KG COLLEGE OF ARTS AND SCIENCE
Autonomous Institution | Affiliated to Bharathiar University
Accredited with A++ Grade by NAAC
ISO 9001:2015 Certified Institution
KGiSL Campus, Saravanampatti, Coimbatore – 641 035

Regulations 2024-25 for Undergraduate Programme

Learning Outcome Based Curriculum Framework - (LOCF) model with Choice Based Credit System (CBCS)

Programme: B.Sc. Information Technology (B.Sc. IT)
Programme Code: BIT

(Applicable for the Students admitted during the Academic Year 2024 - 25 onwards)

Eligibility

The Student should have passed Higher Secondary Examination and wherever the students have not studied mathematics knowledge be imparted through Residential/Bridge Course (As per the eligibility condition given Ref. BU/R/B3-B4/Eligibility Condition/2024/9206 dated 24/05/2024)

Program Learning Outcomes (PLOs)

The successful completion of B.Sc. IT Programme shall enable the students to:

PLO1	Apply the knowledge of mathematics, algorithmic, principles and computing fundamentals in the modeling and design of computer-based systems of varying complexity.
PLO2	Critically analyze, categorizes, formulate and solve the problems that emerges in the field of Computer Science and Data Analytics.
PLO3	Use contemporary techniques, skills and tools necessary for integrated solutions to become a full stack developer.
PLO4	Graduates will recognize the need for self-motivation to engage in lifelong learning to be in par with changing technology.
PLO5	Understand the impact of software solutions in Environmental and societal context and strive for sustainable development. Function effectively with ethical responsibility as an individual or as a team member with positive attitude.

B.Sc. Information Technology
Distribution of Credits and Hours for all the Semesters

Part	Course Category	No. of. Courses	Hours		Credits	Total		Semester
I	Language –I	4	4 X 4	16	4 X 3	12	12	1 – 4
II	Language – II	4	4 X 4	16	4 X 3	12	12	1 – 4
III	Core Theory (6 hrs. /Week)	4	4 X 6	24	4 X 4	16	100	3 , 6
	Core Theory (5 hrs. /Week)	9	9 X 5	45	9 X 4	36		1 – 5
	Core Lab (5 hrs. /Week)	3	3 X 5	15	3 X 3	9		5 & 6
	Core Lab (4 hrs. /Week)	4	4 X 4	16	4 X 2	8		1 – 4
	Allied	4	4 X 4	16	4 X 3	12		1 - 4
	Electives	2	2 X 5	10	2 X 3	6		5 & 6
	Project	1	1 X 6	6	1 X 5	5		6
	Internship (IT)	1	-	-	1 X 2	2		5
	Skill Enhancement (SEC)	3	3 X 2	6	3 X 2	6		3, 4, 6
IV	Foundation Course (FC)	2	2 X 2	4	3 X 2	6	14	1 - 2
	Foundation Course (FC)	1	-	-	1 X 2	2		3
	Ability Enhancement Compulsory Course (AECC)	3	3 X 2	6	3 X 2	6		1, 2, 4
	Ability Enhancement Compulsory Course (AECC) – Online Course – MOOC	1	-	-	1 X 2	2		3
V	Liberal Arts – (Extra-curricular & Co-curricular)	-	-	-	2	2	2	4
Total		**46**		**180**		**140**	**140**	

Consolidated Semester wise and Component wise Hours and Credits Distribution

Semester	Part I		Part II		Part III		Part IV		Part V		Total	
	Hrs.	Credits	Hrs.	Credits	Hrs.	Credits	Hrs.	Credits	Hrs.	Credits	**Hrs.**	**Credits**
1	4	3	4	3	18	13	4	4	-	-	**30**	**23**
2	4	3	4	3	18	13	4	4	-	-	**30**	**23**
3	4	3	4	3	22	15	-	4	-	-	**30**	**25**
4	4	3	4	3	20	15	2	2	-	2	**30**	**25**
5	-	-	-	-	30	23	-	-	-	-	**30**	**23**
6	-	-	-	-	30	21	-	-	-	-	**30**	**21**
Total	**16**	**12**	**16**	**12**	**138**	**100**	**10**	**14**	**-**	**2**	**180**	**140**

Curriculum

B.Sc. Information Technology

Semester – 1									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours/ Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
24TAM11L	I	Language – I	Tamil – I	4	3	25	75	100	3
24HIN11L	I		Hindi – I						
24MAL11L	I		Malayalam – I						
24FRE11L	I		French – I						
24ENG12L	II	Language – II	English – I	4	3	25	75	100	3
24BIT13C	III	Core - I	Python Programming	5	3	25	75	100	4
24BIT14P	III	Core Lab – I	**Lab:** Python Programming	4	3	40	60	100	2
24BIT15C	III	Core - II	Digital Fundamental Architecture & Microprocessor	5	3	25	75	100	4
24BIT16A	III	Allied – I	Numerical Methods	4	3	25	75	100	3
24ENV1FC	IV	FC – I	Environmental Studies	2	2	50	-	50	2
24QUA1AE	IV	AECC – I	Quantitative Aptitude	2	2	-	50	50	2
Total				**30**				**700**	**23**

Semester – 2									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours/ Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
24TAM21L	I	Language - I	Tamil – II	4	3	25	75	100	3
24HIN21L	I		Hindi – II						
24MAL21L	I		Malayalam – II						
24FRE21L	I		French – II						
24ENG22L	II	Language – II	English – II	4	3	25	75	100	3
24BIT23C	III	Core - III	Java Programming	5	3	25	75	100	4
24BIT24P	III	Core Lab - II	**Lab :** Java Programming	4	3	40	60	100	2
24BIT25C	III	Core - IV	Operating Systems	5	3	25	75	100	4
24BIT26A	III	Allied – II	Discrete Mathematics	4	3	25	75	100	3
24HUM2FC	IV	FC – II	Human Rights	2	2	50	-	50	2
24SOF2AE	IV	AECC – II	Soft Skills	2	2	-	50	50	2

Semester – 3									
Course Code	Part	Course Category	Course Name	Hours/ Week	Examination				Credits
					Duration in Hours	Max Marks			
						CIA	ESE	Total	
24TAM31L	I	Language - I	Tamil – III	4	3	25	75	100	3
24HIN31L	I		Hindi – III						
24MAL31L	I		Malayalam – III						
24FRE31L	I		French – III						
24ENG32L	II	Language - II	English – III	4	3	25	75	100	3
24BIT33C	III	Core - V	Data Structures & Algorithms	6	3	25	75	100	4
24BIT34P	III	Core Lab - III	**Lab:** Data Structures & Algorithms	4	3	40	60	100	2
24BIT35C	III	Core - VI	Web Application Development	6	3	25	75	100	4
24BIT36A	III	Allied – III	Internet of Things	4	3	25	75	100	3
24BIT37P	III	SEC – I	**Lab:** Interactive JavaScript Programming	2	3	40	60	100	2
24BAT3FC/	IV	FC – III	Basic Tamil /	-	2	50	-	50	2
24ADT3FC/			Advanced Tamil/						
24IKS3FC			Indian Knowledge Systems(IKS)*						
24MOO3AE	IV	AECC – III	Online Course – MOOC	-	-	50	-	50	2
Total				**30**				**800**	**25**

Semester 1

Part – I : Language I

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours / Week	Credits
24TAM11L	Tamil - I	Language - I	4	3

Course Objectives

The course intends to cover

- இலக்கிய வளர்ச்சியை அறிந்துகொள்ளுதல்
- இலக்கியம் படைக்கும் திறன்
- இலக்கிய இலக்கண உரைசெய்தல்
- திறனாய்வு முறையினைக் கற்றுத்தேர்தல்

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	புதுக்கவிதையின் மூலம் வாழ்வியல் விழுமியங்களை உணர்ந்து கொள்ளுதல்.	K1, K2
CLO2	சிறந்த மற்றும் வாழும் கவிஞர்களை அறிந்துகொள்ளுதல்.	K2, K3
CLO3	சிறந்த படைப்பாளர்களின் சிறுகதையில் வெளிப்படும் சமூகச்சிந்தனைகளை அறிந்து விழிப்புணர்வைப் பெறுதல்.	K3
CLO4	தற்கால இலக்கியங்களான புதுக்கவிதை, சிறுகதை தோன்றி வளர்ந்த பின்புலத்தை அறிதல்.	K1, K3
CLO5	மொழியைப் பிழையின்றி பேச, எழுத, கற்கத் தேவையான தமிழ் இலக்கணத்தின் இன்றியமையாமையை உணர்தல். நடைமுறை வாழ்வியலுக்குத் தேவைப்படும் ஆங்கிலக் கடிதத்தைத் தமிழாக்கம் செய்தலுக்கான பயிற்சி பெறுதல்.	K2, K3
K1 - Remember; **K2** - Understand; **K3** – Apply		

Part – I: Tamil – I

Unit	Content	No. of Hours
I	**(நாட்டுப்பற்று)** 1. உலகத்தை நோக்கி வினவுதல் - பாரதியார் 2. பாரதிதாசன் கவிதைகள் - பாரதிதாசன் • தமிழ்ப்பேறு 3. ஒற்றுமையே உயிர்நிலை - கவிமணி 4. தேவதேவன் கவிதைகள் - தேவதேவன் • சாலையும் மரங்களும் செருப்பும் • புதிய வீடு 5. ஆலாபனை - கவிக்கோ அப்துல் ரகுமான் • போட்டி • பாதை 6. புத்தகச் சந்தை - கவிஞர் வாலி	14
II	**(சமூகம்)** 1. எட்டாவது சீர்..... - ஈரோடு தமிழன்பன் 2. தொலைந்து போனேன் - கவிஞர் தாமரை 3. திருநங்கைகள் காகிதப் பூக்கள் - நா. காமராசன் 4. மரங்களைப் பாடுவேன் - வைரமுத்து 5. புள்ளிப் பூக்கள் (ஹைக்கூ) - அமுத பாரதி 6. நாட்டுப்புறப் பாடல்கள் • தாலாட்டுப் பாடல், தெம்மாங்கு பாடல், உழவுத்தொழில்	14
III	**(சிறுகதை)** 1. அகல்யை - புதுமைப்பித்தன் 2. சுமைதாங்கி - ஜெயகாந்தன் 3. அம்மா ஒரு கொலை செய்தாள் - அம்பை 4. சோற்றுக் கணக்கு - ஜெயமோகன் 5. தூரத்து உறவு - வைரமுத்து	12

Unit	Content	No. of Hours
IV	**(இலக்கிய வரலாறு)** 1. மரபுக்கவிதையின் தோற்றமும் வளர்ச்சியும் 2. புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும் 3. ஹைக்கூ கவிதையின் தோற்றமும் வளர்ச்சியும் 4. சிறுகதையின் தோற்றமும் வளர்ச்சியும்	10
V	**(இலக்கணம்)** 1. எழுத்துக்கள் (முதல் எழுத்துக்கள், சார்பெழுத்துக்கள்) 2. எழுத்துக்களின் பிறப்பு 3. மாத்திரைகள் 4. பயிற்சிக்குரியன - மொழிப்பெயர்ப்பு (ஆங்கிலத்திலிருந்து தமிழுக்கு மொழிப்பெயர்த்தல்)	10
	Total Hours	**60**

Reference Books	
1	பாரதி பாடல்கள் ஆய்வுப் பதிப்பு, பேரா. ம ரா போ குருசாமி,(2016) தமிழ்ப் பல்கலைக் கழகம், தஞ்சாவூர்
2	ஆலாபனை, அப்துல் ரகுமான்,(2000) கவிக்கோ பதிப்பகம்
3	தாமரை கவிதைகள், தாமரை, (2012) நியூ செஞ்சுரி புக் ஹவுஸ்
4	தமிழ் இலக்கிய வரலாறு, மு வரதராசனார், (2021) சாகித்திய அகாதெமி பதிப்பு
5	புதிய வெளிச்சத்தில் தமிழ் இலக்கிய வரலாறு, முனைவர் க பஞ்சாங்கம், (2017) அன்னம் வெளியீட்டு
6	தமிழ் இலக்கிய வரலாறு, முனைவர் கா கோ வேங்கடராமன்,(2008) கலையக வெளியீடு
7	நல்ல தமிழ் எழுத வேண்டுமா?, அ கி பரந்தாமனார் எம். ஏ., (2002)அல்லி நிலையம்
8	100 சிறந்த சிறுகதைகள் (தொகுதி 1 & 2) தொகுப்பு: எஸ் ராமகிருஷ்ணன் (2006) பதிப்பகம்: தேசாந்திரி பதிப்பகம்
9	தமிழ் இலக்கணம் எளிய அறிமுகம் , கோ குமரன் (2010) சந்தியா பதிப்பகம்
10	நாட்டுப்புற இயல் ஆய்வு, சு சக்திவேல்,(2012) மணிவாசகர் பதிப்பகம்

Part – II : Language II - English -I

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours / Week	Credits
24ENG12L	English - I	Language - II	4	3

Course Objectives

The course intends to cover

- Various genres of literature.
- Active and passive vocabulary.
- Usage of Grammar and Communication.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Identify aesthetic sense and appreciate poetry, enhancing creativity and understanding relevant to professional environments.	K1
CLO2	Understand diverse styles of prose, facilitating versatility in writing and inculcating interpersonal skills.	K2
CLO3	Apply the characters and the narrative techniques in creative writing and content creation ethically.	K3
CLO4	Employ vocabulary and grammatical proficiency in communication to enhance clarity in workplace interactions.	K3
CLO5	Enhance overall communication competence. Practicing these skills in combination reinforces learning and provides students with opportunities to use the language in authentic contexts.	K3
K1 - Remember; **K2** - Understand; **K3** - Apply		

Part - II: English - I

Unit	Content	No. of Hours
I	**Poetry** : Nature 1. I Wandered Lonely as a Cloud - William Wordsworth 2. The Sparrow - Paul Laurence Dunbar 3. Stopping by woods on a snowy Evening – Robert Frost	12
II	**Prose** : Friendship 1. The Man in Black - Oliver Goldsmith 2. Of Friendship - Francis Bacon 3. The Blessing of Friends - Sir John Lubbock	12
III	**Short Stories:** Morality 1. The Necklace – Guy de Maupassant 2. The Lottery - Shirley Jackson 3. The Monkey's Paw - W. W. Jacobs	12
IV	**Language Competency:** Vocabulary 1. Vocabulary : Synonyms, Antonyms, Word Formation 2. Appropriate use of Articles and Parts of Speech 3. Error correction	12
V	**English for Communication** 1. Listening for General and Specific Information. 2. Self - Introduction, Introducing others, Greetings. 3. Reading a prose passage, Reading a poem and Reading a short story 4. Descriptive writing – writing a short descriptive essay of two to three paragraphs.	12
	Total Hours	**60**

Text Books	
1.	Zama, M. (2004). Poetry Down the Ages. Orient Blackswan.
2.	Goldsmith, O. (1869). The Works of Oliver Goldsmith. J. Dicks
3.	Bacon, F., & Montagu, B. (1857). The Works of Francis Bacon (Vol. 1). Parry & McMillan.
Reference Books	
1.	Kumar,V. T. Bhavani, Durga.K. Srinivas.YL. (2018). English in use - A textbook for College Students. (English, Paperback).
2.	Swan, M. (2005). Practical english usage (Vol. 7). Oxford: Oxford university press.
Web Resources (Swayam / NPTEL)	
1.	https://nptel.ac.in/courses/109105205

Course Code	Course Name	Category	Hours/ Week	Credits
24BIT13C	Python Programming	Core -I	5	4

Course Objectives

This Course intends to cover:

- Core syntax and semantics of Python programming language.
- Process of structuring the data using lists, dictionaries, tuples and sets

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Remember the fundamentals of solving problems with computers and execute simple Python programs.	K1
CLO2	Learn the Basic Programming constructs in Python.	K2
CLO3	Understand the basic functions in Python Programming.	K2
CLO4	Apply Software Objects and databases in Python.	K3
CLO5	Apply OOPs concepts in Python programs.	K3
K1- Remember; **K2** - Understand; **K3** – Apply		

CLO – PLO Mapping

CLOs/PLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3	1	1	1
CLO2	2	3	2	1	1
CLO3	3	2	3	1	1
CLO4	2	3	1	2	1
CLO5	2	3	1	1	1
3 - Substantial (high)		**2** - Moderate (medium)		**1** - Slight (low)	

Core - I: Python Programming

Unit	Content	No. of Hours
I	**Introduction:** The essence of computational problem solving – Limits of computational problem solving-Computer Algorithms-Computer Hardware-Computer Software-The process of computational problem solving-Python programming language - Literals - Variables and Identifiers - Operators - Expressions and Data types, Input / Output	15
II	**Control Structures:** Boolean Expressions - Selection Control - If Statement-Indentation in Python- Multi-Way Selection - Iterative Control- While Statement-Infinite loops- Definite vs. Indefinite Loops- Boolean Flag. String, List, Tuple and Dictionary, Manipulations Building blocks of python programs, Understanding and using ranges-slicing.	15
III	**Functions:** Program Routines- Defining Functions- More on Functions: Calling Value-Returning Functions- Calling Non-Value-Returning Functions- Parameter Passing - Keyword Arguments in Python - Default Arguments in Python-Variable Scope. Recursion: Recursive Functions	15
IV	**Objects and their use**: Software Objects - Turtle Graphics – Turtle attributes-Modular Design: Modules - Top-Down Design - Python Modules - Text Files: Opening, reading and writing text files – Database Programming: Connecting to a database, Creating Tables, INSERT, UPDATE, DELETE and READ operations, Transaction Control, Disconnecting from a database, String Processing - Exception Handling	15
V	**Dictionaries and Sets:** Dictionary type in Python - Set Data type. Object Oriented Programming using Python: Encapsulation - Inheritance – Polymorphism. Python packages: Simple programs using the built-in functions of packages matplotlib, numpy, pandas etc.	15
	Total Hours	**75**
Text Books		
1.	Charles Dierbach (2022), Introduction to Computer Science using Python - A Computational Problem-solving Focus, Wiley India Edition. (Unit- I, II, III, IV)	
2	Wesley J. Chun (2016), Core Python Applications Programming, 3rd Edition , Pearson Education. (Unit - V)	
Reference Books		
1.	Mark Lutz (2018), Learning Python Powerful Object Oriented Programming, O'reilly Media, 5th Edition.	
2.	Timothy A. Budd (2011), Exploring Python, Tata MCGraw Hill Education Private Limited, 1st Edition.	
3.	John Zelle (2013), Python Programming: An Introduction to Computer Science, 2nd Edition, Course Technology Cengage Learning Publications, ISBN 978- 1590282410	
Web Resources (Swayam / NPTEL)		
1.	https://onlinecourses.swayam2.ac.in/cec24_cs01/course	
2.	https://onlinecourses.nptel.ac.in/noc24_cs57/preview	

Course Code	Course Name	Category	Hours / Week	Credits
24BIT14P	Lab: Python Programming	Core Lab - I	4	2

S. No.	List of Programs
1	Sample programs using Lists, Tuples and Dictionaries.
2	Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
3	Program, to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4	Write a Python script that prints prime numbers less than 20.
5	Program to find factorial of the given number using recursive function.
6	Write a Python program to count the number of even and odd numbers from array of N numbers.
7	Write a Python class to reverse a string word by word.
8	Given a tuple and a list as input, write a program to count the occurrences of all items of the list in the tuple. (Input : tuple = ('a', 'a', 'c', 'b', 'd'), list = ['a', 'b'], Output: 3)
9	Create a Savings Account class that behaves just like a Bank Account, but also has an interest rate and a method that increases the balance by the appropriate amount of interest (Hint: use Inheritance).
10	Write a Python program to construct the following pattern, using a nested loop * ** *** **** ***** **** *** ** *
11	Read a file content and copy only the contents at odd lines into a new file.
12	Create a Turtle graphics window with specific size.
13	Write a Python program for Towers of Hanoi using recursion
14	Create a menu driven Python program with a dictionary for words and their meanings.
15	Devise a Python program to implement the Hangman Game.

S. No.	List of Programs	
16	Program to create student database and calculate total marks, percentage and grade of a student. Marks obtained in each of the five subjects are to be input by user. Assign grades according to the following criteria: Grade A: Percentage >=80 Grade B: Percentage >=70 and 80 Grade C: Percentage >=60 and <70 Grade D: Percentage >=40 and <60 Grade E: Percentage < 40	
	Total Hours	**60**
Text Books		
1.	Charles Dierbach (2022), Introduction to Computer Science using Python - A Computational Problem-Solving Focus, Wiley India Edition	
2.	Wesley J. Chun (2016), Core Python Applications Programming, 3rd Edition, Pearson Education	
Reference Books		
1.	Mark Lutz (2018), Learning Python Powerful Object-Oriented Programming, O'reilly Media, 5th Edition.	
2.	Timothy A. Budd (2011), Exploring Python, Tata MCGraw Hill Education Private Limited, 1st Edition.	
3.	John Zelle (2013), Python Programming: An Introduction to Computer Science, 2nd Edition, Course Technology Cengage Learning Publications, ISBN 978- 1590282410	
Web Resources (SWAYAM / NPTEL Courses)		
1.	https://onlinecourses.swayam2.ac.in/cec24_cs01/course	
2.	https://onlinecourses.nptel.ac.in/noc24_cs57/preview	

Course Code	Course Name	Category	Hours / Week	Credits
24BIT15C	Digital Fundamental Architecture & Microprocessor	Core - II	5	4

Course Objectives

This Course intends to cover:

- Different Number System, Digital Arithmetic and Logic Circuits.
- Various types of Microprocessor Architecture.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Understand the basics of digital systems and computing	K1, K2
CLO2	Apply the basics in digital circuits	K3
CLO3	Develop the various electronic circuits.	K3
CLO4	Understand the architecture and functionalities of Integrated Circuits.	K2
CLO5	Demonstrate an application or a working environment with Integrated Circuits and its Peripherals.	K2
K1 - Remember; **K2** - Understand; **K3** - Apply.		

CLO-PLO Mapping

CLOs/PLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	1	2	2
CLO2	3	3	1	2	1
CLO3	3	2	2	1	1
CLO4	2	2	2	2	1
CLO5	3	2	3	2	2
3 - Substantial (high)		**2** - Moderate (medium)		**1** - Slight (low)	

Core – II: Digital Fundamental Architecture and Microprocessor

Unit	Content	No. of Hours
I	**Number Systems and Logic Gates:** Number systems - Binary, Octal, Decimal, Hexadecimal Number - Binary Arithmetic, Subtraction, Multiplication - One's and Two's Complements Arithmetic. **Codes:** Grey Code - Error Detecting and Correcting Codes. Logic Gates: AND, OR, NOT, NAND, NOR, and Exclusive-OR operations - Boolean algebra - Basic Laws.	15
II	**Combinational Circuits:** Standard representation for logic functions, K-map representation and simplification of logic functions using K-map, minimization of logical functions- Don't care conditions. Half Adders – Full Adder- Half Subtractors - Full Subtractors – Parallel Binary Adder - 4 Bit Binary Adder/Subtractor - BCD Adder – Multiplexer and Demultiplexer - Priority Encoders and Decoders - Digital comparator.	15
III	**Sequential Circuits:** SR flip flop, Clocked SR Flip Flop – JK Flip Flop – D Flip Flops - T Flip Flop - Applications of Flip Flops. Shift Registers and Its Types - Applications of shift Registers. Ring Counter - Ripple (Asynchronous) counters - Synchronous Counters - Up down Counter – Mod – 3 and Mod - 5 Counter – Decade Counter - Applications of Counters.	15
IV	**8085 Microprocessor:** Introduction – Block Diagram - Pin Diagram - 8085 Architecture, bus organization. Instruction Format – Instruction Set – Addressing Modes. Programming the 8085: Arithmetic and Logical Programs.	15
V	**Parallel and Serial Interfacing:** 8255A Programmable Peripheral Interfacing: Block Diagram, Pin Diagram, Modes of Operation: I/O and BSR. 8085 Interrupts - Architecture of Programmable Interrupt Controller 8259 — Architecture of 8254 Programmable Interval Timer / Counter. Direct Memory Access – 8237 DMA Controller. ADC Interfacing – DAC Interfacing.	15
	Total Hours	**75**
Text Books		
1	Morris Mano (2022), Computer System Architecture, 3rd Edition, Pearson Education.(Unit– I, II, III)	
2	Salivahanan S, Arivazhagan (2012), Digital Circuits and Design, 3rd Edition, McGraw Hill Education.	
3	Ramesh Gaonkar (2019), Microprocessor Architecture, Programming and Application with the 808, 6th Edition, Pearson International Publishing. (Unit - IV, V)	
Reference Books		
1	V K Puri (2017), Digital Electronics: Circuits and Systems, McGraw Hill Education.	
2	Badri Ram (2012) Advanced Microprocessor and Interfacing, McGraw Hill Education.	
Web Resources (Swayam / NPTEL Courses)		
1	https://onlinecourses.swayam2.ac.in/cec24_cs09/preview	
2	https://onlinecourses.nptel.ac.in/noc24_ee46/preview	

Part – III : Allied Courses

(B.Sc. Computer Science / BCA / B.Sc. Information Technology / B.Sc. Computer Technology)

Course Code	Course Name	Category	Hours / Week	Credits
24BCS16A / 24BCA16A / 24BIT16A/ 24BCT16A	**Numerical Methods**	**Allied – I**	**4**	**3**

Course Objectives

The course intends to cover

- The ability to use algorithms for approximation problems.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Obtain numerical solutions of algebraic and transcendental equations.	K1
CLO2	Determine the numerical solutions of simultaneous linear equations using different methods	K2
CLO3	Compute the numerical solutions of differentiation of functions	K2
CLO4	Evaluate the definite integrals using numerical methods	K3
CLO5	Distinguish methods of Taylor series, Euler's, Modified Euler's and Runge Kutta methods to find solutions of differential equations.	K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze;		

CLO – PLO Mapping

CLOs/PLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	2	2	1	2
CLO2	2	2	2	1	2
CLO3	2	2	2	1	2
CLO4	2	2	2	1	2
CLO5	1	2	2	2	1
3 - Substantial (high)		**2** - Moderate (medium)		**1** - Slight (low)	

Allied – I : Numerical Methods

Unit	Content	No. of Hours
I	**The Solution of Numerical Algebraic and Transcendental Equations:** Bisection method – Iteration Method – Convergence condition – Regula Falsi Method – Newton – Raphson method - Convergence Criteria – Order of Convergence.	12
II	**Solution of Simultaneous Linear Algebraic Equations:** Gauss elimination method – Gauss Jordan method– Gauss Jacobi method – Gauss Seidel method.	12
III	**Numerical Differentiation:** Newton's forward Difference – Newton's Backward Difference – Derivative using Stirling's formula.	12
IV	**Numerical Integration:** Newton – Cote's formula – Trapezoidal rule – Simpson's $1/3^{rd}$ and $3/8^{th}$ rules.	12
V	**Numerical Solution of Ordinary Differential Equation:** Taylor series method – Euler's method –Modified Euler's method – Runge Kutta method (Second &fourth order Runge Kutta method only).	12
	Total Hours	**60**
Text Book		
1.	P. Kandasamy, K.Thilagavathy & K. Gunavathy (2007). Numerical methods, S. Chand and Company Ltd, New Delhi. Unit I : Chapter 3 : Section 3.1 – 3.4 Unit II : Chapter 4 : Section 4.1, 4.2, 4.8, 4.9 Unit III: Chapter 9 : Section 9.1 – 9.4 Unit IV: Chapter 9 : Section 9.7 – 9.9, 9.13, 9.14 Unit V: Chapter 11 : Section 11.5, 11.6, 11.9, 11.11- 11.13	
Reference Books		
1.	M.K. Venkataraman(1999). Numerical Methods in Science and Engineering, National Publishing company.	
2.	K. Sankara Rao(2018), Numerical Methods for Scientists and Engineers, Prentice Hall India	
3.	S.S. Sastry (2006). Introductory Methods of Numerical Analysis (4^{th} ed.), Prentice Hall of India Pvt. Ltd.,	
Web Resources (Swayam / NPTEL)		
1.	https://archive.nptel.ac.in/courses/111/107/111107105/	

Components for Internal Assessment and

Distribution of Marks for CIA and ESE (Theory)

Max Marks	Marks for		Components for CIA									
	CIA	ESE	CIA – I		CIA – II		Best of CIA-I & CIA-II	Model		Attendance	Active Engagement	Total
100	25	75	Actual	Weightage	Actual	Weightage	Weightage	Actual	Weightage	5	5	25
			50	5	50	5	5	75	10			

Question Paper Pattern

Component	Duration in Hrs.	Section A			Section B			Section C			Total
		Type of question	No. of questions	Marks	Type of question	No. of questions	Marks	Type of question	No. of questions	Marks	
CIA – I & II	2	MCQ	8	8x1=8	Either or	3	3x6=18	Either or	3	3x8=24	50
Model Exam / ESE	3	MCQ	10	10x1=10	Either or	5	5x5=25	Either or	5	5x8=40	75

Components for Internal Assessment and Distribution of Marks for CIA (Lab)

Max Marks	Marks for		Components for CIA							
	CIA	ESE	Test – I		Test - II		Model		Observation	Total
100	40	60	Actual	Weightage	Actual	Weightage	Actual	Weightage	5	40
			50	10	50	10	60	15		

Examination Pattern

Component	Duration in Hrs.	No. of experiments	Marks			Weightage
			Practical	Record	Total	
Test – I	1	1	50	-	50	10
Test – II	1	1	50	-	50	10
Model	3	2	60	-	60	15
ESE	3	2	50	10	60	-

Part – IV : Foundation Courses

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours / Week	Credits
24ENV1FC	Environmental Studies	FC- I	2	2

Unit	Content
I	The Multidisciplinary nature of environmental studies Definition; Scope and importance, Need for public awareness.
II	**Natural Resources:** Renewable and non-renewable resources: Natural resources and associated problems. - Forest resources: Use and Over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people. - Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems. - Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. - Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Case studies. - Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.
III	**Ecosystems** - Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem. - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem: - a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Unit	Content
IV	**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 values. - Biodiversity at global, National and local levels. - India as a mega-diversity nation. - Hot-spots of biodiversity. - Threats to biodiversity: habital loss, poaching of wildlife, man-wildlife conflicts. - Endangered and endemic species of India. - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
V	**Environmental Pollution Definition** - Causes, effects and control measures of: - a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards - Solid waste Management: Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.
VI	**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. Case studies. - Environmental ethics: Issues and possible solutions. - Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. - Wasteland reclamation. - Consumerism and waste products. - Environment Protection Act. - Air (Prevention and Control of Pollution) Act. - Water (Prevention and Control of Pollution) Act. - Wildlife Protection Act. - Forest Conservation Act. - Issues involved in enforcement of environmental legislation. - Public awareness.

Unit	Content
VII	**Human Population and the Environment** - Population growth, variation among nations. - Population explosion-Family welfare Programme. - Environment and human health. - Human Rights. - Value Education. - HIV/AIDS. - Women and Child Welfare. - Role of information Technology in Environment and human health. - Case Studies.
VIII	**Field Work (Practical).** - Visit to a local area to document environmental assets-river/forest/grassland/ hill/mountain. - Visit to a local polluted site-Urban/Rural/Industrial/Agricultural. - Study of common plants, insects, birds. - Study of simple ecosystems-pond, river, hill slopes, etc.
	Total Hours. 30

Web Resources	
1.	https://www.ugc.gov.in/oldpdf/modelcurriculum/env.pdf

Components for Internal Assessment and Distribution of Marks for CIA (Theory)

Max Marks	Marks for		Components for CIA							
	CIA	ESE	CIA – I		CIA – II		Best of CIA-I & CIA-II	Model		Total (Best + Model)
50	50	-	Actual	Weightage	Actual	Weightage	Weightage	Actual	Weightage	50
			50	**25**	50	**25**	**25**	50	**25**	

Question Paper Pattern

Duration in Hrs.	Mode of Exam	Type of Questions	No. of Questions	Marks
2	Offline	Open Choice	5 (Out of 8)	5 x 10=50

Part – IV : Ability Enhancement Compulsory Courses

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours	Credits
24QUA1AE	Quantitative Aptitude	AECC - I	2	2

Course Objectives

The course intends to cover

- Basic concepts of numbers, time and work, interests, data representation and graphs
- Concepts of permutation, probability, discounts, percentage & profit loss.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Remember and Understand the concepts of numbers and average	K1, K2
CLO2	Understand about percentage and apply profit & loss related processing.	K2, K3
CLO3	To understand the concepts of time and work and interest calculations.	K2
CLO4	To understand about the concepts of permutation, combination and probability.	K2
CLO5	Understand , Apply and analyze the concept of problem solving involved in graphs and age.	K2,,K3,K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** -Analyze		

Ability Enhancement Compulsory Course - I: Quantitative Aptitude

Unit	Content	No. of Hours
I	Numbers - Simplification - BODMAS rule - Algebraic formulas - Decimal fractions - Square root and cube roots - Surds and indices - Divisibility rules - HCF and LCM - same remainder - different remainder - application problems – average – equation - mistaken value – replacement - including/excluding.	6
II	Percentage - increase/decrease – netchange – salary – election – marks – consumption - population / machine - profit and loss - profit and loss % - finding cp and sp - profit=loss - same product cp and sp with percentage – discount - ratio and proportion - divided into parts - based on numbers - increase/decrease/ income / expenditure – coins – partnership.	6
III	Time-and-work - individual/combined - alternative days - remaining work - efficiency based - amount split - chain rule - group of male and female or boys - pipes and cistern - finding time - efficiency based – alternative - remaining part - capacity of the tank - simple interest - finding principal - rate of interest – amount - time period - doubles or triples - compound interest - finding rate - finding time, principal - doubles or triples - difference between SI and CI.	6
IV	Permutation - finding value - vowels come together - vowel never comes together - some letters come together - no two vowels come together - vowels in odd/even places - based on repetition - circular permutation – application – combination - finding value and application – probability – coins - dice-cards - balls and miscellaneous problems - odd man out and number series.	6
V	Clock - finding angle - reflex angle - gain or loss – calendars - finding particular day - data interpretation - bar chart - line chart - pie chart – table – combined –ages ratio-twice or thrice - addition /subtraction - family based - problems on numbers - equations.	6
	Total Hours	**30**
Text Book		
1.	R.S. Aggarwal , Quantitative Aptitude, S.Chand & Company Ltd.,	
Reference Book		
1.	Ashish Arora, Quantitative Aptitude.	
Web Resources		
1.	https://www.javatpoint.com/aptitude/quantitative	
2.	https://www.indiabix.com/aptitude/questions-and-answers/	

Components for and Distribution of Marks for ESE (Theory)

Ability Enhancement Compulsory Course(AECC)

Duration in Hrs.	Mode of exam	Type of questions	No. of questions	Marks
2	Online	MCQ	50	50x1=50

Semester 2

Course Code	Course Name	Category	Hours/Week	Credits
24TAM21L	Tamil – II	Language - I	4	3

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	அற இலக்கியங்கள் வழி வாழ்வியல் ஒழுக்கங்களைக் கற்றுத் தருதல்.	K1, K2
CLO2	பக்தி இலக்கியங்கள் வழி பக்தி நெறிகளை உணர்த்துதல்.	K2
CLO3	தமிழில் உரைநடை இலக்கியப் படைப்பாளர்களின் சிந்தனைகளை எடுத்துரைத்தல்.	K3
CLO4	தமிழ் இலக்கிய வரலாற்றில் அற இலக்கியம் மற்றும் உரைநடையின் தாக்கம் குறித்து அறிதல்.	K1, K3
CLO5	பிழையின்றி எழுத இலக்கணங்களைக் கற்றுத் தருதல்.	K2, K3
K1 - Remember; **K2** - Understand; **K3** – Apply		

Part – I: Tamil – II

Unit	Content	No. of Hours
I	**(அறம்)** 1. திருக்குறள் • புகழ் • வினை செயல்வகை • நெஞ்சொடு கிளத்தல் 2. திரிகடுகம்(தேர்ந்தெடுக்கப்பட்ட 10 பாடல்கள்) 3. பழமொழி நானூறு(தேர்ந்தெடுக்கப்பட்ட 10 பாடல்கள்)	**14**
II	**(பக்தி)** 1. அபிராமி அந்தாதி(10 பாடல்கள்) - அபிராமி பட்டர் 2. உமர்கயாம் பாடல்கள் (தனிப்பாடல்கள்) - கவிமணி தேசிய விநாயகம் பிள்ளை 3. முத்துக்குமாரசாமி பிள்ளைத்தமிழ்(தாலப் பருவம்) – குமரகுருபரர் 4. இயேசுகாவியம் - மலைப்பொழிவு - கண்ணதாசன் 5. சித்தர் பாடல்கள் - சிவவாக்கியர் பாடல்	**14**
III	**(கலை மற்றும் பண்பாடு)** 1. அறம் எனப்படுவது - அமுதன் 2. ஏட்டில் எழுதா இலக்கியம் - ஔவை துரைச்சாமி 3. கீழடி - தொல்லியல் துறை, வெளியீடு 4. மனம் எனும் சொர்க்கவாசல் - டாக்டர் எம்.எஸ்.உதயமூர்த்தி 5. ஆளுமைத் திறன் - அறிவுக்கதிர் (அரசுப்பணி சிறப்பிதழ்)	**12**
IV	**(இலக்கிய வரலாறு)** 1. பதினெண் கீழ்க்கணக்கு நூல்கள் 2. உரைநடையின் தோற்றமும் வளர்ச்சியும்	**10**
V	**(இலக்கணம்)** 1. சொல்லின் வகைகள் 2. வேற்றுமைத் தொகைகள் 3. பயிற்சிக்குரியன:(விண்ணப்பங்கள், மடல்கள் எழுதச் செய்தல்) 4.	**10**
	Total Hours	**60**

Reference Books	
1	முத்துக்குமாரசாமி பிள்ளைத்தமிழ்,(2021) கமலா முருகன், சாரதா பதிப்பகம்
2	இயேசு காவியம், கவிஞர் கண்ணதாசன்,(2006) கலைக்காவிரி பதிப்பகம்
3	உரைகளும் உரையாசிரியர்களும்,(2013) தி சு நடராசன் நியூ செஞ்சுரி புக் ஹவுஸ்
4	அபிராமி அந்தாதி, முனைவர் சி சேதுராமன்,(2010) நியூ செஞ்சுரி புக் ஹவுஸ்
5	புதிய வெளிச்சத்தில் தமிழ் இலக்கிய வரலாறு, முனைவர் க பஞ்சாங்கம், (2017) அன்னம் வெளியீட்டு
6	தமிழ் இலக்கிய வரலாறு, மு வரதராசனார்,(2021) சாகித்ய அகாடமி பதிப்பு
7	தமிழ் உரைநடை வரலாறு, வி செல்வநாயகம்,(2003) அடையாளம் பதிப்பகம்
8	தமிழ் இலக்கிய வரலாறு, முனைவர் கா கோ வேங்கடராமன்,(2010) கலையக வெளியீடு
9	எண்ணங்கள் - டாக்டர் எம் எஸ் உதயமூர்த்தி,(2016) வெளியீடு: கங்கை புத்தக நிலையம், சென்னை
10	அடோன் தமிழ் இலக்கணம், புலவர் பொன்மணிமாறன்,(2011) அருண் பப்ளிஷிங்

Part – II : English - II

(All the Undergraduate Programmes)

Semester - 2

Course Code	Course Name	Category	Hours/ Week	Credits
24ENG22L	English-II	Language - II	4	3

Course Objectives

The course intends to cover

- The literary elements in poetry.
- The critical contemplation and writing in styles of prose texts.
- The modernist techniques and ethics in the narratives of short stories.
- The interpersonal skills essential in the work environment.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Identify the common techniques underlying free verse and traditional forms of poetry for crafting poems.	K1
CLO2	Understand humour in prose texts psychologically to master the oratory skills.	K2
CLO3	Employ empathy and morale in diplomatic Day-to-day circumstances.	K3
CLO4	Strengthen the writing skills for documentation.	K3
CLO5	Persist flexibility and mobility in the sequel LSRW.	K3
K1 - Remember; **K2** - Understand; **K3** - Apply		

Part - II: English - II

Unit	Content	No. of Hours
I	**Poetry**: Motherhood 1. My Grand Mother's House – Kamala Das 2. Of mother, among others things – A.K Ramanujam 3. Night of the Scorpion – Nissim Ezekiel	12
II	**Prose**: Humour 1. With The Photographer – Stephen Leacock 2. Travel by Train – J.B.Priestley 3. On Forgetting – Robert Lynd	12
III	**Short Stories:** Integrity 1. The taxi driver – K.S. Duggal 2. A Retrieved Reformation- O Henry 3. Kabuliwala - Rabindranath Tagore	12
IV	**Language Competency:**Vocabulary 1. Homonyms, Homophones, Homographs Portmanteau words 2. Verbs and Tenses, Subject Verb Agreement 3. Error correction Vocabulary : Synonyms, Antonyms, Word Formation	12
V	**English for Communication** 1. Listening with courtesy and adding ideas and giving opinions during themeeting and making concluding remarks 2. Participating in a meeting: face to face and online 3. Reading news and weather reports 4. Preparing first drafts of short assignments	12
	Total Hours	**60**

Text Books	
1.	Ezekiel Nissim, 1989 .Collected Poems 1952-1988. Oxford University Press.
2.	Hewings, M. (2000). Advanced English Grammar. Cambridge. University Press.
Reference Books	
1.	Bakshi, S.P. & Sharma, R. (2019). Descriptive English. Arihant Publications (India) Ltd.
2.	Cameron S & Dempsey L. (2019). The Reading Book: A Complete Guide to TeachingReading. S & L. Publishing.
3.	Sherman B. (2014) Skimming and Scanning Techniques. Liberty University Press.
Web Resources (Swayam / NPTEL)	
1.	https://nptel.ac.in/courses/109103020

Course Code	Course Name	Category	Hours /Week	Credits
24BIT23C	Java Programming	Core -III	5	4

Course Objectives

This Course intends to cover:

- Fundamentals of Object-Oriented Programming in Java.
- AWT controls, Event Handling, Swing and Graphical User Interface (GUI) concepts and Spring Boot.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Remember object-oriented features to build simple applications.	K1
CLO2	Understand the concept of Inheritance, Packages, Interfaces and Exception Handling.	K2
CLO3	Apply multithreaded programming and file handling concepts.	K3
CLO4	Understand the fundamental concepts of AWT controls, layouts and events to demonstrate the user-driven interactive applications	K2, K3
CLO5	Develop GUI Applications using Swing in Java, develop simple Application using Spring Boot	K3
K1-Remember; **K2** - Understand; **K3** – Apply		

CLO-PLO Mapping

CLOs/PLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2	1	2	2
CLO2	3	1	2	1	2
CLO3	1	-	2	2	2
CLO4	2	2	2	2	2
CLO5	1	2	-	2	2
3 - Substantial (high)		**2** - Moderate (medium)		**1** - Slight (low)	

Core – III: Java Programming

Unit	Content	No. of Hours
I	**Introduction:** Review of Object-Oriented concepts – History of Java - Java buzzwords - JVM architecture - Datatypes – Variables - Scope and lifetime of variables – arrays – operators – control statements – type conversion and casting – Simple Java program – constructors – methods – Static Block - Static Data – Static Method String and String Buffer Classes.	15
II	**Inheritance:** Basic concepts - Types of inheritance - Member access rules - Usage of this and Super keyword - Method Overloading - Method overriding - Abstract classes - Dynamic method dispatch - Usage of final keyword. Packages: Definition - Access Protection - Importing Packages - Interfaces- Definition – Implementation – Extending. Exception Handling**:** try –catch - throw - throws – finally – Built–in exceptions - Creating own Exception classes.	15
III	**Multithreaded Programming:** Thread Class - Runnable interface - Synchronization – Using synchronized methods – Using synchronized statement - Interthread Communication – Deadlock. I/O Streams: Concepts of streams - Stream classes - Byte and Character stream - Reading console Input and Writing Console output - File Handling.	15
IV	**AWT Controls:** The AWT class hierarchy - user interface components - Labels - Button - Text Components - Check Box - Check Box Group - Choice - List Box - Panels – Scroll Pane - Menu - Scroll Bar. Working with Frame class - Color - Fonts and layout managers - Event Handling - Events – Event sources - Event Listeners - Event Delegation Model (EDM) - Handling Mouse and Keyboard Events - Adapter classes - Inner classes.	15
V	**Swing**: Introduction to Swing - Hierarchy of swing components. Containers-Top level containers - JFrame - JWindow - JDialog - JPanel - JButton – JtoggleButton - JCheckBox - JRadioButton - JLabel, JTextField - JTextArea - JList - JComboBox - JScrollPane. Spring Boot:Fundamentals of Spring Boot-Spring vs Spring Boot-Spring Boot Architecture-Develop Spring Boot Application step by step-Run Spring Boot Application-Creating first Spring Boot application	15
	Total Hours	**75**
Text Books		
1.	Herbert Schildt (2017), The Complete Reference, Tata McGraw Hill, New Delhi, 9th Edition. (Unit – I, II, III, IV, V)	
2.	E.Balagurusamy (2023), Programming with Java, Tata McGraw Hill, New Delhi, 7th Edition.	
3	Ashish Sarin, J. Sharma, (2017), Getting Started with Spring Framework, CreateSpace Independent Publishing Platform.	
Reference Books		
1.	Y.Daniel Liang (2018), Introduction to Java Programming, 10th Edition, Pearson Education India.	
2.	Kathy Sierra, Bert Bates, Trisha Gee (2022), Head First Java. O.Reilly Publications, 3rd Edition.	
Web Resources (Swayam / NPTEL Courses)		
1.	https://onlinecourses.nptel.ac.in/noc20_cs58/preview	
2.	https://onlinecourses.nptel.ac.in/noc24_cs40/preview	

Course Code	Course Name	Category	Hours /Week	Credits
24BIT24P	Lab: Java Programming	Core Lab -II	4	2

S No.	List of Programs
1	Basic Java programs.
2	Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer.
3	Java program to multiply two given matrices.
4	Java program that displays the number of characters, lines, and words in a text.
5	Generate random numbers between two given limits using Random class and print messages according to the range of the value generated.
6	Java program to do String Manipulation using Character Array and perform the following string operations:- a.) String length b.) Finding a character at a particular position c.) Concatenating two strings.
7	Java program to perform the following string operations using String class: a.) String Concatenation b.) Search a substring c.) To extract substring from the given string.
8	Java program to perform string operations using the String Buffer class: a.) Length of a string b.) Reverse a string c.) Delete a substring from the given string
9	Java program that implements a multi-thread application that has three threads. The first thread generates a random integer every 1 second and if the value is even, the second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number.
10	Java threading program that uses the same method asynchronously to print the numbers 1 to 10 using Thread1 and to print 90 to 100 using Thread2.
11	Java Program to demonstrate the use of the following exceptions. a) ArithmeticException b) NumberFormatException c) ArrayIndexOutofBoundException d) NegativeArraySizeException
12	Java program that reads on file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file, and the length of the file in bytes.
13	Java program to accept a text and change its size and font. Include bold italic options. Use frames and controls.
14	Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. (Use adapter classes).

S No.	List of Programs
15	Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, and % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.
16	Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "stop" or "ready" or "go" should appear above the buttons in a selected color. Initially there is no message shown.
	Total Hours **60**
Text Books	
1.	Herbert Schildt (2017), The Complete Reference, Tata McGraw Hill, New Delhi, 9th Edition.
2.	E. Balagurusamy (2023), Programming with Java, Tata McGraw Hill, New Delhi, 7th Edition.
Reference Books	
1.	Cay S. Horstmann (2007), Gary Cornell, Core Java, Volume I– Fundamentals, Prentice Hall, 8th Edition.
2.	Kathy Sierra, Bert Bates, Trisha Gee (2022), Head First Java, (Grayscale Indian Edition) O'Reilly Publications, 3rd Edition.
Web Resources (Swayam / NPTEL Courses)	
1.	https://onlinecourses.nptel.ac.in/noc20_cs58/preview
2.	https://onlinecourses.nptel.ac.in/noc24_cs40/preview

Course Code	Course Name	Category	Hours / Week	Credits
24BIT25C	Operating Systems	Core-IV	5	4

Course Objectives

This Course intends to cover:

- Basic Operating System concepts.
- Process concepts, Deadlock and Memory management.
- Scheduling algorithms, devices and information management.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Define the process concepts and its lifecycle in operating system.	K1
CLO2	Understand the Asynchronous concurrent process and algorithms.	K2
CLO3	Understand the deadlock detection, prevention and recovery using algorithms.	K2
CLO4	Apply the knowledge of job Scheduling Algorithms to make the effective utilization of CPU	K3
CLO5	Apply memory management strategies to enhance system efficiency.	K3
K1 - Remember; **K2** - Understand; K**3** - Apply		

CLO-PLO Mapping

CLOs/PLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2	1	2	2
CLO2	3	1	2	1	1
CLO3	3	2	1	1	1
CLO4	2	2	2	2	2
CLO5	2	2	2	1	2
3 - Substantial (high)		**2** - Moderate (medium)		**1** - Slight (low)	

Core –IV: Operating Systems

Unit	Content	No. of Hours
I	**Introduction:** Operating system, history (1990s to 2000 and beyond), distributed computing, parallel computation- Process concepts- Definition of process, process states- Life cycle of a process, process management- process state transitions, process control block (PCB), process operations, suspend and resume, context switching, Interrupts - Interrupt processing, interrupt classes, inter-process communication - signals, message passing.	15
II	**Asynchronous concurrent processes:** Mutual exclusion - critical section, mutual exclusion primitives, implementing mutual exclusion primitives, Peterson ‘s algorithm- software solutions to the mutual Exclusion Problem- n-thread mutual exclusion- Lamport Bakery Algorithm- Semaphores – Mutual exclusion with Semaphores, thread synchronization with semaphores- counting semaphores- implementing semaphores - Concurrent programming - Monitors, message passing.	15
III	**Deadlock and indefinite postponement:** Resource concepts, four necessary conditions for deadlock- deadlock prevention- deadlock avoidance and Dijkstra ‘s Banker ‘s algorithm- deadlock detection- deadlock recovery.	15
IV	**Job and processor scheduling:** Scheduling levels- scheduling objectives- scheduling criteria- preemptive vs non-preemptive scheduling- interval timer or interrupting clock- priorities- scheduling algorithms - FIFO scheduling- RR scheduling- quantum size- SJF scheduling- SRT scheduling- HRN scheduling- multi-level feedback queues-Fair share scheduling.	15
V	**Real Memory organization and Management:** Memory organization- Memory management- Memory hierarchy- Memory management strategies-contiguous vs non-contiguous memory allocation- single user contiguous memory allocation- fixed partition multiprogramming - variable partition multiprogramming- Memory swapping- Virtual Memory organization - virtual memory basic concepts, multilevel storage organization- block mapping- paging basic concepts- segmentation- paging-segmentation systems- Virtual Memory Management - Demand Paging- Page replacement strategies.	15
	Total Hours	**75**
Text Books		
1.	H.M.Deitel (2011), Operating Systems, 3rd Edition, Pearson Education Asia. (Unit– I, II, III, IV, V)	
2.	Andrew Tanenbaum (2010), Modern Operating Systems, Pearson Education.	
Reference Books		
1.	William Stallings (2012), Operating System: Internals and Design Principles, 7th Edition, Prentice-Hall of India.	
2.	Avi Silberschatz, Peter Baer Galvin, Greg Gagne (2012), Operating Systems Concepts, 9th Edition, John Wiley &Sons (ASIA) Pvt Ltd.	
Web Resources (Swayam/ NPTEL Courses)		
1.	https://onlinecourses.nptel.ac.in/noc21_cs88/preview	
2.	https://onlinecourses.nptel.ac.in/noc21_cs72/preview	

Part – III : Allied Courses

(B.Sc. Computer Science / BCA / B.Sc. Information Technology / B.Sc. Computer Technology)

Course Code	Course Name	Category	Hours / Week	Credits
24BCS26A / 24BCA26A / 24BIT26A / 24BCT26A	**Discrete Mathematics**	**Allied – II**	**4**	**3**

Course Objectives

The course intends to cover

- The fundamental concepts and tools in discrete mathematics with emphasis on their applications to computer science.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Formulate the basic terminology of sets.	K1
CLO2	Design the operations with relations.	K2
CLO3	Apply FSA to find a solution for a computer based system.	K3
CLO4	Apply the concepts of Connectives and tautological implications in data analysis.	K3
CLO5	Evaluate the basic terminology of graph theory.	K3
K1 - Remember; **K2** - Understand; **K3** - Apply		

CLO – PLO Mapping

CLOs/PLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3	2	1	3
CLO2	2	1	1	3	3
CLO3	2	3	2	1	2
CLO4	3	3	2	1	3
CLO5	3	1	3	2	2
3 - Substantial (high)		**2** - Moderate (medium)		**1** - Slight (low)	

Allied – II : Discrete Mathematics

Unit	Content	No. of Hours
I	**Set Theory:** -Set & its Elements-Set Description-Types of sets-Venn- Euler Diagrams- Set operations & Laws of set theory-Fundamental products-partitions of sets-minsets- Algebra of sets and Duality-Inclusion and Exclusion principle.	12
II	**Relations:** Binary Relations – Set operation on relations-Types of Relations – Partial order relation – Equivalence relation – Composition of relations.	12
III	**Languages:** Operations on languages – Regular Expressions and regular languages – Grammar – Types of grammars – Finite state machine – Finite – State automata.	12
IV	**Mathematical Logic:** Propositional calculus –Basic logical operations-Tautologies-Contradiction-Argument-Method of proof- Predicate calculus.	12
V	**Graph Theory:** Basic terminology – paths, cycle & Connectivity – Sub graphs – Types of graphs – Representation of graphs in computer memory - Trees – Properties of trees – Binary trees – traversing Binary trees – Computer Representation of general trees.	12
	Total Hours	**60**
Text Book		
1.	J.K. Sharma, (2022). Discrete Mathematics(Ed.2), Macmillan India Ltd. Unit I : Chapter 1 : Section 1.1 – 1.7, 1.9,1.10,1.12,1.14 Unit II : Chapter 3 : Section 3.3 – 3.7, 3.9, 3.11 Unit III: Chapter 15 : Section 15.3 – 15.7 Unit IV: Chapter 12 : Section 12.1 – 12.3, 12.8 – 12.12, 12.14 Unit V: Chapter 9 : Section 9.1 – 9.5, 9.8 Chapter 10 : Section 10.1 -10.3, 10.6, 10.8	
Reference Books		
1.	J.P. Tremblay, R. Manohar, (2002). Discrete Mathematics Structures with Applications to Computer Science,, McGraw Hill International Edition.	
2.	M.K. Venkataraman., N. Sridharan. & N. Chandarasekaran, (2004). Discrete Mathematics, National Publishing Company, Chennai.	
Web Resources (Swayam / NPTEL)		
1.	https://archive.nptel.ac.in/courses/111/106/111106086/	

Components for Internal Assessment and Distribution of Marks for CIA and ESE (Theory)

Max Marks	Marks for		Components for CIA											
	CIA	ESE	CIA – I		CIA – II		Best of CIA-I & CIA-II	Model		Attendance		Active Engagement		Total
100	25	75	Actual	Weightage	Actual	Weightage	Weightage	Actual	Weightage	5		5		25
			50	5	50	5	5	75	10					

Question Paper Pattern

Component	Duration in Hrs.	Section A			Section B			Section C			Total
		Type of question	No. of questions	Marks	Type of question	No. of questions	Marks	Type of question	No. of questions	Marks	
CIA – I & II	2	MCQ	8	8x1=8	Either or	3	3x6=18	Either or	3	3x8=24	50
Model Exam / ESE	3	MCQ	10	10x1=10	Either or	5	5x5=25	Either or	5	5x8=40	75

Components for Internal Assessment and Distribution of Marks for CIA (Lab)

Max Marks	Marks for		Components for CIA							
	CIA	ESE	Test – I		Test - II		Model		Observation	Total
100	40	60	Actual	Weightage	Actual	Weightage	Actual	Weightage	5	40
			50	10	50	10	60	15		

Examination Pattern

Component	Duration in Hrs.	No. of experiments	Marks			Weightage
			Practical	Record	Total	
Test – I	1	1	50	-	50	10
Test – II	1	1	50	-	50	10
Model	3	2	60	-	60	15
ESE	3	2	50	10	60	-

Part – IV : Foundation Courses

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours / Week	Credits
24HUM2FC	Human Rights	FC - II	2	2

Unit	Content
I	**Concept of Human Values, Value Education Towards Personal Development** Aim of Education and Value Education; Evolution of Value Oriented Education; Concept of Human Values; Types of Values; Components of Value Education. **Personal Development:** Self-analysis and Introspection; Sensitization towards Gender Equality, Physically Challenged, Intellectually Challenged. Respect to - Age, Experience, Maturity, Family Members, Neighbors, Co-workers. Character Formation towards Positive Personality: Truthfulness, Constructively, Sacrifice, Sincerity, Self-Control, Altruism, Tolerance, Scientific Vision.
II	**Value Education Towards National and Global Development** **National and International Values:** Constitutional or National Values - Democracy, Socialism, Secularism, Equality, Justice, Liberty, Freedom, and Fraternity. Social Values - Pity and Probity, Self-Control, Universal Brotherhood. Professional Values - Knowledge Thirst, Sincerity in Profession, Regularity, Punctuality, and Faith. Religious Values - Tolerance, Wisdom, Character. Aesthetic Values - Love and Appreciation of Literature and Fine Arts and Respect for the Same. National Integration and International Understanding.
III	**Impact of Global Development on Ethics and Values** Conflict of Cross-Cultural Influences, Mass Media, Cross-Border Education, Materialistic Values, Professional Challenges, and Compromise. Modern Challenges of Adolescent Emotions and Behavior; Sex and Spirituality: Comparison and Competition; Positive and Negative Thoughts. Adolescent Emotions, Arrogance, Anger, Sexual Instability, Selfishness, Defiance
IV	**Therapeutic Measures** Control of the Mind through a. Simplified Physical Exercise b. Meditation – Objectives, Types, Effect on Body, Mind and Soul c. Yoga – Objectives, Types, Asanas d. Activities: (i) Moralisation of Desires (ii) Neutralisation of Anger (iii) Eradication of Worries (iv) Benefits of Blessings

Unit	Content
V	**Human Rights** 1. Concept of Human Rights – Indian and International Perspectives a. Evolution of Human Rights b. Definitions under Indian and International Documents 2. Broad Classification of Human Rights and Relevant Constitutional Provisions. a. Right to Life, Liberty and Dignity b. Right to Equality c. Right against Exploitation d. Cultural and Educational Rights e. Economic Rights f. Political Rights g. Social Rights 3. Human Rights of Women and Children a. Social Practice and Constitutional Safeguards (i) Female Feticide and Infanticide (ii) Physical Assault and harassment (iii) Domestic Violence (iv) Conditions of Working Women 4. Institutions for Implementation a. Human Rights Commission b. Judiciary 5. Violations and Redressal a. Violation by State b. Violation by Individuals c. Nuclear Weapons and terrorism d. Safeguards

Web Resources	
1.	https://syllabus.b-u.ac.in/syl_college/ug_ve.pdf

Components for Internal Assessment and Distribution of Marks for CIA (Theory)

Max Marks	Marks for		Components for CIA							
	CIA	ESE	CIA – I		CIA – II		Best of CIA-I & CIA-II	Model		Total (Best + Model)
50	50	-	Actual	Weightage	Actual	Weightage	Weightage	Actual	Weightage	50
			50	**25**	50	**25**	**25**	50	**25**	

Question Paper Pattern

Duration in Hrs.	Mode of Exam	Type of Questions	No. of Questions	Marks
2	Offline	Open Choice	5 (Out of 8)	5 x 10=50

Part – IV : Ability Enhancement Compulsory Courses

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours / Week	Credits
24SOF2AE	Soft Skills	AECC - II	2	2

Course Objectives

The course intends to cover

- The essential soft skills that is crucial for success in today's dynamic and interconnected workplace.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Understand the comprehensive skills to participate actively in conversation, writing short texts with expression	K1, K2, K3
CLO2	Infer the cohesive devices to describe and discuss any objects, pictures using compound, complex sentence forms.	K2, K3
CLO3	Comprehend the logic in the given situation to organize the ideas to write formal and informal letters.	K2, K3
CLO4	Understand the given material to organize it in a logical sequence to present a paragraph with main and supporting ideas with concluding sentences.	K3
CLO5	Present valuable ideas in conversation to emulate the main ideas and key points in short essays.	K3
K1 - Remember; **K2** - Understand; **K3** - Apply;		

Ability Enhancement Compulsory Course - II : Soft Skills

Unit	Details	No. of Hours
I	**Presentation Skills : Getting to Know You:** Grammar: Introduction to Tenses; Listening: Fill in the blanks; Speaking: Self Introduction, Everyday English, Role-Play; Reading: Different ways of communication. **My Day:** Grammar: Present simple positive & negative / Adverbs of Frequency; Vocabulary & Speaking: Daily Activities; Listening: Observe and Answer / Telling the time; Reading & Writing: Describe where you live. **Your World:** Grammar: Possessive determiners; Vocabulary & Speaking: Talk about countries, nationalities; Listening: Positive & negative contractions; Reading & Writing: Personal profile. **The World Of Work:** Grammar: Yes/No & Wh Questions; Vocabulary & Speaking: Jobs; Listening: Recognize the schwa sound; Reading & Writing: Opening and closing an email. .**Places And Things:** Grammar: There is / there are, articles; Vocabulary & Speaking: Talk about rooms & furniture; Listening: Directions; Reading & Writing: Imperatives.**24 Hours:** Grammar: Likes & Dislikes; Vocabulary & Speaking: Speak about hobbies and interests; Listening: Observe & answer; Reading: Match the photos with descriptions; Writing: Write complete sentence using prompts;	6
II	**Confidence : Clothes and Shopping:** Grammar: Modal verbs / Adverbs of Frequency / Adjectives and Adverbs; Vocabulary & Speaking: Shopping; Listening: Observe and Answer; Reading & Writing: Product Review. **Travel & Transport:** Grammar: Past simple questions; Vocabulary & Speaking: Talk about holidays; Listening: At the train station; Reading & Writing: Email - A perfect holiday. **Health & Fitness:** Grammar: Past simple irregular verbs; Vocabulary & Speaking: Talk about a healthy lifestyle; Listening: Listen & Answer; Reading & Writing: Time sequencers. **Music:** Grammar: Present perfect simple; Vocabulary & Speaking: Survey about music; Listening: Listen two people talk about music; Reading: Use adjectives and create sentences. **Let's go shopping:** Grammar: Countable & Uncountable; Vocabulary & Speaking: Town Survey; Listening: Listen and answer; Reading & Writing: Read and match	6
III	**Creativity :Cooking & Eating:** Grammar: Some & Any, Quantifiers; Vocabulary & Speaking: Food & Drink; Listening: Kitchen conversation; Reading & Writing: Article reading & answering. **Survival:** Grammar: Comparison of adjectives; Vocabulary & Speaking: Describing people; Listening: Listen & Answer; Reading & Writing: Read and Answer. **Working Together:** Grammar: Verb + Noun phrases; Vocabulary & Speaking: Talk about technology; Listening: Listen & Answer; Reading & Writing: Notice. **Music:** Grammar: Present perfect simple; Vocabulary & Speaking: Survey about music; Listening: Listen two people talk about music; Reading: Use adjectives and create sentences. **Culture and Arts:** Grammar: Present perfect; Vocabulary & Speaking: Speak on the phone; Listening: Listen and answer; Reading & Writing: Review	6

Unit	Content	No. of Hours
IV	**Problem-Solving :Do's and Don'ts:** Grammar: Modal verbs; Vocabulary & Speaking: Role play; Listening: Holidays in January; Reading & Writing: Article reading & answering. **Body:** Grammar: First conditional; Vocabulary & Speaking: Personality & Appearance; Listening: Listen to conversations about personality; Reading & Writing: Read and Answer about your skills. **Speed:** Grammar: Present simple passive; Vocabulary & Speaking: Talk about relationships; Listening: Listen & Answer; Reading & Writing: Error spotting. **Work:** Grammar: Adverbs of manner; Vocabulary & Speaking: Talk about work advice; Listening: Observe & Answer; Reading: Read & check your ideas	6
V	**Critical Thinking : Influence:** Grammar: would / past habits; Listening: Sentence Correction; Speaking & Vocabulary: Your inspiration; Reading: Picture description; Writing: Rewrite the sentences. **Money:** Grammar: Second conditional; Listening: radio programme; Speaking & Vocabulary: Talk about games; Reading & Writing: Fill in the blanks. **Things that changed the world:** Grammar: articles; Speaking & Listening: Talk about chewing gum; Reading & Writing: Read and write a book review	6
	Total Hours	**30**

Components for and Distribution of Marks for ESE (Theory)

Ability Enhancement Compulsory Course(AECC)

Duration in Hrs.	Mode of Exam	Type of Questions	No. of Questions	Marks
2	Online	MCQ	50	50x1=50

Semester 3

Curriculum

B.Sc. Information Technology

Semester – 3									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours/ Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
24TAM31L	I	Language - I	Tamil – III	4	3	25	75	100	3
24HIN31L	I		Hindi – III						
24MAL31L	I		Malayalam – III						
24FRE31L	I		French – III						
24ENG32L	II	Language - II	English – III	4	3	25	75	100	3
24BIT33C	III	Core - V	Data Structures & Algorithms	6	3	25	75	100	4
24BIT34P	III	Core Lab - III	**Lab:** Data Structures & Algorithms	4	3	40	60	100	2
24BIT35C	III	Core - VI	Web Application Development	6	3	25	75	100	4
24BIT36A	III	Allied – III	Internet of Things	4	3	25	75	100	3
24BIT37P	III	SEC – I	**Lab:** Interactive JavaScript Programming	2	3	40	60	100	2
24BAT3FC/	IV	FC – III	Basic Tamil /	-	2	50	-	50	2
24ADT3FC/			Advanced Tamil/						
24IKS3FC			Indian Knowledge Systems(IKS)*						
24MOO3AE	IV	AECC – III	Online Course – MOOC	-	-	50	-	50	2
Total				**30**				**800**	**25**

Part –I : Language I - Tamil –III

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours / Week	Credits
24TAM31L	Tamil - III	Language - I	4	3

Course Objectives

- தமிழரின் பிற துறை சார்ந்த சிந்தனைகளைக் கற்றுத் தேர்தல்
- இன்றைய அறிவியல் வளர்ச்சி மற்றும் கணினியின் பயன்பாட்டுத் தேவையை உணர்த்துதல்
- இயற்கை பாதுகாப்பு குறித்த விழிப்புணர்வை வளர்த்தல்

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	வணிகத் தமிழ் - கணினித் தமிழின் நுட்பங்கள் மற்றும் பயன்பாடுகளை அறிதல்.	K1, K2
CLO2	ஊடகம் மற்றும் உளவியல் தன்மை குறித்த சிந்தனைகளை வளர்த்தல்.	K2
CLO3	சுற்றுலா - சுற்றுச்சூழலியல் தேவை மற்றும் மீட்டுருவாக்கம் குறித்து உணர்த்துதல்.	K3
CLO4	மேலாண்மை பற்றி அறிதல் மற்றும் சுயக்கற்றல் திறனை வளர்த்தல்.	K1, K3
CLO5	கொங்கு ஆளுமைகள் குறித்து அறியச் செய்தல்.	K2, K3
K1 - Remember; **K2** - Understand; **K3** – Apply		

Part – I: Language I - Tamil – III

பயன்பாட்டுத் தமிழ்

Unit	Content	No. of Hours
I	**வணிகம் மற்றும் கணினித் தமிழ்** தமிழரின் வணிகம் - வணிகக் கடிதங்கள் – உலகமயமாக்கல் - செயற்கை நுண்ணறிவு கற்றல் - இணைய நூலகம் - இணையத் தமிழ் பயன்பாடு	12
II	**ஊடகம் மற்றும் உளவியல் தமிழ்** ஊடகத்தின் இன்றியமையாமை - நிகழ்வுகளைச் செய்திகளாக வடிவமைத்தல் - ஊடகத் துறையில் மொழியின் பங்கு - உளவியல் வரையறை - உளவியல் பிரிவுகள் - வகுப்பறை உளவியல் (ஆசிரியர், மாணவர்)	12
III	**சுற்றுச்சூழலியல் மற்றும் சுற்றுலாவியல்** தமிழரின் சூழலியல் அறிவு - சுற்றுச்சூழல் மாசுபாடு - சுற்றுச்சூழல் பாதுகாப்பு - சுற்றுலா வகைகள் - உலகப் புகழ்பெற்ற சுற்றுலாத் தலங்கள் - சுற்றுலா வளர்ச்சி மற்றும் பயன்கள்	12
IV	**மேலாண்மைத் தமிழ் மற்றும் மொழிப்பயிற்சி** மேலாண்மையும் அணுகுமுறைகளும் - மேலாண்மை செயல்பாடுகள் மற்றும் வகைகள் - வகுப்பறை மேலாண்மை – நேர்காணல் - நூல் திறனாய்வு மற்றும் மதிப்பீடு - படிவங்கள் பூர்த்தி செய்தல் மற்றும் விண்ணப்பங்கள்	12
V	**பன்முக ஆளுமைகள்** ஜி.டி.நாயுடு(அறிவியல்) – பத்மஸ்ரீ டாக்டர் பக்தவத்சலம்(மருத்துவம்) - நா மகாலிங்கம்(தொழில்) - மயில்சாமி அண்ணாதுரை(விஞ்ஞானம்) - என் ஜி ராமசாமி(சமூகம்) - நம்மாழ்வார்(விவசாயம்)	12
	Total Hours	60

Reference Books

1	சுந்தரம்.இல, (2022) கணினித் தமிழ், விகடன் பிரசுரம்
2	மணியரசன்.துரை, (2019), இணையமும் இனியத் தமிழும், இசை பதிப்பகம்
3	பொன்னவைக்கோ.மு, (2015) இணையத் தமிழ் வரலாறு, பாரதிதாசன் பல்கலைக் கழகம்.
4	தங்கமணி இரா.ம, (2018) சுற்றுலாவியல், கொங்கு பதிப்பகம்
5	இலக்கியா க.வி, நந்தினி சா.சு,(2022), விடியல் பதிப்பகம்
6	சின்னத்தம்பி முருகேசன்.பொன்(2016) சுற்றுச் சூழலியல்(உலகம் தழுவிய வரலாறு), எதிர் வெளியீடு
7	இறையன்பு.வெ (2018) இலக்கியத்தில் மேலாண்மை, நியூ செஞ்சுரி புக் ஹவுஸ்
8	ஸ்ரீனிவாசன்.வி, (2009), திருக்குறளில் மேலாண்மை, விகடன் பிரசுரம்

Reference Books	
9	பட்டனத்தி மைந்தன், (2018), ஜி.டி நாயுடு, ராமையா பதிப்பகம்
10	டாக்டர் பக்தவத்சலம்.ஜி (2009) இதயம் ஒரு கோவில், விஜயா பதிப்பகம்

Question Pattern	
காலம் : 3 மணி நேரம்	மொத்த மதிப்பெண்கள் : 75

பிரிவு – அ 10x1=10

- சரியான விடையைத் தேர்ந்தெடுத்து எழுதுக.

பிரிவு – ஆ 5x5=25

- வணிகம் மற்றும் கணினித் தமிழ் - 1 வினா
- ஊடகம் மற்றும் உளவியல் தமிழ் - 1 வினா
- சுற்றுலாவியல் மற்றும் சுற்றுச்சூழலியல் - 1 வினா
- மேலாண்மைத் தமிழ் மற்றும் மொழிப்பயிற்சி- 1 வினா
- கொங்கு ஆளுமைகள் - 1 வினா

பிரிவு – இ 5x8=40

- வணிகம் மற்றும் கணினித் தமிழ் - 1 வினா
- ஊடகம் மற்றும் உளவியல் தமிழ் - 1 வினா
- சுற்றுலாவியல் மற்றும் சுற்றுச்சூழலியல் - 1 வினா
- மேலாண்மைத் தமிழ் மற்றும் மொழிப்பயிற்சி- 1 வினா
- கொங்கு ஆளுமைகள் - 1 வினா

குறிப்பு : ஆ, இ பிரிவுகளில் வினாக்கள் "இது" அல்லது "அது" என்ற வகையில் அந்தந்த அலகுகளிலிருந்து அமைத்தல் வேண்டும்.

Course Code	Course Name	Category	Hours / Week	Credits
24HIN31L	Hindi - III	Language - I	4	3

Course Objectives

- May have knowledge of the contents of primitive poetry
- Learn about contemporary poetry and its techniques.
- Interest in reading poetry and the ability to express social thoughts will improve
- This will help you to understand the basics of Hindi literature and to understand Hindi literature properly
- Knowledge of the elements of poetry and the knowledge of subtle translation will improve

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	May have knowledge of the contents of primitive poetry	K1, K2
CLO2	Learn about contemporary poetry and its techniques.	K2
CLO3	Interest in reading poetry and the ability to express social thoughts will improve	K3
CLO4	This will help you to understand the basics of Hindi literature and to understand Hindi literature properly	K1, K3
CLO5	Knowledge of the elements of poetry and the knowledge of subtle translation will improve.	K2, K3
K1 - Remember; **K2** - Understand; **K3** - Apply		

Part – I: Language I - Hindi – III

Unit	Content	No. of Hours
I	**Poetry: Kavya Lehar – By Dr. V. Baskhar Pracheen Kavitha** 1. Mahatma Kaber – Saki 2. Goswamy Tulasidas – Ram-Van-Aman 3. Mahatma Soordas – Baal – Leela 4. Kavivar Rahim – Dohe	14
II	**Poetry: Kavya Lehar – By Dr. V. Baskhar Aadhunik Kavitha** 1. Mythili Sharn Gupth – Vikaral Bijali 2. Sumithranandan Panth – Parivarthan 3. Suryakanth Thripati Nirala – Sandhayasundarai 4. Ramdhari Sing Dinkar – Bhagavan Ke Dakkiya 5. Harivansray Bachchan – Kota Sikka 6. Agyeya – Anubhav Paripakva 7. Naresh Mehtha – Ullangan 8. Dharmaveer Bharathi – Tum Mere Koun Ho	14
III	**History of Hindi Literature:** (Sahithyik Tippanian) 1. Ammer Kusro 2. Vidhyapathi 3. Chandbardhayi 4. Pruthiviraj Raso 5. Ramacharitha Manas 6. Vinaya Patrika	12
IV	**Alankar:** 1.Anupras 2. Yamak 3. Slesh 4.Vakrokthi 5.Upama, 6. Roopak 7. Virodhabas	10
V	**Translation**: **English - Hindi only** Anuvadh Abhyas – III (16-30 Lessons Only)	10
	Total Hours	**60**

Text Books	
1	Dr Baskhar V., (2006), Kavya lehar –Jawahar Pusthakalay, Sadar Bazaar,Mathura-U.P.281001.
2	Anuvadh Abyas-III,Dakshin Bharath Hindi Prachar Sabha Chennai – 17.
Reference Books	
1	Rajnath sharma,(2010) Hindi sahithya ka saral ithihaas, Vinod Pustak Mandir, Agra-282
2	Kavya pradeep rambadri shukla,(2008) hindi bhavan, 36, tagore town, allahabad – 211 002.

Course Code	Course Name	Category	Hours/Week	Credits
24MAL31L	Malayalam - III	Language - I	4	3

Course Objectives

- May have knowledge of the contents of primitive poetry
- Learn about contemporary poetry and its techniques.
- Interest in reading poetry and the ability to express social thoughts will improve
- This will help you to understand the basics of Malayalam Poetry and to understand Malayalam literature properly
- It will provide knowledge of the elements of poetry.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Get a basic knowledge of the history of Malayalam literature.	K1
CLO2	Enhances the art and taste of Malayalam literary works	K1
CLO3	Literary genres can be learned	K2
CLO4	Create more to read and enjoy Malayalam poetry	K3
CLO5	Get the basic Knowledge of poetry techniques	K4
K1 - Remember; **K2** - Understand; **K3** – Apply; **K4**-Analyse		

Part – I: Language I - Malayalam – III

Unit	Content	No. of Hours
I	Poetry – Chinthavishtayaya Seetha	14
II	Poetry – Chinthavishtayaya Seetha	14
III	Poetry – Mrugasikshakan - (Murgasikshakan, Kausalya, Varavu, Vittupoku Ekalavyan, Mazha) 6 poetries	12
IV	Poetry – Mrugasikshakan - (Kayal, Karkkadakam, Bhagavatham, Vazhivakkile naikutty, Edavelayil oru nimisham, Verumoru kathu) 6 poetries	10
V	Poetry – Aayisha	10
	Total Hours	**60**

Text Books	
1	Kumaranasan, (2012), Chinthavishtayaya Seetha, Kerala Book Store Publishers.
2	Vijayalakshmi, (2010), Mrugasikshakan, DC Books, Kottayam.
3	VayalarRamavarma,(2014), Aayisha, Kerala Book Store Publishers.
Reference Books	
1	Dr.Leelavathi M, (2015) Kavitha SahithyaCharitram, Kerala Sahithya Academy, Trichur.
2	Dr.Leelavathi M, (2015) Kavitha Dwani, D.C.Books, Kottayam.
3	Dr.George K.M, (2014) Aadhunika Sahithyacharithram Prasthanangalilude, D.C.Books, Kottayam.
4	Chummar T.M. (2009) Padya Sahithya Charithram, Kerala Sahithya Academy, Trichur.

Course Code	Course Name	Category	Hours/Week	Credits
24FRE31L	French - III	Language - I	4	3

Course Objective

To interact in a simple way, ask and answer simple questions about themselves, where they live, people they know, and things they have, initiate and respond to simple statements in areas of immediate need or on very familiar topics, rather than relying purely on a very finite rehearsed, lexically-organized repertoire of situation-specific phrases.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Comprehend a repertoire of vocabulary	K1
CLO2	Understand tenses and intermediary level of grammar	K2
CLO3	Try to converse in unknown situation	K3
CLO4	Translate unknown texts on familiar topics	K4
K1 - Remember; **K2** - Understand; **K3** – Apply; **K4**-Analyse		

Part – I: Language I-French – III

Unit	Content	No. of Hours
I	Etape 1 (Lecons 1 - 3)	14
II	Etape2 (Lecons 1 - 3)	14
III	Etape 3 - Leçons 1 – 2	12
IV	Etape 3 – Leçon 3	10
V	Etape 4 – Leçon 1	10
	Total Hours	**60**

Text Book	
1.	Céline Himber, Corina Brillant, Sophie Erlich, (2014), Adomania2 – Methode Defrancais, Publisher : Hachette Fle
Reference Book	
1.	Yves Loiseau, Régine Merieux (2009), Latitudes 1, Publisher: French and European Publications Inc.

Part –II : Language II – English-III

Course Code	Course Name	Category	Hours/ Week	Credits
24ENG32L	English-III	Language- II	4	3

Course Objectives

The course intends to cover

- Various genres of literature
- Inter personal skills essential at work environment

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	List out the connotations and denotations to pen poems.	K1
CLO2	Identify complex characters to navigate philosophical and intellectual learning and employ it in work place.	K2
CLO3	Interpret various prose styles to enhance creative writing	K3
CLO4	Compute vocabulary and grammatical proficiency in communication to enhance clarity in content creation.	K3
CLO5	Practice communication skills to be effective in lifelong learning.	K3
K1 – Remember; **K2**-Understand; **K3**- Apply		

Part-II: Language II - English-III

Unit	Content	No. of Hours
I	**Poetry** 1. Nothing Will Die – Alfred Lord Tennyson 2. Porphyria's Lover – Robert Browning 3. Obituary – A K Ramanujan	12
II	**Scenes from William Shakespeare's Plays** 1. Romeo and Juliet – The Balcony Scene 2. Merchant of Venice - Court Scene 3. Julius Caesar - Murder Scene	12
III	**Famous Speeches** 1. You've Got to Find What You Love-Steve Jobs 2. You Will Prevail -Sundar Pichai 3. I am Malala – Malala Yousafzai	12
IV	**Language Competency** 1. Identifying types of Sentences 2. Sentence Structure 3. Active Voice and Passive Voice 4. Direct and Indirect Speech	12
V	**English for Communication Listening and Speaking** Participating in a Group Discussion 1. Group discussion as a selection process 2. Different kinds of Group Discussion 3. Structure of Group Discussion 4. Successful Group Discussion Techniques 5. Group Discussion – Do's and Don'ts **Reading and Writing** 1. Reading diagrammatic information-interpretations maps, graphs and pie charts 2. Narrative writing– Two to three paragraphs 3. Dramatizing everyday situations/social issues through skits. (Writing scripts and performing)	12
	Total Hours	**60**
Reference Book		
1.	Wren, P.C. (1973). High school English grammar and composition.	
Web Resources (Swayam/NPTEL)		
1.	https://nptel.ac.in/courses/109106129	
2.	https://nptel.ac.in/courses/109104031	

Course Code	Course Name	Category	Hours / Week	Credits
24BIT33C	Data Structures & Algorithms	Core – V	6	4

Course Objectives

The course intends to cover

- Basic concepts of Data Structures and Applications.
- Algorithm Analysis and Design Techniques

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Learn the basic concepts of Stack and Queues Data Structures and its application.	K1
CLO2	Understand the representation of Linked List and its implementation.	K2
CLO3	Organize and manage hierarchical data with non-linear Data structures.	K2
CLO4	Understand various Sorting Algorithms and to manage the data efficiently.	K3
CLO5	Apply algorithmic design paradigms like Dynamic Programming, Backtracking, Divide and Conquer.	K3
K1 - Remember; **K2** - Understand; **K3** – Apply		

CLO – PLO Mapping

CLOs/PLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	2	2
CLO2	3	1	2	3	2
CLO3	2	2	3	2	2
CLO4	2	2	2	2	1
CLO5	2	3	2	3	1
3 - Substantial (high)		**2** - Moderate (medium)		**1** - Slight (low)	

Core - V: Data Structures & Algorithms

Unit	Content	No. of Hours
I	**Basic Concepts:** Overview: System Life Cycle-Algorithm Specification: Introduction- Performance Analysis: Space Complexity-Time Complexity-Asymptotic Notation - **Arrays:** The Abstract Datatype – Sparse Matrics – The Abstract Datatype-Sparse Matrix Representation – Transposing a Matrix. The Representation of Multidimensional Arrays - **Stacks and Queues:** Stacks – Queues - Evaluation of Expression – Multiple Stacks and Queues.	18
II	**Linked List:** Singly Linked Lists and Chains – Linked Stacks and Queues-Polynomials-Polynomial Representation-Adding Polynomial – Circular List Representation of Polynomial-Sparse Matrices-Sparse Matrix Representation-Doubly Linked List.	18
III	**Trees: Terminology –** Representation of Trees – Binary Trees: The Abstract Datatype – Properties of Binary Tree – Binary Tree Traversal. Binary Search Tree-Searching, Inserting and Deleting in Binary Search Tree. Introduction: Threaded Binary Trees. **Graphs** The Graph Abstract Datatype – Elementary Graph Operations: Depth First Search- Breadth First Search -Minimum Cost Spanning Tree – Kruskal's Algorithm – Shortest Path and Transitive Closure.	18
IV	**Searching:** Sequential Search - Binary Search - **Sorting:** Definitions - Insertion sort – Quick sort - Merge sort – Heap sort –**Hashing:** The Symbol Table, Abstract Data Type - Static Hashing - Dynamic Hashing using Directories.	18
V	**Algorithm Analysis Techniques**: Efficiency of Algorithms – Analysis of Recursive Programs – **Algorithm Design Techniques**: Divide and Conquer Algorithms- Dynamic Programming- 0/1 Knapsack Problem - Matrix Chain Multiplication – Greedy Algorithms - Case study on Job Sequencing Algorithm - Huffman Coding - K- Job Sequencing with Deadlines.	18
	Total Hours	**90**
Text Books		
1.	Ellis Horowitz, Sartaj Sahni, Susan Anderson Freed(2014), 2nd Edition, "Fundamentals of Data Structures in C", Universities Press	
2.	Aho V, John E. Hopcroft, Jeffrey D. Ullman, (2008), "Data Structures and Algorithms", 3rd Edition, Pearson Education Alfred Asia	
Reference Books		
1.	Mark Allen Weiss," Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education Asia	
2.	Ellis Horowitz, Sartaj Sahani and Dinesh Mehta (2008), "Fundamentals of Data Structures in C++", 2nd Edition, University Press	
Web Resources (Swayam / NPTEL)		
1.	https://onlinecourses.nptel.ac.in/noc23_cs85/preview	
2.	https://onlinecourses.nptel.ac.in/noc24_cs78/preview	

Course Code	Course Name	Category	Hours /Week	Credits
24BIT34P	Lab: Data Structures & Algorithms	Core Lab –III	4	2

Lab: Data Structures & Algorithms

S.No.	List of Programs
1.	Sample Programs.
	Implementation of Array Operations.
2.	Implementation of Stack using Arrays.
3.	Implementation of Queue using Arrays.
4.	Conversion of Infix to Postfix Expression.
5.	Evaluation of Postfix Expression.
6.	Implementation of Singly linked List
7.	Implementation of Tree Traversal.
8.	Implementation of Depth First Search.
9.	Implementation of Breadth First Search.
10.	Implementation of Linear Search.
11.	Implementation of Binary Search.
12.	Implementation of Quick Sort.
13.	Implementation of Merge Sort.
14.	Greedy Algorithms - Activity Selection Problem.
15.	0-1 Knapsack Problem.
	Total Hours **60**
Text Books	
1.	Ellis Horowitz, Sartaj Sahni, Susan Anderson Freed (2014), 2nd Edition, "Fundamentals of Data Structures in C", University Press
2.	Aho V, John E. Hopcroft, Jeffrey D. Ullman, (2008), "Data Structures and Algorithms", 3rd Edition, Pearson Education Alfred Asia
Reference Books	
1.	Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education Asia.
2.	Ellis Horowitz, Sartaj Sahani and Dinesh Mehta (2008), "Fundamentals of Data Structures in C++", 2nd Edition, University Press.
Web Resources (Swayam / NPTEL)	
1.	https://onlinecourses.nptel.ac.in/noc23_cs85/preview
2.	https://onlinecourses.nptel.ac.in/noc24_cs78/preview

Course Code	Course Name	Category	Hours / Week	Credits
24BIT35C	Web Application Development	Core - VI	6	4

Course Objectives

The course intends to cover

- To learn the basic web concepts and to create rich internet applications that use the most recent client-side programming technologies.
- To learn the basics of HTML, DHTML, XML, CSS, JavaScript AJAX and MySQL

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Understand how to develop and publish web pages using HTML.	K1
CLO2	Learn Cascading Style Sheets (CSS) to develop interactive web pages.	K2
CLO3	Learn scripting language to validate web page forms	K2
CLO4	Understand XML and Ajax data format and use in web page development.	K3
CLO5	Apply MYSQL commands to provide an overview of features and common use.	K3
K1 - Remember; **K2** - Understand; **K3** – Apply		

CLO – PLO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	3	1	1	1	3
CO 2	3	2	3	2	3
CO 3	2	3	1	3	2
CO 4	2	3	3	3	2
CO 5	3	3	3	2	2
3 - Substantial (high)		**2** - Moderate (medium)		**1** - Slight (low)	

Core Theory VI: Web Application Development

Unit	Details	No. of Hours
I	**HTML:** HTML-Introduction-tag basics- page structure-adding comments working with texts, paragraphs and line breaks. Emphasizing test- heading and horizontal rules-list-font size, face and color-alignment- links-tables-frames.	18
II	**Forms & Images Using HTML:** Graphics: Introduction-How to work efficiently with images in web pages, image maps, GIF animation, adding multimedia, data collection with HTML forms textbox, password, list box, combo box, text area, tools for building web page front page.	18
III	**XML & DHTML:** Cascading style sheet (CSS)-what is CSS-Why we use CSS-adding CSS to your web pages-Grouping styles-extensible markup language (XML). Dynamic HTML: Document object model (DCOM)-Accessing HTML & CSS through DCOM Dynamic content styles & positioning-Event bubbling-data binding.	18
IV	**JavaScript:** Client-side scripting, What is JavaScript, How to develop JavaScript, simple JavaScript, variables, functions, conditions, loops and repetition, Advance script, JavaScript and objects, forms and validations.	18
V	**AJAX:** Introduction, advantages & disadvantages, Purpose of it, Ajax based web application. Java Script & AJAX: Introduction to array operators, making statements-date & time-mathematics- strings-Event handling-form properties. AJAX. **MySQL:** Create a new databases, Create tables in a database, Manipulate the database table insert, update, delete and edit, Execute queries against a database, Retrieve data from a database, Create a stored procedures in a database, Create view in a database, set constraints on tables, procedures and views.	18
	Total Hours	**90**

Text Books	
1.	Pankaj Sharma,(2013), reprint, “Web Technology”, Sk Kataria &Sons Bangalore.(UNIT I, II, III & IV).
2.	Achyut S Godbole & Atul Kahate,(2007),”Web Technologies”, 2nd Edition. (UNIT V: AJAX).
3.	Charles A. Bell, (2012), Expert MySQL, Apress.
Reference Books	
1.	Laura Lemay, Rafe Colburn , Jennifer Kyrnin,(2016), Mastering HTML, CSS & Javascript Web Publishing.
2.	DT Editorial Services (Author)(2016), HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery), Paperback, 2nd Edition.
3.	Purewal, Semmy.(2014), “Learning Web App Development: Build Quickly with Proven JavaScript Techniques. " O'Reilly Media, In,
Web Resources (Swayam / NPTEL)	
1.	https://www.w3schools.com/whatis/default.asp
2.	https://www.edureka.co/blog/web-development-tutorial/
3.	https://www.tutorialspoint.com/website_development/index.htm

Course Code	Course Name	Category	Hours / Week	Credits
24BIT36A	Internet of Things	Allied – III	4	3

Course Objectives

The course intends to cover

- To understand the concepts of IoT and its associated protocols.
- To learn methods for analyzing data in IoT systems.
- To design and develop IoT infrastructure for widely used applications.
- To explore and report solutions for IoT privacy, security, and vulnerabilities.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Understand the fundamentals of the Internet of Things.	K1
CLO2	Know the basics of communication protocols and the designing principles of Web connectivity.	K2
CLO3	Understand IoT platform design methodology, application development through case studies.	K2-K3
CLO4	Apply Raspberry Pi, WAMP basics for its role in IoT Systems.	K2-K3
CLO5	Learn about the privacy and security issues in IoT	K2-K3
K1 - Remember; **K2** - Understand; **K3** - Apply;		

CLO – PLO Mapping

CLOs/PLOs	PO1	PO2	PO3	PO4	PO5
CO1	2	2	3	2	2
CO2	1	1	2	2	2
CO3	2	1	2	1	1
CO4	2	2	3	2	2
CO5	3	3	3	1	1
3 -Substantial(high)		**2**-Moderate(medium)		**1**-Slight(low)	

Allied - III: Internet of Things

Unit	Content	No. of. Hours
I	**Introduction**: Introduction - Definition & characteristics of IoT - physical design of IoT - logical design of IoT - IoT enabling Technologies - IoT levels & Deployment templates. Domain specific IoT: Home Automation - Cities - Environment - Energy - Retail - Logistics - Agriculture - Industry - Health and lifestyle.	12
II	**IoT and M2M:** IoT and M2M - Difference between IoT and M2M - SDN and NFV for IoT - IoT systems management - SNMP - YANG – NETOPEER.	12
III	**IoT Specification:** IoT platforms design Methodology - purpose and specification - process specification - Domain model specification - Information model specification - Service specification - IoT level specification - functional view specification - operational view specification - Device and component Integrators - Application Development - Case study on IoT System using weather monitoring.	12
IV	**IoT and Cloud Computing: IoT** physical devices and End points, Basic building blocks of IoT devices - Raspberry Pi - Linux on Raspberry Pi - IoT physical servers & cloud computing - WAMP - Xively cloud for IoT - Python Web application framework - Amazon web services for IoT.	12
V	**Security Management of an IoT Ecosystem:** Introduction- Security Requirements of an IoT Infrastructure- Authentication, Authorization, and Audit Trial (AAA) Framework- Defense-in- Depth- Security Concerns of Cloud Platforms-Distributed Denial of Service (DDoS)- Virtual Machine/Hypervisor-Based Security Threats- Threat Monitoring and Intelligence- Security Concerns in IoT Components.	12
	Total Hours	**60**

Text Books

1.	Arshdeep Bagha and Vijay Madisetti (2015), “Internet of Things: A Hands-on Approach”, Universities Press, ISBN: 9788173719547.
2.	Pethuru Raj and Anupama C.Raman (2017), “The Internet of Things: Enabling Technologies, Platforms and Use Cases”, CRC Press.

Reference Books

1.	Guillaume Girardin, Antoine Bonnabel, Dr. Eric Mounier (2014), “Technologies Sensors for the Internet of Things Businesses & Market Trends 2014 -2024”, Yole Development
2.	Matt Richardson & Shawn Wallace, O'Reilly (2014), “Getting Started with Raspberry Pi”.

Course Code	Course Name	Category	Hours /Week	Credits
24BIT37P	Lab: Interactive JavaScript Programming	SEC – I	2	2

Lab: Interactive JavaScript Programming

S. No.	List of Programs	No. of Hours
Level 1: Basics of JavaScript & User Interaction		
1.	Create a basic calculator based on user input for addition, subtraction, multiplication, and division.	2
2.	Create a simple game where the user guesses a random number, and the program provides hints (higher/lower).	4
3.	Create a JavaScript Program to Manipulate Strings and Arrays.	4
Level 2: DOM Manipulation & Form Handling		
4.	Using JavaScript, validate a registration form with fields like name, email, password, and phone number.	2
5.	Build a word and character counter for a text area input field.	2
6.	Build a dynamic to-do list where users can add, remove, and mark tasks as completed.	4
Level 3: Timers & Real-Time Interaction		
7.	Implement a stopwatch with start, stop, and reset functionalities using JavaScript's setInterval().	2
8.	Display a real-time digital clock using a `Date` object and update it every second.	4
Level 4: Dynamic Content & UI Effects		
9.	Implement an image slider that changes images automatically or using next/previous buttons.	2
Level 5: Working with APIs		
10.	Use the Fetch API to get JSON data from an external source and display it on a webpage.	4
Capstone Project		
Productivity Hub – A Multi-Utility JavaScript Web App (An Interactive Collection of Everyday Tools Built Using HTML, CSS, and Vanilla JavaScript)		
	Total Hours	**30**

Components for Internal Assessment and Distribution of Marks for CIA and ESE (Theory)

Max Marks	Marks for		Components for CIA						
	CIA	ESE	CIA		Model		Attendance	Active Engagement	Total
			Actual	Weightage	Actual	Weightage			
100	25	75	50	**5**	75	**10**	**5**	**5**	**25**

Question Paper Pattern

Component	Duration in Hours	Section A			Section B			Section C			Total
		Type of Question	No. of Questions	Marks	Type of Question	No. of Questions	Marks	Type of Question	No. of Questions	Marks	
CIA	2	MCQ	8	8x1=8	Either or	3	3x6=18	Either or	3	3x8=24	50
Model Exam / **ESE**	3	MCQ	10	10x1=10	Either or	5	5x5=25	Either or	5	5x8=40	75

Components for Internal Assessment and Distribution of Marks for CIA (Lab)

Max Marks	Marks for		Components for CIA						
	CIA	ESE	Test		Model		Experiments / Programs	Observation	Total
			Actual	Weightage	Actual	Weightage	Marks		
100	40	60	50	**10**	60	**15**	**10**	**5**	**40**

Examination Pattern

Component	Duration in Hours	Marks			Total Marks
		Practical Exam	Record	Weightage	
Test	2	50	-	**10**	50
Model	3	60	-	**15**	60
Experiments	-	-	-	**10**	10
Observation	-	-	-	**05**	05
Total Marks - CIA				**40**	**40**
ESE	3	50	10	-	**60**

Components for Internal Assessment and Distribution of Marks for CIA (Foundation Course -Theory)*

Max Marks	Marks for		Components for CIA				
	CIA	ESE	CIA		Model		Total
			Actual	Weightage	Actual	Weightage	
50	50	-	50	25	50	25	50

*FC-III-Indian Knowledge Systems(IKS)-A self-study course with an open book assessment

Question Paper Pattern

Duration in Hours	Mode of Exam	Type of Questions	No. of Questions	Marks
2	Offline	Open Choice	5 (Out of 8)	5 x 10=50

Components for and Distribution of Marks for ESE (Theory) Ability Enhancement Compulsory Courses (AECC) & Question Paper Pattern

Duration in Hours	Mode of Exam	Type of Questions	No. of Questions	Marks
2	Online	MCQ	50	50x1=50