

P.K.R. ARTS COLLEGE FOR WOMEN

(Re-Accredited with 'A' grade by NAAC)

Autonomous Institution- Affiliated to Bharathiar University, Coimbatore

No. 127, Pariyur Road, GOBICHETTIPALAYAM – 638 476.



DEPARTMENT OF COMPUTER SCIENCE

BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

SCHOLASTIC COURSES

AND

CO-SCHOLASTIC COURSES

*For the candidates admitted from the
Academic Year 2024-2025 and onwards*

Under CBCS PATTERN



P.K.R ARTS COLLEGE FOR WOMEN
(Autonomous Institution, Re-Accredited by NAAC with 'A' Grade)
Gobichettipalayam-638476

BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

PROGRAMME STRUCTURE

CBCS Pattern: 2024-2025

Scholastic Courses:

Category	Component	No. of Courses	Credit(s)/ Course	Total Credits	Proposed Semester
Part – I	Tamil/Hindi/French/Kannada/Malayalam/Sanskrit	4	3	12	I – IV
Part – II	English	4	3	12	I – IV
Part - III	Core Courses (Core Theory /Core Practical/ Core Allied/ Elective/Open Elective)	24	2/3/4/5	94	I - VI
	Institutional Training/ Industrial Training/ Mini Project	1	1	1	V
Part –IV	A. Foundation Courses: i. Environmental Studies ii. Yoga and Ethics	1 1	2 2	4	I II
	B. Ability Enhancement Courses: i. Information Security ii. Consumer Rights	1 1	2 2	4	III IV
	C. Skill Enhancement Courses: i. Operating System-Practical ii. Web Programming – Practical iii. Internet of Things - Practical	1 1 1	2 2 2	6	IV V VI
	D. Non-Major Elective: i. Indian Women and Society / Advanced Tamil	1	2	2	III
	A. Proficiency Enhancement i. Digital Marketing (Self Study)	1	2		V
Part –V	B. Competency Enhancement: i. NSS/YRC/RRC/CCC/PHY.EDU/OTHERS ii. Professional Grooming (Life Skills – Jeevan Kaushal)	1 1 1	1 1 1	5	I to VI I to VI I to VI
	iii. Students Social Activity	1	1		I to VI

Total Marks: 3800

Total Credits: 140



P.K.R ARTS COLLEGE FOR WOMEN
(Autonomous Institution, Re-Accredited by NAAC with 'A' Grade)
Gobichettipalayam-638476
BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

Programme Scheme and Scheme of Examinations
(For students admitted from 2024-2025 & onwards)

Scholastic Courses:

Category	Component	Course Code	Course Title	Contact Hrs/ week	Exam Duration hrs.	Max.Marks			Credits
						CIA	ESE	Total	
SEMESTER - I									
Part I	Language : I	24LTU01/ 24LHU01/ 24LFU01/ 24LKU01/ 24LMU01/ 24LSU01	Tamil- I/ Hindi-I/ French-I/ Kannada-I/ Malayalam-I / Sanskrit-I	4	3	25	75	100	3
Part II	English: I	24LEU01	English – I	4	3	25	75	100	3
Part III	Core : I	24ITU01	Programming in C	5	3	25	75	100	4
Part III	Core : II Practical: I	24ITU02	Programming in C – Practical	5	3	40	60	100	4
Part III	Core : III	24ITU03	Digital Computer Fundamentals	5	3	25	75	100	4
Part III	Core : IV Allied : I	24ITU04	Mathematical Structures for Computer Science	5	3	25	75	100	3
Part IV	Foundation : I	24FCU01	Environmental Studies	2	3	50	-	50	2
TOTAL				30				650	23
SEMESTER - II									
Part I	Language : II	24LTU02/ 24LHU02/ 24LFU02/ 24LKU02/ 24LMU02/ 24LSU02	Tamil- II/ Hindi-II/ French II/ Kannada-II/ Malayalam-II/ Sanskrit-II	4	3	25	75	100	3
Part II	English : II	24LEU02	English: II	4	3	25	75	100	3
Part III	Core : V	24ITU05	Programming in C++	6	3	25	75	100	4
Part III	Core :VI Practical: II	24ITU06	Programming in C++ – Practical	5	3	40	60	100	4
Part III	Core : VII Practical: III	24ITU07	Office Automation – Practical	3	3	40	60	100	2
Part III	Core : VIII Allied : II	24ITU08	Discrete Mathematics	6	3	25	75	100	3
Part IV	Foundation : II	24FCU02	Yoga and Ethics	2	3	50	--	50	2
TOTAL				30				650	21

P.K.R Arts College for Women (Autonomous), Gobichettipalayam
B.Sc Information Technology 2024-2025

SEMESTER – III									
Part I	Language : III	24LTU03/ 24LHU03/ 24LFU03/ 24LKU03/ 24LMU03/ 24LSU03	Tamil- III/ Hindi-III/ French-III/ Kannada-III/ Malayalam-III/ Sanskrit-III	4	3	25	75	100	3
Part II	English : III	24LEU03	English: III	4	3	25	75	100	3
Part III	Core : IX	24ITU09	Programming in Java	6	3	25	75	100	5
Part III	Core : X Practical: IV	24ITU10	Programming in Java- Practical	6	3	40	60	100	4
Part III	Core : XI Allied : III	24ITU11	Operating System	6	3	25	75	100	3
Part IV	Ability Enhancement : I	24AEU01	Information Security	2	3	50	-	50	2
Part IV	Non- Major Elective	24NMMU01A/ 24NMMU01B	Indian Women and Society/ Advanced Tamil	2	3	50	-	50	2
TOTAL				30				600	22
SEMESTER – IV									
Part I	Language : IV	24LTU04/ 24LHU04/ 24LFU04/ 24LKU04/ 24LMU04/ 24LSU04	Tamil- IV/ Hindi-IV/ French-IV/ Kannada-IV/ Malayalam-IV/ Sanskrit-IV	4	3	25	75	100	3
Part II	English : IV	24LEU04	English: IV	4	3	25	75	100	3
Part III	Core : XII	24ITU12	Data Structures	6	3	25	75	100	5
Part III	Core : XIII Practical: V	24ITU13	Data Structures using C & C++ - Practical	5	3	40	60	100	4
Part III	Core : XIV Allied : IV	24ITU14	Microprocessor and Assembly Language Programming	6	3	25	75	100	5
Part IV	Skill Enhancement : I	24SEITU01	Operating System-Practical	3	3	50	-	50	2
Part IV	Ability Enhancement : II	24AEU02	Consumer Rights	2	3	50	-	50	2
TOTAL				30				600	24
SEMESTER - V									
Part III	Core : XV	24ITU15	Relational Database Management Systems	6	3	25	75	100	4
Part III	Core : XVI Practical: VI	24ITU16	SQL and PL/SQL - Practical	6	3	40	60	100	4
Part III	Core : XVII	24ITU17	Computer Networks	6	3	25	75	100	4

P.K.R Arts College for Women (Autonomous), Gobichettipalayam
B.Sc Information Technology 2024-2025

Part III	Core : XVIII	24ITU18A/ 24ITU18B/ 24ITU18C	Institutional Training/ Industrial Training/ Mini Project	-	3	100	-	100	1
Part III	Core : XIX (Open Elective)	***	Opted by the students offered by other departments	4	3	25	75	100	2
Part III	Core : XX Elective : I	24ITU19A/ 24ITU19B/ 24ITU19C/ 24ITU19D	Internet of Things: Level-I/ Computer Graphics Level-I/ Introduction to Compiler Design/ Cloud Computing Techniques	5	3	25	75	100	4
Part IV	Skill Enhancement : II	24SEITU02	Web Programming-Practical	3	3	50	-	50	2
Part V	Proficiency Enhancement	24PEITU01	Digital Marketing (Self Study)	--	3	--	100	100	2
			TOTAL	30				750	23
SEMESTER - VI									
Part III	Core : XXI	24ITU20	Programming in Python	6	3	25	75	100	5
Part III	Core : XXII Practical: VII	24ITU21	Programming in Python – Practical	5	3	40	60	100	4
Part III	Core : XXIII	24ITU22	Software Testing	6	3	25	75	100	5
Part III	Core : XXIV Elective :II	24ITU23A/ 24ITU23B/ 24ITU23C/ 24ITU23D	Internet of Things: Level-II/ Computer Graphics Level-II/ Network Security & Cryptography/ Informatics	5	3	25	75	100	4
Part III	Core : XXV Elective : III	24ITU24A/ 24ITU24B/ 24ITU24C/ 24ITU24D	Artificial Intelligence / Big Data Analytics/ Green Computing/ Android APP Development	5	3	25	75	100	4
Part IV	Skill Enhancement: III	24SEITU03	Internet of Things - Practical	3	3	50	-	50	2
			TOTAL	30				550	24
Part V	Competency Enhancement	NSS/YRC/RRC/CCC/ PHY.EDU / Others			SEMESTER I – VI				1
		Professional Grooming (Life Skills – Jeevan Kaushal)			SEMESTER I – VI				1
		Students Social activity (Related to the Curriculum)			SEMESTER I –VI				1

NOTE: CREDIT TRANSFERABILITY FOR ALL COURSES FROM UGC REFERRED SWAYAM AND MOOC COURSES.

Total Marks: 3800

Total credits: 140

**Chair Person
Name, designation**

SYLLABUS

முதற்பருவம்

Category	Component	Course Code	Course Title	Contact Hours / Semester	Credit
PART : I	LANGUAGE : I	24LTU01	Tamil –I	48	3

Contact hours per week: 4

Year	Semester	Internal Marks	External marks	Total Marks
I	I	25	75	100

முகப்புரை:

தமிழ்மொழி குறித்த அடிப்படை அறிவினையும் வகைமையினையும் அறிதல்.

COURSE OUTCOME:

பொதுத்தமிழைப் படிப்பதன் வாயிலாக கீழ்க்கண்ட திறன்களைப் பெறுவர்.

COs	CO Statement	Knowledge Level
CO1	தமிழ் இலக்கிய வகைமைகளைக் கற்றல்	K1
CO2	மொழியை பிழையில்லாமல் எழுதவும் பேசவும் கற்றல்	K2
CO3	பெண்ணியம் சார்ந்த சிந்தனைகளை வளர்த்தல்	K3
CO4	புதுக்கவிதை, சிறுகதை உத்திகளை திறனாய்தல்	K4
CO5	படைப்பாளர்களாக உருவாக்கம் பெறுதல்	K5

K1: Remember Level , K2:Understand Level , K3: Apply Level , K4: Analyze Level, K5: Evaluate Level

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	3	9	3	3	9	9
CO2	9	9	9	9	3	3	3
CO3	9	3	9	9	9	3	3
CO4	9	3	9	9	3	3	3
CO5	9	9	9	3	9	9	3
Total contribution of COs to POs	45	27	45	33	27	27	21
Weighted Percentage of COs contribution to POs	2.29	1.71	2.84	2.10	2.24	2.22	1.94

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;

9- High correlation between COs and POs

COURSE CONTENT

அலகு 1 இயற்கை

8 மணி நேரம்

காலைப்பொழுது, அந்திப்பொழுது, மழை – பாரதியார்
ஆறு – பாரதிதாசன்
இயற்கை வாழ்வு – கவிமணி
நெய்தல் நீர் - சுரதா
மரங்கள் - மு.மேத்தா

அலகு 2 பெண்ணியம்

10 மணி நேரம்

நவீன தாலாட்டு - வைரமுத்து
பெண்ணுரிமை பேணுநர் - பொன்மணி வைரமுத்து
அம்மா - இளம்பிறை

அலகு 3 சிறுகதைகள் - சமுதாயம்

10 மணி நேரம்

கன்னி – இந்திரா பார்த்தசாரதி
அம்மாவுக்கு ஓய்வு – ஜோதர்லதா கிரிஜா
கழிவு – ஆண்டாள் பிரியதர்சினி
பூக்களும் விற்பனைக்கே – திலகவதி

அலகு 4 இலக்கணம்

10 மணி நேரம்

வல்லினம் மிகும் இடங்கள்
வல்லினம் மிகா இடங்கள்
ந ண ன, ல ள ழ, ர ற வேறுபாடு
மரபுச் சொற்கள்

அலகு 5 இலக்கிய வரலாறு

10 மணி நேரம்

புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும்
சிறுகதையின் தோற்றமும் வளர்ச்சியும்
படிமம் - குறியீடு பற்றிய விளக்கங்கள்

பயிற்சிக்குரியன - கடிதம் வரைதல், விண்ணப்பம் எழுதுதல்

பாடநூல்கள் :

1. மகாகவி பாரதியார் கவிதைகள், ஸ்ரீ செண்பகா பதிப்பகம், கிருஷ்ணா தெரு, தியாகராயநகர், சென்னை-600 017. எட்டாம் பதிப்பு: 2005.
2. உவமைக்கவிஞர் சுரதா கவிதைகள்(முதற்தொகுதி), வள்ளுவர் தமிழ்ப்பீடம், 56-அ, டாக்டர் லட்சுமணசாமி சாலை, கலைஞர் கருணாநிதி நகர், சென்னை-600 078 முதற்பதிப்பு: பிப்ரவரி 2007.
3. மு.மேத்தா கவிதைகள் (தேர்ந்தெடுத்த கவிதைகள்) கவிதா பப்ளிகேஷன், 8,மாசிலாமணி தெரு, பாண்டிபஜார்,தி.நகர், சென்னை-600 017 இரண்டாம் பதிப்பு: ஆகஸ்ட் 2011.
4. வைரமுத்து கவிதைகள், சூர்யா லிட்ரேச்சர்(பி)லிட், 22,நான்காம் குறுக்குத்தெரு, டிரஸ்ட் புரம், சென்னை-24 பத்தாம் பதிப்பு: ஜூலை 2009.
5. பொன்மணி வைரமுத்து கவிதைகள், சூர்யா லிட்ரேச்சர்(பி)லிட், 22,நான்காம் குறுக்குத்தெரு, டிரஸ்ட் புரம், சென்னை-24. நான்காம் பதிப்பு: 1996

பார்வை நூல் :

வல்லிக்கண்ணன், புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும், சீதை பதிப்பகம், சென்னை 600005, 6 ஆம் பதிப்பு 2014.

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART – II	ENGLISH: I	24LEU01	ENGLISH - I	48	3

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
I	I	25	75	100

PREAMBLE:

To impart basic knowledge about the English Language and various genres in Literature

COURSE OUTCOME:

On the successful completion of the course, Students will be able to

COs	CO Statement	Knowledge Level
CO1	Identify the main ideas of the different genres.	K1
CO2	Enhance their four skills of language learning.	K2
CO3	Avoid the common grammatical errors.	K3
CO4	Detect the correct usage of vocabulary.	K4
CO5	Interpret the grammatical forms of English through activities, assignments, reading the texts.	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	3	3	3	3	1	1
CO3	9	3	3	1	1	1	1
CO4	3	3	1	1	1	1	1
CO5	3	1	1	1	1	1	0
Total contribution of COs to POs Weightage	33	19	17	15	9	7	6
Weight Percentage of COs contribution to POs	2.42	1.73	1.87	1.94	2.34	2.17	2.48

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;

9- High correlation between COs and POs.

COURSE CONTENT

UNIT I: Poetry (7 Hours)

1. All the world's a stage – William Shakespeare
2. On Killing a tree – Gieve Patel
3. Night of the Scorpion - Nissim Ezekiel

UNIT II: Prose (8 Hours)

- 1 Good Manners - J.C. Hill
2. Of love – Francis Bacon
3. The worship of wealthy- G.K. Chesterton

UNIT III: Short Stories (9 Hours)

1. The Lost Child – Mulk Raj Anand
2. Happy Prince - Oscar Wilde
3. The Lottery Ticket - Anton Chekhov

UNIT IV: One-Act Play (10 Hours)

1. Refund – Fritz Karinthy
2. The Never, Never nest – Cedric Mount.

UNIT V: Grammar and Composition (14 Hours)

1. Parts of Speech
2. Nouns
3. Pronouns
4. Verbs
5. Adjectives
6. Adverbs
7. Prepositions
8. Conjunctions and Interjections

TEXT BOOK: BLOSSOM

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : I	24ITU01	PROGRAMMING IN C	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
I	I	25	75	100

PREAMBLE :

To learn about the C programming language concepts.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Recall the basics of C Tokens, Operators, Array and Files	K1
CO2	Summarize the concepts of input and output functions, decision making and looping, string functions, and pointers	K2
CO3	Classify Arrays and functions	K3
CO4	Analyze the functions of Pointers, Structures and files	K4
CO5	Determine the usage of pointers and files	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to Pos	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to Pos	2.50	2.64	2.66	2.89	1.61	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9 - High correlation between COs and POs.

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : II PRACTICAL : I	24ITU02	PROGRAMMING IN C- PRACTICAL	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
I	I	40	60	100

PREAMBLE :

To learn about the C programming language concepts.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Define the basics of arithmetic operations using C tokens.	K1,K2,K3,K4,K5
CO2	Choose the True/ False statements for checking ODD / EVEN numbers.	
CO3	Calculate simple interest, Employee pay Bill, area of shapes and factorial value	
CO4	Experiment matrix addition	
CO5	Validating the file operations	

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate
CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to Pos	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	1.61	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

PRACTICAL LIST

1. Evaluate the expression which performs all arithmetic operations in mixed mode.
2. Create a Program to calculate simple interest.
3. Evaluate and Check the given number is odd or even - using if else/switch case/conditional operator methods.
4. Construct a program to print all prime numbers between any two given limit.
5. Design a Program to find the sum of the digits of a number.
6. Create a Program to calculate gross salary of an employee
[using formula: gross Sal = basic_sal+hra+da].
7. Create a program to finding area of a square, rectangle, circle using switch case.
8. Generate a program to arrange the given set of numbers in ascending and descending order.
9. Create a program to calculating Matrix addition.
10. Generate a Mark list processing using Structure.
11. Create a program to calculate the factorial value using recursive function.
12. Create a Program to perform various file operations – Add and Finding no of records in the file.

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : III	24ITU03	DIGITAL COMPUTER FUNDAMENTALS	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
I	I	25	75	100

PREAMBLE :

To understand the fundamentals behind digital logic design and the course includes fundamentals of Boolean algebra, Combinational, Sequential circuits, Input-Output organization and Memory organization.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Recall the basic computer components and micro-operations	K1
CO2	Explain number conversions, Boolean algebra and logic circuits	K2
CO3	Utilize the components of register, input/output and Flip flops	K3
CO4	Analyze the Boolean expressions using Boolean algebra	K4
CO5	Evaluate the storage concepts using digital logic	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	3	3	9	9
CO5	9	9	9	3	3	9	9
Total Contribution of COs to Pos	45	45	45	33	15	45	45
Weighted Percentage of COs Contribution to Pos	2.50	2.64	2.66	2.12	1.61	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART-III	CORE :IV ALLIED : I	24ITU04	MATHEMATICAL STRUCTURE FOR COMPUTER SCIENCE	60	3

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
I	I	25	75	100

PREAMBLE:

To enable the students to learn about Matrices, Simultaneous Linear equations, Numerical Differentiation and Integration and also Measures of central tendency.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the basic definitions of Matrices, upper and lower triangular matrix, Numerical Differentiation and Integration, Measures of central tendency and Simultaneous algebraic equations.	K₁
CO2	explain the basic concepts of Matrices, Gauss Elimination, Gauss Jordan, Gauss Jacobi Methods, Gauss Seidel Methods and also Newton's forward & backward Difference Formula , Newton's cotes formula and also Measures of central tendency.	K₂
CO3	apply various formulae to solve the problems on Matrices, Numerical Differentiation and Integration, Measures of central tendency and algebraic equations.	K₃
CO4	analyze the relationship between mean , median , mode and Trapezoidal Rule & Simpson's rule	K₄
CO5	evaluate the problems under Matrices ,Simultaneous Linear equations, Numerical Differentiation and Integration and also Measures of central tendency.	K₅

K₁ - Remember; K₂ – Understand; K₃ - Apply; K₄ - Analyze; K₅ – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	9	9	9	3	3	3
CO3	9	9	9	9	3	3	3
CO4	9	9	3	3	1	1	1
CO5	3	3	3	3	0	0	0
Total Contribution of COs to POs	39	39	33	33	10	10	10
Weighted Percentage of COs contribution to POs							
IT	2.17	2.29	1.95	2.12	1.07	0.73	0.71

**Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs**

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-IV	FOUNDATION : I	24FCU01	ENVIRONMENTAL STUDIES	24	2

Contact hours per week: 2

Year	Semester	Internal Marks	External Marks	Total Marks
I	I	50	-	50

PREAMBLE :

To bring about an awareness of a variety of environmental concerns and to create a pro-environmental attitude and a behavioural pattern in society that is based on creating sustainable lifestyle

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Define environment, ecosystem, biodiversity, environmental pollution and social issues.	K1
CO2	Explain the natural resources, types of ecosystem, geographical classification of India, causes of environmental pollution and the problems related to the society.	K2
CO3	Identify the information related to environment and the resources to protect it.	K3
CO4	Analyze the classification of natural resources, energy flow in the ecosystem, threats to biodiversity, disaster management and the role of information technology in environment and human	K4
CO5	Assess the environmental issues with a focus on sustainability.	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	9	9	9	3	1	3
CO3	9	9	9	9	1	1	3
CO4	9	9	9	9	1	1	3
CO5	9	9	3	3	1	1	3
Total Contribution of COs to Pos	45	45	39	39	9	7	15
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.31	2.50	0.97	0.51	1.06

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.

COURSE CONTENT

UNIT- I

(4 Hours)

Environment: Definition, Components, Segments and Types. Natural Resources: Meaning, Components: (1. Forest-Meaning, Importance and Types 2. Water- Meaning, Types and Problems 3. Mineral- Meaning and Classification 4. Food-Meaning and Problems 5. Energy- Meaning, Forms and Types 6. Land- Meaning, Structure and Functions, Components), Classification: Renewable and Non-Renewable Resources, Role of an Individual in Conservation of Natural Resources.

UNIT -II

(5 Hours)

Ecosystems – Definition, Features, Structure and Function of an Ecosystem, Producers, Consumers and Decomposers, Energy Flow in the Ecosystem (Water, Carbon, Nitrogen, Oxygen and Energy), Food Chains, Food Webs and Ecological Pyramids.

Introduction Types, Characteristics Features, Structure and Function of the following Ecosystem:

- Forest Ecosystem
- Grassland Ecosystem
- Desert Ecosystem
- Aquatic Ecosystems (Ponds, Streams, Lakes, Rivers, Ocean, Estuaries)

UNIT- III

(5 Hours)

Biodiversity and its Conservation-Introduction – Definition – Genetic, Species and Ecosystem Diversity, Bio geographical Classification of India -Value of Biodiversity – Consumptive Use, Productive Use, Social, Ethical, Aesthetic and Option Value- Biodiversity at Global, National and Local Levels- India as a Mega-Diversity Nation- Hot-Spots of Biodiversity- Threats to Biodiversity – Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts- Endangered and Endemic Species of India Conservation of Biodiversity – In-situ and Ex-situ and Conservation of Biodiversity.

UNIT- IV

(5 Hours)

Environmental Pollution: Definition, Causes, Effects, control measures and Prevention Acts for Air, Water, Soil, Noise, Thermal Pollutions and Nuclear Hazards. Solid Waste Management: Meaning, Causes, effects and control measures of urban and industrial wastes. Disaster Management: Meaning, Types of Disasters: floods, earthquake, cyclone and landslides. Environmental Ethics: Issues and possible solutions- Climate change, global warming, acid rain, ozone layer depletion, nuclear - accidents and holocaust. Consumerism and waste products, Public Awareness.

Unit- V

(5 Hours)

Social Issues and the Environment: From Unsustainable to Sustainable development- Urban problems related to energy- Water conservation, rain water harvesting, watershed management- Resettlement and rehabilitation of people; its problems and concerns.

Human Population and the Environment: Population growth and distribution- Population explosion – Family Welfare Programme-Environment and human health- HIV/AIDS- Role of Information Technology in Environment and human health- Medical transcription and bio-informatics.

REFERENCE BOOKS :

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad
3. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
4. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001,
6. Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
7. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
8. Down to Earth, Centre for Science and Environment (R)
9. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev.,
10. Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
11. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural
12. History Society, Bombay (R)
13. Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment, Cambridge Univ. Press 1140p.
1. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws, Himalaya Pub. House, Delhi 284 p.
2. Mckinney, M.L. & School, R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition. 639p.
3. Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
4. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
5. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
6. Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ.Co. Pvt. Ltd. 345p.
7. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
8. Survey of the Environment, The Hindu (M)
9. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (TB)

இரண்டாம் பருவம்

Category	Component	Course Code	Course Title	Contact Hours / Semester	Credit
PART : I	LANGUAGE: II	24LTU02	Tamil - II	48	3

Contact hours per week : 4

Year	Semester	Internal Marks	External Marks	Total Marks
I	II	25	75	100

முகப்புரை:

நீதி இலக்கியம் சார்ந்த நூல்களைப் படிப்பதன் மூலம் வாழ்வில் அற உணர்வினைப் பெறுவர்.

COURSE OUTCOME:

இதனைக் கற்பதன் மூலம் கீழ்க்காணும் நிலையை அடைவர்.

COs	CO Statement	Knowledge Level
CO1	அறஇலக்கிய வகைமைகளை அறிந்து கொள்ளுதல்.	K1
CO2	அறஇலக்கியங்கள் வழிகாட்டும் ஒழுக்கங்களைக் கற்றல்.	K2
CO3	மனித நேய மாண்புடன் விளங்குதல்.	K3
CO4	இலக்கியங்களுக்கிடையே உள்ள உறவு நிலைகளைத் தொடர்புப்படுத்துதல்.	K4
CO5	சுற்றுச்சூழல் குறித்த விழிப்புணர்வைக் கொண்டு சமூகத்தை மதிப்பிடல்.	K5

K1:Remember Level , K2:UnderstandLevel , K3: Apply Level , K4: Analyze Level, K5: Evaluate Level

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	3	3	9	9	9	3
CO3	9	9	9	3	9	3	3
CO4	9	9	9	9	3	3	3
CO5	9	3	9	3	3	3	3
Total contribution of COs to POs Weightage	45	33	39	33	33	27	21
Weight Percentage of COs contribution to POs	2.29	2.09	2.46	2.10	2.74	2.22	1.94

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

COURSE CONTENT

அலகு - 1 அறநூல்கள்

10 மணி

1. திருக்குறள் - அ) இன்னா செய்யாமை (1-10)
ஆ) சொல்வன்மை (1-10)
2. நாலடியார் - அ) கல்வி (1-10)
ஆ) நட்பாராய்தல் (1-10)
3. நன்னெறி - 10 பாடல்கள் (4,5,8,9,11,15,16,18,19,24)

அலகு - 2 தனிப்பாடல் திரட்டு

10 மணி

1. அருணாச்சலக் கவிராயர் - 'வெண்ணெயுற்று நெய்தேட்...'
- 2.அவ்வையார் - 'வான்குருவியின் கூடு...'
'சித்திரமும் கைப்பழக்கம்...'
'சொல்லாமலே பெரியர்...'
'கற்றது கைமண்ணளவு...'
'எட்டேகால் லட்சணமே...'
மதியாதார் முற்றம் மதித்து...'
3. காளமேகப் புலவர் - 'வாரிக்ககளத்து அடிக்கும்...'

அலகு - 3 உரைநடை

10 மணி

1. கைகேயி உள்ளம் - தீப.நடராஜன்
2. வியர்வையின் வெகுமதி - வெ.இறையன்பு
3. கோ.வை. கோதைநாயகி அம்மாள் - பைம்பொழில் மீரான்
4. நண்பரின் பண்பு - தமிழண்ணல்

அலகு- 4 -இலக்கணம்

8 மணி

சொல் வகைகள் - பெயர்ச்சொல் - இடுகுறிப்பெயர், காரணப்பெயர்

வினைச்சொல் - தெரிநிலை வினைமுற்று, ஏவல் வினைமுற்று, வியங்கோலள் வினைமுற்று, குறிப்பு வினைமுற்று, இடைச்சொல்லின் இலக்கணம் - வகைகள், உரிச்சொல்லின் இலக்கணம் - வகைகள்

அலகு- 5 இலக்கிய வரலாறு

10 மணி

1. பதினெண் கீழ்க்கணக்கு நூல்கள்
- 2.உரைநடையின் தோற்றமும் வளர்ச்சியும்

பயிற்சிக்குரியன - மொழிபெயர்ப்பு (ஆங்கிலத்திலிருந்து தமிழில்)

பாடநூல்கள் :

1. ச.வே.சுப்பிரமணியன், இலக்கிய வரலாறு, மணிவாசகர் பதிப்பகம் 31, சிங்கர் தெரு பாரிமுனை, சென்னை 600 108
2. தண்டபாணி தனிப்பாடல் திரட்டு உரை (மூலமும் உரையும்), உமா பதிப்பகம், 58 ஐயப்ப செட்டி தெரு, மண்ணடி, சென்னை 600 001.
3. பேரா. முனைவர் மு.பெரி.மு.இராமசாமி, திருக்குறள், ஸ்ரீ இந்து பப்ளிகேஷன்ஸ், 40 பஞ்சால் சுப்பிரமணிய தெரு, சென்னை 600 017.
4. பேரா. மாணிக்கம், நாலடியார் தெளிவுரை, மணிவாசகர் பதிப்பகம், சென்னை 6 ஆம் பதிப்பு, ஆகஸ்ட் 2014.
5. கவிஞர் பத்மதேவன், நீதி நூல் களஞ்சியம், கொற்றவை வெளியீடு, 4/2 சுந்தரம் தெரு, சென்னை - 600017. முதற்பதிப்பு 2014
6. எளிய நடையில் தமிழ் இலக்கணம் - சுரா பதிப்பகம், அண்ணாநகர், சென்னை-40. முதற்பதிப்பு 2012.

பார்வை நூல்:

- ச.வே.சுப்பிரமணியன், பதினெண் கீழ்க்கணக்கு நூல்கள் (மூலமும் தெளிவுரையும்) , மணிவாசகர் பதிப்பகம், 31 சிங்கர் தெரு, பாரிமுனை, சென்னை 600 108.

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART – II	ENGLISH: II	24LEU02	ENGLISH - II	48	3

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
I	II	25	75	100

PREAMBLE :

To make the students understand the various literary forms in English Literature.

COURSE OUTCOME:

On the successful completion of the course, Students will be able to

COs	CO Statement	Knowledge Level
CO1	Recognize contextual meaning of the word.	K1
CO2	Communicate effectively using wider range of vocabulary.	K2
CO3	Apply their acquired knowledge to identify the sentence structure.	K3
CO4	Examine the themes and literary devices.	K4
CO5	Assess the passages for logical arrangement of sentences in a given text.	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	3	3	3	3
CO2	9	3	3	3	1	1	1
CO3	3	3	3	1	1	1	1
CO4	3	1	1	1	1	1	1
CO5	1	1	1	1	1	0	0
Total contribution of COs to POs Weightage	25	17	17	9	7	6	6
Weight Percentage of COs contribution to POs	1.84	1.55	1.87	1.16	1.82	1.86	2.48

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

COURSE CONTENT

UNIT I: Poetry (7 Hours)

1. Stopping by woods on a snowy evening - Robert Frost
2. How do I Love thee? - Elizabeth Barrett Browning
3. Don'ts– D.H.Lawrence

UNIT II: Prose (8 Hours)

1. Positive Thinking- Francie Baltazar-Schwartz
2. The Last Cab Ride- Kent Nerburn
3. Toasted English – R.K.Narayan

UNIT III: Short Stories (9 Hours)

1. The Postmaster - Rabindranath Tagore
2. Springtime- O.Henry
3. The Lady, or the Tiger? - Frank R. Stockton

UNIT IV: One-Act Play (10 Hours)

1. The Death Trap – Saki
2. Moonshine - Arthur Hopkins

UNIT V: Grammar and Composition (14 Hours)

1. Tenses
2. Articles
3. Letter Writing

TEXT BOOKS: SEVENTH SENSE

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : V	24ITU05	PROGRAMMING IN C++	72	4

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
I	II	25	75	100

PREAMBLE :

To learn about Object Oriented Concepts through C++.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Recall the basics of OOPS	K1
CO2	Summarize the concepts of functions, operator overloading ,pointers ,exceptions	K2
CO3	Classify constructors, classes	K3
CO4	Analyze pointers, exceptions	K4
CO5	Determine operator overloading ,strings ,exceptions	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	1.61	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs

COURSE CONTENT

UNIT- I **Introduction to C++** **(12 Hours)**
Software Evolution- A Look at Procedure-Oriented Programming- Object Oriented Paradigm- Basic Concepts of OOP- Benefits of OOP- Object Oriented Languages- Applications of OOP- Beginning With C++ - Tokens- Expressions and Control Structures.

UNIT- II **Function in C++** **(15 Hours)**
Main Function- Function Prototyping- Call By Reference- Return By Reference- Inline Function- Function Overloading – Classes and Objects: C Structures Revisited- Specifying a Class- Defining Member Function- C++ Program with Class- Nesting of Member Function- Private Member Function- Memory Allocation for Objects- Static Data Members and Functions- Array of Objects- Objects as Function Arguments- Friendly Functions – Constructors and Destructors: Constructor- Parameterized Constructors- Multiple Constructor in a Class- Copy Constructor- Destructor.

UNIT- III **Operator Overloading** **(15 Hours)**
Introduction- Defining Operator Overloading- Overloading Unary Operator- Overloading Binary Operator- Overloading Binary Operator Using Friends- Rules for Overloading Operator – Inheritance: Defining Derived Classes- Single Inheritance- Making a Private Member Inheritable- Multilevel Inheritance- Multiple Inheritance- Hierarchical Inheritance- Hybrid Inheritance- Virtual Base Classes- Abstract Classes.

UNIT- IV **Pointers** **(15 Hours)**
Introduction- Pointers- Array of Pointers- Pointers to Objects- This Pointer- Pointer to Derived Class- Virtual Functions- Rules for Virtual Function- Pure Virtual Function – Managing Console I/O Operations.

UNIT- V **Exception Handling and Strings** **(15 Hours)**
Working with Files –Exception Handling: Introduction- Basics of Exception Handling- Exception Handling Mechanism- Throwing Mechanism- Catching Mechanism – Strings: Introduction- Creating (String) Objects- Manipulating String Objects- Relational Operators- String Characteristics.

TEXT BOOK:

1.E.Balagurusamy, Object Oriented Programming with C++, Fifth Edition, TMH Publication.

REFERENCE BOOKS:

- 1.John R Hubbard, Programming with C++, 2nd Edition, TMH Publication, 2002.
- 2.Maria Litvin & Gary Litvin, C++ for you, Vikas Publication, 2002.
- 3.Yashavant Kanetkar, Let us C++, BPB Publication, 2nd Edition, 2010

WEB REFERENCES

1. <https://youtu.be/s0g4ty29Xgg>
2. https://www.w3schools.com/c/c_functions.php
3. <https://www.programiz.com/cpp-programming/operator-overloading>
4. <https://youtu.be/zuegQmMdy8M?si=GxV0CLaMYPcynQI7>
5. https://www.tutorialspoint.com/cplusplus/cpp_exceptions_handling.htm

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE: VI PRACTICAL:II	24ITU06	PROGRAMMING IN C++ - PRACTICAL	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
I	II	40	60	100

PREAMBLE :

To understand C++ Concepts

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Recall the basic C++ concepts	K1,K2,K3,K4,K5
CO2	Understand concepts of Classes, Operator Overloading, string functions	
CO3	Apply concepts of functions, Inheritance, Exception Handling	
CO4	Analyze pointers, String manipulation	
CO5	Evaluate Exception , Inheritance, Pointers	

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	1.61	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs

PRACTICAL LIST

1. Write a C++ program to find a factorial for a given number using recursive function.
2. Write a C++ program to find a Fibonacci series using while loop.
3. Define a class to represent a bank account. Include the following members:

Data members: Name of the depositor, Account number, Type of account Balance amount in the account
Member functions: To assign initial values, To deposit an amount, To withdraw an amount after checking the balance, To display the name and balance. Write a main program to invoke the member functions.
4. Write a C++ program to read an integer number and find the sum of all the digits until it reduces to a single digit using constructors, destructors and inline member functions.
5. Write a C++ program to swap two numbers using friend function.
6. Write a C++ Program to create class, which consists of EMPLOYEE details like E_Number, E_Name, Department, Basic, Salary, and Grade. Write a member function to get and display them. Derive a class PAY from the above class and write a member function to calculate DA, HRA and PF depending on the grade. Create array of objects for the derived class.
7. Write a C++ program to add two complex numbers using operator overloading concept.
8. Write a C++ Program to check whether the given string is a palindrome or not using Pointers.
9. Write a C++ Program to merge two files into a single file.
10. Write a C++ Program to implement exception handling concept using divide by zero.
11. Write a C++ program to implement the concept of class template.
12. Write a C++ Program to implement any four built in string functions.

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : VII PRACTICAL:III	24ITU07	OFFICE AUTOMATION - PRACTICAL	36	2

Contact hours per week: 3

Year	Semester	Internal Marks	External Marks	Total Marks
I	II	40	60	100

PREAMBLE :

To enable the students in crafting professional word documents, excel spread sheets, power point presentations using the Microsoft suite of office tools.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Utilize the basics options of Word in preparation of documents	K1,K2,K3,K4,K5
CO2	Demonstrate the concepts in Word such as Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.	
CO3	Apply the various accounting features in spread sheet, Accessing, overview of toolbars, Saving excel files, Using help and Resources.	
CO4	Analyze the importance of Spreadsheet tool	
CO5	Assess PowerPoint layouts and presentations	

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze;K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	1.61	3.31	3.19

**Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs**

PRACTICAL LIST

Word processor:

1. **Using word processor to create project certificate.** Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word.
2. Create project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.
3. Create a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs.
4. Create a job offer letter - Features to be covered- Forms, Text Fields, Inserting objects, Mail Merge in Word.

Spreadsheet:

5. Create a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text
6. Calculations - Features to be covered:- Cell Referencing, Formulae in excel – average, std.deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP
7. Performance Analysis - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting
8. Cricket Score Card - Features to be covered:-Pivot Tables, Interactive Buttons, Importing Data, Data Protection, Data Validation

Presentation:

9. Topic covered includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows
10. This session helps students in making their presentations interactive. Topics covered includes: Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART-III	CORE : VIII ALLIED : II	24ITU08	DISCRETE MATHEMATICS	72	3

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
I	II	40	60	100

PREAMBLE:

To enable the students to gain knowledge about the set theory, logical operations, relations, grammars and graphs

COURSE OUTCOME:

On the successful completion of the course, students will be able to

CO's	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the basic terms of set operations, logical operations, relations, grammars and graphs	K₁
CO2	explain the concepts of sets, relations, logical operations and graphs.	K₂
CO3	apply the various formulae to solve the problems based on set operations, logical operations, relations, grammars and graphs.	K₃
CO4	examine the relation between sets, logical operations and graphs.	K₄
CO5	evaluate the problems on set operations, logical operations, relations, grammars and graphs.	K₅

***K₁* - Remember; *K₂* – Understand; *K₃* - Apply; *K₄* - Analyze; *K₅* – Evaluate.**

COS-POS MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	9	9	9	3	3	3
CO3	9	9	9	9	3	3	3
CO4	9	9	9	3	1	1	1
CO5	3	3	3	3	0	0	0
Total Contribution of COs to POs	39	39	39	33	10	10	10
Weighted Percentage of COs contribution to POs							
IT	2.50	2.64	2.66	2.70	4.83	3.31	3.19

**Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation;
9- High Correlation between COs and POs**

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-IV	FOUNDATION : II	24FCU02	YOGA AND ETHICS	24	2

Contact hours per week: 2

Year	Semester	Internal Marks	External Marks	Total Marks
I	II	50	-	50

PREAMBLE :

To enable the learners to acquire the knowledge on basic yogasanas and values and practice them in real life.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Recollect the basic terminologies in yoga and value education	K1
CO2	Demonstrate the importance of yoga, mental exercises, principles of life and components of values.	K2
CO3	Apply the techniques of dynamic & mental exercises and philosophical values in real life	K3
CO4	Classify the different types of asanas, stages of mind, analysis of thought, ethical values and social values.	K4
CO5	Evaluate how the yoga and value education make a person strong both physically and mentally	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	3	1	1	3
CO2	9	9	9	3	3	1	3
CO3	9	9	9	3	3	3	3
CO4	9	9	9	3	3	3	3
CO5	9	9	9	3	3	3	3
Total Contribution of COs to POs	45	45	45	15	13	11	15
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	0.96	1.39	0.81	1.06

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

Category	Component	Course Code	Course Title	Contact Hours / Semester	Credit
PART : I	LANGUAGE: III	24LTU03	Tamil - III	48	3

Contact hours per week : 4

Year	Semester	Internal marks	External marks	Total Marks
II	III	25	75	100

முகப்புரை:

காப்பியங்கள் , நவீன இலக்கியம் மற்றும் அணியிலக்கணம் குறித்து அறிவர்.

COURSE OUTCOME:

பொதுத்தமிழ் கற்பதன் மூலம் கீழ்க்காணும் பயிற்யினை பெறுவர்.

COs	CO Statement	Knowledge Level
CO1	காப்பியங்கள் உணர்த்தும் அன்பு நெறியை உணர்தல்	K1
CO2	நவீன இலக்கியங்களின் தன்மைகளைப் புரிந்து கொள்ளுதல்.	K2
CO3	அணி இலக்கணம் கற்று கொள்வதன் வாயிலாக படைப்பாளுமையை வளர்த்தல்.	K3
CO4	இலக்கணங்களைப் பயில்வதன் மூலம் இலக்கணங்களை உருவாக்க முடியும்.	K4
CO5	காப்பியங்கள் வாயிலாக பெண் கதாபாத்திரத்தைத் திறனாய்தல்.	K5

K1: Remember Level , K2:UnderstandLevel , K3: Apply Level , K4: Analyze Level, K5: Evaluate Level

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	3
CO2	3	9	9	9	9	9	9
CO3	9	9	3	9	9	3	9
CO4	9	9	9	9	3	3	3
CO5	9	3	9	9	9	3	3
Total contribution of COs to POs Weightage	39	39	39	45	33	27	27
Weight Percentage of COs contribution to POs	1.98	2.47	2.46	2.87	2.74	2.22	2.49

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

COURSE CONTENT

அலகு- 1 காப்பியங்கள்

10 மணி

சிலப்பதிகாரம் - ஊர்கூழ் வரி (75 வரிகள்)
இயேசுகாவியம் - பாரச்சிலுவை,தாயும் சேயும்,கசிந்தநெஞ்சங்கள்.
சீராப்புராணம் - மானுக்குப் பினைநின்றபடலம்.

அலகு- 2 புராணம்

10 மணி

கம்பராமாயணம் - கைகேயி சூழ்வினைப்படலம் (40 பாடல்கள்)
பெரியபுராணம் - காரைக்கால் அம்மையார் புராணம் (66 பாடல்கள்)

அலகு- 3 நாவல்

10 மணி

வாடிவாசல் - சி.சு.செல்லப்பா

அலகு- 4 இலக்கணம்

10 மணி

அணி இலக்கணம்

உவமையணி-எடுத்துக்காட்டுஉவமையணி-வஞ்சப் புகழ்ச்சியணி-சொற்பொருள் பின்வருநிலையணி-
தீவகயணி.

அலகு- 5 இலக்கிய வரலாறு

8 மணி

புதினத்தின் தோற்றமும் வளர்ச்சியும்,
காப்பியங்களின் தோற்றமும் வளர்ச்சியும் (ஐம்பெருங்காப்பியங்கள்,ஐஞ்சிறுங்காப்பியங்கள்)
பொதுக்கட்டுரை.

பாடநூல்கள்:

1. ந.மு.வேங்கடசாமிநாட்டார் - சிலப்பதிகாரம் - ராமையாபதிப்பகம்,சென்னை - 600 014.
2. ந.மு. வேங்கடசாமிநாட்டார்,ஒளவை சு. துரைசாமிப்பிள்ளை - மணிமேகலை - சாரதாபதிப்பகம், ஜி-4,சாந்திஅடுக்ககம்,ராயப்பேட்டை,சென்னை.
3. உமறுப்புலவர்,சீராப்புராணம்,முல்லைநிலையம், 9,பாரதிநகர்,தி.நகர்,சென்னை. முதற்பதிப்பு -2009.
4. வ.த.இராமசுப்பிரமணியம் - பெரியபுராணம்,திருமகள் நிலையம்,தி.நகர்,சென்னை.
5. வாடிவாசல் - சி.சு.செல்லப்பா,காலச்சுவடுபதிப்பகம்,பதிப்பு 2009, 669,கே.பி.ரோடு,நாகர்கோவில்

பார்வை நூல்:

1. தமிழ் இலக்கியவரலாறு-பேரா.மது.ச.விமலானந்தம்,முல்லைநிலையம், 9,பாரதிநகர்,- முதல் தெரு,தி.நகர்,சென்னை - 17

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART – II	English :III	24LEU03	ENGLISH - III	48	3

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
II	III	25	75	100

PREAMBLE :

To cater the most required LSRW skills in students along with bridging the gap among perception, communication and practice of the English Language.

COURSE OUTCOME :

On the successful completion of the course, Students will be able to

COs	CO Statement	Knowledge Level
CO1	Recognize the genres in literature.	K1
CO2	Explain the literary devices and themes used in the works.	K2
CO3	Make oral presentation on any given situation.	K3
CO4	Examine the sentence structure and types of advertisements.	K4
CO5	Assess the situations and concepts to construct dialogues and slogans.	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	3	3	3	3
CO2	9	9	3	3	3	1	1
CO3	9	3	3	1	1	1	1
CO4	3	3	1	1	1	1	0
CO5	3	3	1	1	0	0	0
Total contribution of COs to POs	33	27	17	9	8	6	5
Weight Percentage of COs contribution to POs	2.42	2.45	1.87	1.16	2.08	1.86	2.07

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;

9- High correlation between COs and POs.

COURSE CONTENT

UNIT I: POETRY

(9 Hours)

1. The Highwayman - Alfred Noyes
2. Do Not Go Gentle into That Good Night - Dylan Thomas
3. A Different History - Sujata Bhatt

UNIT II: PROSE

(9 Hours)

1. Tree Speaks - C.Rajagopalachary
2. Third thoughts – E.V.Lucas
3. On the Rule of the Road – A.G.Gardiner

UNIT III: SHORT STORIES

(9 Hours)

1. The Monkey' Paw – W.W.Jacobs
2. The Thief's Story - Ruskin Bond
3. A Hero- R.K.Narayan

UNIT IV: ONE-ACT PLAY

(8 Hours)

1. Mother's Day – J.B.Priestly
2. The Proposal – Anton Checkhov

UNIT V: GRAMMAR AND COMPOSITION

(13 Hours)

1. Concord
2. Dialogue writing
3. E-Mail writing

TEXT BOOK: LILACS

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE:IX	24ITU09	PROGRAMMING IN JAVA	72	5

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
II	III	25	75	100

PREAMBLE :

To understand the basic programming constructs of Java Language.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Outline the basic concepts of Java Programming Language	K1
CO2	Explain the concepts of tokens, control structures and looping, arrays, applet programming and Exception handling	K2
CO3	Classify various concepts that can be used for practical solutions	K3
CO4	Analyze wide range of Applications by using java programming	K4
CO5	Determine the usage of all given concepts in the development of programming solutions	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to Pos	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to Pos	2.50	2.64	2.66	2.89	1.61	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : X PRACTICAL : IV	24ITU10	PROGRAMMING IN JAVA -PRACTICAL	72	4

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
II	III	40	60	100

PREAMBLE :

To understand the basic programming constructs of Java Language.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Determine the basic concepts of Java Programming Language	K1
CO2	Apply the concepts of Arrays and String	K2
CO3	Summarizes the concepts of Inheritance	K3
CO4	Demonstrate the interface and threads	K4
CO5	Applying the java programming techniques in graphics and applets.	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	1.61	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.

PRACTICAL LIST

1. Design a Java Program to define a class, define instance methods for setting and Retrieving values of instance variables and instantiate its object.
2. Write a Java Program to demonstrate the use of subclass.
3. Create a Java Program to implement array of objects.
4. Construct a Java program using String class and its methods.
5. Apply a Java program to practice using String Buffer class and its methods.
6. Design a Java Program to implement multilevel inheritance by applying various access controls to its data members and methods.
7. Generate a program to demonstrate the use of implementing interfaces.
8. Apply a program to implement Thread based applications.
9. Create a program using Applet to display a message in the Applet.
10. Design an applet program working with Colors and Fonts.
11. Construct a program using Applet for configuring Applets by passing parameters.
12. Design programs for using Graphics class
 - to display basic shapes and fill them
 - draw different items using basic shapes
 - set background and foreground colors

Category	Component	Course Code	Course Title	Contact Hours / Semester	Credit
PART-III	CORE : XI ALLIED : III	24ITU11	OPERATING SYSTEM	72	3

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
II	III	25	75	100

PREAMBLE :

To learn about the basic building blocks to understand the Operating System in detail.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Recall the fundamental concepts of operating system	K1
CO2	Demonstrate the functions of deadlock and storage management	K2
CO3	Utilize the policies of scheduling	K3
CO4	Analyze memory management	K4
CO5	Evaluate the concepts of storage management	K5

K1 – Remember; K2 – Understand;K3 – Apply;K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	9	9	9
CO4	9	9	9	9	3	3	9
CO5	9	9	9	9	3	3	9
Total Contribution of COs to POs	45	45	45	45	33	33	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	3.54	2.42	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

COURSE CONTENT

UNIT- I Introduction (12 Hours)
What is an Operating System? – Process Concepts – Introduction – Definition of Process – Process States – Process State Transitions – The Process Control Block – Operations on Process – Suspend and Resume – Interrupt Processing.

UNIT- II Deadlock (15 Hours)
Introduction – Examples of Deadlock – Resource Concepts - Four Necessary Conditions for deadlock – Major Areas of Deadlock Research – Deadlock Prevention-Deadlock Avoidance and the Banker’s Algorithm – Deadlock Detection – Deadlock Recovery.

UNIT- III Storage Management (15 Hours)
Storage Organization – Storage Management – Storage Hierarchy – Storage Management Strategies-Contiguous vs. Noncontiguous Allocation- Single User Contiguous Allocation- Fixed Partition Multiprogramming – Variable Partition Multiprogramming – Multiprogramming with storage swapping.

UNIT- IV Virtual Storage Organization & Management (15 Hours)
Virtual Storage: Basic Concepts – Block Mapping – Paging Basic Concepts- Segmentation-Virtual Storage Management Strategies – Page Replacement Strategies- Locality - Working Sets – Page Fault Frequency Page Replacement – Demand Paging – Page Release – Page Size.

UNIT- V Job and Processor Scheduling (15 Hours)
Preemptive Vs. Non Preemptive Scheduling – Priorities – Deadlock Scheduling-First- In-First Out(FIFO)Scheduling-Round Robin Scheduling-Quantum Size – Shortest Job First (SJF) Scheduling - Shortest Remaining Time(SRT) Scheduling-Highest Response Ratio Next(HRN) Scheduling-Fair Share Scheduling.

TEXT BOOK:

1. H.M. Deitel, Operating Systems, 2nd Edition, Addison-Wesley Publishing Company 2003

REFERENCE BOOKS:

1. DeitelChoffnes, Operating Systems, 3rd Edition, Pearson Education, 2003.
2. Stuart E. Madnick, John J.Donovan. Operating Systems, 3rd Edition, Tata McGraw Hill,2003.

WEB REFERENCES :

- 1.[https://drive.uqu.edu.sa/_/mskhayat/files/MySubjects/2017SS%20Operat%20Systems/Abraham%20Silberschatz-Operating%20System%20Concepts%20\(9th,2012_12\).pdf](https://drive.uqu.edu.sa/_/mskhayat/files/MySubjects/2017SS%20Operat%20Systems/Abraham%20Silberschatz-Operating%20System%20Concepts%20(9th,2012_12).pdf)
2. <https://www.youtube.com/watch?v=mXw9ruZaxzQ>
- 3.https://mrcet.com/downloads/digital_notes/CSE/II%20Year/OPERATING%20SYSTEMS%20NOTES%20R18.pdf
4. <https://www.tutorialspoint.com/operating-system-design-and-implementation>
5. <https://github.com/dalmia/Operating-Systems>

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-IV	ABILITY ENHANCEMENT : I	24AEU01	INFORMATION SECURITY	24	2

Contact hours per week: 2

Year	Semester	Internal Marks	External Marks	Total Marks
II	III	50	-	50

PREAMBLE :

To learn about the basics of Information Security.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Recall the fundamental concepts of Information Security, Risk and Security policies	K1
CO2	Discuss the concepts of Risks, vulnerabilities, ethical and privacy issues	K2
CO3	Apply the ideas in security planning and construct the policies	K3
CO4	Categorize the Privacy, Ethical Issues, Laws, Software Issues and Crimes	K4
CO5	Summarize Cryptography, cipher text and threats in information security	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	3
CO3	9	9	9	9	3	3	3
CO4	9	9	9	9	3	3	3
CO5	9	9	9	9	3	1	1
Total Contribution of COs to POs	45	45	45	45	27	25	19
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	2.90	1.18	1.35

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

COURSE CONTENT

UNIT- I Introduction to Information Security (5 Hours)
Information Security: Principles, Concepts and Definitions - The need for Information Security - Benefits of Information Security. The Security Problem in Computing: The Meaning of Computer Security - Computer Criminals.

UNIT- II Information Risk (4 Hours)
Information Risk: Threats and Vulnerabilities of Information Systems – Introduction to Risk Management. Information Security Management Policy, Standards and Procedures.

UNIT- III Security Planning (5 Hours)
Administering Security: Security Planning - Security Planning Team Members - Assuring Commitment to a Security Plan - Business Continuity Plan - Incident Response Plan - Organizational Security Policies, Physical Security.

UNIT IV Privacy and Ethical Issues in Information Security (5 Hours)
Legal Privacy and Ethical Issues in Information Security: Protecting Programs and Data - Information and the Law - Rights of Employees and Employers - Software Failures - Computer Crime - Ethical Issues in Information Security.

UNIT- V Cryptography (5 Hours)
Cryptography: Introduction to Cryptography -What is Cryptography – Plain Text – Cipher Text – Substitution Ciphers - Transposition Ciphers.

TEXT BOOK:

1.Sumitra Kisan and D.ChandrasekharRao, Information Security Lecture Notes, Department of Computer Science and Engineering & Information Technology, Veer Surendra Sai University of Technology (Formerly UCE, Burla) Burla, Sambalpur, Odisha.

REFERENCE BOOK:

1. Andy Taylor (Editor), David Alexander, Amanda Finch & David Sutton, Information Security Management Principles An ISEB Certificate, The British ComputerSociety, 2008.

WEB REFERENCES:

1. <https://www.imperva.com/learn/data-security/information-security-infosec/#:~:text=Information%20security%20protects%20sensitive%20information,financial%20data%20or%20intellectual%20property.>
2. <https://www.geeksforgeeks.org/what-is-information-security>
3. <https://www.techtarget.com/searchsecurity/definition/information-security-infosec>
4. <https://www.exabeam.com/information-security/information-security>
5. <https://www.sans.org/information-security>

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-IV	NON - MAJOR ELECTIVE	24NMU01A	INDIAN WOMEN AND SOCIETY	24	2

Contact hours per week: 2

Year	Semester	Internal Marks	External Marks	Total Marks
II	III	50	-	50

PREAMBLE :

To familiarize students with the specific cultural contexts of women in India

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Know women status in Indian society as an academic discipline	K1
CO2	Interpret the various roles of women, challenges and issues faced by them in the society	K2
CO3	Find out solutions to their legal issues and protect themselves from the violence against women emphasize on women entrepreneurship for their empowerment	K3
CO4	Critically analyze the lifestyle and challenges of women	K4
CO5	Discuss the importance of women health and issues related to women in general	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	0	0	0
CO2	9	9	9	9	3	0	3
CO3	9	9	9	9	9	9	9
CO4	3	3	3	9	9	9	9
CO5	3	3	1	1	1	9	9
Total Contribution of COs to POs	33	33	31	37	22	27	30
Weighted Percentage of COs Contribution to POs	1.84	1.93	1.83	2.37	2.36	1.98	2.13

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.

Category	Component	Course Code	Course Title	Contact Hours / Semester	Credit
PART: IV	NON- MAJOR ELECTIVE	24NMU01B	அடிப்படைத் தமிழ் (Advanced Tamil)	24	2

Contact hours per week : 2

Year	Semester	Internal marks	External marks	Total Marks
II	III	50	-	100

முகப்புரை:

எழுத்துக்களின் வகைமைகள், சொற்றொடர் அமைப்பு, மாற்றம் குறித்து அறிந்து கொள்வர்.

COURSE OUTCOME

அடிப்படைத் தமிழ் கற்பதன் வாயிலாகக் கீழ்க்காணும் தன்மைகளை அறிவர்.

COs	CO Statement	Knowledge Level
CO1	தமிழ் மொழியின் அடிப்படைக் கூறுகளை அறிவர்.	K1,K2
CO2	எழுத்துக்களின் வகைமைகளைக் கற்பர்.	K3
CO3	சொற்பொருள் மாற்றங்களை அறிந்து பின்பற்றுவர்.	K3,K5
CO4	சொற்றொடர் அமைப்பினைப் பகுத்தாராய்வர்.	K4
CO5	தமிழ் மொழியின் மேன்மையை உணர்ந்து மதிப்பிடுவர்.	K5

K1:RememberLevel , k2:UnderstandLevel , K3: Apply Level , K4: Analyze Level, K5: Evaluate Level

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	3	3	9	3	9
CO2	9	9	9	3	3	3	3
CO3	9	9	9	9	3	9	3
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	9	3	9
Total Contribution of COs to POs	45	45	39	33	27	27	33
Weightage Percentage of COs contribution to POs	2.29	2.85	2.46	2.10	2.24	2.22	3.04

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;

9- High correlation between COs and POs.

P.K.R Arts College for Women (Autonomous), Gobichettipalayam
B.Sc Information Technology 2024-2025
இளங்கலை 2021-22 கல்வியாண்டு முதல் சேர்வோர்க்குரியது

(12-ஆம் வகுப்பு வரை தமிழ் மொழிப்பாடம் பயிலாதவர்களுக்கு)

புற மதிப்பீட்டுத் தேர்வு மட்டும்

1. தமிழ் மொழியின் அடிப்படைக் கூறுகள்.
எழுத்துகள் : முதலெழுத்துகள் (உயிர் எழுத்து, மெய் எழுத்து, உயிர்மெய் எழுத்து)
சொற்கள் : பெயர்ச்சொல், வினைச்சொல், இடைச்சொல், உரிச்சொல்
தொடர் : தொடரமைப்பு (எழுவாய், செயப்படுபொருள், பயனிலை)
2. குறிப்பு எழுதுதல் : பத்துப் பதினைந்து தொடர்களில் குறிப்பு வரைதல்
பிழைநீக்கி எழுதுதல் : (ஒற்றுப்பிழை, எழுத்துப்பிழை)

2021- 2022 கல்வியாண்டு முதல் பயில்பவர்களுக்குப் பின்வரும் வினாத்தாள் அமைப்பு பின்பற்றப்பட வேண்டும்.

Course	Sections	Assessment Domain	Marks and Unit Weightage	Total ESE
Non-Major Elective I (Basic Tamil)	Section A	K1: Remember Level K2: Understand Level	4 X 5 = 20 Four out of Six (Open choice) (At least one question from each unit)	50*
	Section B	K3: Apply Level K4: Analyze Level K5: Evaluate Level	3 X 10 = 30 Three out of Five (Open choice) (At least one question from each unit)	

நான்காம் பருவம்

Category	Component	Course Code	Course Title	Contact Hours / Semester	Credit
PART: I	LANGUAGE : IV	24LTU04	Tamil -IV	48	3

Contact hours per week : 4

Year	Semester	Internal marks	External marks	Total Marks
II	IV	25	75	100

முகப்புரை:

சங்க இலக்கிய நூல்களின் அறிமுகத்திணையும் பாடல் மேன்மையையும் அறிவர்.

COURSE OUTCOME:

பொதுத்தமிழ் நான்கு கற்பதன் வழி கீழ்க்காணும் தன்மையைப் பெறுவர்.

COs	CO Statement	Knowledge Level
CO1	எட்டுத்தொகை நூல்கள் மற்றும் பத்துப்பாட்டு நூல்கள் குறித்த அறிவைப் பெறுவர்..	K1
CO2	சங்ககால மக்களின் வாழ்வியல் விழுமியங்களை சங்க இலக்கிய அகப்புறப் பாடல்களின் வழி கற்பர்.	K2
CO3	சங்கப் பாடல்களில் புலப்படும் உவமை , உருவகம், உள்ளுறை,இறைச்சி தன்மையை இன்றைய நவீன இலக்கியங்களுள் பொருத்திப் பார்ப்பர்.	K3
CO4	பட்டினப்பாலை உணர்த்தும் பண்டைய வணிகவியல் முறையோடு நவீன வணிக மேலாண்மையியலுடன் ஒப்பிட்டு பகுத்தாராய்வர்.	K4
CO5	கலித்தொகைப் பாடல்,பிசிராந்தையார் நாடகம் இவற்றின் மூலம் நாடகத்துறையின் பரிணாம வளர்ச்சியினை அறிந்து மதிப்பிடுவர்.	K5

K1:Remember Level , k2:UnderstandLevel , K3: Apply Level , K4: Analyze Level, K5: Evaluate Level

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	3	9	9	9	9
CO2	9	9	3	9	9	9	3
CO3	9	3	9	9	3	3	3
CO4	9	3	9	3	3	3	3
CO5	9	9	9	3	3	3	3
Total contribution of COs to POs Weightage	45	33	33	33	27	27	21
Weightage Percentage of COs contribution to POs	2.29	2.09	2.08	2.10	2.24	2.22	1.94

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

COURSE CONTENT

அலகு- 1

10 மணி

நற்றிணை:குறிஞ்சி (83) பெருந்தேவனார் - “எம்ஊர் வாயில் உண்துறைத் தடையிய”

குறுந்தொகை : குறிஞ்சி(24)ஒளவையார் -“அகவன் மகளேஅகவன் மகளே”

ஐங்குறுநூறு:அன்னாய் வாழிபத்து-கபிலர் (203) - “அன்னாய் வாழிவேண்டன்னநம் படைப்பை”

பதிற்றுப் பத்து-ஐந்தாம்பத்து-42 ஆம் பாடல் - பரணர் - “இரும்பனம் புடைய லீகைவான்கழல்”

பரிபாடல் :வையை 7 – ஆம் பாடல் - “இறுவரைபுரையுமாறு இருகரையேமத்து” (வரி- 40 -50)

புறநானூறு- 243 ஆம் பாடல் - குடவாயிற் கீத்தனார் - இளையோர் சூடார் வளையோர் கொய்யார்”

அலகு- 2

10 மணி

பத்துப்பாட்டு

பட்டினப்பாலைமுழுவதும்

அலகு- 3

10 மணி

நாடகம் - பிசிராந்தையார் - பாரதிதாசன்

அலகு- 4

10 மணி

அகத்திணைப் பாகுபாடுகள்

புறத்திணைப் பாகுபாடுகள்

அலகு- 5

8 மணி

எட்டுத்தொகை-விளக்கம்

பத்துப்பாட்டு-விளக்கம்

படைப்பிலக்கியப் பயிற்சி

கவிதை,சிறுகதை,எழுதச்செய்தல்.

படைப்பிலக்கியப் பயிற்சி

கவிதை,சிறுகதை,எழுதச்செய்தல்.

பாடநூல்கள்:

1. குறுந்தொகை-கழகவெளியீடு-சென்னை,
2. நற்றிணை-கழகவெளியீடு-சென்னை,
3. பட்டினப்பாலை - நியூ செஞ்சரிபுக் ஹவுஸ்,அம்பத்தூர்,சென்னை
4. பிசிராந்தையார் - பாரதிதாசன் மணிக்கவாசகர் பதிப்பகம் சென்னை-8
5. புறநானூறு -திருமகள் பதிப்பகம், 55,வெங்கட் நாராயணாசாலை,திநகர் சென்னை -17
6. பதிற்றுப்பத்து-வர்த்தமானன் பதிப்பகம்,ஏ.ஆர்.ஆர். காமப்ளெக்ஸ் , 141 உஸ்மான் சாலை,திநகர் சென்னை -17
7. ஐங்குறுநூறு-சைவசித்தாந்த நூற்பதிப்புக் கழகம்,சென்னை - 18
8. பரிபாடல் -சாரதாபதிப்பகம்,சென்னை -14 -முதற்பதிப்பு 2009.
9. கலித்தொகை - சாரதாபதிப்பகம்,சென்னை -14 -முதற்பதிப்பு 2009.
10. அகநானூறு - சாரதாபதிப்பகம்,சென்னை -14 - மூன்றாம் பதிப்பு 2012.

பார்வை நூல்:

- 1.இலக்கிய வரலாறு - கா.கோ. வேங்கடராமன்,கலையகவெளியீடுபரமத்திவேலூர் ,நாமக்கல்

Category	Component	Course Code	Course Title	Contact Hours / Semester	Credit
PART – II	ENGLISH: IV	24LEU04	ENGLISH- IV	48	3

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
II	IV	25	75	100

PREAMBLE :

To acquaint the students an idea about the genres of English Literature with enhancing the communication competence among them.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Find the genres in literature.	K1
CO2	Summarize the literary devices used in the works.	K2
CO3	Make use of wider range of words and expressions in their writing.	K3
CO4	Examine the themes and techniques in literary works.	K4
CO5	Select appropriate words for writing.	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	9	3	3	3	1	1
CO3	3	3	3	1	1	1	1
CO4	3	3	1	1	1	1	0
CO5	3	1	1	1	1	0	0
Total contribution of COs to POs Weightage	27	25	17	15	9	6	5
Weight Percentage of COs contribution to POs	1.98	2.27	1.87	1.94	2.34	1.86	2.07

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.

COURSE CONTENT

UNIT I: POETRY

(8 Hours)

1. The Bird Sanctuary - Sarojini Naidu
2. The Justice of the Peace – Hilaire Belloc
3. The Pulley - George Herbert

UNIT II: PROSE

(9 Hours)

1. I Won't let him go –Madhavan Kutty
2. A Little Bit of What You Fancy - Desmond Morris
3. Character is Destiny – Dr.S. Radhakrishnan

UNIT III: SHORT STORIES

(9 Hours)

1. An Astrologer's Day – R.K.Narayan
2. Valiant Vicky – Flora Annie Steel
3. The Nightingale and the rose- Oscar Wilde

UNIT IV: ONE-ACT PLAY

(10 Hours)

1. The Bishop's Candlesticks – Norman McKinnel
2. The Count's Revenge - J.H. Walsh

UNIT V: GRAMMAR AND COMPOSITION

(12 Hours)

1. Framing Questions
2. Resume Writing
3. Agenda & Minutes

TEXT BOOK: MODERN VOICES

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XII	24ITU12	DATA STRUCTURES	72	5

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
II	IV	25	75	100

PREAMBLE :

This course offers the basic understanding and knowledge of different data structures, sorting algorithms and symbol tables.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Recall various data structures, algorithms and sorting methods	K1
CO2	Describe the basic concepts of data structures, sorting and symbol table	K2
CO3	Use appropriate data structures for varied problems	K3
CO4	Examine different data structures and algorithms to find best solution for the real time applications	K4
CO5	Recommend a specific data structure and sorting algorithm for an application.	K5

K1 – Remember;K2 – Understand;K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	3	3	3	9
CO4	9	9	9	3	3	3	9
CO5	9	9	9	3	3	3	9
Total Contribution of COs to POs	45	45	45	27	15	27	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	1.73	1.61	1.98	3.19

**Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.**

COURSE CONTENT

UNIT - I Introduction and Elementary Data Structure (12 Hours)

Introduction - Data structure- Overview - Definition - How to create a program – Arrays - Ordered List – Sparse Matrices - Representation of Arrays - Stacks and Queues – Fundamentals - Evaluation of Expressions.

UNIT- II Linked List and Tree (15 Hours)

Linked Lists - Singly Linked List - Linked Stacks and Queues – Polynomial Addition - Doubly Linked Lists and Storage Management. Trees: Basic Terminology - Binary Trees - Binary Tree Representation - Binary Tree Traversal.

UNIT- III Graph and its applications (15 Hours)

Graphs-Introduction – Definition and Terminology - Graph Representation – Traversals - Connected components and spanning Trees - Shortest path - Transitive Closure.

UNIT- IV Internal Sorting (15 Hours)

Internal Sorting- Insertion sort - Quick sort - Merge sort - Heap sort – Sorting on Several Keys.

UNIT- V Symbol Tables (15 Hours)

Symbol Tables - Static Tree Tables - Dynamic Tree Tables - Hash Tables - Hashing Functions - Overflow Handling.

TEXT BOOK:

1. Ellis Horowitz, Sartaj Shani, (1994), Fundamentals of Data Structures, First Edition, Galgotia Publication.

REFERENCE BOOKS:

1. Seymour Lipschutz , Data Structures , Tata McGrawhill, Year 2006.
2. D. Samanta, “Classical Data Structure”, Prentice Hall India.
3. G A V PAI, Data Structures and Algorithms Concepts, Techniques Applications, McGraw Hill Education, New Delhi.

WEB REFERENCES

1. <https://www.geeksforgeeks.org/data-structures/>
2. <https://www.javatpoint.com/data-structure-tutorial>
3. https://www.youtube.com/watch?v=DFpWCl_49i0

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE :XIII PRACTICAL : V	24ITU13	DATA STRUCTURES USING C & C++ - PRACTICAL	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
II	IV	40	60	100

PREAMBLE :

To enable the students to learn the concepts of different data structures, sorting algorithms and symbol tables.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Demonstrate various data structures, algorithms and sorting methods	K1,K2,K3,K4,K5
CO2	Evaluate various expressions	
CO3	Implement appropriate data structures for varied problems	
CO4	Examine different data structures and algorithms to find best solution for the real time applications	
CO5	Recommend a specific data structure and sorting algorithm for an application.	

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	3	3	3	9
CO4	9	9	9	3	3	3	9
CO5	9	9	9	3	3	3	9
Total Contribution of COs to POs	45	45	45	27	15	27	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	1.73	1.61	1.98	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.

PRACTICAL LIST

1. Write a program that implements sparse matrix.
2. Write a program that converts the given expression from Infix to prefix.
3. Write a program to evaluate the given postfix expression.
4. Write a program that implements all the operations on stack.
5. Write a program that implements all the operations on queue.
6. Write a program on singly linked list and perform operations such as insertion and deletion.
7. Write a program to represent graph using adjacency list.
8. Write a program on Insertion sort.
9. Write a program on Quick sort.
10. Write a program on hashing to find whether an array is subset of another array.

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XIV ALLIED : IV	24ITU14	MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING	72	5

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
II	IV	25	75	100

PREAMBLE :

To learn about the basic components of Microprocessor

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Recall the fundamental concepts of microprocessor	K1
CO2	Demonstrate the functions of 8085	K2
CO3	Identify the internal organization and operation of microprocessors/microcontrollers.	K3
CO4	Analyze the functions of Program 8085 Microprocessor	K4
CO5	Evaluate the microprocessors/microcontrollers-based systems	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	9	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	33	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	3.54	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.

COURSE CONTENT

UNIT –I Introduction To Microprocessors (12 hours)

Evolution Of Microprocessor -Single Chip Microcomputer -Embedded Microprocessor - Slice Microprocessor -Microprogramming -RISC And CISC Processor-Scalar And Super Scalar Processor- Vector Processor- Array Processors Symbolic Processors -Digital Signal Processors (DSP)-Transputers.

UNIT -II 16-Bit Intel Microprocessors (15 hours)

Intel 8086- Pin Description of Intel Is 8086- Operating Modes of 8086 -Pin Description for Minimum Mode- Pin Description for Maximum Mode- Register Organization of 8086 -Bus Interface and Execution Unit- Interrupts-8086 Based Computer System- 8086 Read And Write Bus Cycles –Lock- Addressing Modes Of 8086- Intel 80186- Intel 80286- Intel 8088 –Intel 80188.

UNIT-III 8086 Instruction Set (15 hours)

8086 Instruction Groups- Addressing Mode Byte -Segment Register Selection- Segment Override -8086 Instructions.

UNIT- IV Intel 386 And 486 Microprocessors (15 hours)

Intel 386 Microprocessor- Intel 486 Microprocessor -486DX Architecture- Register Organization Of 486 Microprocessor- Memory Organization- Descriptors,GDT,LDR and IDT -Operating Modes Of Intel 486- Virtual Memory- Memory Management Unit (MMU)- Protection Gates- Interrupts And Exceptions- Addressing Modes Of 80486 -Pin Configuration And Signals of 80486.

UNIT- V Other Microprocessors (15 hours)

Power Pc MicroProcessors- Pentium Microprocessor -Pentium Pro Microprocessor- Alpha Microprocessor- Cyrix Microprocessors -MIPS Microprocessor- SUN's SPARC Microprocessor - AMD(Advanced Micro Devices)-Microprocessors Intel PA8000 Series Of Microprocessors - Motorola 68000 -Motorola 68020- Motorola 68030 -Motorola 68040 -Motorola Mc88100.

TEXT BOOK:

1. Advanced Microprocessors and Interfacing.-Authour:Badri Ram,Farmely Professor and Head,PG Electrical Engineering, Bihar College of Engineering, Patna University, Patna.

REFERENCE BOOK

1. Fundamentals of Microprocessor and Microcomputers--B.RAM, Dhanpat Rai Pub.

WEB REFERENCES:

1. https://www.tutorialspoint.com/microprocessor/microprocessor_overview.htm
2. <https://www.javatpoint.com/microprocessor-introduction>
3. <https://www.geeksforgeeks.org/introduction-of-microprocessor>

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-IV	SKILL ENHANCEMENT : I	24SEITU01	OPERATING SYSTEM- PRACTICAL	36	2

Contact hours per week: 3

Year	Semester	Internal Marks	External Marks	Total Marks
II	IV	50	-	50

PREAMBLE :

To experiment Operating System Concepts

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Demonstrate the basic concepts of Operating System	K1,K2,K3,K4,K5
CO2	Understand the basic concepts of process, storage	
CO3	Apply deadlock avoidance, paging, segmentation	
CO4	Examine different scheduling algorithm	
CO5	Evaluate storage and scheduling algorithm	

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	9	9	9
CO4	9	9	9	9	9	9	9
CO5	9	9	9	9	9	9	9
Total Contribution of COs to Pos	45	45	45	45	45	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	4.83	3.31	3.19

**Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.**

PRACTICAL LIST

1. Write C program to demonstrate various process related concepts
2. Write C program to implement system calls and file management
3. Write C program to simulate Bankers Algorithm for Deadlock Avoidance
4. Write C program to simulate contiguous memory allocation techniques
5. Write C program to simulate producer-consumer problem using semaphores.
6. Write C program to simulate paging technique of memory management.
7. Write C program to simulate the Round Robin CPU scheduling algorithms
8. Write C programs to simulate Page Replacement Algorithms
9. Write C program to simulate Paging and segmentation memory segment techniques
10. Write C programs to simulate implementation of Disk Scheduling Algorithms

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-IV	ABILITY ENHANCEMENT : II	24AEU02	CONSUMER RIGHTS	24	2

Contact hours per week: 2

Year	Semester	Internal Marks	External Marks	Total Marks
II	IV	50	-	50

PREAMBLE :

This course seeks to familiarize the students with their rights and responsibilities as a consumer, the social framework of consumer rights and legal framework of protecting consumer rights.

COURSE OUTCOME:

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

COs	CO Statement	Knowledge Level
CO1	Memorize the procedure of redress of consumer complaints, and the role of different agencies in establishing product and service standards	K1
CO2	Explain the Consumer Protection Law in India	K2
CO3	Impart sound practical grounding about the practice of consumer law and the procedure Followed	K3
CO4	Evaluate the regulations and legal actions that helps to protect consumers	K4
CO5	Analyse the knowledge and skills needed for a career in this field	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	1	0	1
CO2	9	9	9	9	1	0	1
CO3	9	9	9	3	3	1	1
CO4	9	3	1	1	3	3	3
CO5	9	1	3	0	9	9	9
Total Contribution of COs to POs	45	31	31	22	17	13	15
Weighted Percentage of COs Contribution to POs	2.50	1.82	1.83	1.41	1.82	0.96	1.06

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.

COURSE CONTENT

UNIT- I Conceptual Framework (6 Hours)

Consumer and Markets: Concept of Consumer, Nature of markets: Liberalization and Globalization of markets with special reference to Indian Consumer Markets, E-Commerce with reference to Indian Market, Concept of Price in Retail and Wholesale, Maximum Retail Price (MRP), Fair Price, GST, labeling and packaging along with relevant laws, Legal Metrology. Experiencing and Voicing Dissatisfaction: Consumer buying process, Consumer Satisfaction/dissatisfaction-Grievances-complaint, Consumer Complaining Behaviour: Alternatives available to Dissatisfied Consumers; Complaint Handling Process: ISO 10000 suite.

UNIT -II The Consumer Protection Law in India (6 Hours)

Objectives and Basic Concepts: Consumer rights and UN Guidelines on consumer protection, Consumer goods, defect in goods, spurious goods and services, service, deficiency in service, unfair trade practice, and restrictive trade practice. Organizational set-up under the Consumer Protection Act: Advisory Bodies: Consumer Protection Councils at the Central, State and District Levels; Adjudicatory Bodies: District Forums, State Commissions, and National Commission: Their Composition, Powers, and Jurisdiction (Pecuniary and Territorial), Role of Supreme Court under the CPA with important case law.

UNIT-III Grievance Redressal Mechanism under the Indian Consumer Protection Law (4 Hours)

Grounds of filing a complaint; Limitation period; Procedure for filing and hearing of a complaint; Disposal of cases, Relief/Remedy available; Temporary Injunction, Enforcement of order, Appeal; Offences and penalties. Leading Cases decided under Consumer Protection law by Supreme Court/National Commission: Medical Negligence; Banking; Insurance; Housing & Real Estate; Electricity and Telecom Services; Education; Defective Products; Unfair Trade Practices.

UNIT- IV Role of Industry Regulators in Consumer Protection (4 Hours)

- i. Banking: RBI and Banking Ombudsman
- ii. Insurance: IRDA and Insurance Ombudsman
- iii. Telecommunication: TRAI
- iv. Food Products: FSSAI
- v. Electricity Supply: Electricity Regulatory Commission
- vi. Real Estate Regulatory Authority

UNIT -V Contemporary Issues in Consumer Affairs (4 Hours)

Consumer Movement in India: Evolution of Consumer Movement in India, Formation of consumer organizations and their role in consumer protection, Misleading Advertisements and sustainable consumption, National Consumer Helpline, Comparative Product testing, Sustainable consumption and energy ratings. Quality and Standardization: Voluntary and Mandatory standards; Role of BIS, Indian Standards Mark (ISI), Ag-mark, Hallmarking, Licensing and Surveillance; Role of International Standards: ISO an Overview.

Note: Unit 2 and 3 refers to the Consumer Protection Act, 1986. Any change in law would be added appropriately after the new law is notified

Suggested Readings:

1. Khanna, Sri Ram, Savita Hanspal, Sheetal Kapoor, and H.K. Awasthi. (2007) *Consumer Affairs*, Universities Press.
2. Choudhary, Ram Naresh Prasad (2005). *Consumer Protection Law Provisions and Procedure*, Deep and Deep Publications Pvt Ltd.
3. G. Ganesan and M. Sumathy. (2012). *Globalisation and Consumerism: Issues and Challenges*, Regal Publications
4. Suresh Misra and SapnaChadah (2012). *Consumer Protection in India: Issues and Concerns*, IIPA, New Delhi
5. Rajyalaxmi Rao (2012), *Consumer is King*, Universal Law Publishing Company
6. Girimaji, Pushpa (2002). *Consumer Right for Everyone* Penguin Books.
7. E-books :- www.consumereducation.in
8. Empowering Consumers e-book,
9. ebook, www.consumeraffairs.nic.in
10. *The Consumer Protection Act, 1986 and its later versions.* www.bis.org

Articles

1. Misra Suresh, (Aug 2017) “Is the Indian Consumer Protected? One India One People.
2. Raman Mittal, SonkarSumit and Parineet Kaur (2016) Regulating Unfair Trade Practices: An Analysis of the Past and Present Indian Legislative Models, *Journal of Consumer Policy*.
3. Chakravarthy, S. (2014). MRTP Act metamorphoses into Competition Act. CUTS Institute for Regulation and Competition position paper. Available online at www.cuts-international.org/doc01.doc.
4. Kapoor Sheetal (2013) “Banking and the Consumer” *Akademios* (ISSN 2231-0584)
5. Bhatt K. N., Misra Suresh and ChadahSapna (2010). *Consumer, Consumerism and Consumer Protection*, Abhijeet Publications.
6. Kapoor Sheetal (2010) “Advertising-An Essential Part of Consumer’s Life-Its Legal and Ethical Aspects”, *Consumer Protection and Trade Practices Journal*, October 2010.
7. Verma, D.P.S. (2002). *Regulating Misleading Advertisements, Legal Provisions and Institutional Framework.* *Vikalpa*. Vol. 26.No. 2. pp. 51-57.

Periodicals

1. *Consumer Protection Judgments (CPJ)* (Relevant cases reported in various issues)
2. Recent issues of magazines: *International Journal on consumer law and practice*, National Law School of India University, Bengaluru
3. ‘*Consumer Voice*’, Published by VOICE Society, New Delhi.

Websites:

www.ncdr.nic.in
www.consumeraffairs.nic.in
www.iso.org.
www.bis.org.in
www.consumereducation.in
www.consumervoice.in
www.fssai.gov.in
www.cercindia.org

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XV	24ITU15	RELATIONAL DATABASE MANAGEMENT SYSTEMS	72	4

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	25	75	100

PREAMBLE :

This course covers the basic concepts of database systems, relational database, queries and database design. It is designed to provide solutions related to the strategies for storing data and transaction management.

COURSE OUTCOME:

On successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Explain the basic concepts of database system.	K1
CO2	Explain Normalization and Query language.	K2
CO3	Apply appropriate SQL queries and PL/SQL Programs for database application.	K3
CO4	Analyze different normal forms to design effective database design.	K4
CO5	Verify data in tables against appropriate constraints.	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	1.61	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.

COURSE CONTENT

UNIT- I Introduction to Database System (12 Hours)

Database Concepts: A Relational approach: Database – Relationships – DBMS – Relational Data Model – Integrity Rules – Theoretical Relational Languages. Database Design: Data Modeling and

Normalization: Data Modeling – Dependency – Database Design – Normal forms – Dependency Diagrams - Denormalization – Another Example of Normalization.

UNIT- II **Oracle9i and Oracle Tables** **(15 Hours)**

Oracle9i: Overview: Personal Databases – Client/Server Databases – Oracle9i an introduction – SQL *Plus Environment – SQL – Logging into SQL *Plus - SQL *Plus Commands – Errors & Help – Alternate Text Editors - SQL *Plus Worksheet - iSQL *Plus. Oracle Tables: DDL: Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – Table Types – Spooling – Error codes.

UNIT- III **Working with Table** **(15 Hours)**

Working with Table: Data Management and Retrieval: DML – Adding a new Row/Record – Customized Prompts – Updating and Deleting an Existing Rows/Records – Retrieving Data from Table – Arithmetic Operations – Restricting Data with WHERE clause – Sorting – Revisiting Substitution Variables – DEFINE command – CASE structure. Functions and Grouping: Built-in functions – Grouping Data. Multiple Tables: Joins and Set operations: Join – Set operations.

UNIT- IV **PL/SQL** **(15 Hours)**

PL/SQL: A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators. Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control statements. PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT...FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.

UNIT- V **PL/SQL Composite Data Types** **(15 Hours)**

PL/SQL Composite Data Types: Records – Tables – Varrays. Named Blocks: Procedures – Functions – Packages – Triggers – Data Dictionary Views.

TEXT BOOK:

1. DATABASE SYSTEMS USING ORACLE – Nilesh Shah, 2nd Edition, PHI.(UNIT-I:Chapters 1 & 2, UNIT-II:Chapters 3 & 4, UNIT-III:Chapters 5 & 6,UNIT-IV:Chapters 10 & 11, UNIT-V:Chapters 12, 13 & 14).

REFERENCE BOOKS:

1. Abraham Silberschatz, Henry F.Korth, S.Sudarshan, Database System Concepts, 5th Edition, TMH.
2. Alexis Leon, Mathews Leon , Fundamentals of Database Management Systems, VijayNicole Imprints Private Limited.

WEB REFERENCES:

1. <https://www.astera.com/type/blog/relational-database-management-system/>
2. https://docs.oracle.com/cd/A97630_01/server.920/a96524/toc.htm
3. <https://www.youtube.com/watch?v=vs04JXcRwkY>
4. <https://www.oracletutorial.com/plsql-tutorial/>
5. <https://www.youtube.com/watch?v=xofpqqdU3cD4>

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XVI PRACTICAL : VI	24ITU16	SQL AND PL/SQL - PRACTICAL	72	4

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	40	60	100

PREAMBLE :

This course covers the conception creation of relational databases, storing, retrieving, Updating and displaying data using Structured Query Language (SQL) integrated into Stored Procedures, Functions, Packages and Triggers (PL/SQL Programming).It is designed to provide hands-on experience to create database-level applications using Oracle SQL and PL/SQL.

COURSE OUTCOME:

On successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Explore the basic concepts of database system.	K1,K2,K3,K4,K5
CO2	Apply the various table keys in real time applications	
CO3	Apply appropriate SQL queries and PL/SQL Programs for database application.	
CO4	Examine different functions to design effective program	
CO5	Assess the data in tables against appropriate constraints.	

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	1.61	3.31	3.19

**Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs**

PRACTICAL LIST

1. Construct a table Department with Dept Id as primary key, Dept name and Location name. Create a table Employee with Employee Id as primary key, Employee Name, Designation, Gender, Age, Date of Joining, Dept Id as foreign key and Salary and insert data in both the tables.
2. Extract queries using Comparison, Logical, Set, Sorting and Grouping operators to retrieve required data from the Employee table created in Question1.
3. Write queries using aggregate functions to summarize the data from the Employee table created in Question1.
4. Extract Query to
 - A. Display the Employee id, employee name for all employees who earn more than the average salary.
 - B. Display the employees who have the highest salary
 - C. Display all employees who belong to a particular location
5. Construct tables for the library management system which demonstrate the use of primary key and foreign key. Master table should have the following fields: Accno, Title, Author and Rate. Transaction table should have the following fields: User id, Accno, Date of Issue and Date of Return. Create a Report(Select verb) with fields Accno, Title, Date of Issue for the given Date of Return with column formats
6. Create a Student table with following fields and Constraints.
 - Regno - Primary key
 - Name - Not null
 - Marks - Check marks between 0 to 100
 - Gender - Default value of Female
 - Aadhar card number -Unique
7. Write a PL/SQL program
 - A. To check whether a given character is letter or digit.
 - B. To convert a temperature in scale Fahrenheit to Celsius and vice versa.
8. Create a program in PL/SQL
 - A. To check whether a number is prime or not using goto statement with for loop.
 - B. To print the prime numbers between 1 and 50.
9. Create a PL/SQL to update the rate field by 20% more than the current rate in the inventory table which has the following fields: Prono, ProName and Rate. After updating the table a new field (Alter) called for Number of item and place for values for the new field without using PL/SQL block
10. Write a PL/SQL to split the student table into two tables based on result (One table for Pass and another for Fail). Use a cursor for handling records of the student table. Assume necessary fields and create a student details table
11. Create a database trigger on master and transaction tables which are based on an inventory management system for checking data validity. Assume the necessary fields for both tables
12. Construct a PL/SQL program to raise an Exception in the Bank Account Management table when the deposit amount is zero.

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XVII	24ITU17	COMPUTER NETWORKS	72	4

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	25	75	100

PREAMBLE :

To understand the concepts and design of Computer Networks

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Recall the concepts, reference models and various layers of computer networks	K1
CO2	Explain the principles, protocols and algorithms of different layers of OSI reference models	K2
CO3	Apply the error detection and correction techniques and routing algorithms for efficient and error free transmission in networks	K3
CO4	Analyze the various routing algorithms for handling internal traffic efficiently	K4
CO5	Evaluate the data transmission services and connection establishment on network	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	1.61	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.

COURSE CONTENT

UNIT- I Introduction to Computer Networks (12 Hours)

Network Hardware: LAN, Man, WAN, Wireless Networks, Home Networks, Internetworks. Network Software: Protocol Hierarchies, Design Issues for Layers – Connection Oriented and Connection less services – Service Primitives. Reference Models: OSI – TCP/IP – Comparison of OSI and TCP/IP Reference Models.

UNIT -II Physical Layer (15 Hours)

Guided Transmission Media: Magnetic Media – Twisted Pair – Coaxial Cable – Fiber Optics. Wireless Transmission - Communication Satellites –Public Switched Telephone Networks – Mobile Telephone System.

UNIT- III Data Link Layer (15 Hours)

Data link Layer Design Issues - Error Detection and Correction – Elementary data link protocols – Sliding Window Protocols. Multiple Access Protocols: ALOHA- Carrier Sense Multiple Access Protocols – Collision Free Protocols. Ethernet: Ethernet Cabling -Ethernet MAC sublayer protocol. Wireless LANS – Bluetooth: Bluetooth protocols stack.

UNIT- IV Network Layer Services (15 Hours)

Networks Layer Design Issues – Routing Algorithm – The Network Layer in the Internet: The IP Protocol, IP Address, Mobile IP, IPV6.

UNIT- V Transport Layer & Application Layer (15 Hours)

The Transport Service: Services Provided to the Upper Layer –Transport Service Primitives. Elements of Transport Protocols: Addressing- Connection Establishment – Connection Release – Flow Control and Buffering. Internet Transport Protocols: TCP and UDP. Application Layer: DNS – E-Mail – WWW.

TEXT BOOK:

1. Andrew S.Tanenbaum, Computer Networks, PHI Private Ltd, Fourth Edition.

REFERENCE BOOK:

1. Behrouz A Forouzan, Data Communications and Networking, Tata McGraw Hill, Fifth Edition, 2013.

WEB REFERENCE:

1. <https://theswissbay.ch/pdf/Gentoomen%20Library/Networking/Prentice%20Hall%20-%20Computer%20Networks%20Tanenbaum%204ed.pdf>
2. https://oms.bdu.ac.in/ec/admin/contents/171_16SCCA8-16SCCS6-16SCCIT6_2020051809575550.pdf
3. <https://www.youtube.com/watch?v=VwN91x5i25g&list=PLBlnK6fEyqRgMCUAG0XRw78UA8qnv6jEx>

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XVIII	24ITU18A/ 24ITU18B/ 24ITU18C	Institutional Training/ Industrial Training/ Mini Project	-	1

Contact hours per week: -

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	100	-	100

PREAMBLE :

To expose the students to practice themselves and find solution for the problems in the respective areas

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Remember the thrust areas of project	K1,K2,K3,K4,K5
CO2	Demonstrate the problem pertaining to the domain	
CO3	Apply various algorithms in their relevant field	
CO4	Explore the real time applications	
CO5	Evaluate demographic variables and factors influencing software development	

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	9	9	9
CO4	9	9	9	9	9	9	9
CO5	9	9	9	9	9	9	9
Total Contribution of COs to POs	45	45	45	45	45	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	4.83	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs

Category	Components	Course Code	Course Title	Contact Hours	Credit
PART: III	CORE: XIX OPEN ELECTIVE COURSE	24TAUOE1	திறன் மேம்பாட்டு கல்வி	48	2

Contact hours per week : 4

Year	Semester	Internal Mark	External Marks	Total Marks
III	V	25	75	100

முகப்புரை:

தனிதிறன் மேலாண்மையையும் செயல்பாட்டினையும் வளர்கும் முறையினை அறிவர்.

COURSE OUTCOME :

தனிதிறன் அறிவினைக் கற்பதன் மூலம் கீழ்க்காணும் நிலையை அடைவர்.

COs	CO Statement	Knowledge Level
CO1	பேசுதல், எழுதுதல், தொடர்புகொள்ளுதல் ஆகியவற்றைக் குறித்து அறிந்து கொள்வர்.	K1
CO2	திட்டமிடல், செயல்படுத்துதல் ஆகியவற்றை கற்பர்.	K2
CO3	நேர மேலாண்மை, குழு கலந்துரையாடல், நேர்காணல் செய்தல் போன்றவற்றில் திறம்பட செயலாற்றுவர்.	K3
CO4	தனிநபர் செயல்பாடு, ஆக்கத்திறன், தனிமனித விழுமியங்கள் ஆகியவற்றை பகுத்து ஆராய்வர்.	K4
CO5	தன்னம்பிக்கை, ஊக்கம், முயற்சி, நேர்மறை சிந்தனை, மக்கள் தொடர்பு ஆகியவற்றை உணர்ந்து மதிப்பிடுவர்	K5

K1: Remember Level , K2:UnderstandLevel , K3: Apply Level , K4: Analyze Level, K5: Evaluate Level

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	3	3	9	9	9
CO2	9	9	9	9	9	3	3
CO3	9	3	9	9	9	9	9
CO4	9	3	3	9	3	9	9
CO5	9	9	9	9	9	9	9
Total contribution of COs to POs Weightage	45	33	33	39	39	39	39
Weight Percentage of COs contribution to POs	2.29	2.09	2.08	2.48	3.24	3.22	3.60

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

COURSE CONTENT

அலகு -1

10 மணி

ஆளுமைத் திறன் மேம்பா தலைமைப் பண்பு, பேசுதல், எழுதல், தொடர்பு கொள்ளுதல், குழு செயல்பாடு, தனிநபர் செயல்பாட்டு விளக்கம்.

அலகு-2

9 மணி

செயல் திறன் மேம்பாடு திட்டம் அமைத்தல், செயல்படுத்துதல், இடர்பாடுகள், செயலாக்கம்

அலகு-3

10 மணி

நேர்காணல்நேர மேலாண்மை, செயல்படுத்துதல், முன்தயாரிப்பு, உடல் அசைவு மொழிகள், குழு கலந்துரையாடல், அறிமுக நிகழ்வு, இன்றைய தகவல்கள் குறித்த விழிப்புணர்வு

அலகு-4

10 மணி

உணர்வு மேலாண்மைதனிநபர் செயல்பாடு, ஆக்கத்திறன், தனி மனித விழிமியங்கள், வெற்றி உன் கையில்

அலகு -5

9 மணி

உன்னை நீ அறிவாய்தன்னம்பிக்கை, ஊக்குவித்தல், முயற்சி, நேர்மையான சிந்தனை, மக்களுடன் தொடர்பு கொள்ளுதல்

பாட நூல்கள்:

ஆளுமைத் திறன், பாதை தெரியுது பார், நெல்லைகவினேசன், தினத்தந்தி வெளியீடு,

பார்வை நூல்கள் :

- 1.சாதிக்க ஆசைப்படு, டாக்டர் சே.சைலேந்திரபாபு, சுரா பதிப்பகம், அண்ணா நகர், சென்னை
2. நேர்முகத் தேர்வை எதிர்கொள்வது எப்படி?, சே.ஆனந்த முருகன், சிவம் புத்தகாலயம், சென்னை
3. முடியும் என்றால் முடியும், ரவி பாரதி, நர்மதா பதிப்பகம், தி.நகர், சென்னை.

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART: III	CORE :XIX OPEN ELECTIVE	24ENUOE1	ENGLISH FOR EFFECTIVE COMMUNICATION	48	2

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	25	75	100

PREAMBLE:

To focus the theory and fundamental tools of communication and various dimensions of communication skills.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Define the verbal and Non-Verbal Communication	K1
CO2	Explain the practice in four modes of literacy.	K2
CO3	Make use of appropriate Verbal and Non Verbal signs for effective communication.	K3
CO4	Examine the primary academic writing associated with the communication.	K4
CO5	Assess the communicative competencies such as managing conflict, understanding group processes, active listening, appreciate self-disclosure ,etc..	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	9	9	3	3	3	1
CO3	9	9	3	3	3	1	1
CO4	9	3	3	1	1	0	0
CO5	3	3	3	1	0	0	0
Total contribution of COs to POs Weightage	39	33	27	17	10	7	5
Weight Percentage of COs contribution to POs	2.86	3.00	2.97	2.20	2.60	2.17	2.07

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

COURSE CONTENT

UNIT I : Aspects Of Communication (9 Hours)

1. Communication through Words
2. Communication through Body Language
3. Communication through Technology

UNIT II : Oral Communication (10 Hours)

1. Dyadic communication
2. Active listening
3. Meetings
4. Seminars and conferences
5. Group discussions

UNIT III : Written Communication (10 Hours)

1. Reading Comprehension
2. Précis writing
3. Business and Technical Reports
4. Style
5. Technical Proposals

UNIT IV : Written Communication (10 Hours)

1. Memorandum Writing
2. Notice, Agenda, Minutes
3. Handbooks and Manuals
4. Research Papers and Articles
5. Advertising and Job Description

UNIT V : Mechanics Of Manuscript Preparation (9 Hours)

1. Editing and Proofreading
2. Copy Editing
3. Punctuation and Capitalization
4. Abbreviations and Numerals

TEXT BOOK:

Developing Communication Skills by Krishna Mohan & Meera Banerji

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART- III	CORE –XIX OPEN ELECTIVE	24MAUOE1	MATHEMATICS FOR BUSINESS	48	2

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	25	75	100

PREAMBLE:

To enable the students to learn Business Mathematics.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO STATEMENT	KNOWLEDGE LEVEL
CO1	recall the basic concepts of sequence and series ,matrix, set theory, simple interest and compound interest.	K1
CO2	interpret sequence and series ,matrix, set theory, simple interest and compound interest.	K2
CO3	apply different quantitative models in solving business problems	K3
CO4	determine the solutions of the problems based on matrix , simple interest and compound interest problems	K4
CO5	evaluate the problems on sequence and series ,matrix, set theory, simple interest and compound interest problems.	K5

K_1 - Remember; K_2 – Understand; K_3 - Apply; K_4 - Analyze; K_5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	3
CO2	9	9	9	3	3	3	1
CO3	9	9	3	3	3	1	1
CO4	9	3	3	1	1	0	0
CO5	3	3	3	1	0	0	0
Total Contribution of COs to POs	39	33	27	17	10	7	5
Weighted Percentage of COs contribution to POs	2.24	2.08	1.82	1.24	1.18	0.92	0.73

Level of Correlation: 0–No Correlation; 1–Low Correlation; 3–Medium Correlation; 9- High Correlation between COs and POs

COURSE CONTENT

UNIT - I	SERIES	(10 Hours)
Sequence and series - Arithmetic progression –Geometric progression – Arithmetic mean - Geometric mean – Harmonic mean.		
UNIT - II	MATRICES	(6 Hours)
Fundamental ideas about Matrices and their operational rules- Matrix Multiplication- Inverse of a matrix.		
UNIT - III	SET THEORY	(6 Hours)
Introduction- Types of sets- Set operation- Venn diagrams, Inconsistency of data.		
UNIT - IV	MATHEMATICS OF FINANCE	(7 Hours)
Simple Interest.		
UNIT - V	MATHEMATICS OF FINANCE	(7 Hours)
Compound Interest.		

NOTE: No derivation and proof, simple problems only.

TEXT BOOK

Navnitham P.A (2012) – “Business Mathematics and Statistics”, Sultan Chand & Sons, New Delhi.

UNIT	CHAPTER	PAGE
I	1	1 -33.
II	4	147-184.
III	3	104-136.
IV	2	43-51.
V	2	51-61.

REFERENCE BOOK:

Vittal.P.R (2002) - “Business Mathematics and Statistics, Margham publishers, Chennai.

WEB REFERENCES:

1. <http://www.mim.ac.mw/books/Business%20mathematics%20and%20statistics,%206th%20ed.pdf>
2. https://en.wikipedia.org/wiki/Business_mathematics
3. <https://youtu.be/pn2Fx9-G1Ds>

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits		
PART – III	CORE: XVII OPEN ELECTIVE	24PHUOE1	PHYSICS IN DAY TO DAY LIFE	48	2		
Contact hours per week: 4							
Year	Semester	Internal Marks	External Marks	Total Marks			
III	V	25	75	100			
PREAMBLE: To demonstrate knowledge and understanding of the fundamental concepts in Physics							
COURSE OUTCOME: After completion of the course, the learners will be able to							
COs	Course Statement				Knowledge Level		
CO1	Identify the measurements, Electric Current, Electricity, Magnetism, Electrolysis, Magnetic field effect and Natural Phenomena's in Atmosphere				K1		
CO2	Explain the concepts in Electricity, standard units and Types of Motion, Electric power, Effects of current and Magnet, lightning, thunder, water harvesting, coal and petroleum				K2		
CO3	Perform different SI units in measurement, electricity and magnetism, electric potential, resistance, chemical effect of Electric current and magnetism				K3		
CO4	Criticize the measurements of different units, Electricity, Resistance, associate reaction of magnetic Poles, Protection against natural calamities,				K4		
CO5	Interpret the measuring, electric current, Laws in Physics, electricity and magnetism, Natural Resources				K5		
K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate							
CO-PO MAPPING (COURSE ARTICULATION MATRIX)							
POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	1
CO2	9	9	9	3	3	1	1
CO3	9	9	3	3	2	1	1
CO4	9	3	3	1	1	1	1
CO5	3	3	3	1	1	1	1
Total Contribution of COs to POs	39	33	27	17	10	7	5
Weighted Percentage of COs Contribution to POs	2.25	2.17	1.96	1.47	1.12	0.98	0.70
Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs							

COURSE CONTENT

UNIT- I - Motion and Measurements of Distances (10 Hours)

History of Transportation-Measurement of Length – Distance-Conventional Methods of Measurement-Standard Units of Measurement-Types of Motion

UNIT- II - Electricity (10 Hours)

Electric current-Electric circuit-Components of basic electric circuit: Cell, Switch, and Bulb Conductor-Insulator-Electric potential and potential difference-Circuit diagram-Ohm's law Factors on which the resistance of conductor depends-Resistance of a system of resistors-Heating effect of electric current-Electric power

UNIT- III - Chemical Effects of Electric Current and Magnetism (10 Hours)

Conduction of Electricity-Conduction of Electricity in Liquids – Electrolysis-Electrolysis and Electroplating - Discovery of Magnets-Magnet-Poles of a magnet-Like poles repel and unlike poles attract Magnetic Field of Earth and Compass

UNIT- IV - Some Natural Phenomena (9 Hours)

Lightning-Charging by rubbing-Transfer of Charge-The Story of Lightning-Lightning Safety Phenomena related to earthquakes-Protection against earthquakes

UNIT- V - Management of Natural Resources (9 Hours)

Save the Environment from Environmental Pollution – Reuse– Recycle-Why do we need to manage our natural resources-Forest and wildlife-Sustainable management-Water for all : dam-Water harvesting-Coal and petroleum

Reference Book

1.Monograph – Department of Physics

Web reference

1. https://www.researchgate.net/publication/277130091_Energy_Resources_Indian_Scenario
2. https://www.aps.edu/energy-conservation/energy-lessons-and-games/energy-lessons-and-games/26_HS-IssueOfRenewableEnergy.pdf
3. <https://ncert.nic.in/textbook/pdf/hesc114.pdf>
4. <https://www.learnbse.in/motion-and-measurement-of-distances-class-6-notes/>
5. <https://web.njit.edu/~vitaly/121/notes121.pdf>

Category	Component	Course Code	Course Title	Contact Hours / Semester	Credits
PART – III	CORE: XIX (OPEN ELECTIVE)	24CGUOE1	BASICS OF ACCOUNTING	48	2

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	25	75	100

PREAMBLE (For Other Major Students)

To equip the students with the fundamental principles of accountancy for sole trading concerns

COURSE OUTCOME

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Acquire the knowledge in accounting, system of maintenance of accounts, journal, ledger and different types of subsidiary books.	K1
CO2	Familiarise the concept of accounting equation, types of accounts, golden rules of accounting, trial balance and final accounts.	K2
CO3	Develop the application skills in preparation of ledger accounts and final accounts.	K3
CO4	Analyse the assets and liabilities in the balance sheet.	K4
CO5	Evaluate the financial position of a business.	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	1
CO2	9	9	9	3	3	1	1
CO3	9	9	3	3	3	1	1
CO4	9	3	3	1	1	1	1
CO5	3	3	3	1	0	1	1
Total Contribution of COs to POs	39	33	27	17	10	7	5
Weighted Percentage of COs Contribution to POs	2.09	2.07	1.68	2.00	0.92	0.42	1.07

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.

COURSE CONTENT

UNIT- I

(10 Hours)

Introduction to Accounting: Accounting – meaning and definition – need – steps – objectives – advantages – limitations – users of accounting information – book keeping Vs accounting – double entry system – dual aspects – advantages of double entry system – types of accounts – personal account, real account and nominal account – golden rules of accounting – accounting terms – accounting equation – accounting cycle.

UNIT- II

(10 Hours)

Journal and Ledger: Journal – meaning and definition – format – recording business transactions in journal with narration. Ledger - meaning and definition – format – posting journal entries in ledger.

UNIT- III

(10 Hours)

Subsidiary Books: Meaning – benefits – types – purchase book, sales book, purchase return book, sales return book, bills receivable book, bills payable book, petty cash book and cash book with single, double and triple columns.

UNIT- IV

(10 Hours)

Trial Balance: Meaning – objectives – methods of preparing trial balance – preparation of trial balance from the balances extracted from the ledger accounts – errors disclosed by trial balance – errors not disclosed by trial balance)

UNIT- V

(8 Hours)

Final accounts: Introduction – preparation of trading account, profit and loss account and balance sheet with simple adjustments – closing stock, outstanding expenses, prepaid expenses, accrued income and income received in advance.

Note: Distribution of Marks: Theory- 40% and Problems- 60%.

TEXT BOOKS:

S.No	Authors	Title	Publisher	Year of Publication
1	Reddy.T.S & Murthy A	Financial Accounting	Margham Publication, Chennai	2012
2	Vinayakam.N, Mani.P.L & Nagarajan.K.L	Principles of Accountancy	S.Chand & Sons, New Delhi, New Delhi	2002

BOOKS FOR REFERENCE:

S.No	Authors	Title	Publishers	Year of Publication
1	Grewal.T.S	Introduction to Accountancy	S.Chand & Sons, New Delhi, New Delhi	2003
2	Gupta.R.L, Gupta, V.K & Shukla.M.C	Financial Accounting	S.Chand&Sons, NewDelhi	2009
3	Maheswari.S.K, Reddy.T.S	Advanced Accountancy	Vikas Publishing House, New Delhi.	1996

Power Point presentation, Quiz, Assignment, Experience Discussion, Brain Storming, Group Discussion, Seminars.

Category	Component	Course Code	Course Title	Contact Hours / Semester	Credit
PART – III	CORE : XIX OPEN ELECTIVE	24CCUOE1	E- ADVERTISING	65	2

Contact hours per week:4

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	25	75	100

PREAMBLE : (For other major students)

To make the students to understand the concept of e-advertising tools and techniques in media

COURSE OUTCOME :

Upon Completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	spell out the meanings for the different terms used in E-advertising	K1
CO2	explain the various domain concepts in E-advertising	K2
CO3	apply the modern techniques of advertising in media planning, advertising agencies and social advertising	K3
CO4	analyse the role of creativity in advertising, factors influencing media choice, challenges faced by advertisers and distinguish between traditional advertising and E advertising	K4
CO5	evaluate the effectiveness of E-advertising to withstand the products in the market	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	1
CO2	9	9	9	3	3	1	1
CO3	9	9	3	3	3	1	1
CO4	9	3	3	1	1	1	1
CO5	3	3	3	1	0	1	1
Total Contribution of COs to POs	39	33	27	17	10	7	5
Weighted Percentage of COs Contribution to POs	1.95	1.87	1.50	1.21	1.33	0.67	0.83

Level of Correlation: 0-No Correlation; 1-Low Correlation; 3-Medium Correlation;
9-High Correlation between COs and POs.

COURSE CONTENT

UNIT I

(13 hours)

E-advertising

Meaning – Traditional advertising Vs E- advertising – Facets of E- advertising – Role of E-advertising- Models for E- advertising – Significance and limitations of E- advertising – Constraints in E- advertising.

UNIT-II

(13 hours)

Creativity in advertising

Role of creativity in advertising - Determining the message theme / major selling idea and Unique selling Proposition (USP) - Positioning strategies - Persuasion Advertising appeal and its types – Executional styles of presenting ads- Advertising Copy-meaning, essentials and its elements– headline, sub-headline, body copy, illustration, slogan, signature and logo

UNIT-III

(13 hours)

Media planning and Decisions

Media Planning-The function of media planning in advertising-Role of media Planner - Challenges in media planning -Media planning process -Major media types – characteristics of media- internet as an advertising media- merits and demerits- Factors influencing media choice- media selection- media scheduling- Advertising through the Internet-media devices.

UNIT IV

(13 hours)

Effectiveness of E-advertising

Evaluating communication and sales effects- Pre- and Post-testing techniques- E-advertising agencies – selection, compensation and appraisal of advertising agency

UNIT V

(13 hours)

E- advertising in Indian Scenario

Trends in advertising industry in India – Challenges faced by advertisers in India in the era of globalization- Social Advertising by Indian Government through Directorate of Advertising and Visual Publicity (DAVP)

TEXT BOOKS:

Authors	Title	Publisher	Year of Publication
Jaishree Jethwaney and Shruti Jain,	Advertising Management –	2nd Ed. Oxford University Press	2012
Ronald Lane,W. J. Thomas Russell, Karen Whitehill King	Kleppners Advertising Procedure	16th Ed., Pearson Education India	2008

BOOKS FOR REFERENCE:

S. No	Authors	Title	Publishers	Year of Publication
1.	Belch G. and Belch M.	Advertising and Promotion, An Integrated Marketing Communications Perspective	6th ed., Tata McGraw-Hill Publishing Company Limited, New Delhi, India	2003
2.	Burnett, Wells, and Moriatty	Advertising: Principles and Practice	5th ed. Prentice Hall of India New Delhi	2015
3.	Kazmi S. H. H. and Batra Satish K	Advertising and Sales Promotions	2nd ed., Excel Books, New Delhi,	2004

Power Point Presentation, Quiz, Assignment, Activity, Group Discussion, Seminars, Experience Discussion, Brain Storming.

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART – III	CORE :XIX OPEN ELECTIVE	24CPUOE1	HUMAN RESOURCES MANAGEMENT	52	2

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	50	50	100

PREAMBLE

To make the students to understand the various facets of Human Resource Management and comprehend emerging developments in HRM.

COURSE OUTCOME:

After completion of the course, the learners will be able to

COs	CO Statement	Knowledge Level
CO1	recollect the concepts of Human Resource Management, Human resource planning, Recruitment, selection and placement, job analysis, training, performance appraisal, promotion, motivation	K1
CO2	illustrate the role of human resource manager, benefits of human resource planning, job description and job specification.	K2
CO3	apply the organizational set up of human resource department, methods of selection, job design and performance appraisal	K3
CO4	analyze the problems involved in placement, methods of training-techniques of wage fixation, styles of leadership	K4
CO5	evaluate the implications of human resource planning, need for training, measurements, motivation and leadership	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	3	1
CO2	9	9	9	3	3	1	1
CO3	9	9	3	3	3	1	1
CO4	9	3	3	1	1	1	1
CO5	3	3	3	1	0	1	1
Total Contribution of COs to POs	39	33	27	17	10	7	5
Weighted Percentage of COs Contribution to POs	2.24	2.19	1.79	1.59	1.63	0.92	0.85

**Level of Correlation: 0-No Correlation; 1-Low Correlation; 3-Medium Correlation;
9-High Correlation between COs and POs.**

COURSE CONTENT

UNIT I (10 Hours)

Human Resource Management

Meaning of HRM- importance of HRM- objectives - Role of human resource manager- duties and responsibilities of human resource manager- typical organizational setup of human resource department.

UNIT II (10 Hours)

Human Resources Planning

Meaning and importance of human resources planning- benefits of human resource planning- process of human resource planning- Recruitment- Selection- testing interview- Placement.

UNIT III (10 Hours)

Job Analysis

Concept and uses of job analysis- Process and methods of job analysis- Job description and job specification- Role analysis -Concept of job design- approach and methods of job design- Training and induction-meaning- Objectives and purpose of induction-need for training-benefits of training-methods of training

UNIT IV (12 Hours)

Performance Appraisal, Compensation and Promotion

Meaning of performance appraisal- Objectives of performance appraisal- methods of performance appraisal and limitations- job evaluation- Principles and techniques of wage fixation -Objectives of Compensation.

UNIT V (10 Hours)

Motivation and Leadership

Motivation-meaning-importance-factors influencing motivation and theories of motivation-Maslow's theory of motivation-Herzberg two factors hygiene theory of motivation-X,Y and Z theories

Leadership

Leadership: Meaning- Qualities and styles of leadership.

BOOKS FOR REFERENCE:

S.No	Authors	Title	Publishers	Year of Publication
1	Aswathappa K	Human Resource management	McGraw Hill Education; Eighth edition, New Delhi.	2017
2	Dessler, Gary	Human Resource management	Prentice Hill, New Delhi.	2014
3	Prasad L.M.	Human Resource Management	Sultan Chand & Sons, New Delhi	2007
4	Rao, S.	Personnel and human resource management	Himalaya publishing house, Bangalore	2014
5	Reddy & Appannah	Human Resource management	Himalaya publishing house, New Delhi	
6	Tripathi P.C.	Human Resource Management	Sultan Chand & Sons, New Delhi	2010

WEB REFERENCES:

- 1) <https://www.hrdconnect.com/2019/05/22/what-is-hr-management-in-an-organisation/>
- 2) <https://www.economicdiscussion.net/human-resource-management/human-resource-planning-definition-importance-objectives-process-prerequisites/31575>
- 3) <https://www.economicdiscussion.net/human-resource-management/job-analysis-meaning-concept-purposes-contents-process-and-methods/31576>
- 4) <https://www.economicdiscussion.net/performance-appraisal/performance-appraisal-in-hrm/31873>
- 5) <https://www.toolbox.com/hr/talent-management/articles/what-is-talent-management/>
- 6) <https://www.businessmanagementideas.com/human-resources-management/work-life-balance-in-hrm/20853>
- 7) <https://www.slideshare.net/timadams2323/balanced-scorecard-presentation-1068670>
- 8) https://www.slideshare.net/jithindas05/competency-mapping-ppt-15741755?next_slideshow=1

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credits
PART - III	CORE: XIX OPEN ELECTIVE	24BAUOE1	START-UP BUSINESS	48	2

Contact hours per week: 4

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	25	75	100

PREAMBLE:

The course is designed to understand the practices and technology to start a business.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Find out the start-up activities of a business.	K1
CO2	Demonstrate the trends and supporting agencies for starting a business.	K2
CO3	Build the importance of start-up ideas and map the strategies to start a business with different stages of business.	K3
CO4	Categorise the application of start up business activities	K4
CO5	Evaluate the ideologies of start-up business in real time scenario	K5

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

COs / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	0	0
CO2	9	9	9	3	3	1	1
CO3	9	9	3	3	0	3	1
CO4	9	3	3	1	3	0	3
CO5	3	3	3	1	1	3	0
Total Contribution of COs to POs	39	33	27	17	10	7	5
Weighted Percentage of COs Contribution to POs	2.23	2.26	2.29	1.71	1.22	1.22	0.81

Level of correlation: 0 – No correlation; 1- Low correlation; 3 – Medium correlation;
9 – High correlation between COs and POs

COURSE CONTENT

UNIT- I INTRODUCTION TO START-UP (10 Hours)

Start-up: Meaning- Difference between start-up idea and opportunity-Need for start-up- Qualities required for a start-up-Factors influencing start-up-Problems for start-up- Startup scenario in India.

UNIT -II MENTORING AND FUNDING FOR START-UP (10 Hours)

Ownership structure for start-up -Selection of mentors-Importance of start-up mentors
Bootstrapping-Funding for start-up.

UNIT- III START-UP IDEAS AND MINDMAPPING (10 Hours)

Start-up ideas: Market-Focus Groups-Brainstorming-Gordon Method-Collective notebook method and Big dream approach-Mind mapping.

UNIT- IV LIFE CYCLE STAGES OF START-UP (10 Hours)

Life cycle stages of start-up's – Activities during each stage-Interaction with a start-up entrepreneur.

UNIT- V START-UP REGISTRATION & PRACTICAL TRAINING (8 Hours)

Student start-up's-Role of TBI in promoting start-up- Start-up registration process -overview of start-up marketing ideas.

BOOK FOR REFERENCE:

S. no	Authors	Title	Publishers	Year of publication
1.	Vijayakumar Ivaturi, Meena Ganesh	The manual for Indian start-ups	Penguin Random House India	2018

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XX ELECTIVE : I	24ITU19A	INTERNET OF THINGS: LEVEL-I	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	25	75	100

PREAMBLE :

This course gives an overview of the basic concepts of building an IoT system and its applications

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Recall the general concepts of Internet of Things (IoT).	K1
CO2	Illustrate various IoT sensors and applications	K2
CO3	Apply design concepts to IoT solutions	K3
CO4	Compare various IoT architectures	K4
CO5	Evaluate Design issues in IoT applications	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	27	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	2.90	3.31	3.19

**Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and Pos**

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XX ELECTIVE : I	24ITU19B	COMPUTER GRAPHICS: LEVEL-I	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	25	75	100

PREAMBLE :

To learn about graphics algorithms and its applications.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Describe the basics of computer graphics	K1
CO2	Explain applications, principles, commonly used and techniques of computer graphics and algorithms for Line-Drawing, Circle- Generating and Ellipse Generating.	K2
CO3	Analyze the attributes of output primitives	K3
CO4	Learn and apply two dimensional Geometric Transformations	K4
CO5	Examine and appraise the two dimensional viewing	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	2.90	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs

COURSE CONTENT

UNIT- I Overview of Graphics system (12 Hours)

A survey of Computer Graphics – Overview of Graphics Systems: Video Display Devices – Raster-Scan Systems – Random-Scan Systems – Graphics Monitors and Workstations – Input Devices – Graphics Software.

UNIT- II Output Primitives (12 Hours)

Points and Lines – Line-Drawing algorithms – Loading frame Buffer – Line function – Circle-Generating algorithms – Ellipse-generating algorithms.

UNIT- III Attributes of Output Primitives (12 Hours)

Attributes of Output Primitives: Line Attributes – Curve attributes – Color and Grayscale Levels – Area-fill attributes – Character Attributes.

UNIT- IV Two Dimensional Geometric Transformations (12 Hours)

Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations.

UNIT- V Two Dimensional Viewing (12 Hours)

The Viewing Pipeline – Viewing Coordinate Reference Frame – Window-to-Viewport Coordinate Transformation - 2D Viewing Functions – Clipping Operations - Point Clipping - Line Clipping – Cohen Sutherland Line Clipping – Polygon Clipping – Sutherland-Hodgeman Polygon Clipping.

TEXT BOOK:

1. Donald Hearn and M. Pauline Baker, Computer Graphics C Version, Second Edition ,Pearson Education, 2006.

REFERENCE BOOK:

1. William M. Neuman, Robert R. Sprout, Principles of interactive Computer Graphics, McGraw Hill International Edition.

WEB REFERENCES:

- 1.https://www.tutorialspoint.com/computer_graphics/line_generation_algorithm.htm
- 2.<https://docs.microsoft.com/en-us/dotnet/desktop/winforms/advanced/matrix-representation-of-transformations>
- 3.<https://www.youtube.com/watch?v=D7jKO661adA>
- 4.<https://www.javatpoint.com/computer-graphics-clipping>

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XX ELECTIVE : I	24ITU19C	INTRODUCTION TO COMPILER DESIGN	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	25	75	100

PREAMBLE :

To understand the principles of compiler design.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Recall the basics of compilers and lexical analysis	K1
CO2	Infer the concepts of syntactic specification of programming languages and parsing techniques	K2
CO3	Apply the syntax and symbol tables in compiler design	K3
CO4	Analyze runtime storage and error recovery	K4
CO5	Interpret General introduction on code optimization	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	1	9	9
CO5	9	9	9	9	1	9	9
Total Contribution of COs to POs	45	45	45	45	17	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	2.90	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and Pos

COURSE CONTENT

UNIT- I Introduction to Compilers (12 Hours)

Compilers and Translator – Need of Translator – The Structure of a Compiler – Lexical analysis – Syntax analysis – Intermediate code generation – optimization – code generation. Finite automata and lexical Analysis: The role of the lexical analysis - Regular expressions to finite automata – Minimizing the number of states of a DFA.

UNIT-II The Syntactic specification of programming languages (12 Hours)

Context free grammars – derivations and parse trees – capabilities of context free grammars. Basic parsing techniques: Parsers –top down parsing – predictive parsers.

UNIT- III Syntax – directed translation (12 Hours)

Syntax-directed translation schemes – implementation of syntax-directed translators – intermediate code – postfix notation – parse trees and syntax trees – 3 address code – quadruples and triples– Boolean expressions – statements that alter the flow of control. Symbol tables: the contents of a symbol table – data structures for symbol table – representing scope information.

UNIT- IV Run time storage administration (12 Hours)

Implementation of a simple stack allocation scheme – Implementation of block-structured languages – storage allocation in block structured languages. Error deduction and recovery: errors – lexical phase errors – syntactic phase errors – semantic errors.

UNIT- V Introduction of code optimization (12 Hours)

The principle sources of optimization – loop optimization – the DAG representation of basic blocks – value numbers and algebraic laws. Code generation: Object programs – problems in code generation – a machine model– register allocation and assignment – code generation from DAG's – peepholes optimization.

TEXT BOOK:

1. V.Aho, Jeffrey D.Ullman, Principles of Compiler Design by Alfred, Narosa Publishing House.

REFERENCE BOOK:

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, Compilers, Principles. Techniques, and tools.

WEB REFERENCES:

1. <https://www.askbooks.net/2022/02/pdf-compiler-principles-techniques-and.html>
2. <https://www.guru99.com/compiler-design-tutorial.html>
3. http://hjemmesider.diku.dk/~torbenm/Basics/basics_lulu2.pdf
4. <https://easyexamnotes.com/p/introduction-to-compiler.html>
5. <http://160592857366.free.fr/joe/ebooks/ShareData/Modern%20Compiler%20Design%20e.pdf>

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XX ELECTIVE : I	24ITU19D	CLOUD COMPUTING TECHNIQUES	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	25	75	100

PREAMBLE :

To understand the Cloud computing architectures, applications and challenges

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Recall the basics of Cloud Computing, Working, Benefits and Discovering cloud services.	K1
CO2	Explain the cloud services	K2
CO3	Apply the concepts of communications and collaboration using cloud in Industry 4.0	K3
CO4	Analyze the various cloud services	K4
CO5	Evaluate the cloud services	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	1	9	9
CO4	9	9	9	9	1	9	9
CO5	9	9	9	9	1	9	9
Total Contribution of COs to POs	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	2.90	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.

COURSE CONTENT

UNIT- I Introduction (12 Hours)
Understanding Cloud Computing: Beyond the Desktop – An Introduction to Cloud Computing– Are you Ready for Computing in the Cloud? – Developing Cloud Services.

UNIT- II Cloud Computing For Everyone (12 Hours)
Cloud Computing for the Family - Cloud Computing for the Community - Cloud Computing for the Corporation.

UNIT-III Using Cloud Services (12 Hours)
Collaborating on calendars, Schedules and task management – Collaborating on Event Management.

UNIT- IV Collaboration on Cloud Services (12 Hours)
Collaborating on Contact Management, Collaborating on Project Management – Sharing Digital Photographs.

UNIT- V Outside The Cloudx (12 Hours)
Evaluating web mail services, Evaluating instant messaging, Evaluating web conference tools, creating groups on social networks, Evaluating on line groupware, Collaborating via blogs and wikis.

TEXT BOOK:

1. Michael Miller, “Cloud Computing”, Pearson Education, New Delhi, 2009

REFERENCE BOOK:

1. Anthony T. Velte, Cloud Computing A Practical Approach 1st Edition, Tata Mcgraw Hill Education Private Limited (2009)

WEB REFERENCES :

1. <https://www.educba.com/cloud-computing-technologies/>
2. https://www.tutorialspoint.com/cloud_computing/cloud_computing_technologies.htm
3. <https://www.javatpoint.com/cloud-computing-technologies>

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-IV	SKILL ENHANCEMENT: II	24SEITU02	WEB PROGRAMMING -PRACTICAL	36	2

Contact hours per week: 3

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	50	-	50

PREAMBLE :

To learn about the basic components of HTML and PHP

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Remember the basics syntax of HTML & PHP	K1 K2 K3 K4 K5
CO2	Demonstrate the concepts of HTML & PHP	
CO3	Utilize the syntax of HTML& PHP	
CO4	Analyze an insight on forms	
CO5	Assess an insight on MYSQL Database	

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	9	9	9
CO4	9	9	9	9	9	9	9
CO5	9	9	9	9	9	9	9
Total Contribution of COs to POs	45	45	45	45	45	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	4.83	3.31	3.19

**Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.**

PRACTICAL LIST

HTML Program

1. Design a page having suitable background colour and text colour using all the attributes of the Font tag
2. Write HTML code to create a Web Page that contains an Image at its centre
3. Create a HTML document containing a nested list
4. Develop a website to publish your family and the details of each member using HTML
5. Develop a HTML document to display a Registration Form for an inter-collegiate function
6. Create a web page using Embedded CSS

PHP Program

1. Create a PHP Program for finding factorial number
2. Write a PHP program to find maximum value
3. Design a PHP program to display Multiplication table
4. Create a PHP Program to draw Human face
5. Design a PHP program that demonstrates simple web page in PHP
6. Create an Authentication web page in PHP with MySql to check username and password

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-V	PROFICIENCY ENHANCEMENT	24PEITU01	DIGITAL MARKETING (SELF STUDY)	-	2

Contact hours per week: 0

Year	Semester	Internal Marks	External Marks	Total Marks
III	V	-	100	100

PREAMBLE :

To create a structured digital marketing plan and budget, Identify the correct measures to set objectives and evaluate digital marketing, Review and prioritize the strategic options for boosting customer acquisition, conversion, and retention using digital marketing.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Remember the important terminologies in digital marketing	K1
CO2	Illustrate the role of Digital Marketing	K2
CO3	Apply various digital marketing options	K3
CO4	Analyze Return on Investment for any digital marketing program.	K4
CO5	Evaluate the key Performance Indicators tied to any digital marketing program.	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	9	9	9
CO4	9	9	9	9	9	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	39	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	4.18	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;

9- High correlation between COs and POs.

COURSE CONTENT

UNIT-I Introduction & origin of Digital Marketing

Introduction & origin of Digital Marketing, Traditional v/s Digital Marketing. Digital Marketing Strategy, The P-O-E-M Framework, Segmenting & Customizing Messages, The Digital landscape, Digital Advertising Market in India. Skills required in Digital Marketing. Digital Marketing Plan.

UNIT-II Social Media Marketing

Social Media Marketing: Meaning, Purpose, types of social media websites. Blogging: Types of blogs, Blogging platforms & recommendations. Social Media Engagement, Target audience, Sharing content on social media, Do's and don'ts of social media.

UNIT-III Search Engine Optimization

Search Engine Optimization: Meaning, Common SEO techniques, Understanding Search Engines, basics of Keyword search, Google rankings, Link Building, Steps to optimize website. Basics of Email Marketing: Types of Emails, Mailing List, Email Marketing tools, Email Deliverability & Email Marketing automation.

UNIT-IV Facebook

Facebook Marketing-Introduction, Facebook for business. Anatomy of an Ad Campaign, Role of Adverts-Types & Targeting, Adverts Budget & Scheduling, Adverts Objective & Delivery. LinkedIn Marketing-Introduction & importance, LinkedIn Strategies, Sales Leads Generation Using LinkedIn, Content Strategies. Mobile Marketing-Introduction, Mobile Usage, Mobile Advertising, Mobile Marketing tool Kit, Mobile Marketing Features.

UNIT-V Understanding Web Analytics

Understanding Web Analytics: Purpose, History, Goals & objectives, Web Analytic tools & Methods. Web Analytics Mistakes and Pitfalls. Basics of Content Marketing: Introduction, Content marketing statistics, Types of Content, Types of Blogposts, Content Creation, Content optimization, Content Management & Distribution, Content Marketing Strategy, Content creation tools and apps, Challenges of Content Marketing.

TEXT BOOKS:

1. Digital Marketing by Vandana Ahuja, Oxford University Press
2. Digital Marketing by Seema Gupta, McGraw-Hill Publishing Company Ltd.

REFERENCE BOOK:

1. Commonsense Direct & Digital Marketing by Drayton Bird, Kogan Page Publisher

WEB REFERENCES :

1. <https://www.digitalmarketer.com/digital-marketing/assets/pdf/ultimate-guide-to-digital-marketing.pdf>
2. <https://www.slideshare.net/slideshow/digital-marketing-227045801/227045801>

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XXI	24ITU20	PROGRAMMING IN PYTHON	72	5

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
III	VI	25	75	100

PREAMBLE :

The Course offers the understanding of basic principles in python and skills to create computer programs for small scale usage.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Recall syntax and semantics of various programming constructs.	K1
CO2	Illustrate the process of structuring data using lists, tuples, and dictionaries	K2
CO3	Identify appropriate programming structure for a real time applications	K3
CO4	Apply file concepts in various aspects	K4
CO5	Infer the object oriented concepts in python	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	27	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	2.90	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XXII PRACTICAL : VII	24ITU21	PROGRAMMING IN PYTHON - PRACTICAL	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
III	VI	40	60	100

PREAMBLE :

The course offers the understanding of basic principles in python and skills to create computer programs for small scale usage.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Demonstrate the various programming constructs.	K1,K2,K3,K4,K5
CO2	Illustrate the process of structuring data using lists, tuples, and dictionaries	
CO3	Identify appropriate programming structure for a real time applications	
CO4	Apply file concepts in various aspects	
CO5	Infer the object oriented concepts in python	

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	27	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	2.90	3.31	3.19

**Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs**

PRACTICAL LIST

1. Write a program to find prime numbers between 1 to n.
2. Construct a program to print the decimal equivalents of $1/2$, $1/3$, $1/4$,..... $1/n$.
3. Design a program to check given number is Armstrong or not.
4. Simulate a basic calculator using various arithmetic operators.
5. Compute GCD and LCM of two numbers using functions.
6. Develop a program to accept a line of text and find the number of characters, number of vowels and number of blank spaces in it.
7. Demonstrate various List operations.
8. Write a program to create a List and split it into two lists for odd and even numbers.
9. Design a program to create a tuple and perform various slicing operations.
10. Build a program to display the file contents and copy the file contents from one file to another.
11. Develop a program to create a dictionary, add a key-value pair, change and retrieve the values based on the key.
12. Develop a program to implement class and object concepts.

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XXIII	24ITU22	SOFTWARE TESTING	72	5

Contact hours per week: 6

Year	Semester	Internal Marks	External Marks	Total Marks
III	VI	25	75	100

PREAMBLE :

To learn about the software testing concepts.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Recall the basics concepts of software testing	K1
CO2	Explain the different software testing methods	K2
CO3	Develop various testing levels for different domains	K3
CO4	Classify various testing techniques that can be used for software testing	K4
CO5	Decide test plans for real time applications	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	3	3	3
CO4	9	9	9	9	3	3	3
CO5	9	9	9	9	1	3	1
Total Contribution of COs to POs	45	45	45	45	25	27	25
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	2.68	1.98	1.77

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs

COURSE CONTENT

UNIT- I **Life Cycle Models** **(12 Hours)**
Software Development Life Cycle Models: Requirements Gathering and Analysis - Quality, Quality Assurance, and Quality Control- Testing, Verification, and Validation. White Box Testing: What is White Box Testing? - Static Testing - Static Testing by Humans - Static Analysis Tools - Structural Testing - Unit/Code Functional Testing - Code Coverage Testing - Code Complexity Testing - Challenges in White Box Testing.

UNIT- II **Black Box Testing** **(15 Hours)**
What is Black Box Testing? -Why Black Box Testing?- When to do Black Box Testing? -How to do Black Box Testing? - Requirements Based Testing - Positive and Negative Testing - Boundary Value Analysis - Decision Tables - Equivalence Partitioning - State Based or Graph Based Testing - Compatibility Testing - User Documentation Testing - Domain Testing.

UNIT -III **Integration Testing** **(15 Hours)**
What is Integration Testing? - Integration Testing as a Type of Testing - Integration Testing as a Phase of Testing - Scenario - Defect Bash.

UNIT- IV **System and Acceptance Testing** **(15 Hours)**
System Testing: Why is System Testing Done?- Functional System Testing- Non-Functional Testing- Acceptance Testing:Acceptance Criteria-Selecting Test Cases for Acceptance Testing- Executing Acceptance Tests.

UNIT -V **Performance Testing and Regression Testing** **(15 Hours)**
Performance Testing : Introduction Factors Governing Performance Testing Methodology for Performance Testing -Collecting Requirements - Writing Test Cases - Automating Performance Test Cases - Executing Performance Test Cases - Analyzing the Performance Test Results - Performance Tuning - Performance Benchmarking - Capacity Planning -Tools for Performance - Testing Process for Performance Testing. Regression Testing: What is Regression Testing? - Types of Regression Testing - When to do Regression Testing?- Best Practices in Regression Testing.

TEXT BOOK:

1. Srinivasan Desikan, Gopalaswamy Ramesh “Software Testing Principles and Practices” Pearson Education

REFERENCE BOOKS:

1. B. Beizer, “Software Testing Techniques”, II Edn., DreamTech India, New Delhi, 2003.
2. K.V.K. Prasad , “Software Testing Tools”, DreamTech. India, New Delhi, 2005.

WEB REFERENCES:

1. <https://www.geeksforgeeks.org/types-software-testing/>
2. <https://www.ibm.com/in-en/topics/software-testing>
3. <https://www.guru99.com/software-testing-introduction-importance.html>

UNIT- II Basic Electronics for IoT & Arduino IDE (12 Hours)

Basic electronic components and power elements: Electric Charge, Resistance, Current and Voltage – Resistors, Capacitors, Diodes, LED, Potentiometer, circuit boards - Analog and digital circuits – Microcontrollers – Electronic Signals – A/D and D/A Conversion – Pulse Width Modulation Arduino IDE: Installation and Set-up - Programming Fundamentals with C using Arduino IDE Program Structure in C - Basic Syntax - Data Types / Variables / Constants - Operators, Conditional Statements and Loops - Using Arduino C Library functions.

UNIT- III Arduino Microcontroller and sensors (12 Hours)

Working with Arduino: LED and Switch - Data acquisition with IOT Devices - Understanding the Inputs from Sensors - Temperature Sensors – Ultrasonic Sensor - Humidity sensor - IR Sensor – PIR Sensor - Accelerometer and vibration sensor. Understanding the Outputs through Actuators - Activating LED Lights - Activating Relays - Activating Buzzer - Running DC Motors – Running Stepper Motors and Servo Motors.

UNIT- IV Medical Sensors & Data Communication from IoT devices (12 Hours)

Introduction to Medical Sensors: Body Temperature Sensor - Blood Pressure Sensor – Airflow sensor - Patient position sensor - Pulse and oxygen in blood sensor (SPO2) - Galvanic skin response sensor. Using Communication Devices to transfer data from IOT Devices - WIFI data transfer – Remote Communication to cloud/external application.

UNIT- V Raspberry Pi (12 Hours)

Introduction to Raspberry Pi - Models - Peripherals - Applications of Raspberry Pi. Setting up Raspberry Pi – NOOBS – GPIO Pin configuration. Programs using Raspberry Pi: LED interfacing – Buzzer interfacing – Digital sensors interfacing.

TEXT BOOKS:

1. Arshdeep Bahga, Vijay Madiseti, ‘Internet of Things: A Hands-On Approach’, Universities Press, 2015.
- 2 Boris Adryan, Dominik Obermaier, Paul Fremantle, ‘The Technical Foundations of IoT’, Artech Houser Publishers, 2017.
- 3 Michael Margolis, “Arduino Cookbook” 2nd Edition, O'Reilly Media, 2012.
- 4 Marco Schwartz, ‘Internet of Things with ESP8266’, Packt Publishing, 2016.
- 5 Tim Cox, Steven Laurence Fernandes, Raspberry Pi3 Cookbook for Python Programmers, Third Edition, Packt Publishing, 2018.

REFERENCE BOOKS:

1. Charles Platt, “Make Electronics – Learning by discovery”, O'Reilly Media, 2015.
- 2 Michael Miller, “ The Internet of Things”, Pearson India, 2015.

WEB REFERENCES:

1. <https://www.oracle.com/in/internet-of-things/what-is-iot/>
2. <https://www.youtube.com/watch?v=uLbtexcw39Y>
3. <https://www.ibm.com/blogs/internet-of-things/what-is-the-iot/>
4. <https://www.youtube.com/watch?v=h0gWfVCSGQQ>
5. <https://youtu.be/PNsWWHlOJM>

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XXIV ELECTIVE : II	24ITU23B	COMPUTER GRAPHICS: LEVEL-II	60	4

Contact hours per week:5

Year	Semester	Internal Marks	External Marks	Total Marks
III	VI	25	75	100

PREAMBLE :

To learn about graphics algorithms and Blender Tool

COURSE OUTCOME:

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Learn three dimensional concepts	K1
CO2	Understand three dimensional Geometric Transformations	K2
CO3	Examine and appraise the three dimensional viewing	K3
CO4	Apply the concepts in Blender Tool	K4
CO5	Implement the different models using Blender Tool	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyse; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	2.90	3.31	3.19

**Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.**

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XXIV ELECTIVE : II	24ITU23C	NETWORK SECURITY & CRYPTOGRAPHY	60	4

Contact hours per week:5

Year	Semester	Internal Marks	External Marks	Total Marks
III	VI	25	75	100

PREAMBLE :

To provide grounding in basic and advanced techniques in network security and its effective algorithms.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Define the concepts of Symmetric Encryption	K1
CO2	Illustrate various public key cryptographic techniques	K2
CO3	Classify Secure Socket Layer	K3
CO4	Examine authentication applications	K4
CO5	Sketch IP Security and web Security	K5

K1 – Remember;K2 – Understand;K3 – Apply; K4 – Analyze; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	2.90	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs. As per UGC Notification

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XXIV ELECTIVE : II	24ITU23D	INFORMATICS	60	4

Contact hours per week:5

Year	Semester	Internal Marks	External Marks	Total Marks
III	VI	25	75	100

PREAMBLE :

To understand the basics of Informatics.

COURSE OUTCOME :

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Recall the Basics of Informatics	K1
CO2	Demonstrate strong understanding of security and Ethics issues related to informatics.	K2
CO3	Apply technology informatics skills to solve specific industry data and information management problems, with a focus on usability and designing for users.	K3
CO4	Ideate informatics products and services.	K4
CO5	Conduct informatics Analysis and visualization applied to different real-world fields.	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyse; K5 – Evaluate.

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	2.90	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;

9- High correlation between COs and POs. As per UGC Notification

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XXV ELECTIVE : II	24ITU24A	ARTIFICIAL INTELLIGENCE	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
III	VI	25	75	100

PREAMBLE :

To learn about the concepts of Artificial Intelligence (AI) and its applicability in Industry 4.0

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Outline the basic AI problems, techniques and knowledge representation issues	K1
CO2	Explain the AI problem designs and issues, heuristic techniques and knowledge representation methods	K2
CO3	Apply AI techniques in Industry 4.0	K3
CO4	Analyze AI problems using various search techniques	K4
CO5	Assess procedural and declarative knowledge representation methods	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	2.90	3.31	3.19

**Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs**

COURSE CONTENT

UNIT- I Introduction – Problems and Search (12 Hours)

What is Artificial Intelligence? The AI Problems – The Underlying Assumption – What is an AI Technique? – The Level of the Model – Criteria for Success. Problems, Problems Space and Search – Defining the Problem as a State Search – Production Systems – Problem Characteristics – Production System Characteristics – Issues in the Design of Search Programs.

UNIT- II Heuristic Search Techniques (12 Hours)

Heuristic Search Techniques: Generate and Test – Hill Climbing – Best First Search. Problem Reduction – Constraint Satisfaction – Means – Ends Analysis.

UNIT- III Knowledge Representation (12 Hours)

Knowledge Representation Issues: Representations and Mappings – Approaches to Knowledge Representation – Issues in Knowledge Representation – The Frame Problem. Using Predicate Logic: Representing Simple Facts in Logic – Representing Instance and Isa Relationships – Computable Functions and Predicates – Resolution.

UNIT- IV Representing Knowledge Using Rules (12 Hours)

Representing Knowledge Using Rules: Procedural versus Declarative Knowledge - Logic Programming – Forward versus Backward Reasoning – Matching – Control Knowledge

UNIT- V Statistical Reasoning (12 Hours)

Statistical Reasoning: Probability and Bayes Theorem– Certainty Factors and Rule Based Systems – Bayesian Networks – Dempster-Shafer Theory – Fuzzy Logic. Robotics.

TEXT BOOK:

1. Elaine Rich & Kevin Knight, Artificial Intelligence - Tata McGraw Hill – Second Edition, 1991.

REFERENCE BOOKS:

1. Stuart Russel, Peter Norvig, Artificial Intelligence: A Modern Approach, 3rd Edition
2. David W. Rolston, Principles of Artificial Intelligence & Expert Systems Development – Mc Graw Hill.

WEB REFERENCES:

1. <https://www.geeksforgeeks.org/artificial-intelligence-an-introduction/>
2. <https://www.javatpoint.com/artificial-intelligence-tutorial>
3. <https://www.youtube.com/watch?v=oV74Najm6Nc>

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XXV ELECTIVE : III	24ITU24B	BIG DATA ANALYTICS	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
III	VI	25	75	100

PREAMBLE :

To enable the students to learn the concepts of Big Data Analytics and its tools in Industry 4.0

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Recall the definitions in Big Data and Data Analytics	K1
CO2	Explain NoSQL, Hadoop and Map Reduce Concepts with algorithms	K2
CO3	Apply Data Stream Management, Frequent Itemset Mining in clustering techniques	K3
CO4	Analyze Big Data Challenges, link analysis and Recommendation systems towards Industry 4.0	K4
CO5	evaluate Hadoop architecture and types of Big Data approach	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	2.90	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs.

COURSE CONTENT

UNIT- I Big Data Analytics & Hadoop (12 Hours)

Big Data Analytics: Introduction to Big Data- Big Data Characteristics- Types of Big Data- Traditional Versus Big Data Approach – Technologies Available for Big Data- Infrastructure for Big Data- use of Data Analytics - Big Data Challenges- Desired Properties of a Big Data System- Case study for Big Data Solutions.**Hadoop:** Introduction- What is Hadoop?- Core Hadoop Components- Hadoop Ecosystem- Hive- Physical Architecture- Hadoop Limitations.

UNIT- II NoSQL & MapReduce (12 Hours)

What is NoSQL?: What is NoSQL?- NoSQL Business Drivers- NoSQL Case studies- NoSQL Data Architectural Patterns- Variations of NoSQL Architectural Patterns- using NoSQL to Manage Big Data.**MapReduce:** MapReduce and The New Software stack-MapReduce- Algorithms Using MapReduce.

UNIT- III Finding analogous Items and Mining Data Streams (12 Hours)

Finding Similar Items: Introduction- Nearest Neighbor Search- Applications of Nearest Neighbor Search- Collaborative Filtering as a Similar– Sets Problem- Recommendation Based on User Ratings- Distance Measures.**Mining Data Streams:** Introduction- Data Stream Management Systems- Data stream Mining- Examples of Data Stream Applications- Stream Queries- Issues in Data Stream Query Processing- Sampling in Data Streams- Filtering Streams – counting Distinct Elements in a Stream- Querying on Windows- Counting ones in a Window- Decaying Windows.

UNIT- IV Link Analysis and Frequent Itemset Mining (12 Hours)

Link Analysis: Introduction- History of Search Engines and Spam- PageRank- Efficient Computation of PageRank- Topic- Sensitive PageRank- Link Spam-Hubs and Authorities.**Frequent Itemset Mining:** Introduction- Market-Basket Model- Algorithm for Finding Frequent Itemsets- Handling Larger Datasets in Main Memory- Limited Pass Algorithms- Counting Frequent Items in a Stream.

UNIT- V Clustering Approach and Recommendation Systems (12 Hours)

Clustering Approach: Introduction- Overview of Clustering Techniques- Hierarchical clustering- Partitioning Methods- The CURE Algorithm - Clustering Streams.**Recommendation Systems:** Introduction- A model For Recommendation Systems-Collaborative-Filtering system- Content-Based Recommendations.Features of R language.

TEXT BOOK:

1. RadhaShankarmani and M.Vijayalakshmi, “Big Data Analytics”, 2nd Edition, Wiley.
(Unit I: Chap 1&2, Unit II: Chap 3&4, Unit III: Chap 5&6, Unit IV: Chap 7&8, Unit V: Chap 9&10)

REFERENCE BOOK:

1. VigneshPrajapati, “Big Data Analytics with R and Hadoop”, PACKT publishing open source community experience distilled, Mumbai. 2013.

WEB REFERENCES:

- 1.<https://www.techtarget.com/searchdatamanagement/definition/big-data>
- 2.<https://www.techtarget.com/searchdatamanagement/definition/NoSQL-Not-Only-SQL>
- 3.<https://www.youtube.com/watch?v=nbBJ27XhEyM>
- 4.<https://www.youtube.com/watch?v=fL41WSVDunM>
- 5.<https://www.youtube.com/watch?v=a3It88zzbiA>

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE : XXV ELECTIVE : III	24ITU24C	GREEN COMPUTING	60	4

Contact hours per week: 5

Year	Semester	Internal Marks	External Marks	Total Marks
III	VI	25	75	100

PREAMBLE :

To acquire knowledge to adopt green computing practices to minimize negative impacts on the environment, skill in energy saving practices in their use of hardware, examine technology tools that can reduce paper waste and carbon footprint by user.

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Label the problems concerning with e-waste and its consequences on environment	K1
CO2	Describe the components involved and how effectively we can achieve cost saving without harming environment	K2
CO3	Inspect the procedural aspects towards going green.	K3
CO4	Categorize the means of green compliance	K4
CO5	Specify the certifications necessary for hardware devices	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	2.90	3.31	3.19

**Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and Pos**

COURSE CONTENT

UNIT- I Green Computing Essentials (12 Hours)
Overview and Issues: Introduction - green Computing - Problems – Your Company’s Carbon Footprint – Cost Savings. **Initiatives and Standards:** Global Initiatives – Comparative study on green initiatives of other countries.

UNIT- II Green Computing Tribulations and Optimizations (12 Hours)
Minimizing Power Usage: Power problems - Monitoring power Usage – Reducing Power Usage – Low power Computers – Components. **Cooling:** Cooling Costs – Reducing Cooling Costs – Optimizing air Flow – Adding Cooling – Datacenter Design.

UNIT -III Green Enterprise Transforming (12 Hours)
Changing the Way of Work: Old Behaviour – Steps – Teleworkers and Outsourcing. **Going Paperless:** Paper Problems – Paper and Office – Going Paperless – Intranets – Electronic Data Interchange (EDI).

UNIT- IV Green Computing (12 Hours)
Recycling: Problems – Means of Disposal – Life Cycle – Recycling Companies – Hard Drive Recycling. **Hardware Considerations:** Certification Programs – Energy Star – Servers – Hardware Considerations – Remote Desktop.

UNIT- V Green Accomplishment (12 Hours)
Greening Your Information Systems: Initial Improvement Calculations – Change Business Process – Improve Technology Infrastructure. **Staying Green:** Organizational Check-ups – Equipment Check-ups – Certifications – Helpful Organizations.

TEXT BOOK:

1. Tushar Sambare , Sonali Sambare: Green Computing, Himalaya Publishing House, First Edition 2008.

REFERENCE BOOKS:

1. Carl Speshocky, Empowering Green Initiatives with IT, John Wiley & Sons, 2010.
2. Jason Harris, Green Computing and Green IT- Best Practices on regulations & Industry, Lulu.com, 2008.

WEB REFERENCES:

1. <https://www.himpub.com/documents/Chapter1765.pdf>
2. <https://www.wiley.com/en-us/Empowering+Green+Initiatives+with+IT+%3A+A+Strategy+and+Implementation+Guide-p-x000528886>
3. <https://www.wiley.com/en-be/exportProduct/pdf/9780470550151>
4. <http://docplayer.net/102991987-Green-home-computing-learn-to-woody-leonhard-katherine-murray-making-everything-easier-use-your-computer-to-green-your-lifestyle.html>

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-III	CORE :XXV ELECTIVE : III	24ITU24D	ANDROID APP DEVELOPMENT	60	4

Contact hours per week:5

Year	Semester	Internal Marks	External Marks	Total Marks
III	VI	25	75	100

PREAMBLE :

To learn application development in Android

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Explain the basic concepts of Android Application Development	K1
CO2	Understand the concepts of Application Design	K2
CO3	Explain about Application Creation and Deploy	K3
CO4	Analyze the common API	K4
CO5	Identify the various structure for application	K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	3	9	9
CO2	9	9	9	9	3	9	9
CO3	9	9	9	9	3	9	9
CO4	9	9	9	9	3	9	9
CO5	9	9	9	9	3	9	9
Total Contribution of COs to POs	45	45	45	45	15	45	45
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.89	2.90	3.31	3.19

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation;
9- High correlation between COs and POs

COURSE CONTENT

UNIT – I Introduction to Android (12 Hours)
Why Develop for Android?-Android Development Basics-Hardware Tools-Software Tools-Developing the Android Developer Inside You-Assembling Your Toolkit-Tuning Up Your Hardware-Installing and Configuring Your Support Tools-Installing Android Studio-Installing Java 7-Adding SDK Packages-Navigating the Android SDK-Specifying Android Platforms-Using SDK Tools for Everyday Development

UNIT – II Android Application Design Essentials (12 Hours)
Starting a New Project in Android Studio-Responding to errors- Setting Up an Emulator-Running the Hello Android App-Understanding Project Structure-Creating the Silent Mode Toggle Application-Laying Out the Application-Adding an Image to Your Application- Creating a Launcher Icon for the Application-Previewing the Application in the Visual Designer

UNIT – III Android User Interface Design Essentials (12 Hours)
Understanding Activities and the Activity Life cycle -Creating Your First Activity-Working with the Android Frame work Classes- Installing Your Application-Material Design-Uh Oh!(Responding to Errors)-Thinking Beyond the Application Boundaries-Understanding Resources -Working with Resources-Different Strokes for Different Folks :Using Resource Qualifier Directories

UNIT – IV Testing Android applications (12 Hours)
Working with App Widgets in Android -Working with Intents and Pending Intents- Creating the App Widget-Placing Your Widget on the Home Screen-Creating a Distributable File-Creating a Google Play Developer Profile -Pricing Your Application-Getting Screen Shots for Your Application -Uploading Your Application to the Google Play Store -Watching the Number of Installs Soar

UNIT – V Using Common Android APIs (12 Hours)
Reviewing the Basic Requirements-Creating the Application's Screens-Creating the TaskEditActivity-Creating the TaskEditActivity-Linking the List View to the Edit View-Creating the TaskEditFragment-You Put the Fragment in the Activity and Shake It All Up-Updating the Styles-A Special Bonus-Understanding Options and Context Menus-Creating Your First Menu-Creating a Long Press Action-Creating the User Input Interface-Getting Choosy with Dates and Times-Creating an Alert Dialog-Validating Input

TEXT BOOK:

1. Michael Burton, “Android Application Development for Dummies”, 3rd Edition

REFERENCE BOOKS:

1. Reto Meier, “Professional Android 2 Application Development”, Wiley India Pvt Ltd
2. Mark L Murphy, “Beginning Android”, Wiley India Pvt Ltd
3. Android Application Development All in one for Dummies by Barry Burd, Edition: I

WEB REFERENCES:

1. <https://www.geeksforgeeks.org/android-tutorial/>
2. <https://www.javatpoint.com/android-tutorial>
3. <https://www.tutorialspoint.com/android/index.htm>
4. <https://www.tutlane.com/tutorial/android>
5. <https://www.youtube.com/watch?v=FjrKMcKahY>

Category	Component	Course Code	Course Title	Contact Hours/ Semester	Credit
PART-IV	CORE : XXV ELECTIVE : III	24SEITU03	INTERNET OF THINGS -PRACTICAL	36	2

Contact hours per week: 3

Year	Semester	Internal Marks	External Marks	Total Marks
III	VI	50	-	50

PREAMBLE :

This course gives an overview of the basic concepts of building an IoT system and its application

COURSE OUTCOME:

On the successful completion of the course, students will be able to

COs	CO Statement	Knowledge Level
CO1	Evoke the architecture of Internet of Things (IoT)	K1,K2
CO2	Illustrate various IoT sensors and applications	K2,K3
CO3	Apply design concepts APIs for IoT	K3,K4
CO4	Discuss the development framework of IoT with case studies	K4,K5
CO5	Evaluate cloud applications with IoT	K4,K5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate

CO-PO MAPPING (COURSE ARTICULATION MATRIX)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	9	9
CO2	9	9	9	9	9	9	9
CO3	9	9	9	9	9	9	9
CO4	9	9	9	9	3	3	9
CO5	9	9	9	3	1	3	3
Total Contribution of COs to POs	45	45	45	39	31	33	39
Weighted Percentage of COs Contribution to POs	2.50	2.64	2.66	2.50	3.33	2.42	2.77

Level of correlation: 0 – No correlation; 1 – Low correlation; 3 – Medium correlation; 9- High correlation between COs and POs.

PRACTICAL LIST

1. Controlling the Light Emitting Diode (LED) with a push button
2. Interfacing the RGB LED with the Arduino
3. Controlling the LED blink rate with the potentiometer interfacing with Arduino
4. Detection of the light using photo resistor
5. Interfacing of temperature sensor LM35 with Arduino
6. Interfacing Servo Motor with the Arduino
7. Interfacing of the Active Buzzer with Arduino.
8. Interfacing of the Relay with Arduino
9. Building Intrusion Detection System with Arduino and Ultrasonic Sensor
10. Directional Control of the DC motor using Arduino