entrepreneurship Development, NewageInternational (P) Ltd, 2012,Delhi
4. GuptaCBandSrinivasanNP,EntrepreneurialDevelopment,Sul

Subject Code: HBDS24L02	Subject Name: **R PROGRAMMING LAB**		Ty/Lb/ ETL	L	T/ S.Lr	P/R	C
	Prerequisite: NIL		Lb	0	0/0	3/0	2

L: Lecture T: Tutorial   S.Lr : Supervised Learning P : Project R : Research C: Credits
Ty/Lb/ETL: Theory/Lab/Embedded Theory and Lab

OBJECTIVES:
- Learn the RStudio interface, basic R coding, and data import/export.
- Data Manipulation and Tidying: Usedplyr for manipulation and tidyr for data cleaning.
- Create and customize plots with ggplot2 and plotly, including interactive and time series visualizations.
- Conduct statistical tests, fit regression models, and apply machine learning algorithms, culminating in a data science project.

COURSE OUTCOMES (COs):(3- 5)

CO1	Navigate RStudio, write basic R code, and manage data import/export.
CO2	Effective Data Manipulation and Tidying for data manipulation, cleaning, and reshaping.
CO3	Advanced Data Visualization including time series and geospatial data.
CO4	Perform statistical tests, fit regression models, and apply machine learning algorithms.
CO5	Execute a full data science project, from problem definition to model building and insight presentation.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	2	2	1	2	1	1	2	1	1
CO2	2	2	2	2	2	1	2	1	1
CO3	2	2	2	3	2	1	2	1	1
CO4	3	2	3	3	3	2	2	1	1
CO5	3	3	3	3	3	2	3	2	2

COs / PSOs	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	2	2	1
CO3	2	2	1
CO4	3	3	2
CO5	3	3	3

3/2/1 indicates Strength of Correlation   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
								✔	

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

Subject Code: **HBDS24L02**	Subject Name: **R PROGRAMMING LAB**	**Ty/Lb/ ETL**	**L**	**T/ S.Lr**	**P/R**	**C**
	Prerequisite: NIL	Lb	0	0/0	3/0	2

1: Introduction to R and RStudio –
- Explore RStudio interface.
- Write basic R code (e.g., arithmetic operations, data types).

2. Data Import and Export
- Import data from CSV, Excel, and JSON files.
- Export data to various formats.

3. Data Manipulation with dplyr
- Filter, select, and arrange data.
- Create new variables and summarize data.

4. Data Tidying with tidyr
- Reshape data: pivoting, unpivoting.
- Handle missing values and outliers.

5. Data Visualization
- Create histograms, bar charts, and scatter plots.
- Customize plot aesthetics and add labels.   Using with ggplot2
- Create interactive plots with plotly.
- Visualize time series and geospatial data.

6. Perform statistical tests and regression:
- Conduct t-tests, chi-square tests, and ANOVA.
- Fit and evaluate linear regression models.

7. Apply machine learning algorithms
- Supervised learning: classification algorithms (decision trees, k-NN, SVM)
- Unsupervised learning: clustering algorithms (k-Means, hierarchical clustering)

8. Data Science Project
- Define a problem, preprocess data, build models.
- Present findings and insights.

Total periods: 45

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

Subject Code: **HBDS24I02**	Subject Name: **DATA VISUALIZATION LAB**	**T / Lb/ ETL/IE**	**L**	**T / S.Lr**	**P/ R**	**C**
	Prerequisite:data structure	IE	0	0/0	2/0	1

L: Lecture T : Tutorial   S.Lr : Supervised Learning P : Project R : Research C: Credits
Ty/Lb/ETL: Theory/Lab/Embedded Theory and Lab

OBJECTIVES:
- Create and customize basic charts (bar, line, pie) in Excel or Google Sheets.
- Knowledge of Generate and customize plots with Matplotlib and advanced visuals with Seaborn.
- Create interactive plots and dashboards with Plotly and Plotly Dash.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Create and customize basic charts (bar, line, pie) in Excel or Google Sheets for data presentation.
CO2	Implement advanced visuals with Seaborn for in-depth data analysis.
CO3	Implement visualizations with Plotly and Plotly Express
CO4	Build dynamic Dash applications with interactive plots

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	2	2	1	2	1	1	1	1	1
CO2	3	2	2	3	2	2	2	2	2
CO3	2	2	2	2	2	2	2	2	2
CO4	2	2	2	3	2	2	3	1	2

COs / PSOs	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	2	2	2
CO3	2	2	2
CO4	2	3	2

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

Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skillenhancing elective	Inter Disciplinary/Allied	Skill Component	Practical /Project/internship	Others
								✔	

Subject Code: **HBDS24I02**	Subject Name: **DATA VISUALIZATION LAB**	**T / Lb/ ETL/IE**	**L**	**T / S.Lr**	**P/ R**	**C**
	Prerequisite:data structure	IE	0	0/0	2/0	1

1.Introduction to Data Visualization

  Create basic charts (bar charts, line graphs, pie charts) using Excel or Google Sheets.

2. Data Visualization with Python Basics

  Create basic plots (scatter plots, histograms, box plots)
  Customize plots (e.g., colors, markers, labels, titles).
  Practice creating subplots and combining different plot types. Using python, Matplotlib

3. Advanced Python Visualization Techniques

  Create advanced plots (e.g., pair plots, heatmaps, violin plots).
  Use Seaborn's built-in themes and color palettes for aesthetic improvements.
  Practice plotting with Pandas Data Frames for ease of use.

4. Interactive Visualizations with Plotly

  Create basic interactive plots (e.g., interactive scatter plots, line charts).
  Implement features like zooming, hovering, and clickable elements.
  Explore Plotly Express for quick and easy interactive plots.

5. Building Interactive Dashboards with Plotly Dash

  Create a simple Dash application with multiple interactive plots.
  Implement callbacks to update plots based on user inputs (e.g., dropdowns, sliders).
  Design a user-friendly dashboard layout.

Total periods: 30

Subject Code: **HBCC22I07**	Subject Name: **NCC / NSS / INTERNSHIP**	**Ty/Lb/ ETL/IE**	**L**	**T/ S.Lr**	**P/R**	**C**
	Prerequisite:NIL	IE	0	0/0	2/0	1

<u>INTERNSHIP</u>

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.

VI Semester

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

Subject Code: **HBDS24006**	SubjectName: **SOCIAL NETWORK ANALYTICS**			Ty/Lb/ETL/IE	L	T/S.Lr	P/R	C
	Prerequisite: basic network knowledge of network			Ty	3	1/0	0/0	4

L: Lecture T: Tutorial SLr : Supervised Learning P: Project R : Research C : Credits
Ty/Lb/ETL:Theory/Lab/Embedded Theory and Lab

OBJECTIVES:
- To understand the components of the social network.
- To model and visualize the social network.
- To mine the users in the social network.
- To understand the evolution of the social network.

COURSE OUTCOMES (COs) Studentscompletingthiscoursewereableto

CO1	Work on the internals components of the social network
CO2	Model and visualize the social network
CO3	Mine the behavior of the users in the social network
CO4	Predict the possible next outcome of the social network
CO5	Applysocial network inrealtimeapplications

Mapping of Course Outcome with Program Outcome (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	2	2	3	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	2	3	3	2	3

COs/PSOs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	2	2	3
CO3	3	3	3
CO4	2	3	2
CO5	3	2	3

3/2/1 Indicates Strength ofCorrelation, 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
	✓								

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

Subject Code: **HBDS24006**	SubjectName: **SOCIAL NETWORK ANALYTICS**	Ty/Lb/ETL /IE	L	T /S.Lr	P/R	C
	Prerequisite: basic network knowledge of network	Ty	3	1/0	0/0	4

UNIT I   SOCIAL NETWORK ANALYSIS   **12 Periods**

Network analysis- Development of Social network analysis- Key concepts and measures in network analysis -The global structure of networks -The macro-structure of social networks-Personal networks.

UNIT II WEB SEMANTICS IN SOCIAL NETWORK APPLICATIONS   **12 Periods**

Electronic sources for network analysis-Electronic discussion networks –Blogs and online communities – Web based networks-Knowledge Representation on the Semantic Web- On tologies and their rolein the Semantic Web Ontology languages for the Semantic Web - The Resource Description Framework (RDF) and RDFSchema- The Web Ontology Language (OWL) –Comparison to the Unified Modeling Language (UML) - Comparison to the Entity/Relationship (E/R) model and the relational model - Comparison to the Extensible Markup Language (XML) and XML Schema.

UNIT III MODELLING AND AGGREGATING SOCIAL NETWORK DATA   **12 Periods**

State-of-the-art in network data representation - Ontological representation of social individuals – Ontologicalrepresentationof social relationships – Aggregatingandreasoningwithsocialnetworkdata - Representing identity - On the notion of equality - Determining equality - Reasoning with instance equality - Evaluating smushing

UNITI V DEVELOPING SOCIAL – SEMANTIC APPLICATIONS   **12 Periods**

Building SemanticWebapplicationswithsocialnetworkfeatures –ThegenericarchitectureofSemantic Webapplications-Sesame–Elmo –GraphUtil- The featuresofFlink – Systemdesign–openacademia: distributed, semantic-based publication management - The features of open academia - System design.

UNIT V EVALUATION OF SOCIAL NET WORK ANALYSIS   **12 Periods**

Evaluation of web-based social network extraction - Data collection - Preparing the data – Optimizing goodnessoffit–Comparisonacrossmethodsand networks-Predictingthe goodness offit –Evaluation through analysis - Semantic-based Social Network Analysis in the sciences - Data acquisition - Representation, storage and reasoning- Visualization and Analysis – Results - Descriptive analysis - Structural and cognitive effects on scientific performance .

                                                                            TOTAL Periods: 60

TEXTBOOKS

1.PeterMika, Social Networks and the Semantics Web",Springer, 2007

REFERENCEBOOKS
1.BorkoFurht,"Hand book of Social Network Technologies and Applications",1stEdition, Springer,2010

Dr. M.G.R.
EDUCATIONAL AND RESEARCH INSTITUTE
DEEMED TO BE UNIVERSITY
University with Granted Autonomy Status
(An ISO 21091 : 2018 Certified Institution)
Periyar V.V.K. High Road, Maduravoyal, Chennai-95, Tamilnadu, India.

Subject Code: **HBCC22ET1**	Subject Name **UNIVERSAL HUMAN VALUES**		Ty/Lb/ETL	L	T/S Lr	P/R	C
	Prerequisite: None		ETP	2	0/0	2/0	3

L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits

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

OBJECTIVES:
- Describe meaning, purpose, and relevance of universal human values.
- 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.
- Understand and practice professional ethics with the goal for the universal wellness

COURSE OUTCOMES (Cos):Students 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	Inculcate and practice them consciously to be good human beings.
CO5	Practice professional ethics with the goal for the universal wellness

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	2	1	1	1	1	1	1	3	1
CO2	2	2	1	1	1	1	1	3	1
CO3	2	2	1	1	1	1	1	3	1
CO4	2	1	1	1	1	1	1	3	1
CO5	2	1	1	1	1	1	1	3	1

COs/PSOs	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	1	1	1
CO3	1	1	1
CO4	1	1	1
CO5	1	1	1

3/2/1IndicatesStrength ofCorrelation,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 Code: HBCC22ET1	Subject Name: **UNIVERSAL HUMAN VALUES**	Ty/Lb/ETL	L	T/SLr	P/R	C
	Prerequisite: None	ETP	2	0/0	2/0	3

Unit 1 :Love and Compassion: 9 Periods

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: 9 Periods

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 9 Periods

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 9 Periods

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

Unit 5: Professional Ethics **9 Periods**

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 Periods: 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.

Subject Code: **HBDS24L03**	Subject Name: **PROJECT**	Ty/Lb/ETL	L	T/S.Lr	P/R	C
	Prerequisite: None	Lb	0	0/0	18	9

L : Lecture T : Tutorial   S.Lr : Supervised Learning P : Project R : Research C: Credits
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 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/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	3	3	3	2	3	3	1	1
CO2	3	3	3	3	3	3	3	1	2
CO3	3	3	3	3	3	3	3	1	1
CO4	3	2	3	3	3	3	2	1	2
CO5	1	2	2	2	2	2	3	1	1

COs / PSOs	PSO1	PSO2	PSO3
CO1	3	3	2
CO2	3	3	3
CO3	3	3	3
CO4	2	2	2
CO5	3	2	2

3/2/1 indicates Strengthof Correlation   3- High, 2- Medium, 1-Low

Category	Program Core	Program elective	Humanities and social Science	Open Elective	Skillenhancing elective	Inter Disciplinary/Allied	Skill Component	Practical /Project/internship	Others
								✔	

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

Subject Code: **HBDS24L03**	Subject Name: **PROJECT**	Ty/Lb/ ETL	L	T/ S.Lr	P/R	C
	Prerequisite: NIL	Lb	0	0/0	18	9

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.

PROGRAM ELECTIVE

Program Elective - I

Subject Code: HBDS24E01	Subject Name: **CLOUD COMPUTING FOR DATA SCIENCE**			Ty/Lb/ ETL/IE	L	T /S.Lr	P/R	C
	Prerequisite: ComputerNetworks			Ty	3	1/0	0/0	4

L: LectureT: TutorialSLr: Supervised Learning P: ProjectR. ResearchC: Credits

Ty/Lb/ETL:Theory/Lab/Embedded Theory and Lab

OBJECTIVES:

- To provide concepts of cloud Architecture and its services
- To gain expertiseinserver, network and storage virtualization.
- To classify the various Cloud Computing applications
- To appreciate the emergence of clouds then Ext generation computing paradigm.

COURSE OUTCOMES (COs) Students completing this course were able to

CO1	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
CO2	Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
CO3	Learn the key and enabling technologies that help in the development of cloud.
CO4	Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.
CO5	Explain the core issues of cloud computing such as resource management and security.

Mapping of Course Outcome with Program Outcome (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	2	2	3	3	1	2	2	3
CO2	2	3	3	2	2	2	3	2	2
CO3	3	3	2	2	3	3	2	1	2
CO4	2	2	3	3	3	3	2	2	3
CO5	3	3	2	3	2	3	3	2	3

COs/PSOs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	3	2	1
CO3	2	3	2
CO4	2	3	2
CO5	3	2	3

3/2/1Indicates Strength of Correlation, 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 Code: **HBDS24E01**	SubjectName: **CLOUD COMPUTING FOR DATA SCIENCE**	Ty/Lb/ ETL/IE	L	T /S.Lr	P/R	C
	Prerequisite: Computer Networks	Ty	3	1/0	0/0	4

UNIT- I   **12 Periods**

Introduction to Cloud Architecture and its Types– Definition of Cloud – Evolution of Cloud Computing – Environment for Cloud Computing: Components, Cloud provider, Service-Oriented Architecture (SOA) - Cloud Types, Characteristics of Cloud Computing - NIST Cloud Computing Reference Architecture.

UNIT - II   **12 Periods**

Types of Cloud services: Software as a Service - Platform as a Service – Infrastructure as a Service - Database as a Service - Monitoring as a Service - Communication as services - Service providers- Google App Engine, Amazon EC2 - Introduction to MapReduce - GFS - HDFS - Hadoop Framework

UNIT - III   **12 Periods**

Virtualization: Basics of Virtualization - Components of virtualization, Types of Virtualizations - Storage Virtualization - Network Virtualization - Memory Virtualization - Application Virtualization Implementation, Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Advantages of virtualization

UNIT - IV   **12 Periods**

Standards, And Applications: Common Standards: The Open Cloud Consortium – The Distributed management Task Force – Standards for application Developers – Standards for Messaging – Standards for Security, End user access to cloud computing, Microsoft Cloud Services, Google Cloud Applications, Amazon Cloud Services, Cloud Applications.

UNIT - V   **12 Periods**

Cloud Security: Security Overview – Cloud Security Challenges – Software-as-a-Service, Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security, - Identity Management and Access Control, Disaster Recovery in Clouds.

Total periods: 60

TEXTBOOKS:

Dr.Anand Nayyar, (2019), ―Handbook of Cloud Computing‖, BPBK. Ch and rasekharan, Essentials of Cloud Computing, CRC press, 2014.

REFERENCES:

John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.
Bloor R., Kanfman M., Halper F. Judith Hurwitz ―Cloud Computing ‖ Wiley India Edition,2010
Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, ―Mastering Cloud Computing: Foundations and Applications Programming‖, McGraw Hill, ISBN:978

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

Subject Code: **HBDS24E02**	SubjectName: **COMPUTER VISION TECHNIQUES**		Ty/Lb/E TL/IE	L	T /S.Lr	P/R	C
	Prerequisite: basic computer knowledge		Ty	3	1/0	0/0	4

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 understand Fundamental Concepts in Computer Vision
- To Develop Proficiency in Image Processing Techniques
- To Master Feature Detection and Matching Methods
- To Implement and Evaluate Object Detection and Recognition Systems
- To Analyze and Apply Advanced Computer Vision Technique

COURSEOUTCOMES(COs) Studentscompletingthiscoursewereableto

CO1	Demonstrate a Strong Understanding of Computer Vision Fundamentals
CO2	Effectively Implement Image Processing Techniques
CO3	Apply and Evaluate Feature Detection and Matching Algorithms
CO4	Develop and Assess Object Detection and Recognition Systems
CO5	Analyze and Implement Advanced Techniques in Video Analysis and Computer Vision

Mapping of Course Outcome with Program Outcome (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	2	1	1	1	1	1	1	2
CO2	2	2	3	1	1	1	1	1	2
CO3	2	2	2	3	1	1	1	1	2
CO4	2	2	2	3	1	1	1	1	1
CO5	1	2	2	3	1	1	1	1	2

COs/PSOs	PSO1	PSO2	PSO3
CO1	1	3	1
CO2	1	3	1
CO3	1	3	1
CO4	1	3	2
CO5	1	3	2

3/2/1IndicatesStrength ofCorrelation, 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 Code: **HBDS24E02**	SubjectName: **COMPUTER VISION TECHNIQUES**	Ty/Lb/E TL/IE	L	T /S.Lr	P/R	C
	Prerequisite: basic computer knowledge	Ty	3	1/0	0/0	4

Unit – I: Introduction and Image Processing: **12 Periods**

Overview of Computer Vision: Definition and scope, Applications in various fields, Fundamentals of Image Formation: Image acquisition and representation, Color spaces and image properties, Basic Image Processing Techniques: Filtering (e.g., blurring, sharpening), Edge detection (e.g., Sobel, Canny), Image enhancement (e.g., histogram equalization).

Unit – II: Feature Detection and Matching: **12 Periods**

Feature Detection: Key point detection algorithms (e.g., Harris, SIFT, SURF), Feature Description and Matching: Feature descriptors (e.g., ORB, BRIEF), Feature matching techniques, Geometric Trans formations: RANSAC for outlier removal, Homography and affine transformations.

Unit –III: Object Detection and Recognition: **12 Periods**

Object Detection Techniques: Sliding window approach, Region-based methods (e.g., R-CNN, Fast R-CNN, Faster R-CNN), Modern Object Detection Frameworks: YOLO (You Only Look Once), SSD (Single Shot Multi Box Detector), Object Recognition and Classification: Machine learning approaches (e.g., SVM, KNN), Deep learning methods (e.g., CNNs).

Unit – IV: Image Segmentation and 3D Vision: **12 Periods**

Image Segmentation: Thresholding and region-based segmentation, Clustering methods (e.g., K-means, Mean-shift), Advanced segmentation techniques (e.g., Graph cuts, Watershed), 3D Vision: Depth perception and stereo vision, Structure from motion, 3D reconstruction and modeling.

Unit – V: Video Analysis and Advanced Topics: **12 Periods**

Video Analysis: Motion detection and tracking, Background subtraction and object tracking, Video stabilization and analysis, Advanced Topics in Computer Vision: Generative Adversarial Networks (GANs), Image-to-image translation (e.g., Cycle GAN), Current trends and research directions.

                                                                        Total Periods: 60

TEXT BOOK:

Computer Vision: Algorithms and Applications, David L. Poelman, Springer Publications, 2011

REFERENCE BOOKS:

1. Multiple View Geometry in Computer Vision, Richard Hartley and Andrew Zisserman, Cambridge University Press, 2003 (Second Edition 2004)

2. Computer Vision: A Modern Approach, David L. Poelman and Gary Bradski, Prentice Hall, 2004

3. Digital Image Processing, Rafael C. Gonzalez and Richard E. Woods, Pearson, 2018 (4th Edition)

4. Pattern Recognition and Machine Learning, Christopher M. Bishop, Springer, 2006

Dr. M.G.R.
EDUCATIONAL AND RESEARCH INSTITUTE
DEEMED TO BE UNIVERSITY
University with Granted Autonomy Status
(An ISO 21091 : 2018 Certified Institution)
Periyar E.V.R. High Road, Maduravoyal, Chennai-95, Tamilnadu, India.

	SubjectName: **INFORMATION RETRIEVAL AND PROCESSING**	Ty/Lb/ ETL/IE	L	T /S.Lr	P/R	C
Subject Code: **HBDS24E03**	**Prerequisite:** Data science introduction, programming skills, data structures and algorithms, databases and sql, statistics and probability, mathematics, ML, data visualization and information systems.	Ty	3	1/0	0/0	4

L : Lecture T : Tutorial   S.Lr : Supervised Learning P : Project R : Research C: Credits

Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVES:

- The overall objective is to effectively manage and utilize data to support decision making, uncover insights, efficient data access, data cleaning and preparation, data integration, data transformation, information extraction, querying and search techniques, data analysis and visualization, ethical and privacy considerations and solve real world problems

COURSEOUTCOMES(COs) Studentscompletingthiscoursewereableto

CO1	Students will be able to describe and explain the principles of data retrieval systems, including indexing, search algorithms, and database management systems.
CO2	Proficient in applying various data processing techniques to clean, transform, and prepare data for analysis.
CO3	Capable of applying methods for extracting meaningful information from both structured and unstructured data sources.
CO4	Enhance their problem-solving skills by tackling complex data retrieval and processing challenges.
CO5	Develop the ability to work collaboratively on data-related projects, demonstrating skills in teamwork, project management, and effective communication within a group setting.

Mapping of Course Outcome with Program Outcome (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	2	2	3	2	1	3	1	2
CO2	3	2	3	3	2	1	3	1	3
CO3	3	2	3	3	2	1	3	1	2
CO4	3	2	3	3	2	2	2	1	2
CO5	2	3	3	2	2	3	2	2	2

COs/PSOs	PSO1	PSO2	PSO3
CO1	3	2	2
CO2	2	3	2
CO3	3	2	3
CO4	2	2	3
CO5	2	3	2

3/2/1Indicates Strength of Correlation, 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 Code: **HBDS24E03**	SubjectName: **INFORMATION RETRIEVAL AND PROCESSING**	Ty/Lb /ETL/ IE	L	T /S.Lr	P/R	C
	Prerequisite: Data science introduction, programming skills, data structures and algorithms, databases and sql, statistics and probability, mathematics, ML, data visualization and information systems.	Ty	3	1/0	0/0	4

Unit – I: Introduction to Information Retrieval and Processing   **12 Periods**

Introduction of Information Retrieval and processing - History of Information Retrieval - Components of Information Retrieval - Issues related to Information Retrieval - Boolean retrieval - Dictionaries and tolerant retrieval

Unit – II: Link Analysis and Similarities   **12 Periods**

Link Analysis – Hubs and authorities – Page rank and HITS algorithms – Similarity – Hadoop and Map Reduce – Evaluation

Unit –III: Specialized Search and Retrieval   **12 Periods**

Introduction of personalized search – Collaborative filtering and content-based recommendation of documents and products – Handling invisible web – Snippet generation – Summarization – Questions and answering – Cross Lingual Retrieval

Unit – IV: Search Engine Optimization   **12 Periods**

Web search engine overview – Web structure – User – Paid placement – Search engine optimization – Web size measurement – Search engine optimization – Web search architectures

Unit – V: Concepts of XML Retrieval   **12 Periods**

Basic xml concepts – Challenges in xml retrieval – Vector space model for xml retrieval – Evaluation of xml retrieval – Text centric versus data centric xml retrieval

Total Periods: 60

TEXT BOOK:

Information Retrieval Implementing and Evaluating Search Engines, Stefan Büttcher, Charles L. A. Clarke and Gordon V. Cormack, The MIT Press; Reprint edition (February 12, 2016)

REFERENCE BOOKS:

1) Introduction to Information Retrieval, C. Manning, P. Raghavan, and H. Schütze, Cambridge University Press, 2008
2) Modern Information Retrieval: The Concepts and Technology behind Search, Ricardo Baeza -Yates and Berthier Ribeiro – Neto, 2 nd Edition, ACM Press Books 2011.
3) Search Engines: Information Retrieval in Practice, Bruce Croft, Donald Metzler and Trevor Strohman, 1 st Edition, Pearson, 2009.

Program Elective-II

	SubjectName: **BUSINESS AND FINANCIAL ANALYTICS**		Ty/Lb/ ETL/IE	L	T /S.Lr	P/R	C
Subject Code: **HBDS24E04**	**Prerequisite:** Data science introduction, programming skills, data structures and algorithms, databases and sql, statistics and probability, mathematics, ML, data visualization and information systems.		Ty	3	1/0	0/0	4

L : Lecture T : Tutorial S.Lr : Supervised Learning P : Project R : Research C: Credits
Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVES:
- Understand the significance and fundamentals of Business analytics
- Understand the basic models of analytics.

COURSE OUTCOMES (COs) Students completing this course were able to

CO1	Understand the basics on Business Intelligence.
CO2	Describe the essentials on Business Analytics models
CO3	Understand the importance of Business Analytics for Managers
CO4	ExplaintheroleandimportanceofFinancialAnalytics.
CO5	Understand the role of Business Analyst and Data Science in business

Mapping of Course Outcome with Program Outcome (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	2	2	3	2	1	3	1	2
CO2	3	2	3	3	2	1	3	1	3
CO3	3	2	3	3	2	1	3	1	2
CO4	3	2	3	3	2	2	2	1	2
CO5	2	3	3	2	2	3	2	2	2

COs/PSOs	PSO1	PSO2	PSO3
CO1	3	2	2
CO2	2	3	2
CO3	3	2	3
CO4	2	2	3
CO5	2	3	2

3/2/1Indicates Strength of Correlation, 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 Code: **HBDS24E04**	Subject Name **BUSINESS AND FINANCIAL ANALYTICS**	Ty/Lb/ ETL/IE	L	T /S.Lr	P/R	C
	Prerequisite: Data science introduction, programming skills, data structures and algorithms, databases and sql, statistics and probability, mathematics, ML, data visualization and information systems.	Ty	3	1/0	0/0	4

Unit:1   Business Intelligence (BI)   12 Periods

Business Intelligence - Definitions-Evolution of Business Intelligence and Role of DSS, EIS, MIS and Digital dashboards – Difference between ERP and Business Intelligence – need for BI-BIForpast, Present and Future. Business Intelligence Applications – technology solutions and business solutions-Business Intelligence Roles and Responsibilities.

Unit:2   Essentials of Business Analytics   12 Periods

Introduction: Decision Making- Business Analytics Definition-Business Analytics meaning – categorization of Analytical methods and models: Descriptive-Predictive-Prescriptive–Bigdata-Business Analytics in practice: Financial, Human Resource, Marketing, Healthcare, Supply chain Analytics. Analytics for government and Nonprofits, sports and web Analytics

Unit:3   BusinessAnalyticsforManagers   12 Periods

Business analytics model: Over view of Business-driven environment & technically oriented environment-types of Reporting and Analytical process-casestudy.

Unit:4   FinancialAnalytics   12 Periods

Introduction: Meaning-Importance of Financial Analytics Uses-Features-Documents used in Financial Analytics: Balance Sheet, Income Statement, Cash flow statement-Elements of Financial Health: Liquidity, Leverage, Profitability.

Unit:5   Analysts:RoleandResponsibilities   12 Periods

Information and Knowledge-Methodology-Data-Required Competencies for the Analyst -Data Scientists. Data Engineer's. Business Analyst, Career in Business Analytics, Applications for Data science, Data Scientists Roles and Responsibility.

Total Periods: 60

Text Book (s)

1.AnIntroductiontoBusinessAnalytics,GerKoole,Lulu.com,2019

2.BusinessAnalyticsforManagers-GEATH.N.LAURSENJESPERTHORLUND,
P.No:1-16-UnitIII,P.No:93-136-UnitV

3.FundamentalsofBusinessAnalytics-RNPrasad,.SeemaAchavya,WileyIndiaPVT
Ltd,NewDelhi,P.No:87-100,P.No:115-125

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

SubjectCode: **HBDS24E05**	Subject Name: **NEURAL NETWORKS AND DEEP LEARNING**	Ty/Lb/ ETL	L	T/ S.Lr	P/R	C
	Prerequisite: knowledge about network	Ty	3	1/0	3/0	4

L : Lecture T : Tutorial   S.Lr : Supervised Learning P : Project R : Research C: Credits

Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVES:
- Understand biological and artificial neural network structures and functions.
- Explore supervised and unsupervised neural network architectures and training methods.
- Study advanced neural network models and their specialized applications.
- Analyze pre-trained models and their impact on transfer learning and performance.
- Apply machine learning concepts to real-world challenges in speech recognition and NLP.

COURSE OUTCOMES (COs) : (3- 5) Studentscompletingthiscoursewereableto

CO1	Understand the structure, functions, and evolution of biological and artificial neural networks.
CO2	Differentiate and apply various supervised and unsupervised neural network architectures and training methods
CO3	Evaluate and implement advanced neural network models for specialized applications.
CO4	Leverage pre-trained models and transfer learning to improve machine learning performance
CO5	Apply fundamental machine learning algorithms to solve real-world problems in speech recognition and NLP.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	2	2	2	2	1	1	1	2
CO2	3	2	3	2	2	1	2	1	2
CO3	3	1	3	3	3	2	1	1	2
CO4	2	2	2	2	2	2	1	1	2
CO5	2	2	3	3	3	1	2	1	2

COs / PSOs	PSO1	PSO2	PSO3
CO1	3	2	1
CO2	2	3	2
CO3	3	3	2
CO4	2	2	1
CO5	3	3	3

3/2/1 indicates Strength of Correlation   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
		✔							

SubjectCode: HBDS24E05	Subject Name: **NEURAL NETWORKS AND DEEP LEARNING**	Ty/Lb/ ETL	L	T/ S.Lr	P/R	C
	Prerequisite:knowledge about network	Ty	3	1/0	3/0	4

Unit 1: Artificial Neural Networks 12Periods

Human Brain, Model of an artificial Neuron, Basic concepts of Neural Networks, Fundamentals of Biological Neural Network and Artificial Neural Network, Evolution of Neural Networks, Characteristics of Neural Networks, Learning Methods – supervised, unsupervised and reinforcement, Taxonomy of Neural Network Architectures, Terminologies – weights, bias, threshold, learning rate, Applications of Neural Networks.

Unit 2: Supervised and Unsupervised Neural Networks 12 Periods

Hebb Network theory and training algorithm, Perceptron Networks architecture and training algorithm, Backpropagation Network architecture and training algorithm, Associative Memory Network architecture and training algorithm, Hopfield Networks architecture and training algorithm, Counter propagation Networks architecture and training algorithm, Adaptive Resonance Theory Network architecture and training algorithm

Unit 3: Advanced Neural Networks 12 Periods

Kohonen Self-Organising Feature Maps architecture and training algorithm, Learning Vector Quantization architecture and training algorithm, Boltzmann Machine, Cognitron Network, Neocognitron Network, Optical Neural Networks Electro-optical Multipliers and Holographic Correlators.

UNIT 4 : Pre-Trained Models 12 Periods

Self-Supervised Pretraining, AlexNet, VGG, NiN, GoogleNet, Residual Network (ResNet), DenseNet, Region-Based CNNs (R-CNNs) – Transfer Learning - FSL

Unit 5 :"Machine Learning: From Basics to Advanced Neural Networks" 12 Periods

Machine learning basics, Simple Machine Learning Algorithm -- Linear Regression, underfitting and overfitting challenges in Machine Learning, Supervised Learning approach for Support Vector Machine, Deep Feedforward Networks, Convolutional Networks, Deep Recurrent Networks, Deep Boltzmann Machine, Applications in Speech Recognition and Natural Language Processing.

Total Periods: 60

Text Book :
1. Neural Networks and Deep Learning by C.Aggarwal (2023),Springer
2. "Pattern Recognition and Machine Learning" by Christopher M. Bishop,Springer

Reference book :

1. Deep Learning, Ian Goodfellow Yoshua Bengio Aaron Courville, MIT Press, 2017 2.
2. Deep Learning: A Practitioner's Approach, Josh Patterson, Adam Gibson, O'Reilly
3. Deep Learning with TensorFlow: Explore neural networks with Python, Giancarlo Zaccone, Md. RezaulKarim, Ahmed Menshawy, Packt Publisher, 2017. Deep Learning: A Practitioner's Approach, Josh Patterson, Adam Gibson, O'Reilly Media,

Subject Code: **HBDS24E06**	Subject Name: **NATURAL LANGUAGE PROCESSING**	Ty/Lb/ ETL /IE	L	T/ S.Lr	P/R	C
	Prerequisite: Nil	Ty	3	1/0	0/0	4

L : Lecture T : Tutorial   S.Lr : Supervised Learning P : Project R : Research C: Credits

Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVES:

- Introduce NLP fundamentals for word analysis via Morphology and Corpus.
- Examine NLP models and algorithms for sentence classification using symbolic and statistical methods.
- Explore algorithmic descriptions of language levels—morphology, syntax, semantics, and pragmatics—for information retrieval and machine translation**.**

COURSEOUTCOMES(Cos) :(3–5) Studentcompletingthe coursewereableto

CO1	Show sensitivity to linguistic phenomena and an ability to model them with formal grammars
CO2	Understand and carryout proper experimental methodology for training and evaluating empirical NLP systems.
CO3	Manipulate probabilities, build statistical models for strings and trees, and estimate parameters with supervised and unsupervised methods.
CO4	Able to design,implement,and analyze NLP algorithms
CO5	Able to design different language modeling Techniques.

MappingofCourseOutcomeswithProgramOutcomes(POs)

COs / PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	2	2	3	2	1	1	2	2	2
CO2	2	3	2	2	2	2	1	1	2
CO3	3	2	3	3	3	1	2	2	2
CO4	3	2	3	3	2	2	2	2	1
CO5	3	2	2	3	2	1	2	2	1

COs / PSOs	PSO1	PSO2	PSO3
CO1	2	2	2
CO2	2	2	2
CO3	3	2	3
CO4	3	3	2
CO5	3	2	2

3/2/1 indicates Strength of Correlation   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
		✔							

Dr. M.G.R.
EDUCATIONAL AND RESEARCH INSTITUTE A+
DEEMED TO BE UNIVERSITY
University with Granted Autonomy Status
(An ISO 21091 : 2018 Certified Institution)
Periyar E.V.R. High Road, Maduravoyal, Chennai-95, Tamilnadu, India.

Subject Code: **HBDS24E06**	Subject Name: **NATURAL LANGUAGE PROCESSING**	Ty/Lb/ ETL /IE	L	T/ S.Lr	P/ R	C
	Prerequisite: NIL	Ty	3	1/0	0/0	4

UNIT – I   Introduction to NLP   **12 Periods**

Introduction to various levels of natural language processing, Ambiguities and computational challenges in processing various natural languages. Introduction to Real life applications of NLP Such as spell and grammar checkers, information extraction, question answering and machine translation.

UNIT – II Syntax Analysis   **12 Periods**

Parsing Natural Language, Treebanks: A Data-Driven Approach to Syntax, Representation of Syntactic Structure, Parsing Algorithms, Models for Ambiguity Resolution in Parsing, Multilingual Issues

UNIT – III Lexical Syntax   **12 Periods**

Introduction to word types, POS Tagging, Maximum Entropy Models for POS tagging, Multi- word Expressions.

UNIT – IV Integrating Predicate   **12 Periods**

 Predicate- Argument Structure, Meaning Representation Systems, Software.

UNIT – V Discourse Processing & Language Modeling   **12 Periods**

Cohension, Reference Resolution, Discourse Cohension and Structure, Introduction, N-Gram Models, Language Model Evaluation, Parameter Estimation, Language Model Adaptation, Types of Language Models, Language-Specific Modeling Problems, Multilingual and Cross lingual Language Modeling

Total Periods: 60

TEXT BOOKS:
1. Multilingual natural Language Processing Applications: From Theory to Practice – Daniel M. Bikel and Imed Zitouni, Pearson Publication.
2. Daniel Jurafsky and James H.Martin"Speech and Language Processing", 3rd edition, Prentice Hall, 2009..

REFERENCE BOOK:
1. Speech and Natural Language Processing - Daniel Jurafsky& James H Martin, Pearson Publications.
2. Chris Manning and Hinrich Schütze, "Foundations of Statistical Natural Language Processing", 2nd edition, MIT Press Cambridge, MA, 2003.
3. NitinIndurkhya, FredJ.Damerau "Hand book of Natural Language Processing", Second Edition, CRC Press, 2010.
4. JamesAllen "Natural Language Understanding", Pearson Publication 8th Edition.2012.

Program Elective-III

Subject Code: **HBDS24E07**	SubjectName: **USER INTERFACE DESIGN**		Ty/Lb/E TL/IE	L	T /S.Lr	P/R	C
	Prerequisite: basic computer knowledge		Ty	3	1/0	0/0	4

L : Lecture T : Tutorial   S.Lr : Supervised Learning P : Project R : Research C: Credits
Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVES:
- Understand the principles of usability and human characteristics in design.
- Learn about window management, organization, and operations.
- Understand the importance of providing effective feedback to users.
- Conduct retests and understand their importance.

COURSEOUTCOMES(COs) Studentscompletingthiscoursewereableto

CO1	Study the principles and characteristics of web user interfaces.
CO2	Understand system timings and their importance in interface design
CO3	Explore the characteristics of web systems and device-based controls.
CO4	Learn about the use of icons, images, and multimedia elements.
CO5	Explore methods for information search and visualization.

Mappingof CourseOutcomewithProgramOutcome (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	2	2	2	1	1	3	1	2
CO2	3	1	2	3	2	2	2	1	2
CO3	3	2	3	3	2	2	3	2	2
CO4	3	2	2	2	1	2	2	1	2
CO5	3	1	3	3	3	2	2	2	2

COs/PSOs	PSO1	PSO2	PSO3
CO1	2	3	3
CO2	2	3	2
CO3	3	3	3
CO4	2	3	2
CO5	3	3	3

3/2/1IndicatesStrength ofCorrelation, 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 Code: **HBDS24E07**	SubjectName: **USER INTERFACE DESIGN**	Ty/Lb/E TL/IE	L	T /S.Lr	P/R	C
	Prerequisite: basic computer knowledge	Ty	3	1/0	0/0	4

Unit – I   Introduction: **12 Periods**
Human – Computer Interface – Characteristics of Graphics Interface – Direct Manipulation Graphical System – Web User Interface – Popularity – Characteristic & Principles.

Unit – II   Human Computer Interaction   **12 Periods**
User Interface Design Process – Obstacles – Usability –Human Characteristic In Design – Human Interaction Speed – Business Functions –Requirement Analysis – Direct – Indirect Methods – Basic Business Functions – Designs Standards – System Timings .

Unit –III   Windows   **12 Periods**
Characteristics – Components – Presentation Styles – Types – Managements – Organizations – Operations – Web Systems – Device – Based Controls Characteristics –Screen – Based Controls – Operate Control – Text Boxes – Selection Control – Combination Control .

Unit – IV   Multimedia   **12 Periods**
Text For Web Pages – Effective Feedback - Guidance and Assistance – Internationalization – Accessibility – Icons –mage – Multimedia – Coloring.

Unit – V Windows Layout   **12 Periods**
Test: Prototypes – Kinds Of Tests – Retest – Information Search – Visualization – Hypermedia – WWW-Software Tools.

Total Periods:60

TEXT BOOK:

1. Wilbent. O. Galitz, "The Essential Guide to User Interface Design", John Wiley & Sons, 2001.

REFERENCE BOOKS:
1. Ben Scheiderman, "Design the User Interface", Pearson Education, 1998. 2. Alan Cooper," The Essential of User Interface Design", Wiley – Dream Tech Ltd., 2002

Subject Code: **HBDS24E08**	SubjectName: **DATA SECURITY AND COMPLIANCE**		Ty/Lb/E TL/IE	L	T /S.Lr	P/R	C
	Prerequisite: data structure		Ty	3	1/0	0/0	4

L : Lecture T : Tutorial   S.Lr : Supervised Learning P : Project R : Research C: Credits

Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVES:
- Increase information security and privacy awareness.
- Manage information system security risk for organizations.
- Know the security and privacy compliance requirements and standards.

COURSEOUTCOMES(COs) Studentscompletingthiscoursewereableto

CO1	Understand the Security requirements, components and processes.
CO2	Understand the various needs, risks and issues related to Information Security.
CO3	To plan information security risk management.
CO4	Understand Physical, Operational and Personnel Security.
CO5	Comprehend the Information Security and Privacy Compliance Requirements.

Mapping of Course Outcome with Program Outcome (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	2	2	2	1	1	3	1	2
CO2	3	1	2	3	2	2	2	1	2
CO3	3	2	3	3	2	2	3	2	2
CO4	3	2	2	2	1	2	2	1	2
CO5	3	1	3	3	3	2	2	2	2

COs/PSOs	PSO1	PSO2	PSO3
CO1	2	3	3
CO2	2	3	2
CO3	3	3	3
CO4	2	3	2
CO5	3	3	3

3/2/1IndicatesStrength ofCorrelation, 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 Code: **HBDS24E08**	Subject Name: **DATA SECURITY AND COMPLIANCE**	Ty/Lb/E TL/IE	L	T /S.Lr	P/R	C
	Prerequisite: data structure	Ty	3	1/0	0/0	4

Unit: I   **12 Periods**

Introduction

History - What is Information Security? - CIA requirements- security model - Components of an information system - Securing the components - Balancing security and access - The SDLC –Security in SDLC

Unit: II   **12 Periods**

Needs, Information Threats, Attacks and Issues

Need for security -Business needs-Threats–Attacks–Legal-Ethical and professional issues.

Unit: III   **12 Periods**

Risk Management

Planning for Security, Risk management: Identifying and assessing risk-Assessing and controlling risk.

Unit: IV   **12 Periods**

Physical, Operational and Personnel Security

User-Defined Functions: Introduction–Need and Elements of User-Defined Functions-Definition-Return Values and their types-Function Calls–Declarations–Category.

Unit: V   **12 Periods**

Compliance–Information Security Management Systems

Importance of ISMS – Purpose and Objectives, Process Approach, Processes involved in Establishing, Implementing, Operating, Monitoring, Reviewing, Maintaining and Improving ISMS. Scope and Exclusions.ISO27001,ISO/IEC27701,GDPR,DataProtection Bill-India

Total Periods:60

References:

1. Michael E Whit man and Herbert J Mattord, "Principles of Information Security", Sixth Edition, Cengage Learning,2017
2. Alan Calder, Steve Watkins, "IT Governance: An International Guide to Data Security andISO27001/ISO27002",KoganPage;6thedition,2015
1. ISO/IEC 27701

   PIMS:https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RE3uDwE

Subject Code: **HBDS24E09**	Subject Name: **IOT AND ITS APPLICATIONS**		**Ty/Lb/E TL/IE**	**L**	**T /S.Lr**	**P/R**	**C**
	Prerequisite: basic computer knowledge		Ty	3	1/0	0/0	4

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 understand the concepts of Internet of Things and the application of IoT.
- To Determine the Market perspective of IoT.
- To Understand the vision of IoT from a global context

COURSEOUTCOMES(COs) Students   completing this course were able to

CO1	Use of Devices, Gate ways and Data Management in IoT.
CO2	Design IoT applications indifferent domain and beagle to analyze their performance
CO3	Implement basic IoT applications on embedded platform**.**

Mapping of Course Outcome with Program Outcome (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	2	2	2	1	1	3	1	2
CO2	3	1	2	3	2	2	2	1	2
CO3	3	2	3	3	2	2	3	2	2
CO4	3	2	2	2	1	2	2	1	2
CO5	3	1	3	3	3	2	2	2	2

COs/PSOs	PSO1	PSO2	PSO3
CO1	2	3	3
CO2	2	3	2
CO3	3	3	3
CO4	2	3	2
CO5	3	3	3

3/2/1Indicates Strength of Correlation, 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 Code: **HBDS24E09**	SubjectName: **IOT AND ITS APPLICATIONS**	Ty/Lb/ETL/IE	L	T /S.Lr	P/R	C
Prerequisite: basic computer knowledge		Ty	3	1/0	0/0	4

UNIT– I   **12 Periods**

IoT & Web Technology, The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendationson Research Topics.

UNIT–II   **12 Periods**

M2Mto IoT – A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT ValueChains, An emerging industrial structure for IoT, The international driven global value chain and globalinformation monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design

Principles and needed capabilities, An IoT architecture outline, standards considerations.

UNIT–III   **12 Periods**

IoT Architecture –State of the Art–Introduction, State of the art, Architecture. Reference Model-Introduction, Reference Model and architecture, IoT reference Model, IoT Reference Architecture-Introduction, Functional View, Information View, Deployment and Operational View, Other Relevantarchitecturalviews.

UNIT–IV   **12 Periods**

IoT Applications for Value Creations Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT,Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management, e Health.
UNIT–V   **12 Periods**

Internet of Things Privacy, Security and Governance Introduction, Overview of Governance, Privacy andSecurity Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security

Total Periods:60

TEXTBOOK:

1.Vijay Madisetti and Arshdeep Bahga,"*Internet of Things:(A Hands-on Approach)*",Universities Press (INDIA) Private Limited 2014, 1ˢᵗEdition.

REFERENCEBOOKS:

1. Michael Miller,"*Th eInternet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World*", Pearson Education 2015.
2. Francisda Costa, "*Rethinking the Internet of Things: AS callable Approach to Connecting Everything*",Apress Publications 2013, 1ˢᵗEdition.
3. Waltenegus Dargie, Christian Poellabauer, "*Fundamentals of Wireless Sensor Networks: Theory and Practice*",**Wiley 2014.**

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

FOREIGN LANGUAGES

Dr. M.G.R.
EDUCATIONAL AND RESEARCH INSTITUTE
DEEMED TO BE UNIVERSITY
University with Granted Autonomy Status
(An ISO 21091 : 2018 Certified Institution)
Periyar V.V.N. High Road, Maduravoyal, Chennai-95, Tamilnadu, India.

Subject Code **HBFL22I01**	Subject Name: **FRENCH**	Ty/Lb/ETL/IE	L	T/SLr	P/R	C
	Prerequisite: NIL	IE	1	0/0	1/0	1

C: Credits, L: Lecture, T: Tutorial, SLr: Supervised Learning, P: Problem / Practical
R: Research, Ty/Lb/ETL/IE: Theory /Lab/Embedded Theory and Lab/Internal Evaluation

OBJECTIVES:
- To understand the main idea and some detailed aspects of complex and unfamiliar texts.
  Know emerging awareness of aesthetic properties of language and literary style.
- Recognize the role of cultural knowledge in understanding written texts.

COURSE OUTCOMES (Cos) Students completing this course were able to

CO1	Learn to write numbers, alphabets, regular and irregular verbs
CO2	Practice preposition and articles.
CO3	Comprehend model verbs and speak in future
CO4	Familiarize colours, places and create phrases
CO5	Master conjugation and speaking the language

Mapping of Course Outcome with Program Outcome (POs)

Cos/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		2
CO2										3		2
CO3										3		2
CO4										3		2
CO5										3		2

3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low

Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/Project	Internships/ Technical Skills	Soft Skills
			✔						

Subject Code **HBFL22I01**	Subject Name: **FRENCH**	**Ty/ Lb/ ETL/IE**	**L**	**T/SLr**	**P/R**	**C**
	Prerequisite: NIL	IE	1	0/0	1/0	1

UNIT: I 6 periods

Les Salutations, Les Nombres (1-20), Les alphabets, Les Pronoms Sujets, Les Langues, Les Nationalities, Les Verbes : Parler, être, avoir,

UNIT: II 6 periods

Les Nombres (21-100), L'heure, Les Pays, Les propositions des pays, Les articles définis, Les articles indéfinis, Les Verbes :s'appeler, Aimer et habiter.

UNIT: III 6 periods

Les verbes : Aller, Venir, Les Articles Contractés, La Négation, Les Adjectifs Demonstratives, Futur Prôche, Model Verbs, Adjectifs Possessifs.

UNIT: IV 6 periods

Les articles partitifs, Les Verbes : Faire, Jouer. La Famille, Les Couleurs, Les lieux dans la ville,

UNIT: V 6 periods
Les Verbes: Lire, Écrire, Regarder, Voir, Écouter, Entendre

Total periods: 30

TEXT BOOKS:
1. Écho A1, J.Girardet&J.Pecheur, CLE International, 2nd Edition
2. Saison A1, Jean Giraudoux, Goyal publisher, 1st Edition

REFERENCE BOOKS:

1. Alter Ego A1, Veronique M Kizirian & Annie Berthet, Hachette, 1st Edition
2. Cosmopolite A1, Nathalie Hirschsprung & Tony Tricot, Goyal Publisher 1st edition

HBFL22I01 FRENCH-Details in English for contents of each

Unit - I

Introduction to French words through the greetings and simple vocabulary like numbers, languages, nationalities are taught. Concept of conjugation of regular and irregular verbs.

Unit - II

More focus on grammatical elements like prepositions and articles. Various scenarios inclusive of the parts of speech learnt are to be discussed and practiced. Complete vocabularyfor numbers and therefore practices how to say time.

Unit - III

Comprehension of demonstrative and possessive adjectives and the concept of model verbs is introduced. Simple understanding of 'Futurprôche' which enables the student to speak in future tense. Building negative sentences with different verbs.

Unit - IV

Learning vocabulary in most common categories like colours, places etc. and picking up on creating French phrases of right construct. Focus primarily on speaking and writing.

Unit - V

Learning essential verbs of regular actions in French that are more frequent in our daily life and thus mastering conjugations and speaking from the top of our heads. More familiarity towards language is therefore attained.

Total periods: 30

TEXT BOOKS:

1. Écho A1, J.Girardet&J.Pecheur, CLE International, 2nd Edition
2. Saison A1, Jean Giraudoux, Goyal publisher, 1st Edition

REFERENCE BOOKS:

1. Alter Ego A1, Veronique M Kizirian & Annie Berthet, Hachette, 1st Edition
2. Cosmopolite A1, Nathalie Hirschsprung & Tony Tricot, Goyal Publisher 1st edition

Subject Code **HBFL22I02**	Subject Name: **GERMAN**	Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C
	Prerequisite: NIL	IE	1	0/0	1/0	1

C:Credits,L:Lecture,T:Tutorial,SLr:SupervisedLearning,P:Problem/Practical
R:Research,Ty/Lb/ETL/IE:Theory/Lab/EmbeddedTheoryandLab/InternalEvaluation

OBJECTIVES:
- To understand the main idea and some detailed aspects of complex and unfamiliar texts. Know emerging awareness of aesthetic properties of language and literary style.
- Recognize the role of cultural knowledge in understanding written texts.

COURSE OUTCOMES (Cos) Students completing this course were able to

CO1	Learn to write numbers, alphabets, regular and irregular verbs
CO2	Practice preposition and articles.
CO3	Comprehend model verbs and speak in future
CO4	Familiarize colours, places and create phrases
CO5	Master conjugation and speaking the language

Mapping of Course Outcome with Program Outcome (POs)

Cos/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		2
CO2										3		2
CO3										3		2
CO4										3		2
CO5										3		2

3/2/1 Indicates Strength Of Correlation, 3 – High, 2- Medium, 1- Low

Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/Project	Internships/Technical Skills	Soft Skills
			✔						

Subject Code HBFL22I02	Subject Name : **GERMAN**	**Ty/ Lb/ ETL/IE**	**L**	**T/SLr**	**P/R**	**C**
	Prerequisite : NIL	IE	1	0/0	1/0	1

UNIT - I   **6 periods**

Das Alphabet, Die Zahlen von ein -hundert, Begrüßung,Verabschiedung ,SichVortstellen , W – Fragen. Grammatik :- W- Frage, Aussagasatz, Verban und Personnel pronomen

UNIT - II   **6 periods**

Genders in Deutsch,,DiePersonelpronomen, Definite /Indefinite / Negative Articles, Jemandenkennenlernen,Landkarte. Grammatik – bestimmterArtikel :der,die , das , Nomen: Singular und Plural, aussagesatz, negationartikel

UNIT - III   **5 periods**

Possessivpronomen,Verbkonjugation, Ja/Nein Fragen, Satzstruktur Grammatik : Regelmäßige, Unregelmäßige, hilfsverben- Sein/haben, Unbestimmer Artikel

UNIT - IV   **5 periods**

Wie spätist es, Tageszeiten, Die, Wochentage, Die Monate, das Wetter, Die Himmelsrichtungen,Diefamilie, Klassenzimmer – Substantive , Countries and Languages, Negation , Like /Dislike. Grammatik: Akkusative, Verbenmit accusative, wörterorden und lernen, artikelimdativ, Präpositionmit +Dativ

UNIT - V   **5 periods**

Nominativ, Dativ, Accusative, Einkaufen, ImFlugzueg, Imkaufhaus, Jobsuche. Grammatik

Personal pronomen   im Akkusativ   mich, dich,   model verb anmüssen, können, wollen

Total periods: 30

TEXT BOOKS & REFERENCE BOOKS:
1. Shritte International, Daniela Niebisch, Fraz Sppeeht, Angela Pude
2. Netzwerk A1, Stefanie Dengler, Paul Rusch, Helen Schmitz, Tanja Sieber

---

HBFL22I02   GERMAN-Details in English for contents of each unit

---

Unit - I

Alphabet- Numbers from 1 to 100 - Greetings and Goodbye- Self Introduction

W questions - Grammar

Unit - II

Genders in German - Personal Pronoun (For Conjugation) - Definite /Indefinite / Negative Articles - Ask about others - (MAP and Possition of Land) – Grammar

Unit - III

Possessive Pronoun- Verb Conjugation- Yes /No Question - Sentence making in German – Grammar

Unit - IV

what time is it ?, Times of the day - The Week days and Months) - The Weather, Directions - The Family - Substantive , Countries and Languages - Class Room – Substantive Countries and its Languages - Negation , Like /Dislike – Grammar

Unit - V

Accusative - Shopping - In Flight - In departmental store - Job search
Grammar

Total periods: 30

TEXT BOOKS & REFERENCE BOOKS:

1. Shritte International, Daniela Niebisch, Fraz Sppeeht, Angela Pude
2. Netzwerk A1, Stefanie Dengler, Paul Rusch, Helen Schmitz, Tanja Sieber

Subject Code **HBFL22I03**	Subject Name: **JAPANESE**	**Ty/ Lb/ ETL/IE**	**L**	**T/SLr**	**P/R**	**C**
	Prerequisite: NIL	IE	1	0/0	1/0	1

C:Credits,**L**:Lecture,**T**:Tutorial,**SLr**: Supervised Learning :Problem/Practical
R:Research,**Ty/Lb/ETL/IE**:Theory/Lab/EmbeddedTheoryandLab/InternalEvaluation

OBJECTIVES:
- To understand the main idea and some detailed aspects of complex and unfamiliar texts. Know emerging awareness of aesthetic properties of language and literary style.
- Recognize the role of cultural knowledge in understanding written texts.

COURSE OUTCOMES (Cos) Students completing this course were able to

CO1	Learn to write Roumajiscript, Able to self in traduce themselves,Will have knowledge ofHiraganaandalsoabletospeakabout theirFamily members. Countupto100.
CO2	A bleb to countuptp10,000,Will have knowledge of Katakana Alphabets, Will beable Identify the body parts. Ableto understand pronouns.
CO3	Analyze Varied particles and also the existential verbs. Willbeable to contusing the Concept of Counters.
CO4	Will get knowledge of the two different types of adjectives both Iending and Naending adjectives and frame different sentences with these two.
CO5	Master the conjugation of 24forms of the verbs.

Mapping of Course Outcome with Program Outcome (POs)

Cos/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		2
CO2										3		2
CO3										3		2
CO4										3		2
CO5										3		2

3/2/1 Indicates Strength of Correlation, 3 – High, 2- Medium, 1- Low

Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/Project	Internships/ Technical Skills	Soft Skills
			✔						

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

Subject Code HBFL22I03	Subject Name: **JAPANESE**	Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C
	Prerequisite: NIL	IE	1	0/0	1/0	1

UNIT - I   **5 periods**

Introduction, Roumaji, Hiragana, Self Introduction, Family relations,Numbers (1-100)

UNIT - II   **5 periods**

Numbers (101-1000), Numbers (1001-10,000), Katakana, Body parts, and Pronouns

UNIT - III   **8 periods**

Introduction to particles (wa, mo, ka, desu, ni, ga, de), Imasu, Arimasu, Couters

UNIT - IV   **5 periods**

Adjective i-ending, and Na Ending

UNIT - V   **7 periods**

Verbs (24 forms)

Total periods: 30

TEXT BOOKS:

1.   Genki, Eri Bnno, Yoka Ikeda, Yutaka Ohno, ChikkaoShinogawa, Kyoko
       Tokoshiki, The Japanese Publishing Company

REFERENCE BOOKS:

Minna No Nihongo, 3A Corporation, Goyal Publication

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

Subject Code **HBFL22I04**	Subject Name : **ARABIC**	Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C
	Prerequisite : NIL	IE	1	0/0	1/0	1

C:Credits,L:Lecture,T:Tutorial,SLr:SupervisedLearning,P:Problem/Practical
R:Research,Ty/Lb/ETL/IE: Theory/Lab/Embedded Theory and Lab/Internal Evaluation

OBJECTIVES:
- To learn, speak, write and do basic conversation in Arabic Language

COURSE OUTCOMES (Cos) Students completing this course were able to

CO1	Learnal phabets, vowels and gender
CO2	Ask questions, numbers and counting
CO3	Converse in a public place in Arabic
CO4	Identify and speak about food, weather etc
CO5	Analyze verbs, tenses ingular and plural

Mapping of Course Outcome with Program Outcome (POs)

Cos/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		2
CO2										3		2
CO3										3		2
CO4										3		2
CO5										3		2

3/2/1 Indicates Strength of Correlation, 3 – High, 2- Medium, 1- Low

Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/Project	Internships/ Technical Skills	Soft Skills
			✔						

Sub. Code	Subject Name **ARABIC**	Ty/Lb/ETL/IE	L	T /S.Lr	P/R	C
HBFL22I04	**Prerequisite:**NIL	IE	1	0/0	1/0	1

UNIT - I   **6 periods**

Alphabets – Greetings – question words – meeting people first time – introduction – introducing family members

Grammar – Present simple, long and short vowels, masculine and feminine distinctions

UNIT - II   **6 periods**

Asking questions -describing city, capital cities, towns countries – numbers and counting – how many – how much – buying and selling

Grammar – negation to present form – moon letters – genitive case – spelling rules for Hamza, Idafa

UNIT - III   **6 periods**

Eating and drinking – talking about ethnic foods anfavorite cuisines – communicative phrases at public places – questions with what

Grammar – Group words – past tense – plural and joint cases

UNIT - IV   **6 periods**

Describing weather – trips and adventures -camping – school trips Grammar

– future tense, verbs in plural

UNIT - V   **6 periods**

Time and everyday routine – making comparison – days of week – comparing past and present

Grammar – Negative statements – pronouns - superlatives

Total periods: 30

TEXT BOOKS & REFERENCE BOOKS:

1. The Essentials Arabic., Rafiel Imad Faynan., Arabic Edition Publisher
2. Gateway to Arabic, Imran.H.Alawiye, Paperback publisher

Subject Code **HBFL22I05**	Subject Name : **CHINESE**	Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C
	Prerequisite : NIL	IE	1	0/0	1/0	1

C:Credits,**L**:Lecture,**T**:Tutorial,**SLr**: Supervised Learning, **P**:Problem/Practical
R:Research,Ty/Lb/ETL/IE: Theory/Lab/ Embedded Theory and Lab/Internal Evaluation

OBJECTIVES:
- This is a beginning level course in Chinese Mandarin, including introduction of phonetics and daily expressions. It is aimed at students with no prior knowledge of Chinese.

COURSE OUTCOMES (Cos) Students completing this course were able to

CO1	Basic understanding of Chinese Mandarin
CO2	Doconversations ofdailylivingsuchasgreetings
CO3	Acquaint exchange personal information, making an inquiry on time,etc
CO4	Acquirelistening,speaking,andreading skillsinChineseMandarin.
CO5	Use the language in real life scenarios and for everyday conversational communications.

Mapping of Course Outcome with Program Outcome (POs)

Cos/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		2
CO2										3		2
CO3										3		2
CO4										3		2
CO5										3		2

3/2/1 Indicates Strength of Correlation, 3 – High, 2- Medium, 1- Low

Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/Project	Internships/ Technical Skills	Soft Skills
			✔						

Subject Code **HBFL22I05**	Subject Name : **CHINESE**	**Ty/ Lb/ ETL/IE**	**L**	**T/SLr**	**P/R**	**C**
	Prerequisite : NIL	IE	1	0/0	1/0	1

UNIT -I   **6 periods**

Introduction of Chinese language Initials and finals, readinitials:b,p,m,f,d,t,n,l,g,k,h Be able to read finals: a, o, e, i, u, ü, ai, ei, ao, ou, an, en, ang, new words combined with tones greet people using: How do you do?

UNIT -II   **6 periods**

Initials: j, q, x, z, c, s, zhi, chi, shi, r finals: eng, ong, ia, iao, ie, -iu, ian, in,iang, ing, iong, er new words combined with tones greet people using: How are you?

UNIT -III   **6 periods**

Finals:ua, uo,uai, ui,uan, uen,un, uang,ueng,üe,üan, ün
New words combined with tone so count numbers count date, month and year greet people using: Are you busy with your work?

UNIT -IV   **6 periods**

New words questions with "吗" questions with interrogative pronouns adjectival predicate acquaintance using: May I know your name?

UNIT -V   **6 periods**

Sentences with a verbal predicate attributive genitive use the "是" sentence acquaintance using: Let me introduce..

                                                                        Totalperiods:30

TEXT BOOKS & REFERENCE BOOKS:

The first100ChineseCharacters, Laurence Mathews, Tuttle Publishers
Learning Mandarin Chinese, Version2,YiRen, Tuttle Publishers

Subject Code **HBFL22I06**	Subject Name : **RUSSIAN**	Ty/ Lb/ ETL/IE	L	T/SLr	P/R	C
	Prerequisite : NIL	IE	1	0/0	1/0	1

C:Credits,**L**:Lecture,**T**:Tutorial,**SLr**: Supervised Learning, **P**:Problem/Practical
R:Research,Ty/Lb/ETL/IE:Theory/Lab/EmbeddedTheoryandLab/InternalEvaluation

OBJECTIVES:

This is a beginning level course in Chinese Mandarin, including introduction of phonetics and daily expressions. It is aimed at students with no prior knowledge of Chinese.

COURSE OUTCOMES (Cos) Students completing this course were able to

CO1	AcquaintPhonetics–Alphabetsandsounds
CO2	Use different types of nouns and self-introduce.
CO3	Identify general vocabulary and greet in the language
CO4	Identify and apply sounds with different stems and word construction
CO5	Construct and speak sentences in the language

Mapping of Course Outcome with Program Outcome (POs)

Cos/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		2
CO2										3		2
CO3										3		2
CO4										3		2
CO5										3		2

3/2/1 Indicates Strength of Correlation, 3 – High, 2- Medium, 1- Low

Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/Project	Internships/ Technical Skills	Soft Skills
			✔						

Subject Code	Subject Name : **RUSSIAN**	**Ty/ Lb/ ETL/IE**	**L**	**T/SLr**	**P/R**	**C**
HBFL22I06	**Prerequisite** : NIL	IE	1	0/0	1/0	1

UNIT -I   **6 periods**
Phonetics: Alphabets and Sounds, Voice and vowels, Voice and Voiceless–Consonants-Self Intro, Self Name in Russian Language

UNIT -II   **6 periods**
Etho construction, Shtho Etho, Kmo Etho-Animates and Inanimate nouns

UNIT -III   **6 periods**
General Vocabulary, Answering the objects with Etho on interrogatives ShthoEtho and Kmotho? - Greetings of the Day on various timings

UNIT -IV   **6 periods**
Alphabets , sounds with Hard stems - Gender of Nouns, Demonstrative Pronouns using vocabulary and simple word constructions - General words on regular us: Excuse me, May I Come in, Excuse me, Thank you and see you again

UNIT -V   **6 periods**
Revision of Vocabulary, New Words, Greetings and other Day today usage of sentences

Total periods:30

TEXTBOOKS&REFERENCE BOOKS:

Russian for begineers, Gateway Guides, Kindle Edition
Learn to speak &Write Russian,Vasuda Bhaskar,Chatter Singh Publishers.

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

Subject Code **HBFL22I07**	Subject Name : **SPANISH**	**Ty/ Lb/ ETL/IE**	**L**	**T/SLr**	**P/R**	**C**
	Prerequisite : NIL	IE	1	0/0	1/0	1

:Credits,L:Lecture,T:Tutorial,SLr:SupervisedLearning,P:Problem/Practical
R:Research,Ty/Lb/ETL/IE:Theory/Lab/EmbeddedTheoryandLab/InternalEvaluation

OBJECTIVES:
To understand the main idea and some detailed spects of complex and unfamiliar texts.
Know emerging awareness of aesthetic properties of language and literary style.
Recognize the role of cultural knowledge in understanding written texts.

COURSE OUTCOMES (Cos) Students completing this course were able to

CO1	Learn to write numbers, alphabets, regular and irregular verbs
CO2	Practice preposition an darticles.
CO3	Comprehend model verbs and speak in future
CO4	Familiarize colours, places and create phrases
CO5	Master conjugation and speaking the language

Mapping of Course Outcome with Program Outcome (POs)

Cos/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		2
CO2										3		2
CO3										3		2
CO4										3		2
CO5										3		2

3/2/1 Indicates Strength of Correlation, 3 – High, 2- Medium, 1- Low

Category	Basic Sciences	Engg.Science	Humanities & social Science	Program Core	Program Elective	Open Elective	Practical/Project	Internships/ Technical Skills	Soft Skills
			✔						

Subject Code HBFL22I07	Subject Name: SPANISH	Ty/Lb/ETL/IE	L	T /S.Lr	P/R	C
	Prerequisite:NIL	IE	1	0/0	1/0	1

UNIT -I   **5 periods**
Los Saludos y Despedidas, Los Alfabetos, Los Numeros (1-20), Sonidos y Letras: H, C/Qa, G/J, B/V, C/Z, R, R/rr, Ch, G/Gu, Ll, N, Aficiones.

UNIT -II   **5 periods**
LosNumeros(21-100),PronombresPersonales:Yo,Tu,El,Eyya,Nosotros,Vosotros,Ustedes, Usted. Ser verbos: Soy, Eres, Es, Somos, Sois, Son. Nacionalidad, Profesiones.

UNIT -III   **5 periods**
Singular y Plural,Conversion de Singular a Plural. Masculinoy Feminino, conversion de masculinoafeminino. Tener verbos: Tengo, Tienes, Tiene, Tenemos, Teneis, Tienen. Llevarverbos.

UNIT -IV   **10 periods**
Vocabulario de Colores, Casa, Bebidas, Ciudad, Clima, Colegio, Comida, Medios, Saludos, Verduras. Articulesdefinidos, Articulesindefinidos.

UNIT -V   **5 periods**
Estar verbos: Estoy, Estas, Esta, Estamos, Estais, Estan. Reflexive verbos: Me, Te, Se, Nos, Os, Se. Cuantificadores, Preguntar y Responder.

Totalperiods:30

TEXTBOOK:
Aulainternacional1,Jaimecorpas & Eva Garcia, diffusion, Nuevaedicion

REFERENCEBOOK:

GrammaticadeusoA1-B2,LuisAragones, Ramon Palencia, smeLe, Nuevaedicion

HBFL22I07   SPANISH-Details in English for contents of each unit

UNIT-I
Introduction of Spanish words through the greetings, goodbyes, hobbies. Simple vocabulary like numbers (1–20) and alphabets .Pronunciation of H,C/Qa,G/J,B/V,C/Z, R, R/rr, Ch, G/Gu, Ll, N are taught.

UNIT-II
Focusing on grammatical elements like subject pronouns and irregular verbs. Complete vocabulary for numbers, Nationality and professions. Therefore, practice how to say time, phone number, Nationality and profession.

UNIT-III
Singular and plural forms of noun and conversion from singular to plural. Identifying the nouns as masculine or feminine. Conversion of nouns from masculine to feminine. Focusing on Tener and L levar verbs.

UNIT– IV
Learning vocabulary in most common categories like colours, Houses, Drinks, City, Climate, Foods. Learning both definite and indefinite articles. More focusing on reading, writing and speaking.

UNIT– V
More focusing on grammatical element slike Estarverbs and Reflexive verbs usually used in everyday life, Quantification like much,more. More familiarity towards languageis therefore attained.

Total periods:30

TEXTBOOK:
1. Aulainternacional 1, Jaime corpas & Eva Garcia, diffusion, Nuevaedicion

REFERENCEBOOK:

1.GrammaticadeusoA1-B2, Luis Aragones, Ramon Palencia, smeLe, Nuevaedicion