KG College of Arts and Science
Autonomous Institution | Affiliated to Bharathiar University
ISO 9001-2015 Certified Institution
KGiSL Campus, Saravanampatti, Coimbatore – 641 035

Regulations 2024-25 for Postgraduate Programme

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

Programme: M.Sc. Software System (M.Sc. SS)
Programme Code: MSS

(Applicable for the Students admitted during the academic year 2024-25 onwards)

Eligibility

The student should have passed Higher Secondary Examination with Mathematics / Business Mathematics / Applied Mathematics. (As per the eligibility condition given by Bharathiar University Ref. BU/R/B3-B4/ Eligibility Condition /2024/9206 dated 24/5/2024).

Program Learning Outcomes (PLOs)

The successful completion of the M.Sc. Software System programme shall enable the students to:

PLO1	Assimilate technical concepts well to contribute code reviews and meet modern demands effectively in the area of Artificial Intelligence and Machine Learning.
PLO2	Develop skills for effective leadership in IT support, Network Architect, Web Developer and successful Entrepreneur as well.
PLO3	Use logical skills, analytical skills and programming skills relevant to Full Stack Development and DB Administration.
PLO4	Creatively use the knowledge in computational science, mathematics and statistics for Data Analysis, Data Science and Business Analysis to solve real world problems.
PLO5	Engage in lifelong learning with ethical principles for the betterment of self as well as society.

M.Sc. Software System

Distribution of Credits and Hours for all the Semesters

Part	Course Category	No. of Courses	Hours		Credits	Total Credits		Semester
I	Language	4	4 X 3	12	4 X 3	12	12	1 - 4
II	English	4	4 X 3	12	4 X 3	12	12	1 - 4
III	Core Theory (5 hrs./week)	14	14 X 5	70	14 X 4	56	200	1 – 3, 5 - 9
	Core Theory (4 hrs./week)	9	9 X 4	36	9 X 4	36		4 - 9
	Core Lab (4 hrs./week)	16	16 X 4	64	16 X 3	48		1 - 9
	Allied	4	4 X 4	16	4 X 3	12		1 - 4
	Elective	3	3 X 4	12	3 X 4	12		5, 6, 8
	Project Work and Internship	2	-	-	2 X 13	26		7 & 10
	Skill Enhancement Course (SEC) Theory	2	2 X 4	8	2 X 4	8		5 & 9
	Skill Enhancement Course (SEC) Lab	1	1 X 2	2	1 X 2	2		4
IV	Ability Enhancement Compulsory Course (AECC)	3	3 X 2	6	3 X 2	6	6	1, 2, 4
	Ability Enhancement Compulsory Course (AECC) – Online Course MOOC	1	-	-	1 X 2	2	2	3
	Foundation Course (FC)	1	1 X 2	2	1 X 2	2	2	3
Total		**64**		**240**		**234**	**234**	

Consolidated Semester wise and Component wise Hours and Credits Distribution

Semester	Part I		Part II		Part III		Part IV		Total	
	Hrs.	Credits	Hrs.	Credits	Hrs.	Credits	Hrs.	Credits	**Hrs.**	**Credits**
1	3	3	3	3	22	17	2	2	**30**	**25**
2	3	3	3	3	22	17	2	2	**30**	**25**
3	3	3	3	3	22	17	2	4	**30**	**27**
4	3	3	3	3	22	19	2	2	**30**	**27**
5	-	-	-	-	30	26	-	-	**30**	**26**
6	-	-	-	-	30	26	-	-	**30**	**26**
7	-	-	-	-	-	13	-	-	-	**13**
8	-	-	-	-	30	26	-	-	**30**	**26**
9	-	-	-	-	30	26	-	-	**30**	**26**
10	-	-	-	-	-	13	-	-	-	**13**
Total	**12**	**12**	**12**	**12**	**208**	**200**	**8**	**10**	**240**	**234**

Curriculum

M.Sc. Software System

Semester – 1									
Course Code	**Part**	**Course Category**	**Course Name**	**Hrs. / week**	**Examination**				**Credits**
					Duration in hrs.	**Max Marks**			
						CIA	**ESE**	**Total**	
24TAM11L	I	Language – I	Tamil – I	3	3	25	75	100	3
24HIN11L			Hindi – I						
24MAL11L			Malayalam – I						
24FRE11L			French – I						
24ENG12L	II	English – I	English – I	3	3	25	75	100	3
24MSS13C	III	Core – I	C Programming	5	3	25	75	100	4
24MSS14P	III	Core Lab -I	**Lab:** C Programming	4	3	40	60	100	3
24MSS15C	III	Core – II	Digital Electronics and Microprocessor	5	3	25	75	100	4
24MSS16P	III	Core Lab-II	**Lab:** HTML	4	3	40	60	100	3
24MSS17A	III	Allied – I	Numerical Methods	4	3	25	75	100	3
24QUA1AE	IV	AECC - I	Quantitative Aptitude	2	2	-	50	50	2
Total				**30**				**750**	**25**

Semester – 2									
Course Code	**Part**	**Course Category**	**Course Name**	**Hrs. / week**	**Examination**				**Credits**
					Duration in hrs.	**Max Marks**			
						CIA	**ESE**	**Total**	
24TAM21L	I	Language – II	Tamil – II	3	3	25	75	100	3
24HIN21L			Hindi – II						
24MAL21L			Malayalam – II						
24FRE21L			French – II						
24ENG22L	II	English – II	English – II	3	3	25	75	100	3
24MSS23C	III	Core – III	C++ Programming	5	3	25	75	100	4
24MSS24P	III	Core Lab -III	**Lab:** C++ Programming	4	3	40	60	100	3
24MSS25C	III	Core - IV	Data Structures	5	3	25	75	100	4
24MSS26P	III	Core Lab-IV	**Lab:** Data Structures	4	3	40	60	100	3
24MSS27A	III	Allied - II	Applied Mathematics	4	3	25	75	100	3
24SOF2AE	IV	AECC - II	Soft Skills	2	2	-	50	50	2
Total				**30**				**750**	**25**

Semester – 1

Part – I : Language I

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours / Week	Credits
24TAM11L	Tamil - I	Part - I	3	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	**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	Part - 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
24MSS13C	C Programming	Core - I	5	4

Course Objectives

This course intends to cover:

- Basics of C Programming.
- Real world problems using control structures, arrays, functions and pointers.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Recite the basics of programming languages.	K1
CLO2	Understand the concepts of variables, expressions, control structures, arrays and strings.	K2
CLO3	Infer the concept of functions, structures and union.	K3
CLO4	Apply the concepts of pointers.	K3
CLO5	Explore the BIOS and DOS Interrupts.	K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze		

CLO – PLO Mapping

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

Core – I : C Programming

Unit	Content	No. of Hours
I	**Programming Languages:** Planning the Computer Program – Flow Chart – Types of Logic used in Flowchart – Computer Languages – Hierarchy of Programming Languages – Classifications of Programming Languages – Popular Programming Languages – Program development process – Characteristics of a Good Program – Program Development Process – Error in Programming.	16
II	**Overview of C:** An overview of C – Data types and sizes – Declarations – Variables – Constants – Operators – Expressions – Formatted and Unformatted Input / Output statements - Program Control Structures – Loop Control Structures – Arrays – Strings.	15
III	**Functions:** Introduction- Function Arguments – Function Prototype – Recursion – Storage Classes. Structures and Union**:** Structures –Array of Structures- Unions–Self - Referential Structures – Dynamic Memory Allocation.	15
IV	**Pointers:** Pointers – Introduction – Pointers and Arrays – Pointers and Strings – Pointers and Functions - Pointers and Structures.	14
V	**File processing**: Basic methods for FILE - Sequential Files – Random Access Files – C Preprocessors – Command Line Arguments Low Level Programming in C – Calling BIOS and DOS Interrupts – Port I/O Functions to Access CMOS – Keyboard and Speaker – Writing into Video Buffer.	15
	Total Hours	**75**

Text Books	
1.	Yeswanth Kanetkar (2022), Let us C, 19th Edition, BPB.
2.	Yeswanth Kanetkar TSR through C, BPB.
Reference Books	
1.	Balagurusamy.E (2019), Programming in ANSI C, 8th Edition, Tata McGraw Hill.
2.	Ashok N.Kamthane (2006), Programming with ANSI and Turbo C, Pearson Education Asia.
3.	Deitel & Deitel (2010), C How to Program, 6th Edition, PHI/Pearson Education Asia.
Web Resources (Swayam, NPTEL)	
1.	https://onlinecourses.nptel.ac.in/noc24_cs02/preview
2.	https://onlinecourses.swayam2.ac.in/cec20_cs02/preview

Course Code	Course Name	Category	Hours / Week	Credits
24MSS14P	Lab: C Programming	Core Lab - I	4	3

S. No.	List of Programs	
1.	Basic programs in C.	
2.	Find the sum, average, standard deviation for a given set of numbers.	
3.	Develop a program using control structures.	
4.	Develop a program using loop.	
5.	Program to print magic square using relational operators.	
6.	Develop a program to sort the given set of numbers in ascending order using arrays.	
7.	Check whether the given string is a palindrome or not using pointers.	
8.	Develop a program to find the length of string using pointers.	
9.	Develop a program to compare two strings using pointers	
10.	Develop a program to count the number of vowels in the given sentence using loop.	
11.	Develop a program using recursive function.	
12.	Print the students Mark sheet assuming roll no, name, and marks in 5 subjects in a structure. Create an array of structures and print the mark sheet in the university pattern.	
13.	Function using pointers to add two matrices and to return the resultant matrix to the calling functions.	
14.	Develop a program which receives two filenames as arguments and check whether the file contents are same or not. If same delete the second file.	
15.	Develop a program which takes a file as command line argument and copy it to another file. At the end of the second file write the total i) no of chars ii) no. of words and iii) no. of lines.	
16.	Perform basic operations using Github platform.	
	Total Hours	**60**
Text Books		
1.	Yeswanth Kanetkar (2022), Let us C, 19th Edition, BPB.	
2.	Yeswanth Kanetkar TSR through C, BPB.	
Reference Books		
1.	Balagurusamy.E (2019), Programming in ANSI C, 8th Edition, Tata McGraw Hill.	
2.	Ashok N.Kamthane (2006), Programming with ANSI and Turbo C, Pearson Education Asia.	
3.	Deitel & Deitel (2010), C How to Program, 6th Edition, PHI/Pearson Education Asia.	
Web Resources (Swayam / NPTEL)		
1.	https://onlinecourses.nptel.ac.in/noc24_cs02/preview	
2.	https://onlinecourses.swayam2.ac.in/cec20_cs02/preview	

Course Code	Course Name	Category	Hours / Week	Credits
24MSS15C	Digital Electronics and Microprocessor	Core - II	5	4

Course Objectives

The course intends to cover:

- Principles of digital electronics, binary numbers, boolean algebra, logic gates and truth tables.
- Combinational logic circuits, complex logic circuits, multiplexers and decoders.
- Architecture and operation of the 8085 microprocessors.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Identify and summarize the basic characteristics of various number systems and logic gates.	K1, K2
CLO2	Explain the functionalities of basic combinational circuits like half adders, full adders, subtractors, multiplexers, and demultiplexers.	K2
CLO3	Analyze the operation and functionality of various sequential circuits like flip-flops, counters, and shift registers.	K4
CLO4	Identify the functional units of the 8085 architecture and explain the basic concepts of 8085 operation, including instruction and data formats, addressing modes, and machine cycles.	K1, K2
CLO5	Apply their knowledge of 8085 microprocessor to interface with external devices and develop basic programs to control their operation.	K3
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** – Analyze		

CLO-PLO Mapping

CLOs/PLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	-	2	2
CLO2	3	3	-	2	-
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 Electronics and Microprocessor

Unit	Content	No. of Hours
I	**Number System 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 Microprocessors:** Pin Diagram – Architecture of 8085 - bus organization-registers- ALU- control section- instruction format- data format- addressing modes-Programming the 8085: Arithmetic and Logical Programs. Memory Read Machine Cycle – Memory Write Machine Cycle.	15
V	**I/O Interfacing:** I/O interfacing – Parallel communication interface (8255 PPI) - Serial communication interface (8251 USART) - Interrupts - Interrupt controller (8259) – DMA controller – Programming and applications Case studies: Time Delay Program – Traffic Light Control System – Water Level Controller–Stepper Motor Control – Interfacing DAC – Interfacing ADC – Temperature Measurement.	15
	Total Hours	**75**

Text Books	
1.	Morris Mano (2022), Computer System Architecture, 3rd Edition, Pearson Education.
2.	Salivahanan S (2012), Digital Circuits and Design, 3rd Edition, McGraw Hill Education.
3.	Ramesh Gaonkar (2019), Microprocessor Architecture, Programming and Application with the 8085, 6th Edition, Pearson International Publishing.
Reference Books	
1.	Puri V K (2017), Digital Electronics: Circuits and Systems, McGraw Hill Education.
2.	Badri Ram (2012), Advanced Microprocessor and Interfacing, McGraw Hill Education.
Web Resources (Swayam / NPTEL)	
1.	https://onlinecourses.swayam2.ac.in/cec24_cs09/preview
2.	https://onlinecourses.nptel.ac.in/noc24_ee46/preview

Course Code	Course Name	Category	Hours / Week	Credits
24MSS16P	Lab: HTML	Core Lab - II	4	3

S. No.	List of Programs
1.	Develop a static web page using basic formatting tags.
2.	Develop a web page using the concept of hyperlink.
3.	Create a web page using various attributes of table tag.
4.	Develop a HTML document to display Text ordered and unordered Lists.
5.	Display images and texts using image tag and it's various attributes.
6.	Develop a website using frames and frameset tag.
7.	Design a webpage using form tag and it's elements.
8.	Create a style sheet that defines the style with class method, id method.
9.	Create an internal style sheet that defines style for positioning elements and setting the background color / image.
10.	Perform basic arithmetic operations using JavaScript.
11.	Create a JavaScript program to access various HTML elements.
12.	Perform form fields validation using JavaScript.
	Total Hours **60**
Text Books	
1.	MG Martin (2018), HTML: Basic Fundamental Guide for Beginners.
2.	Jon Duckett (2010), Beginning HTML, XHTML, CSS, and JavaScript, Wiley Publishing.
Reference Books	
1.	C.Xavier (2007), World Wide Web Design with HTML, TMH.
2.	Faithe Wempen (2012), HTML 5 Step by Step, Microsoft Press, PHI.
3.	David Sawyer McFarland (2009), CSS – The Missing Manual, 2nd Edition, Pogue Press, O'Reilley Willey Publishing.
Web Resources (Swayam/NPTEL)	
1.	https://onlinecourses.swayam2.ac.in/aic20_sp11/preview

Course Code	Course Name	Category	Hours / Week	Credits
24MSS17A	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} Edition, 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
			Actual	Weightage	Actual	Weightage	Weightage	Actual	Weightage			
100	25	75	50	**5**	50	**5**	**5**	75	**10**	**5**	**5**	**25**

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
			Actual	Weightage	Actual	Weightage	Actual	Weightage		
100	40	60	50	**10**	50	**10**	60	**15**	**5**	**40**

Examination Pattern

Component	Duration in Hrs.	Marks			Weightage
		Practical	Record	Total Marks	
Test – I	2	50	-	50	10
Test – II	2	50	-	50	10
Model	3	60	-	60	15
ESE	3	50	10	60	-

Part – IV : Ability Enhancement Compulsory Courses

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours/Week	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 particularday - 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	Credit
24TAM21L	Tamil – II	Language - II	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)	**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)

Course Code	Course Name	Category	Hours/ Week	Credits
24ENG22L	English-II	Part - 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 the meeting 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 Teaching Reading. 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
24MSS23C	C++ Programming	Core - III	5	4

Course Objectives

The course intends to cover:

- C++ concepts from the basis of C Language.
- Object Oriented Programming concepts.
- Variables, type conversion, control flow, subroutines and inheritance.
- Objects, classes and methods.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Reminisce the basic concepts of OOPs.	K1
CLO2	Understand the functions in C++.	K2
CLO3	Apply the constructors, destructor, operator overloading and type conversion in C++.	K3
CLO4	Explore the different types of inheritance.	K4
CLO5	Create the file pointers using I/O streams.	K6
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** – Analyze; **K6** - Create		

CLO-PLO Mapping

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

Core-III: C++ Programming

Unit	Content	No. of Hours
I	**Principles of Object-Oriented Programming:** Software crisis - Software Evolution – Procedure oriented programming -Object oriented programming paradigm - Basic concepts and benefits of OOP - Object oriented language - Application of OOP - structure of C++ - Applications of C++ - Tokens, Expressions and control structures - Operators in C++ - Manipulators.	15
II	**Functions in C++:** Function prototyping - Call by reference - Return by reference – Inline functions - Default, Const arguments - Functions overloading - Friend and virtual functions - Classes and Objects - Member functions - Nesting of member functions - Private member functions - Memory allocations for objects - Static data numbers - Static member functions - Arrays of objects - Objects as function arguments – Friend functions - Returning objects - Const member functions - Pointers to members	16
III	**Constructors:** Parameterized constructor - Multiple constructors in a class - Constructor with default arguments - Dynamic initialization of objects - Copy and dynamic constructors - Destructors - Operator overloading -Overloading unary and binary operators – Overloading operators using friend functions.	14
IV	**Inheritance:** Defining derived classes - Single inheritance - Making a private member inheritable - Multiple inheritance - Hierarchy inheritance - Hybrid inheritance - Virtual base classes – Abstract classes - Constructed and derived classes - Member classes - Nesting of classes.	15
V	**Streams:** String I/O - Character I/O - object I/O - I/O with multiple objects - File pointers – Disk I/O with member functions - Error handling - Redirection - Command line arguments - Overloading extraction and insertion operators	15
	Total Hours	**75**
Text Books		
1.	Balagurusamy E (2013), Object Oriented Programming with C++, New Delhi 6th Edition, Tata McGraw Hill Education (India) Private Limited.	
2.	Ashok N.Kamthane (2003), Object - Oriented Programming with ANSI & Turbo C++, First Indian Print, Pearson Education.	
Reference Books		
1.	Paul Deitel, Harvey Deitel (2014), C++ How to Program, 9th edition, PHI.	
2.	Herbert Schildt (1998), C++ The Complete Reference, Tata McGraw Hill.	
Web Resources (Swayam / NPTEL)		
1.	https://onlinecourses.nptel.ac.in/noc21_cs02/preview	
2.	https://onlinecourses.nptel.ac.in/noc24_cs44/preview	
3.	https://onlinecourses.nptel.ac.in/noc21_cs38/preview	
4.	https://onlinecourses.nptel.ac.in/noc22_cs103/preview	

Course Code	Course Name	Category	Hours / Week	Credits
24MSS24P	Lab: C++ Programming	Core Lab - III	4	3

S. No.	List of Programs	
1.	Program to get and print the string.	
2.	Program demonstrating a stack implementation operation.	
3.	Create a class named Arithmetic that carries out basic arithmetic operations as member functions.	
4.	Program for constructors, destructors, and inline functions.	
5.	Program to implement increment ++ and decrement -- operator overloading in C++.	
6.	Implement operator overloading by creating a STRING class to concatenate two strings using the ++ and to compare two strings using the = = operator.	
7.	Program to find the number of vowels, consonants, digits and white spaces in the given string.	
8.	Create a class SHAPE which consists of two VIRTUAL FUNCTIONS to calculate area and perimeter of various figures. Derive three classes SQUARE,RECTANGLE, TRIANGE . Calculate Area and Perimeter of each class separately to display the result.	
9.	Create a friend function that accepts objects of two classes along with their respective integer and float values, and then displays the result based on the provided data.	
10.	Implement a function overloading in C++.	
11.	Check whether the given string is a palindrome or not using C++	
12.	Create a file and to display the contents of that file with line numbers.	
13.	Program that merges the contents of two files into a single file.	
	Total Hours	**60**
Text Books		
1.	Balagurusamy E (2013), Object Oriented Programming with C++, 6th Edition, McGraw Hill Education (India) Private Limited, New Delhi.	
2.	Ashok N.Kamthane, (2003), Object-Oriented Programming with ANSI & Turbo C++, First Indian, Pearson Education.	
3.	Robert Lafore (1993), Object Oriented Programming in Turbo C++, Galgotia Publications.	
Reference Books		
1.	Paul Deitel, Harvey Deitel (2014), C++ How to Program, 9th edition, PHI.	
2.	Herbert Schildt (1998), C++ The Complete Reference, Tata McGraw Hill.	
3.	Bjarne Stroustrup (1991), The C++ Programming, Addition Wesley.	
Web Resources (Swayam / NPTEL)		
1.	https://onlinecourses.nptel.ac.in/noc21_cs02/preview	
2.	https://onlinecourses.nptel.ac.in/noc24_cs44/preview	
3.	https://onlinecourses.nptel.ac.in/noc21_cs38/preview	
4.	https://onlinecourses.nptel.ac.in/noc22_cs103/preview	

Course Code	Course Name	Category	Hours / Week	Credits
24MSS25C	Data Structures	Core - IV	5	4

Course Objectives

The course intends to cover:

- Various data structures algorithms.
- Data representation techniques such as Stack, Queue, List, Trees, Graphs.
- Sorting and searching methods.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Recite the basics of algorithm and elementary data structures.	K1
CLO2	Understand the various types of linked lists and dynamic storage management.	K2
CLO3	Infer the concepts of trees and binary tree traversal	K3
CLO4	Understand and apply graph algorithms for efficient data representation and problem-solving	K3
CLO5	Apply sorting techniques to organize and process data efficiently for various computational problems	K3
K1 - Remember; K2 - Understand; K**3** - Apply		

CLO – PLO Mapping

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

Core: IV Data Structures

Unit	Content	No. of Hours
I	**Introduction:** Overview - System Life Cycle – Algorithm Specification –**Arrays:** The Abstract Data Type – Arrays in C. **Sparse Matrix:** The Abstract Data Type – Sparse Matrix Representation - Transposing a Matrix. **Stack and Queues:** Stacks – Stacks using Dynamic Arrays – Queues – Circular Queues using Dynamic Arrays - Evaluation of Expressions - Multiple Stacks And Queues. **Chapters :** 1.1, 1.3, 2.1, 2.5.1, 2.5.2, 2.5.3, 3.1, 3.2, 3.3, 3.4, 3.6, 3.7	15
II	**Linked Lists:** Singly Linked List – Linked Stacks and Queues – Polynomial Representation - Adding Polynomials – Circular List Representation of Polynomials - Operations for Circularly Linked Lists - Doubly Linked Lists. **Chapters :** 4.1, 4.3, 4.4.1, 4.4.2, 4.4.4, 4.5.2, 4.8	15
III	**Trees:** Terminology – Representation of trees - Binary Trees – Binary Tree traversals - Threaded Binary Tress. **Binary Search Trees**: Definition - Searching a Binary Search Tree - Insertion into a Binary Search Tree - Deletion from a Binary Search Tree – Selection Trees. **Chapters :** 5.1, 5.2, 5.3, 5.5, 5.7.1, 5.7.2, 5.7.3, 5.7.4, 5.8	15
IV	**Graphs:** The Graph Abstract Data Type - Depth First Search - Breadth First Search - Spanning Trees - Minimum Cost Spanning Trees - Shortest Paths And Transitive Closure. **Chapters :** 6.1, 6.2.1, 6.2.2, 6.2.4, 6.3, 6.4	15
V	**Sorting:** Insertion sort – Quick sort - Merge sort – Heap sort – Sorting on several keys. **Hashing:** Introduction - Static Hashing - Dynamic Hashing. **Chapters :** 7.1, 7.2, 7.3, 7.5, 7.6, 7,7, 8.1, 8.2, 8.3	15
	Total Hours	**75**

Text Books	
1.	Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed (2008), Fundamentals of Data Structures in C, Second Edition, Universities Press
Reference Books	
1.	Data Structures Using C (2011), Aaron M.Tenenbaum, Yedidyah Langsam, Moshe J.Augenstein, Ninth Edition
2.	Programming and Data Structures(2009), Ashok N.Kamthane, First Edition
Web Resources (Swayam / NPTEL)	
1.	https://onlinecourses.swayam2.ac.in/nou24_cs06/preview
2.	https://onlinecourses.swayam2.ac.in/cec19_cs04/preview
3.	https://onlinecourses.swayam2.ac.in/aic20_sp06/preview

Course Code	Course Name	Category	Hours / Week	Credits
24MSS26C	Lab: Data Structures using C	Core Lab - IV	4	3

S. No.	List of Programs
1	Implementation of matrix operations using arrays.
2	Implementation of Stack using array.
3	Implementation of Queue using array.
4	Implementation of Singly Linked List.
5	Implementation of Doubly Linked List.
6	Implementation of Circular Linked List.
7	Implementation of Stack using linked list.
8	Implementation of Queue using linked list.
9	Evaluation of postfix expression.
10	Implementation of Binary Tree and Binary tree traversal techniques.
11	Implementation of Linear search
12	Implementation of Binary search
13	Implementation of Insertion Sort
14	Implementation of Quick Sort
15	Implementation of Depth First Search traversal(DFS) for a graph
16	Implementation of Breadth First Search traversal(BFS) for a graph
Total Hours	**60**

Text Books	
1.	Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed (2008), Fundamentals of Data Structures in C, Second Edition, Universities Press
2.	Data Structures Using C (2011), Aaron M.Tenenbaum, Yedidyah Langsam, Moshe J.Augenstein, Ninth Edition
Reference Books	
1.	Programming and Data Structures(2009), Ashok N.Kamthane, First Edition
2.	Mark Allen Weiss, Data Structures and Algorithm Analysis in C, 2nd Edition, Pearson Education Asia.
Web Resources (Swayam / NPTEL)	
1.	https://onlinecourses.swayam2.ac.in/nou24_cs06/preview
2.	https://onlinecourses.swayam2.ac.in/cec19_cs04/preview
3.	https://onlinecourses.swayam2.ac.in/aic20_sp06/preview

Course Code	Course Name	Category	Hours / Week	Credits
24MSS27A	Applied Mathematics	Allied - II	4	3

Course Objectives

The Course intends to cover

- The fundamental concepts of Mathematics by exploration

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Relate and apply binomial, exponential, logarithmic & summation series.	K1
CLO2	Recall the basic concepts of matrices in solving linear problems.	K1
CLO3	Remember the formulas and problems in differentiation.	K1
CLO4	Classify the different concepts of integration through simple formulas and problems.	K2
CLO5	Recognise measures of central tendency and dispersion in data analysis.	K1
K1 - Remember; **K2** - Understand		

Allied - II: Applied Mathematics

Unit	Content	No. of Hours
I	Binomial, Exponential and Logarithmic series (Statement only) – Applications to summation of series only.	12
II	Quadratic Equation – Matrices – Determinant of a matrix – Inverse of a matrix – Characteristic equation of a matrix – Eigen values – Solutions of simultaneous linear equations in three variables using matrix.	12
III	Differentiation of algebraic, Exponential, logarithmic and trigonometric functions – physical interpretations of derivatives with reference of velocity and acceleration – Application of differentiation of maxima and minima (simple problems).	12
IV	Partial differentiation (Simple problems) – Integration of simple algebraic, exponential and trigonometric functions – substitution method – Integration by parts.	12
V	Measures of central tendency – Mean, Median, Mode - Measure of dispersion – Range – Standard deviation - Mean deviation - Correlation – Karl pearson's coefficient of correlation – rank correlation.	12
	Total Hours	**60**

Text Books	
1.	S. Narayanan., T.K. Manickavachagom Pillay.(2009), Algebra (Vol. I) , Viswanathan, S. Printers & Publishers Pvt Ltd. Unit I : Chapter 3 : Section 3.1 - 3.11 Chapter 4 : Section 4.1- 4.11 Chapter 5 : Section 5.1-5.7 Unit V: Chapter 7 : Section 7.177- 7.266 Chapter 8 : Section 8.268 - 8.328 Chapter 10 : Section 10.377- 10.389
2.	S. Narayanan., T.K. Manickavachagom Pillay (2009), Calculus (Vol. I &II), Viswanathan, S. Printers & Publishers Pvt Ltd. Unit II : Chapter 1 : Section 1.1- 17.1 Chapter 2: Section 2.1- 16.1 Unit III: Chapter 2 : Section 2.6- 3.3 Chapter 5 : Section 5.6- 5.6 Unit IV: Chapter 8 : Section 8.1-8.5
3.	S.P. Gupta (2001), Statistical Methods, Sultan Chand and Sons. Unit V: Chapter 7 : Section 7.177- 7.266 Chapter 8 : Section 8.268 - 8.328 Chapter 10 : Section 10.377- 10.389
Reference Book	
1.	M.K. Venkataraman, Engineering Mathematics (Vol1,2), The National Publishing Co.
Web Resources (Swayam / NPTEL)	
1.	https://archive.nptel.ac.in/courses/111/101/111101153/
2.	https://archive.nptel.ac.in/courses/111/101/111101164/

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.	Marks			Weightage
		Practical	Record	Total Marks	
Test – I	2	50	-	50	10
Test – II	2	50	-	50	10
Model	3	60	-	60	15
ESE	3	50	10	60	-

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