BACHELOR OF VOCATION (SOFTWARE DEVELOPMENT AND SYSTEM ADMINISTRATION)

SYLLABUS – 2025

Department of Software Development and System Administration

St. Joseph's College (Autonomous)

Tiruchirappalli - 620002, Tamil Nadu, India

Programme Outcomes (POs)

POs - UG

1. Graduates will be able to apply the concepts learnt, in real life situations with analytical skills.
2. Graduates with acquired skills and enhanced knowledge will be employable/ become entrepreneurs or will pursue higher Education.
3. Graduates with acquired knowledge of modern tools and communicative skills will be able to contribute effectively as team members.
4. Graduates will be able to read the signs of the times analyze and provide practical solutions.
5. Graduates imbibed with ethical values and social concern will be able to appreciate cultural diversity, promote social harmony and ensure sustainable environment.

Programme Specific Outcomes (PSO)

1. **PSO1:** Understand the fundamental concepts of the design and development of software solutions and management of computational systems.
2. **PSO2:** Analyze and develop computer programs in the areas related to web design, mobile application design on par with industry requirements.
3. **PSO3:** Acquaint themselves with the state of the art trends in software development and provide novel ideas and resolutions in the area of software development.
4. **PSO4**: Ability to work as an individual and in collaboration with teams by applying imbibed technological skills to effectively provide optimal software products.
5. **PSO5:** Equip them to ethically manage and create computational systems which cater to practical needs of the society

B. VOC. SOFTWARE DEVELOPMENT AND SYSTEM ADMINISTRATION PROGRAMME PATTERN							
Course Details							
Semester	**Part**	**Course Code**		**Course Title**		**Hrs.**	**Credit**
1	I	**25USS110001**	**DSL**	Language l Tamil – 1		2	2
	II	**25USS120101**	**DSL**	Language English – 1		2	2
	III	**25USS130201**	**CC**	C programming		3	3
		25USS130401	**AC**	Mathematics-I		3	3
		25USS130202	**SC**	Junior Software Developer (SSC / Q0508)	Theory (8) Practical (10)	18	18
	IV	**25USS141001**	**VE**	Part- IV (Value Education)		2	2
					Total	**30**	**30**
2	I	**25USS210002**	**DSL**	Language l Tamil – 2		2	2
	II	**25USS220102**	**DSL**	Language English – 2		2	2
	III	**25USS230203**	**CC**	User Interface Design		3	3
		25USS230402	**AC**	Mathematics-II		3	3
		25USS230204	**SC**	Web Developer (SSC/Q 0503)	Theory (8) Practical (10)	18	18
	IV	**25USS240901**	**AECC**	Environmental Science		2	2
					Total	**30**	**30**
3	I	**25USS310003**	**DSL**	Language l Tamil – 3		2	2
	II	**25USS320103**	**DSL**	Language English – 3		2	2
	III	**25USS330205**	**CC**	PHP Programming		3	3
		25USS330403	**AC**	Database Systems: Relational and NoSQL		3	3
		@	**SC**	Database Administrator (SSC/Q8109)	Theory (8) Practical (10)	18	18
	IV	**25USS341002**	**SEC**	Soft Skills		2	2
					Total	**30**	**30**

4	I	**25USS410004**	**DSL**	Language l Tamil – 4		2	2
	II	**25USS420104**	**DSL**	Language English – 4		2	2
	III	**25USS430206**	**CC**	Java Programming		3	3
		25USS430404	**AC**	Operating System with Unix/Linux		3	3
		25USS430207	**SC**	Database Administrator (SSC/Q8109)	Theory (8) Practical (10)	18	18
	IV	**25USS441003**	**LC**	Life Coping Skills		2	2
					Total	**30**	**30**
5	III	**25USS530208**	**CC**	Web Development using ASP.NET		4	4
		25USS530209	**CC**	Software Engineering		4	4
		25USS530210	**CC**	ReactJS		4	4
		@	**SC**	Theory	8	18	18
				Software Developer (SSC/Q0501)	7		
				Project	3		
					Total	**30**	**30**
6	III	**25USS630211**	**CC**	Fundamentals of Computer Networks		4	4
		25USS630212	**CC**	Programming in Python		4	4
		25USS630213	**CC**	Android Programming		4	4
		25USS630214	**SC**	Theory	8	18	18
				Software Developer (SSC/Q0501)	7		
				Project	3		
					Total	**30**	**30**
1-6					**TOTAL**	**180**	**180**

SC: Skill Component
DSL: Department Specific Language
@ Practical Exam will be conducted in the even semester
 # Conducted as Theory (8 Hours) + Practical (10 Hours)

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	25USS110001	Language – I: Tamil – I	2	2

கற்றலின் நோக்கங்கள்(Course Objectives)
காலந்தோறும் கணினியின் வளர்ச்சியைத் தெரிந்துகொள்ளுதல்
தமிழ் மென்பொருள் வகைபாடுகளை அறியும் திறனைப் பெறுதல்.
கணினித் தமிழின் அடிப்படைப் பயன்பாட்டை அறிதல்.
தமிழ்மொழி ஆய்வுக் கருவிகளின் பயன்பாட்டினை அறிதல்.
இணையத் தமிழ் தொழில்நுட்பத்தின் அடிப்படைத் திறனை அறிதல்.

அலகு 1 **(6 மணி நேரம்.)**

கணினி அறிமுகம் – கணினியின் வரலாறு – கணினியின் வகைப்பாடு – கணினியின் கட்டமைப்பு – மையச்செயலகம் – உள்ளீட்டகம் – வெளியீட்டகம் – கணினி வன்பொருள் – முதன்மை, துணைமை வன்பொருள்கள் – இணையம் சார்ந்த வன்பொருள்களும் தொழில்நுட்பங்களும்.

அலகு 2 **(6 மணி நேரம்)**

கணினி செயல்படும் விதம் – அமைப்பு மென்பொருள் – இயக்க மென்பொருள் – கணினி இயக்க மென்பொருள் – பயனீட்டு மென்பொருள் – மொழிமாற்றிகள் – நூலக நிரல்கள் – இயக்கி மென்பொருள் – பயன்பாட்டு மென்பொருள் – கையடக்க மென்பொருள் – குறுஞ்செயலிகள் – குறுக்குவிசைகள்.

அலகு 3 **(6 மணி நேரம்)**

கணினியும் பயன்பாடும் – கணினியும் தமிழும் – தமிழைத் தட்டச்சு செய்ய உதவும் மென்பொருள்கள் – தட்டச்சு செய்யும் முறைகள் – தமிழ்த் தட்டச்சுப் பயிற்சி – இயல்பிருப்புகள் – கையடக்கக் கணினியும் திறன் பேசியும்.

அலகு 4 **(6 மணி நேரம்)**

தமிழ்மொழி ஆய்வுக்கருவிகள் – ஒலியியல் ஆய்வு முதல் பேசும் அகராதி வரையிலான ஆய்வுகள்.

அலகு 5 **(6 மணி நேரம்)**

கணினித்தமிழ் ஆய்வு- இயற்கை மொழியாய்வு- கணினி மொழியியல்- மொழித் தொழில் நுட்பம்- கணினித்தமிழ் ஆய்வும் தமிழ் மென்பொருள்களும்- பொதுமை இலக்கணம்.

கற்பித்தல்முறை (Teaching Methodology)	விரிவுரை(Lecture),காணொளிக்காட்சி(Videos), விளக்கக்காட்சி (PPT presentation)
மதிப்பீட்டு முறைகள் (Assessment methods)	ஒப்படைவு (Assignment), கருத்துரை (Seminar),

பாடநூல்கள் :

1. சுந்தரம் . இல, 2015 ,கணினித்தமிழ், விகடன் பிரசுரம் .
2. மணிகண்டன் .துரை, 2010, தமிழ்க் கணினி இணையப் பயன்பாடுகள் , கமலினி பதிப்பகம்.

பார்வை நூல்கள் :

1. துரையரசன். க, (2015), இணையமும் இனிய தமிழும், இசை பதிப்பகம்
2. வீரநாதன் ஜெ. (2010), இணையத்தை அறிவோம், பாலாஜி கணினி வரைகலைப் பயிலகம்

Semester	Course Code	Title of the Course	Hours	Credits
I	25USS120101	Language II: English – I	2	2

Remedial Grammar and Vocabulary

Course Outcome

- To train students to speak and write fluency and correctly.
- To increase students' vocabulary to be ready for global communication.

UNIT I **(6 Hours)**

1. Subject-verb agreement
2. Tenses
3. Active voice and passive voice

UNIT II **(6 Hours)**

4. Do Forms
5. Use of negatives
6. Prepositions

UNIT III **(6 Hours)**

7. Vocabulary I and II
8. Word stress and rhythm
9. Weak forms and strong forms

UNIT IV **(6 Hours)**

10. Listening Test
11. Reading Test

UNIT V **(6 Hours)**

12. Test of Accuracy
13. Test of Fluency

Books for Study:

1. Dutt, Kiranmai, P., Basic communication skills, New Delhi: Foundation Books, 2013.

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	25USS130201	**Core Course – I:** C Programming	3	3

Course Objectives
To provide a comprehensive understanding of the fundamental concepts in C programming.
To develop proficiency in working with functions and arrays in C.
To explore the concepts of string handling and data structures.
To master the use of pointers and memory management techniques.
To understand file handling and advanced data manipulation techniques in C.

UNIT I: Introduction to C Language Basics (9 Hours)

Features of C Language - Data Types - Variables - Operators - Control Structures – Looping Structures.

UNIT II: Functions and Arrays in C (9 Hours)

Arrays -Functions – Built-in-functions – User defined functions - Scope of Variables - Passing Arrays to functions.

UNIT III: Strings and Structures (9 Hours)

Declaring and Initializing String Variable- Reading Strings from Terminal – Reading a Line of Text – Writing Strings to Screen – Putting Strings Together – String Handling Functions - Structure – Union.

UNIT IV: Pointers and Memory Management (9 Hours)

Pointers - Pointer to Array - Pointer Array - Pointer Arithmetic - Pointer of Pointer – Functions and Pointers – Call by Value and Call by Reference - Structures and Pointers

UNIT V: File Handling in C (9 Hours)

Files -Text file - Sequential File – Random Access file - Command Line Arguments

Teaching Methodology	Lectures, Demonstration
Assessment Methods	Seminar, Test, MCQ

Books for Study:

1. Balagurusamy, E, (2024). "*Programming in ANSI C*" (9th Ed). Tata McGraw Hill, New Delhi.

Books for Reference:

1. Kanetkar, Y. (2023). "*Let Us C"* (16th Ed.). BPB Publications, New Delhi.
2. Deitel, P., & Deitel, H. (2022). "*C How to Program"* (8th Ed.). Pearson Education, Boston.

Websites and eLearning Sources:

1. https://www.udemy.com/course/c-programming-for-beginners/
2. https://www.cprogramming.com/
3. https://www.edx.org/course/introduction-to-c-programming

CO NO.	CO- Statements
	On successful completion of this course, the students will be able to
CO1	Identify situations where computational methods and computers would be useful.
CO2	Understanding the basic concepts of C Language
CO3	Choose the right data representation formats based on the problem
CO4	Write the program on computer, edit, compile, debug, correct and run it
CO5	Identify tasks in which numerical techniques are learned and apply them to write programs

Relationship Matrix											
Semester	**Course Code**		**Title of the Course**						**Hours**		**Credits**
1	**25USS130201**		**Core Course – I:** C Programming						**3**		**3**
Course Outcomes↓	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	3	2	3	3	3	2	3	2	2	2.6
CO-2	2	3	2	3	2	3	3	2	2	2	2.4
CO-3	3	3	2	3	3	3	3	3	2	2	2.7
CO-4	2	3	2	2	2	3	3	2	2	2	2.3
CO-5	3	3	2	2	3	2	3	3	2	3	2.6
Mean overall score											2.52 **(High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
I	25USS130401	Allied Course -I: Mathematics -1	3	3

Course Objectives
To enable the students to understand the concept of number system and some operations.
To enable the students to understand the concepts of measure of dispersions
To enable the students to understand the concepts of relations
To provide the idea of functions.
To understand the matrix and apply them to several field

UNIT I **(9 Hours)**

Sets: Notation –Numerical sets – Universal set – Equality – Subsets - Union –Intersection-Difference

UNIT II **(9 Hours)**

Relations: Cartesian product of two sets- Relations- Representation of a relation- operations on relations

UNIT III **(9 Hours)**

Functions: Functions and operators - One to one, Onto functions- Special types of functions.

UNIT IV **(9 Hours)**

Matrix: Addition – Subtraction – Multiplication- Transpose - Rank of a matrix of order 2 and3.

UNIT V **(9 Hours)**

Averages: Mean, Median, Mode - Measures of variation: Range, Standard deviation.

Teaching Methodology	Chart, PPT, chalk and talk
Assessment Methods	Seminar, Snap Test, MCQ

Book for Study:

1. Venkataraman M. K, Sridharan and Chandrasekaran N (2012). Discrete Mathematics, The national publication company.
2. Pillai R.S.N and Bagavathi, (2008), Statistics. S. Chand Publications.

Books for Reference:

1. Fundamentals of Mathematical Statistics by S.C. Gupta and V.K. Kapoor.
2. Dr. M.K. Venkataraman Higher Mathematics for Engineering and Science

Websites and eLearning Sources:

1. https://www.udemy.com/course/sets-relations-and-functions-simplifying-discrete-math/?utm_source=chatgpt.com
2. https://ocw.mit.edu/courses/18-100a-real-analysis-fall-2020/resources/18100a-lecture-1-multicammp4/?utm_source=chatgpt.com
3. https://learn.saylor.org/course/view.php?id=67&sectionid=15589&utm_source=chatgpt.com
4. https://study.iitm.ac.in/ds/course_pages/BSMA1001.html?utm_source=chatgpt.com
5. https://www.khanacademy.org/?utm_source=chatgpt.com

CO No.	CO-Statements
	On successful completion of this course, the students will be able to
CO1	Acquire the knowledge in basic concepts of sets
CO2	Understand various concepts of number system
CO3	Evaluate the representation relations
CO4	Illustrate matrix operations and matrix relations with examples
CO5	Acquire the knowledge in measure of dispersion

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
1	**25USS130401**			**Allied Course-I: Mathematics -1**						**3**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	3	2	2	3	2	2	3	2	**2.4**
CO2	2	3	2	3	2	3	2	3	2	1	**2.3**
CO3	2	2	3	2	1	3	3	2	3	1	**2.2**
CO4	3	3	2	3	2	3	3	2	3	2	**2.6**
CO5	2	2	3	2	1	3	2	3	2	1	**2.1**
Mean Overall Score											**2.4 (High)**

Semester	Course Code	Title of the Course	Hours	Credits
I	25USS141001	Essentials of Humanity	2	2

Course Outcome

- To create an awareness among students on Human values
- To involve in a process of analyzing, appreciating and personalizing values as our own

UNIT -I **(6 Hours)**

Principles of value Education -Introduction - What is value Education - Characteristic of values - Kinds of values.

UNIT – II **(6 Hours)**

Development of Human Personality – Personality traits – Theories of Personality - Discovering self – Defense Mechanism – Power of Positive Thinking – Why Worry?

UNIT –III **(6 Hours)**

Dimensions of Human Development – Physical Development – Intellectual Development – Emotional Development – Social Development- Moral Development- Spiritual Development.

UNIT – IV **(6 Hours)**

Responsible parenthood – Human sexuality – Sex and Love - Becoming a spouse

UNIT –V **(6 Hours)**

Gender Equality and Empowerment – Historical perspective – Education and Economic Development – Crimes against women – Women rights.

Books for Study:

1. S. Papu Benjamin Elango, V. Francis, Marie Serena McConnell
2. S. Antony Sakthi, X. John Paul "Essentials of Humanity", (7th Revised Ed.) St. Joseph's College (Autonomous), Tiruchirappalli.

Semester	Course Code	Title of the Course	Hours/Week	Credits
II	25USS210002	Language – I: Tamil - II	2	2

கற்றலின் நோக்கங்கள் (Course Objectives)
இணையத் தமிழ் மற்றும் தமிழ் எழுத்துருக்களைப் பற்றி அறிமுகம் செய்தல் .
தமிழ் இணைய மாநாடுகள் பற்றி எடுத்துரைத்தல்.
தமிழ் மின்னியல் நூலகத்தைப் பயன்படுத்தும் திறனைப் பெறுதல்
புதிய படைப்புகளை மின்னூலாக வெளியிடுதல்
கற்றலுக்கு பயன்படும் சமூக ஊடகங்களைப் பகுத்தாராய்தல்

அலகு 1 **(6 மணி நேரம்.)**

கணினி இணையத்தில் தமிழ் - இணையத்தில் தமிழ் முன்னோடி- இயங்கு எழுத்துரு - தமிழ்.நெட் - - அரசின் ஏற்பு - கீமான் - நிலை பெற்றஒருங்கு குறி.

அலகு 2 **(6 மணி நேரம்)**

ஒன்று முதல் ஐந்து வரை நடைபெற்ற தமிழ் இணைய மாநாடுகள் - ஆறு முதல் பத்து வரை நடைபெற்ற தமிழ் இணைய மாநாடுகள் - பதினொன்று முதல் பதினைந்து வரை நடைபெற்ற இணைய தமிழ் மாநாடுகள்.

அலகு 3 **(6 மணி நேரம்)**

கூகுள் மொழிபெயர்ப்பு – தேசிய மொழிபெயர்ப்புத்திட்டம் (National Translation mission) – தோற்றம் –விரிவான திட்டம்- இந்திய மொழிகளுக்கான இயந்திர மொழிபெயர்ப்பு – அமைப்பு – மொழிகள்- தமிழ் இந்தி- இந்தி தமிழ்- தமிழ் தெலுங்கு மொழிபெயர்ப்புகள்- தனிமின் மொழிபெயர்ப்பு- மின்மொழிபெயர்ப்பின் தன்மைகள்

அலகு 4 **(6 மணி நேரம்)**

தகவல் பரிமாற்றம்- மின்னஞ்சல் உருவாக்கமும் பயன்பாடுகளும்- மின்னஞ்சலின் உள்ளடக்கம்- மின்னஞ்சலில் தமிழ்க் கலைச்சொற்கள்

அலகு 5 **(6 மணி நேரம்)**

கணினித்தமிழ் அமைப்புகளும் செயல்பாடுகளும்- கணினித்தமிழ் ஆய்வு நிறுவனங்கள்- கணினித்தமிழ் ஆய்வு சார்ந்த தன்னார்வ அமைப்புகள்

கற்பித்தல் முறை (Teaching Methods)	விரிவுரை (Lecture), காணொளிக் காட்சி (Videos), விளக்கக் காட்சி (PPT presentation)
மதிப்பீட்டு முறைகள் (Assessment methods)	கொள்குறி வினாத்தேர்வு (MCQs), கருத்துரை(Seminar), குழுக் கலந்துரையாடல் (Group Discussion), ஒப்படைவு (Assisgnment). வலைப்பூ உருவாக்கம் (Practical)

பாடநூல்கள்:

1.மணிகண்டன் . துரை, 2010, தமிழ்க் கணினி இணையப் பயன்பாடுகள் , கமலினி பதிப்பகம்.
2. சுந்தரம் . இல, 2015 ,கணினித்தமிழ், விகடன் பிரசுரம் .

பார்வை நூல்கள் :

1. மணிகண்டன் .து ரை, 2008, இணையமும் தமிழும், நல்நிலம் பதிப்பகம்.
2.துரையரசன். க,2015, இணையமும் இனிய தமிழும், இசை பதிப்பகம்.
3. வீரநாதன் ஜெ., 2010, இணையத்தை அறிவோம், பாலாஜி கணினி வரைகலைப் பயிலகம்

Semester	Course Code	Title of the Course	Hours	Credits
II	25USS220102	Language II: English - II	2	2

Basic Communication Skills

Course Outcome

- To gain proficiency in communication
- To improve language with respect to communication

UNIT I **(6 Hours)**

1. Talking about yourself
2. Social English
3. Getting about

UNIT II **(6 Hours)**

4. Shopping
5. Going to the doctor‟s
6. at school

UNIT III **(6 Hours)**

7. Finding Work
8. At the Bank and Post office

UNIT IV **(6 Hours)**

9. Using the Telephone
10. Emergencies

UNIT V **(6 Hours)**

11. Understanding Regional Speech
12. Metaphor in Spoken English

Books for Study:

1.Massey Dorothy, Better English, 3 rd Ed, VIVA Books

Semester	Course Code	Title of the Course	Hours/Week	Credits
II	25USS230203	**Core Course - II:** User Interface Design	3	3

Course Objectives
To understand the basic structure of HTML and create structured web pages.
To develop skills in using HTML for text formatting, images, links, and multimedia.
To gain practical knowledge of CSS for styling and layout.
To create interactive and responsive web pages using JavaScript.
To build a foundation for advanced web development techniques.

UNIT I: Basic HTML structure (9 Hours)

Starting your web page - creating a title - creating headings - grouping headings - creating a header - marking navigation - creating an article - defining a section - specifying an aside - creating a footer - creating generic containers.

UNIT II: Text Formatting (9 Hours)

Text: starting a new paragraph - creating a figure - specifying time - quoting text - highlighting text - creating superscripts and subscripts - creating a line break. Images: inserting images on a page - specifying image size. Link: creating a link to another web page - creating anchors - linking to a specific anchor.

UNIT III: Working with style sheets (9 Hours)

Creating an external style sheet - linking to external style sheets - creating an embedded style sheet - applying inline styles. Defining selectors: constructing selectors - selecting elements by name - selecting elements by class or id - selecting elements by context - combining selectors.

UNIT IV: Formatting text with styles (9 Hours)

Choosing a font family - specifying alternate fonts - creating italics - applying bold formatting - setting the font size - setting the line height - setting all font values at once - setting the color - changing the text's background. Lists: creating ordered and unordered lists - styling nested lists - creating description lists. Forms: creating forms - processing forms - organizing the form elements - creating text boxes - creating password boxes - creating radio buttons - creating select boxes - creating checkboxes - creating a submit button - using an image to submit a form.

UNIT V: Video, audio, and multimedia (9 Hours)

Video, audio, and multimedia: video file formats - adding a single video to your web page - adding audio file formats - adding a single audio file to your web page - getting multimedia files. Tables: structuring tables - spanning columns and rows. JavaScript overview: loading an external script - adding an embedded script - JavaScript events.

Teaching Methodology	Hands-on Practice chalk and talk
Assessment Methods	Seminar, Snap Test, MCQ, Practical Exams

Books for Study:

1. Lemay, L. (2022). *Mastering HTML, CSS & JavaScript* Web Publishing – 2022. BPB Publications.
2. Carey, P. M. (2021). *New Perspectives on HTML5 and CSS: Comprehensive, 8th Edition*. Cengage Learning.

Books for Reference:

1. Ruvalcaba, Z., Boehm, A., & Delamater, M. (2024). Murach's HTML and CSS (6th Edition). Mike Murach & Associates.
2. Hopper, A. (2023). HTML, CSS, and JavaScript Crash Course: Learn HTML, CSS & JavaScript from Scratch and Master It. Official Coding Books.

Websites and eLearning Sources:

1. https://www.coursera.org/specializations/ui-ux-design
2. https://www.edx.org/course/user-interface-design

CO No.	CO-Statements
	On successful completion of this course, the students will be able to
CO1	Gain knowledge on the concepts and principles of HTML5
CO2	Understand the concepts and principles of CSS3
CO3	Build dynamic websites by using HTML5 and CSS3
CO4	Implement structured and semantic data in websites
CO5	Writing valid and concise script for web pages

Relationship Matrix											
Semester	**Course code**			**Title of the Course**					**Hours**		**Credits**
II	**25USS230203**			**Core Course - II:** User Interface Design					**3**		**3**
Course Outcomes↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	2	3	2	2	3	2	2	3	2	**2.6**
CO-2	2	3	2	3	2	3	2	3	2	1	**2.6**
CO-3	2	2	3	2	1	3	3	2	3	1	**2.8**
CO-4	3	3	2	3	2	3	3	2	3	2	**2.6**
CO-5	2	2	3	2	1	3	2	3	2	1	**2.6**
Mean Overall Score											**2.64 (High)**

Semester	Course Code	Title of the Course	Hours	Credits
II	25USS230402	**Allied Course – II:** Mathematics - II	3	3

Course objectives
To enable the students to understand the concept of permutations and combinations
To enable the students to understand the concepts of probability
To enable the students to understand the concepts of A.P and G. P
To provide the idea of linear programming problem.
To understand the transportation problem and apply them to several field

UNIT I **(9 Hours)**

Mathematical Preliminaries - Permutations - combinations (concepts & simple problems only)

UNIT II **(9 Hours)**

Probability: Events – Probability Addition Theorem - Probability Multiplication Theorem (Without proof, only simple relevant problems)

UNIT III **(9 Hours)**

Arithmetic Progression - Sum of series in A.P - Geometric progression- Sum of series in G.P (simple problems only).

UNIT IV **(9Hours)**

Operation Research: Linear Programming Problem - Graphical method - Simplex method (simple problems)

UNIT V **(9 Hours)**

Transportation Problem - North West corner method – Least cost method

Books for Study:

1. Pillai R.S.N and Bagavathi, (2008), Statistics. S. Chand Publications.
2. Sanchetti, D.C., & Kapoor, V.K. (2002) Business Mathematics, (11th Ed.). Sultan Chand and Sons, New Delhi.
3. Kanti Swarup, Gupta P. K, Man Mohan (2011) Operation Research (15th Ed.). Sultan Chand and Sons, New Delhi.

Books for Reference:

1. Alan Doerr, Kenneth, Levasseur, “Applied Discrete Structure for Computer Science”, Galgotia Pub., New Delhi, 1995.
2. David Gries, “The Science of Programming”, Narosa Pub. House, New Delhi, 1993.

Websites and eLearning Sources:

1. https://openstax.org/books/contemporary-mathematics/pages/7-6-probability-with-permutations-and-combinations?utm_source=chatgpt.com
2. https://courses.lumenlearning.com/mathforliberalartscorequisite/chapter/probability-using-permutations-and-combinations/?utm_source=chatgpt.com
3. https://en.wikipedia.org/wiki/Transportation_theory_%28mathematics%29?utm_source=chatgpt.com
4. https://www.khanacademy.org/?utm_source=chatgpt.com
5. https://elearningindustry.com/top-elearning-resources-help-learn-anything-today-10?utm_source=chatgpt.com

CO No.	CO-Statements
	On successful completion of this course, the students will be able to
CO1	Acquire the knowledge in basic concepts of permutations and combinations
CO2	Understand various concepts of probability
CO3	Evaluate the representation A.P and G. P
CO4	Illustrate Linear Programming problem
CO5	Acquire the knowledge in transportation problem

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
II	**25USS230402**			**Allied Course – II:** Mathematics - II						**3**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	3	2	2	3	2	2	3	2	**2.4**
CO2	2	3	2	3	2	3	2	3	2	1	**2.3**
CO3	2	2	3	2	1	3	3	2	3	1	**2.2**
CO4	3	3	2	3	2	3	3	2	3	2	**2.6**
CO5	2	2	3	2	1	3	2	3	2	1	**2.1**
Mean Overall Score											**2.4 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
II	25USS240901	Environmental Science	2	2

Course Objectives
To enable students connect themselves with nature
To Impart knowledge of the concept of Biodiversity
To create awareness of the causes and consequences of various pollution
To help them recognize the available natural resources and the need to sustain them
To enable them to Identify the environmental problems and offer alternatives by making interventions both individually and collectively

UNIT I: Introduction to Environmental Studies (6 Hours)

Introduction -Subsystems of Earth - Scope and Importance - Various Recycling Methods - Environmental Movements in India – Eco- Feminism - Public awareness - Suggestions to conserve environment

UNIT II: Natural Resources (6 Hours)

Introduction - Food Resources - Land Resources - Forest resources - Mineral Resources - Water Resources - Energy Resources

UNIT III: Ecosystems, Biodiversity and Conservation (6 Hours)

Kinds of Ecosystem - General structure of ecosystem - Functions of Ecosystem - Energy flow and Ecological pyramids - Levels of Biodiversity - Biodiversity at Global Level- Hot spots of Biodiversity - Endangered and Endemic Species - Value of Biodiversity - Threats to Biodiversity - Conservation of Biodiversity

UNIT IV: Environmental Pollution (6 Hours)

Air Pollution - Water Pollution - Oil Pollution - Soil Pollution - Marine Pollution - Noise Pollution - Thermal Pollution - Radiation Pollution

UNIT V: Environmental Organizations and Treatise (6 Hours)

United Nations Environment Program (UNEP) - International treaties on Environmental protection - Ministry of Environment, Forest and Climate Change - Important National Environmental Acts and rules- Environmental Impact assessment

Teaching Methodology	Power point and Field visit
Assessment Methods	Seminar, Group Discussion.

Books for Study:

1. Department of Human Excellence, (2025). *Environmental Studies.*

Books for Reference:

1. Rathor, V.S. & Rathor B. S. (2013). *Management of Natural Resources for Sustainable Development*. Daya Publishing House.
2. Sharma P.D. (2010). *Ecology and Environment*, (8th Ed.). Rastogi Publications.
3. Agrawal, A &Gibson, C.C. (2001). *Introduction: The Role of Community in Natural Resource Conservation.* Rutgers University Press.

Websites and eLearning Sources

1. https://www.unep.org/
2. http://moef.gov.in/en/
3. https://www.ipcc.ch/reports/

Course Outcomes		
CO No.	CO-Statements On successful completion of this course, students will be able to	Cognitive Levels (K - Level)
CO1	Identify the concepts related to global ecology and the environment	K1
CO2	Comprehend the natural resources and environmental organizations	K2
CO3	Apply the acquired knowledge to sensitize individuals and public about the environmental crisis	K3

Relationship Matrix											
Semester	Course Code	Title of the Course							Hours	Credits	
II	25USS240901	Environmental Science							2	2	
Course Outcomes	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	1	2	2	3	2	2	2	2	2.1
CO2	3	2	1	2	2	3	2	2	2	2	2.1
CO3	3	2	2	2	2	2	3	2	1	2	2.1
Mean Overall Score											2.1 (Medium)

Semester	*Course code*	*Title of the Course*	*Hours/Week*	*Credits*
III	*25USS310003*	*Language –I: Tamil III*	*2*	*2*

கற்றலின் நோக்கங்கள் (Course Objectives)
கணினியில் தமிழ் விசைப்பலகையின் செயல்பாட்டைப் பற்றி அறிந்து கொள்ளுதல்
கணினியில் தமிழ் சொற்பிழைத்திருத்தி குறித்த விவரங்களைப் பதிவேற்றும் பயிற்சியைப் பெறுதல்
தமிழ் மின் அகராதி மென்பொருள் வளர்ச்சியைப் பயன்படுத்துதல்
கணினியில் தமிழ் எழுத்துரு மாற்றிகளின் வளர்ச்சியைக் கண்டறிதல்
தமிழ் மின்னியல் நூலகம் அமைக்கும் முறையைப் பகுத்தாராய்தல்

அலகு 1 ***(6 மணி நேரம்)***

தமிழ் விசைப்பலகைகள் - விசைப்பலகைச் சிக்கல்கள் – பொதுத்தரம் இல்லா எழுத்துருக்கள் – தமிழ் எழுத்துருக்கள்– மயிலை – தமிழ் லேசர்– இஸ்கி – தாரகை – இ கலப்பை – அஸ்க்கி – தகுதரம் – ஒருங்குறி – அகபே தமிழ் எழுதி – அழகி – என்.எச்.எம் – செல்லினம்

அலகு 2 ***(6 மணி நேரம்)***

தமிழ் சொற்பிழைத் திருத்தி – சர்மா சொற்பிழைச் சுட்டி – மென்தமிழ்ச் சொல்லாளர் – பொன்மொழி – பொன்சொல் – வாணி எழுத்து பிழைத்திருத்தி – சந்திப்பிழைத் திருத்தி – நாவி சந்திப்பிடைத் திருத்தி –மென்தமிழ் சந்திப் பிழைத் திருத்தி - பொன்மொழி

அலகு 3 ***(6 மணி நேரம்)***

தமிழ் மின் அகராதி மென்பொருள் – குறள் தமிழ்ச் செயலி – சொற்செயலிகள் – எழுத்துணரி – திருக்குரல் எழுத்துப் பேச்சு மாற்றி – எழுத்துப்பேச்சு மாற்றி – தமிழ் பிரெய்லி எழுத்துப் பேச்சு மாற்றி- பேச்சுணரி – ஒலி எழுத்துணரி – பொன்விழி – கையெழுத்துணரி – பொன்மடல் – கூகுள் உள்ளீட்டு கருவி- யாப்பு உணரி – அவலோகிதம் – ஒலிபெயர்ப்பு உணரி – அனுநாதம்

அலகு 4 ***(6 மணி நேரம்)***

எழுத்துரு பிரச்சனை – எழுத்துரு மாற்றிகள்- பொங்குதமிழ் எழுத்துரு மாற்றி – அதியமான் எழுத்துரு மாற்றி – தமிழ் எழுத்துரு மாற்றி – சிலம்பம் - இஸ்லாம் கல்வி எழுத்துரு மாற்றி – என்.எச்.எம்.எழுத்துரு மாற்றி – எழுதி மாற்றி – கொழும்பு பல்கலைக்கழகம் – தமிழ் 24 செய்தி – பயன்பாடுகள்.

அலகு 5 ***(6 மணி நேரம்)***

மின்னியல் நூலகம் – உலக மின்னியல் நூலகம் - தமிழ் மின்னியல் நூலகம் – ரோஜா முத்தையா ஆராய்ச்சி நூலகம் – மதுரைத் திட்டம் – தமிழ் இணையப் பல்கலைக் கழகம் – சிறப்புக் கூறுகள் – தேவாரம் – காந்தளகம் – தமிழ் மரபு அறக்கட்டளை – நூலகம்.நெட் – இந்திய மின்னியல் நூலகம் – சென்னை நூலகம் – உலகத் தமிழாராய்ச்சி நிறுவனம் – மின்னியல் நூலகப் பயன்பாடு

கற்பித்தல் முறை (Teaching Methods)	*விரிவுரை (Lecture), காணொளிக் காட்சி (Videos), விளக்கக் காட்சி (PPT presentation)*
மதிப்பீட்டு முறைகள் (Assessment methods)	*கொள்குறி வினாத்தேர்வு (MCQs), கருத்துரை(Seminar), குழுக் கலந்துரையாடல் (Group Discussion), ஒப்படைவு (Assisgnment). வலைப்பூ உருவாக்கம் (Practical)*

பாடநூல்கள்:

1. மணிகண்டன், துரை. வானதி, த. (2010), ***தமிழ்க்கணினி இணையப் பயன்பாடுகள்****, கமலினி பதிப்பகம், தஞ்சாவூர்*

2. சுந்தரம், இல. (2015), ***கணினித்தமிழ்,*** *சென்னை விகடன் பிரசுரம்.*

3. பன்னிருகைவடிவேலன், (2012) இரா. ***கன்னித் தமிழும் கணினித் தமிழும்****, உலகத் தமிழாராய்ச்சி நிறுவனம்*

பார்வை நூல்கள்:

1. பிரகாஷ், த. (2005), ***கணிப்பொறியில் தமிழ்****, பெரிகாம் வெளியீடு, சென்னை.*

2. சந்திரிகா சுப்ரமண்யன், (2020), ***இணையத் தமிழ்****, சந்திரோதயம் பதிப்பகம்,*

3. பன்னிருகைவடிவேலன், இரா.(2014) ***தமிழ் மென்பொருள்கள்****, நோக்கு நகர், சென்னை.*

4. இராதா செல்லப்பன், (2011) ***தமிழும் கணினியும்****, கவிதை அமுதம் வெளியீடு, திருச்சி.*

Semester	Course Code	Title of the Course	Hours	Credits
III	25USS3201003	Language - II: English-III	2	2

Effective Communication Skills

Course Outcome

- To Learn English through Exercises
- Spotting out errors, while learning

UNIT I **(6 Hours)**

Present continuous-Present simple- Present Continuous and Present simple (1)-Present continuous and present simple (2) –past simple-Past continuous- Present perfect- Present perfect (2)- Present perfect continuous- Present perfect continuous and simple.

UNIT II **(6 Hours)**

How long have you (been)-When and How long- For and Since- Present perfect and past (1) – Present perfect and past (2) – past perfect –past perfect continuous- have and have got – Used to – Present tenses for the future-going to.

UNIT III **(6 Hours)**

Will/shall- Will/shall (2)-I will and I am going to-Will be doing and will have done- When and if – Can, Could and able to- Could and Could have – must and can‟t – may and might may and might (2)

UNIT IV **(6 Hours)**

Must and have to- must, mustn‟t and needn‟t-Should (1) –Should (2)_ Had better , It‟s time Can, Could, Would you..etc-If I do and If I did – If I knew , If I do and If I did -If I knew , I wish I knew - If I had known, I wish I had known- Would , I wish.. Would

UNIT V **(6 Hours)**

Passive (1)-Passive (2)-Passive (3) It is said that, He is said to, supposed to – Have something done-Reported speech (1)-Reported speech (2)-Questions (1)-Questions (2)-Auxiliary verbs.

Books for Study:

1. Murphy Raymond, Essential English Grammar, 2nd edition, Cambridge University Press.

Semester	Course Code	Title of the Course	Hours	Credits
III	25USS330205	**Core Course – III:** PHP Programming	3	3

Course objectives
To introduce the fundamentals of PHP and its role in web development.
To develop proficiency in working with PHP variables, data types, and control structures.
To understand the concepts of arrays, string functions, and their applications in PHP.
To explore function creation, passing parameters, and returning values.
To gain hands-on experience in database connectivity using MySQL.

UNIT I: ESSENTIAL PHP (9 Hours)

Creating your Development Environment- Mixing HTML and PHP – Command Line PHP – Working with Variables – Creating Constants – Understanding PHP's Internal Data Types – Operators and Flow Control

UNIT II: STRINGS AND ARRAYS (9 Hours)

String Function – Modifying Data in an Array – Deleting Array Elements – Array with Loops – PHP Array Functions – Sorting Array – Splitting Array – Merging Array.

UNIT III: CREATING FUNCTION (9 Hours)

Passing Function – Passing Arrays to Function – Passing by Reference – Using Default Arguments – Passing Variable Numbers of Argument – Returning Data from Function - Nesting Functions.

UNIT IV: WORKING WITH DATABASE (9 Hours)

Creating a MYSQL Database – Creating a New Table – Putting Data into the New Database – Accessing the Database –Update data into the Database– Insert data into the Database – Delete data from Database– Handling and Avoiding Errors.

UNIT V: LARAVEL FRAMEWORK OVERVIEW (9 Hours)

Introduction - Advantages of Laravel - Features of Laravel. Laravel -Installation - Application Structure– Configuration – Routing – Controllers – Request - Response - Laravel Forms and HTML Component.

Teaching Methodology	Lectures, Demonstration and Gamification
Assessment Methods	Seminar, Test, MCQ, Project-Based Assessment

Books for Study:

1. Kuzmany, B. (2021). *PHP 8 Programming Tips, Tricks, and Best Practices*. Packt Publishing.
2. Stauffer, M. (2021*). Laravel: Up & Running*. O'Reilly Media.

Books for Reference:

1. Lopes, K. (2022). *Modern PHP Web Development: Building Applications with MySQL, HTML, CSS, and JavaScript*. A press.
2. Schultz, D. (2022). *Laravel: The Definitive Guide to Beginner-to-Advanced Web Development*. Independently Published.
3. Ullman, L. (2023). *PHP & MySQL for Dynamic Web Sites: Visual Quick Pro Guide*. Peach pit Press.

Websites and eLearning Sources:

1. https://www.php.net/manual/en/
2. https://laravel.com/docs
3. https://nptel.ac.in/courses/

CO NO.	CO- Statements
CO-1	On successful completion of this course, the students will be able to
CO-2	Understand the various existing libraries for developing application.
CO-3	Apply various technique of web development and will be able to design and develop a complete website
CO-4	Analyse the basic structure of a PHP web application and be able to install and maintain the web server, compile, and run a simple web application.
CO-5	Design and publish simple dynamic websites based on user requirements.

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
III	**25USS330205**			**Core Course – III:** PHP Programming						**3**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	3	2	2	3	2	2	3	2	**2.6**
CO2	2	3	2	3	2	3	2	3	2	1	**2.7**
CO3	2	2	3	2	1	3	3	2	3	1	**2.7**
CO4	3	3	2	3	2	3	3	2	3	2	**2.8**
CO5	2	2	3	2	1	3	2	3	2	1	**2.7**
									Mean Overall Score		**2.7 (High)**

Semester	Course Code	Title of the Course	Hours	Credits
III	25USS330403	**Allied Course – III:** Database System: Relational and NoSQL	3	3

Course objectives
To understand the fundamental differences between file systems and database systems.
To learn different data models and DBMS architecture.
To gain knowledge of data independence and entity-relationship modeling.
To understand SQL queries, views, constraints, and normalization techniques.
To explore transaction processing, serializability, and locking techniques.

UNIT I: Introduction to Database Systems and Data Modeling (12 Hours)

Introduction: File systems versus Database systems – Data Models – DBMS Architecture – Data Independence – Data Modelling using Entity – Relationship Model – Enhanced E-R Modelling.

UNIT II: Relational Model and Query Evaluation (12 Hours)

Relational Model and Query Evaluation: SQL – Basic Queries – Complex SQL Queries – Views – Constraints –Functional Dependencies – Normal Forms – 1NF – 2NF-3NF-BCNF – 4NF-5NF.

UNIT III: Transaction Processing (12 Hours)

Transaction Processing: Transaction Processing – Properties of Transactions - Serializability – Transaction support in SQL - Locking Techniques.

UNIT IV: Files and Indexing Techniques (12 Hours)

Files and Indexing: File operations – Hashing Techniques – Indexing – Single level and Multi-level Indexes – B+ tree – Static Hashing - Indexes on Multiple Keys.

UNIT V: Special Purpose Databases (12 Hours)

Special Purpose Databases: OODBMS- - Object-Based Databases - OO Data Model - OO Languages – Persistence – Object Relational Databases - XML – Structure of XML — Cloud based systems – NOSQL introduction - NOSQL key features – Introduction to Mongodb.

Teaching Methodology	PPT, chalk and talk
Assessment Methods	Seminar, Test, MCQ

Books for Study:

1. Elmasri, R., & Navathe, S. B. (2021). "*Fundamentals of Database Systems"* (7th ed.). Pearson.

Books for Reference:

1. Vaidya, M. (2021). "*RDBMS In-Depth"*. BPB Publications.
2. Korth, H. F., & Silberschatz, A. (2020). "*Database System Concepts"* (8th ed.). McGraw-Hill.

Websites and eLearning Sources:

1. https://www.khanacademy.org/computing/computer-programming/sql
2. https://www.edx.org/course/database-systems-uc-berkeleyx-cs186-2x
3. https://www.sqlbolt.com/

CO. No.	CO-Statements
	On successful completion of this course, the students will be able to
CO1	Explain the differences between file systems and database systems.
CO2	Apply entity-relationship modeling for data design.
CO3	Construct and execute SQL queries using different techniques.
CO4	Analyze transaction processing, serializability, and locking mechanisms.
CO5	Implement indexing and hashing techniques for file organization.

Semester	Course code	Title of the Course	Hours	Credits
III	**25USS330403**	**Allied Course – III:** Database System: Relational and NoSQL	**3**	**3**

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	2	3	2	3	2	3	1	2	2	2	**2.2**
CO-2	2	2	2	2	1	2	2	2	2	2	**1.9**
CO-3	2	2	1	2	2	2	1	2	2	3	**1.9**
CO-4	2	1	2	2	2	2	3	2	2	2	**2**
CO-5	2	3	3	3	2	2	2	2	2	3	**2.4**
Mean Overall Score											**2.08 (High)**

Semester	Course Code	Title of the Course	Hours	Credits
III	25USS341002	Soft Skills	2	2

Module 1: Effective Communication

Definition of communication, Barriers of Communication, Verbal and Non-verbal Communication; Self introduction matrix, Conversation Techniques, Good manners and Etiquettes, Introduction to Professional Communication, Professional Grooming and Presentation Skills and exercises

Module II: Resume Writing & Interview skills

Resume Writing: Basic Resume Formats. Types of Resume - Chronological, Functional and Mixed Resume**,** Steps in preparation of Resume, Sample objectives, Model Resumes.

Interview Skills: Preparation for interview, Common interview questions, Attitude, Body Language, Mock interviews and Practicum, Figuring out common interview questions and answers

Module III: Group Discussion: Definition of GD. The salient features of GD, Factors that influence GD, Outcome of GD, Tips for success in GD, Parameters of GD, Essential Points for GD preparation, GD Topics, Model GD and Practicum.

Module IV: Personal Effectiveness: Self Discovery: Personality, Traits of Personality; Personality Tests; Intelligence and Skill Assessment Form. **Goal Setting**: Goal setting Process, Questioners & Presentations

Module V: Numerical Ability: Average, Percentage; Profit and Loss**,** Area, Volume and Surface Area. (Simple Interest, Compound Interest; Time and Work, Pipes and Cisterns; Time and Distance**,** Problems on Trains**,** Illustrations, Boats and Streams; Illustrations-Optional)

Module VI: Test of Reasoning - Verbal Reasoning: Series Completion, Analogy. **Non- Verbal Reasoning**

Books for Study:

1. Melchias G, Balaiah John, John Love Joy (Eds), 2018. Straight from the Traits: Securing Soft Skills, SJC, Trichy.

Books for References:

1. Aggarwal, R.S. 2010. *A Modern Approach to Verbal and Non Verbal Reasoning*. S. Chand, New Delhi. Covey, Stephen. 2004. *7 Habits of Highly effective people,* Free Press. Egan, Gerard. (1994).
2. *The Skilled Helper* (5^{th} Ed). Pacific Grove, Brooks/Cole.
3. Khera, Shiv 2003. *You Can Win.* Macmillan Books, Revised Edition.
4. Melchias G, Balaiah John, John Love Joy (Eds), 2018. Winners in the Making: A primer on soft skills. SJC, Trichy.

Other books:

1. Murphy, Raymond. 1998. *Essential English Grammar*. 2^{nd} ed., Cambridge University Press. Sankaran, K., & Kumar, M. *Group Discussion and Public Speaking*. M.I. Pub, Agra, 5^{th} ed., Adms, Media.
2. Trishna‟s 2006. *How to do well in GDs & Interviews*, Trishna Knowledge Systems.
3. Yate, Martin. 2005. H*iring the Best: A Manager's Guide to Effective Interviewing and Recruiting**

Semester	Course Code	Title of the Course	Hours/ Week	Credits
IV	25USS410004	Language – I: Tamil - IV	2	2

கற்றலின் நோக்கங்கள் (Course Objectives)
இணையம் குறித்த அடிப்படையான அறிவைப் பெறுதல்
இணைய இயங்குதளங்கள், தமிழ்த்தேடுபொறிகளின் வகைகளைப் புரிந்துகொள்ளுதல்
கற்றல் கற்பித்தலில் இணையத்தின் பங்கினை விளக்கும் திறன் பெறுதல்
வலைப்பூ உருவாக்கம், படைப்பாக்கங்களைப் பதிவேற்றும் முறையை அறிதல்
மின்னனுத் தொழில்நுட்பத்தைக் கொண்டு வலைப்பக்கங்களை மதிப்பிடுதல்

அலகு 1 **(6 மணி நேரம்)**

இணையம்: அறிமுகம் – இணையத்தின் வரலாறும் வளர்ச்சியும் – இணைய முகவரி அமைப்பு - இன்றைய வாழ்விற்கு இணையத்தின் பங்கு – தமிழ் இணையத்தின் தொடக்கம் – வளர்ச்சிப் போக்குகள்

அலகு 2 **(6 மணி நேரம்)**

இணைய இயங்குதளங்கள் – தேடுபொறிகள் – தகவல் உலாவுதல் , தகவல் தேடுதல் – இணையத்தில் தரவுகளைப் பதிவிறக்குதல், பதிவேற்றுதல்

அலகு 3 **(6 மணி நேரம்)**

விக்கிப்பீடியா அறிமுகம் – விக்கிப்பீடியா பெயர்க்காரணம் – தமிழ் விக்கிப்பீடியா – விக்கிப்பீடியா கணக்கு உருவாக்கமும் கட்டுரை எழுதுதலும் – தமிழ் மின்னிதழ்கள்- மின்னாளுகைகள் – அரசு இணைய பக்கங்கள்- வேலைவாய்ப்பு இணையப் பக்கங்கள்

அலகு 4 **(6 மணி நேரம்)**

வலைப்பூ அறிமுகம் – வலைப்பூ வளர்ச்சியும் வகைப்பாடும் – தமிழ் வலைப்பூக்கள் – வலைப்பூ தொடங்குவதற்கான அடிப்படைகள் – இன்றியமையாத வலைப்பூக்கள் – சமூக வலைதளங்கள் மற்றும் அதன் பயன்பாடுகள்

அலகு 5 **(6 மணி நேரம்)**

கல்வி சார்ந்த வலைதளங்கள் – இணையவழிக் கற்றல் கற்பித்தல் நடைமுறைகள் –செயற்கை நுண்ணறிவில் தமிழ்

கற்பித்தல் அணுகுமுறை (Teaching Methodology)	விரிவுரை (Lecture), காணொளிக் காட்சி (Videos), விளக்கக் காட்சி (PPT presentation)
மதிப்பீட்டு முறைகள் (Assessment methods)	கொள்குறி வினாத்தேர்வு (MCQs), கருத்துரை(Seminar), குழுக் கலந்துரையாடல் (Group Discussion), ஒப்படைவு (Assisgnment). வலைப்பூ உருவாக்கம் (Practical)

பாடநூல்கள்:

1.மணிகண்டன், துரை. (2012).,தமிழ்க் கணினி இணையப் பயன்பாடுகள், கமலினி பதிப்பகம்.
2.சுந்தரம்.இல. (2015)., கணினித்தமிழ், விகடன் பிரசுரம்.

பார்வை நூல்கள்:

1.பாஸ்கரன். சு.(1998), கணிப்பொறித் தகவல் தொழில்நுட்பம், உமா பதிப்பகம்.
2.பொன்னவைக்கோ, மு. (2010), இணையத் தமிழ் வரலாறு, பாரதிதாசன் பல்கலைக்கழகம்.

Semester	Course Code	Title of the Course	Hours	Credits
IV	25USS420104	Language- II: English – IV	2	2

English language and its usage

Course Outcome

- Giving importance to usage of the language.
- Focusing on Structure of the language

UNIT I **(6 Hours)**

Conjunctions-Particular Conjunctions-Word order and sentence organization- Basic word order- Inversion – Fronting- Information structure- Emphasis.

UNIT II **(6 Hours)**

Constructing text- discourse makers-paragraphs-Repetition-Correspondence-Special kinds of language-Politeness- Varieties and styles of English.

UNIT III **(6 Hours)**

Topic areas- Spelling and Punctuation-Word building.

UNIT IV **(6 Hours)**

Spoken Grammar- Contractions- Spoken structures and Tags – Short answers –reply questions

UNIT V **(6 Hours)**

Various structures-Questions- Question Tag-Negative structures-Imperatives-Exclamations Direct speech-Indirect speech- relatives-Whoever, Whatever etc., - If –Preparatory it, Cleft sentences –Ellipsis

Books for Study:

1. Swan Michael, Practical English Usage, Oxford University Press

Semester	Course Code	Title of the Course	Hours	Credits
IV	25USS430206	**Core Course - IV:** Java Programming	3	3

Course objectives
To introduce the fundamental concepts of Java programming, including control structures and object-oriented programming.
To enable students to understand and implement inheritance, polymorphism, and interface concepts.
To develop skills in exception handling, multi-threading, and concurrent programming.
To provide hands-on experience with the Spring framework, dependency injection, and ORM techniques.
To familiarize students with web services, REST APIs, and API testing tools.

UNIT-I: Introduction to Java **(9 Hours)**

Primaries – Control Statements. **CLASSES ANDOBJECTS:** General form of a class – Creation of Objects –Usage of Constructors – "this" keyword- Constructor Overloading-Copy constructors- Static Data Members – Static Methods- "finalize ()" Method.

UNIT-II: Inheritance and Polymorphism **(9 Hours)**

Inheriting Variables in a Class – Inheriting Methods in a Class – Inheritance and Constructors – Abstract Classes – Final Classes. **INTERFACES AND PACKAGES:** Interfaces- Structure of an Interface – Implementation of an Interface – Interface Inheritance. Packages – Placing the Classes in a Package –Package Hierarchy – Access Control Modifiers.

UNIT-III: Exception Handling **(9 Hours)**

Default Exception Handling – Exception and Error Classes – Catch Block Searching Pattern – "Throw" Statement – "Throws" Statement – Custom Exceptions. **THREADS:** Life Cycle of a Thread – Creating and Running Threads – Methods in the Thread Class.

UNIT-IV: Introduction to Spring Framework **(9 Hours)**

Introduction to Spring Frame work Dependency Injection – IOC container – Spring AOP – Spring ORM Layer – Annotation –Spring boot Architecture – JPA.

UNIT-V: Introduction to Web Service **(9 Hours)**

Introduction to web services – Creating RESTAPI – Difference between JDBC& JPA – Web apps using spring – API testing using POSTMAN.

Teaching Methodology	PPT, chalk and talk
Assessment Methods	Seminar, Test, MCQ

Books for Study:

1. Herbert Schildt, *"Java: The Complete Reference,"* McGraw Hill, 13th Edition, 2023.
2. E. Balagurusamy, *"Programming with Java,"* McGraw Hill, 6th Edition, 2021.

Books for Reference:

1. Cay S. Horstmann, *"Core Java Volume I – Fundamentals,"* Prentice Hall, 12th Edition, 2022.
2. Bruce Eckel, *"Thinking in Java,"* Pearson Education, 4th Edition, 2022.
3. Benjamin J. Evans & Jason Clark, *"Java in a Nutshell,"* O'Reilly Media, 8th Edition, 2023.

Websites and eLearning Sources:

1. https://docs.oracle.com/javase/tutorial/ - Official Java Documentation
2. https://www.w3schools.com/java/ - W3Schools Java Tutorial
3. https://www.javatpoint.com/java-tutorial - JavaTPoint Java Guide
4. https://www.udemy.com/course/java-the-complete-java-developer-course/ - Udemy Java Course

CO NO.	CO- Statements
	On successful completion of this course, the students will be able to
CO-1	Develop Java programs using OOP principles
CO-2	Develop Java programs with the concepts of Inheritance and Interfaces
CO-3	Build Java applications using exceptions, threads and generics classes
CO-4	Apply Dependency Injection, IoC, AOP, ORM, and JPA concepts in Spring Boot application development
CO-5	Develop RESTful web services using Spring Boot, differentiate JDBC & JPA, build web applications, and test APIs using Postman

Relationship Matrix											
Semester	**Course code**			**Title of the Course**					**Hours**		**Credits**
IV	**25USS430206**			**Core Course - IV:** Java Programming					**3**		**3**
Course Outcomes↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	2	3	1	3	3	3	3	2	2	3	2.5
CO-2	2	2	3	2	2	1	2	2	2	3	2.1
CO-3	2	1	2	2	2	2	3	1	2	3	2
CO-4	2	1	3	2	2	2	1	2	2	2	1.9
CO-5	2	2	1	3	3	3	1	2	2	3	2.2
										Mean Overall Score	2.1 **(High)**

Semester	Course Code	Title of the Course	Hours	Credits
IV	25USS430404	**Allied Course - IV:** Operating Systems Concept with Unix / Linux	3	3

Course objectives
To understand the fundamentals of operating systems, including system structures and real-time systems.
To gain knowledge of process management, CPU scheduling, and process synchronization techniques.
To explore UNIX architecture, file systems, shell types, and shell scripting concepts.
To learn essential Linux commands, shell programming, and administrative operations.
To understand Linux history, open-source principles, and system installation and configuration.

UNIT I: Introduction (9-Hours)

Meaning – Mainframe Systems – Multiprocessor Systems – Real-Time Systems. **Computer System Structures:** Computer-System Operation - Storage Hierarchy – Network Structure. **Operating System Structures:** System Components - System Calls - Virtual Machines - System Generation.

UNIT II: Process Management (9-Hours)

Processes - Process Concept - Operation on Processes - Inter-Process Communication. **CPU SCHEDULING:** Basic Concepts - Scheduling Algorithms - Real Time Scheduling. **PROCESS SYNCHRONIZATION:** Background - Critical-Selection Problem – Semaphores**.**

UNIT III: Unix Architecture (9-Hours)

Unix Architecture-Unix Features, -Types of Shell (C, Bourn, Korn)-Unix File System, - Types of File (Ordinary Files, Directory Files, Device Files)-Unix File & Directory Permissions- Connecting Unix Shell: Telnet- Login Commands, File / Directory Related Command- Operators in Redirection & Piping- Finding Patterns in Files.

UNIT IV: Introduction of Vi Editor (9-Hours)

Shell Keywords -Shell Variables - System variables -Positional Parameters -Interactive shell script using read and echo -Decision Statements- Looping statements- Array -Function -Various shell script examples.

UNIT V: GNU (9-Hours)

History of Linux -GNU, GPL Concept - Open Source & Freeware -Structure and Features of Linux - Installation and Configuration of Linux o Using with Ubuntu -Startup, Shutdown and boot loaders of Linux- Linux Booting Process.

Teaching Methodology	PPT, chalk and talk
Assessment Methods	Seminar, Test, MCQ

Books for study:

1. Silberschatz, A., Galvin, P. B., & Gagne, G. (2023). *"Operating System Concepts"* (10th Ed.). Wiley India Pvt. Ltd., New Delhi.
2. Forouzan, B. A. (2022). *"Unix and Shell Programming"*. Cengage Learning India Pvt. Ltd., New Delhi.

Books for Reference:

1. Kochan, S. G. (2020). *"Unix Shell Programming"* (4th Ed.). Pearson Education, New Delhi.
2. Negus, C. (2022). *"Linux Bible"* (10th Ed.). Wiley India Pvt. Ltd., New Delhi.

Websites and eLearning Sources:

1. https://tldp.org/guides.html
2. https://www.gnu.org/home.en.html
3. https://help.ubuntu.com/

CO NO.	CO- Statements
	On successful completion of this course, the students will be able to
CO-1	Understand the basic concepts, structure, and types of operating systems including system components, virtual machines, and system generation.
CO-2	Understand and simulate activities of operating system components
CO-3	Understand how the various elements that underlie an operating system interact and provide services for execution of application software
CO-4	Understand the implementation underpinnings of modern computing infrastructure to effectively utilize the full spectrum of the modern computing infrastructure
CO-5	Measure, evaluate, and compare OS components through instrumentation for performance analysis

Relationship Matrix											
Semester	**Course code**			**Title of the Course**					**Hours**		**Credits**
IV	**25USS330205**			**Core Course - IV:** Java Programming					**3**		**3**
Course Outcomes↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	2	3	2	1	3	3	2	2	2	2.3
CO-2	3	3	3	3	2	3	3	3	3	3	2.9
CO-3	3	3	3	3	1	3	3	3	3	3	2.9
CO-4	3	3	3	3	2	3	3	3	3	3	2.8
CO-5	3	3	3	3	2	3	3	3	3	3	2.8
Mean Overall Score											2.84 **(High)**

Semester	Course Code	Title of the Course	Hours	Credits
IV	25USS441003	**Part - 4:** Life Coping Skills	2	2

Course objectives
To help students develop essential life skills for personal and professional growth.
To enhance self-esteem, self-concept, and personality development.
To cultivate positive thinking, motivation, and goal-setting techniques.
To build the right attitude toward success and overcome challenges.
To develop problem-solving, decision-making, and time management skills.

UNIT I **(6 Hours)**

Introduction and outline of the programme – Life Coping Skills – Restructuring one's own Life Story

UNIT II **(6 Hours)**

Self Esteem: Importance and Advantages of High Self Esteem – Manifestation of Low Self Esteem – Qualities of High & Low Self Esteem. Self-Concept: Characteristics – Self-Acceptance and Personality Development.

UNIT III **(6 Hours)**

Positive Thinking – Motivation and Self-Actualization – Goal Setting: Definition of Goal –Focus on the Goal – Keeping eyes – The importance of Goals – Dreams – The Obstacles to set Goals – Goat setting – Different Types – Balancing – Scrutinizing – Meaningless Goals.

UNIT IV **(6 Hours)**

Meaning and Attitude to Success: Success – Definition – Obstacles – Winning Edge –Struggle – Overcoming – Measuring – Qualities for Successful – Guidelines.

UNIT V **(6 Hours)**

Problem Solving: Meaning – Principles. Decision Making: Meaning – Decision Making Process. Time Management: Introduction – The Time Factor – Management of Time – Tips for Time Management.

Teaching Methodology	PPT, chalk and talk
Assessment Methods	Seminar, Test, MCQ

Books for Study:

1. Dr. Xavier Alphonse SJ*," A Textbook on Life Coping Skills* "–, ICRDCE Publication, Chennai, December 2011.

Books for Reference:

1. Stephen R. Covey*,' The 7 Habits of Highly Effective People* "
2. Carol S. Dweck*," Mindset: The New Psychology of Success* "
3. Norman Vincent Peale*," The Power of Positive Thinking* "
4. Dale Carnegie, "*How to Win Friends and Influence People* "

Websites and E-Learning Sources:

1. https://www.coursera.org/courses?query=personal%20development
2. https://www.udemy.com/course/setting-goals-for-success
3. https://www.edx.org/learn/personal-development

CO NO.	CO- Statements
	On successful completion of this course, the students will be able to
CO-1	Understand the life cycle of humanities
CO-2	Identify the various challenges (physical, emotional, and social) faced in adolescence
CO-3	Strengthen their relationships & Empathize with others
CO-4	Acquire success through quality planning
CO-5	Develop positive emotions as well as health Consciousness and various life challenges with their own coping strategies.

Relationship Matrix											
Semester	**Course code**			**Title of the Course**					**Hours**		**Credits**
IV	**25USS441003**			**Part - 4:** Life Coping Skills					**2**		**2**
Course Outcomes↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	2	3	2	3	2	2	1	2	2	2	2.1
CO-2	2	2	2	2	1	2	2	2	2	2	1.9
CO-3	2	2	1	2	2	2	1	2	2	2	1.8
CO-4	2	1	2	2	2	2	2	2	2	2	1.9
CO-5	2	2	2	2	1	2	2	2	2	3	2
Mean Overall Score											1.9 **(Medium)**

Semester	Course Code	Title of the Course	Hours	Credits
V	25USS530208	**Core Course – V:** Web Development using ASP.NET	4	4

Course objectives
To understand distributed technologies like client-server models, SQL, .NET, and MVC architectures.
To learn C# programming concepts, including variables, data types, loops, and methods.
To explore ASP.NET architecture, runtime, and web development tools.
To work with web controls like HTML controls, validation, AJAX, and state management.
To master ADO.NET for database connectivity using provider and consumer objects.

UNIT -I: Introduction (12 Hours)

Introduction to Distributed Technology, Client server architecture: 2-tier model – 3-tier model – n- tier model, SQL architecture –DOTNET architecture – MVC architecture.

UNIT- II: Variables (12 Hours)

Introduction to C# language – Variables - Data Types - Boxing and Unboxing - Data Type Conversion - Operators and Expressions – Branching - Looping Statements - Arrays -Methods.

UNIT-III: Architecture (12 Hours)

ASP.NET: Introduction – architecture – ASP.NET Runtime – Internet Information Services – Visual Web Developer Web Server – ASP.NET Parser – Assembly – Page class.

UNIT- IV: Server controls (12 Hours)

Web Server Controls – HTML Controls – Ad Rotator and Calendar controls – Validation Controls – Ajax Controls- State management.

UNIT- V: Databases (12 Hours)

ADO.NET: System. Data, SqlClient and Xml namespaces – Provider objects and Consumer objects – Disconnected data access – Grid View & Form View.

Teaching Methodology	PPT, chalk and talk
Assessment Methods	Seminar, MCQ

Books for Study:

1. Jon Duckett, "ASP.NET Core in Action", Manning Publications, 2022.
2. Adam Freeman, "Pro ASP.NET Core 6", A press, 2022.

Books for Reference:

1. Stephanie Bodoff, Dale Green, Eric Jendrock, "*The J2EE tutorial*", Addison-Wesley,2022.
2. Hitesh Seth, "*Microsoft .NET: kick start*", Sams Publishing, 2021.
3. Platt S David, "*Introducing Micorsoft .Net*", Prentice Hall of India, New Delhi, 2023.

CO NO.	CO- Statements
	On successful completion of this course, the students will be able to
CO-1	Gain knowledge of the concepts related to distributed system technologies.
CO-2	Understanding on concepts related ASP. NET technology
CO-3	Design and develop professional console and window-based .NET application.
CO-4	Construct the code solutions and develop projects within the .NET framework.
CO-5	Build a dynamic web application using ADO.NET

Relationship Matrix											
Semester	**Course code**			**Title of the Course**					**Hours**		**Credits**
V	**25USS530208**			**Core Course – V:** Web Development using ASP.NET					**4**		**4**
Course Outcomes↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	2	3	2	2	3	2	2	3	2	**2.6**
CO-2	2	3	2	3	2	3	2	3	2	1	**1.6**
CO-3	2	2	3	2	1	3	3	2	3	1	**2.7**
CO-4	3	3	2	3	2	3	3	2	3	2	**2.8**
CO-5	2	2	3	2	1	3	2	3	2	1	**2.8**
Mean Overall Score											**2.5 (High)**

Semester	Course Code	Title of the Course	Hours	Credits
V	25USS530209	**Core Course -VI:** Software Engineering	4	4

Course objectives
To Understand software engineering principles and various software development life cycle models.
To Learn project management concepts like estimation techniques and risk management.
To Explore software design methodologies, including structured and object-oriented design with UML diagrams.
To Apply coding and testing techniques to ensure software reliability and quality
To Analyze CASE tools and understand software maintenance strategies.

UNIT I: Introduction (12 Hours)

The Software Engineering Discipline - Software Development Projects - Emergence of Software Engineering - Software Life Cycle Models: Classical Waterfall Model - Iterative Waterfall Model - Prototyping Model - Spiral Model.

UNIT II: Software Project Management (12 Hours)

Responsibilities of a Software Project Manager - Project Planning - Metrics for Project Size Estimation - Project Estimation Techniques - Empirical Estimation Techniques - COCOMO - Risk Management - Requirements Analysis and Specifications: Requirements Gathering and Analysis – SRS.

UNIT III: Software Design (12 Hours)

Cohesion and Coupling - Function-Oriented Software Design: Structured Analysis - DFDs - Structured Design - Object Modelling: Overview of Basic Object Orientation Concepts - UML Diagrams - Activity Diagram - State Chart Diagram - User Interface Design: Characteristics of a Good User Interface - Basic Concepts. Quality Management: Quality Concepts: Software Quality – The Software Quality Dilemma – Achieving Software Quality.

UNIT IV: Coding and Testing (12 Hours)

Coding - Software Documentation - Testing - UNIT Testing - Black-Box Testing - White-Box Testing - Debugging - Integration Testing - System Testing - Software Reliability and Quality Management: Software Reliability - Software Quality and Management System. Risk Management: Software Risks – Risk Identification – Risk Projection – Risk Refinement – Risk Mitigation, Monitoring and Management.

UNIT V: Computer Aided Software Engineering (12 Hours)

Case Environment - Characteristics of CASE Tools - Maintenance: Characteristics of a Software Maintenance - Software Reverse Engineering - Estimation of Maintenance Cost - Software Reuse: A Reuse Approach.

Teaching Methodology	PPT, chalk and talk
Assessment Methods	Seminar, MCQ

Books for Study:

1. Pressman, R. S. (2023). *Software Engineering: A Practitioner's Approach (10th Ed.) *. McGraw-Hill.
2. Sommerville, I. (2022). *Software Engineering (11th Ed.) *. Pearson.
3. Jalote, P. (2021). *An Integrated Approach to Software Engineering (4th Ed.) *. Springer.

Books for Reference:

1.Fairley, R. (2021). *Software Engineering Concepts*. McGraw-Hill.

2.Van Vliet, H. (2022). *Software Engineering: Principles and Practice (3rd Ed.) *. Wiley.

Websites and eLearning Sources:

1.https://nptel.ac.in/courses/106105087 - NPTEL Software Engineering Course

2.https://www.coursera.org/learn/software-engineering - Coursera Software Engineering

3.https://www.udemy.com/course/software-engineering - Udemy Software Engineering

CO NO.	CO- Statements
	On successful completion of this course, the students will be able to
CO-1	understand software engineering principles and life cycle models
CO-2	apply software project management techniques
CO-3	design and model software using structured and object-oriented techniques
CO-4	evaluate software quality assurance and testing methodologies
CO-5	develop maintenance strategies and CASE tool applications

Relationship Matrix											
Semester	**Course code**			**Title of the Course**					**Hours**		**Credits**
V	**25USS530209**			**Core Course - VI:** Software Engineering					**4**		**4**
Course Outcomes↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	2	3	2	2	3	2	2	3	2	**2.6**
CO-2	2	3	2	3	2	3	2	3	2	1	**2.2**
CO-3	2	2	3	2	1	3	3	2	3	1	**2.3**
CO-4	3	3	2	3	2	3	3	2	3	2	**2.4**
CO-5	2	2	3	2	1	3	2	3	2	1	**2.7**
										Mean Overall Score	**2.44 (High)**

Semester	Course Code	Title of the Course	Hours	Credits
V	25USS530210	**Core Course - VII:** ReactJS	4	4

Course objectives
To learn the fundamentals of JavaScript, including variables, operators, loops, functions, and the DOM.
To understand React.js concepts, setup, and component-based architecture.
To explore state management and React lifecycle methods for efficient UI development.
To explore state management and React lifecycle methods for efficient UI development.
To develop and test React applications using best practices and UNIT testing.

UNIT I: Introduction (12 Hours)

Basic JavaScript - Variables - Operators - Decision Making statement - Looping Statements - Functions - Arrays - DOMS: Methods, Forms, Event Listeners.

UNIT II: React Components (12Hours)

React JS Introduction – Work Flow – Advantages – React JS Environment Setup: Node Setup, Create Package. Json. - JSX - React Components Overview: Class, Props, Events.

UNIT III: State Management (12 Hours)

State Management in React - React Lifecycle - React Hooks: Managing component data, Handling side effects. - Containers in React: Container Component.

UNIT IV: MySQL operations (12 Hours)

Handling Data in React - Connecting React with MySQL - CRUD Operations: Create, Read, Update, Delete - Fetching Data.

UNIT V: App Building (12 Hours)

Understanding React App Development - Creating a React App - Testing in React: UNIT Testing.

Teaching Methodology	PPT, Chalk and Talk
Assessment methods	Group projects, Code Review

Books for Study:

1. Philip Ackermann, "*JavaScript the Comprehensive Guide*", 1st Edition., Rhein work Publishing., Bonn Germany 2022.
2. Azat Mardan, John sonmez, "*React Quickly*", Manning Publication., Sheter Island NY 2017.

Books for Reference:

1. Alex Banks, Eve Porcello, "*Learning React*", O'Reilly Media, 2020.
2. Adam Boduch, Roy Derks, "*React and React Native*", Packt Publishing, 2020
3. Robin Wieruch,"*The Road to React",* Independently Published, 2022.

Websites and eLearning Sources:

1. https://react.dev/
2. https://reactrouter.com/

CO No.	CO-Statements
	On successful completion of this course, the students will be able to
CO1	Recall JavaScript fundamentals, including variables, operators, and loops.
CO2	Explain React.js concepts, components, and JSX syntax.
CO3	Apply state management and lifecycle methods in React applications.
CO4	Analyze CRUD operations and database interactions in React with MySQL.
CO5	Evaluate and test React applications using UNIT testing techniques.

Relationship Matrix											
Semester	**Course code**			**Title of the Course**					**Hours**		**Credits**
V	**25USS530210**			**Core Course - VII:** ReactJS					**4**		**4**
Course Outcomes↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	2	3	2	2	3	2	2	3	2	**2.6**
CO-2	2	3	2	3	2	3	2	3	2	1	**2.2**
CO-3	2	2	3	2	1	3	3	2	3	1	**2.3**
CO-4	3	3	2	3	2	3	3	2	3	2	**2.4**
CO-5	2	2	3	2	1	3	2	3	2	1	**2.7**
Mean Overall Score											**2.44 (High)**

Semester	Course Code	Title of the Course	Hours	Credits
VI	25USS630211	**Core Course - VIII:** Fundamentals of Computer Networks	4	4

Course objectives
Understand fundamental underlying principles of computer networking
Investigate the hardware, software, components of a network and the interrelations.
Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and Technologies
Familiarity with the basic protocols of computer networks and how they can assist in network design and implementation
Construct various types of networks for processing data

UNIT-I: **Introduction to Computer Network** **(12 Hours)**

Need for computer networks - evolution - Data Communication - Data Transmission - Transmission media- Topology.

UNIT-II: Classification of Networks **(12 Hours)**

Switching and Routing - Routing - Multiplexing and Concentration - Concentrator - Terminal Handling - Components of a Computer Network.

UNIT-III: Network Standards and OSI **(12 Hours)**

Need for network standard – OSI reference model - Physical layer - Data link layer - Network layer – Transport layer - Session layer - Application layer.

UNIT-IV: TCP/IP **(12 Hours)**

OSI Reference Model and TCP/IP - The Network Layer - Transport Layer - Application Layer - Other File Transfers- -Software-Defined Networking: SDN Architecture, OpenFlow Protocol, Network Virtualization - SDN vs. Traditional Networking.

UNIT-V: Network Security **(12 Hours)**

Software-Defined Networking: SDN Architecture, OpenFlow Protocol, Network Virtualization - SDN vs. Traditional Networking.

Teaching Methodology	Chart, PPT, chalk and talk, Lectures
Assessment Methods	Seminar, viva voce, MCQ, Group Activities

Books for Study:

1. Forouzan, B. A. (2023). Data Communications and Networking with TCP/IP Protocol Suite (6th Ed.). McGraw Hill.
2. Kurose, J. & Ross, K. (2023). Computer Networking: A Top-Down Approach (8th Ed.). Pearson.

Books for Reference:

1. Oswalt, M., Lowe, S. & Edelman, J. (2023). Network Programmability and Automation (2nd Ed.). O'Reilly.
2. Goransson, P. & Black, C. (2021). Software Defined Networks: A Comprehensive Approach

Websites and eLearning Sources:

1. https://nptel.ac.in/courses/106105183
2. https://www.coursera.org/specializations/network-security
3. https://www.udemy.com/course/the-complete-network-security-course

CO NO.	CO- Statements
	On successful completion of this course, the students will be able to
CO-1	Understand fundamental underlying principles of computers networking
CO-2	Investigate the hardware, software, components of a network and the interrelations.
CO-3	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and Technologies
CO-4	Familiarity with the basic protocols of computer networks and how they can be used to assist in network design and implementation
CO-5	Construct various types of networks for processing data

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
VI	**25USS630211**			**Core Course - VIII:** Fundamentals of Computer Networks						**4**	**4**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	3	2	2	3	2	2	3	2	**2.5**
CO2	2	3	2	3	2	3	2	3	2	1	**2.4**
CO3	2	2	3	2	1	3	3	2	3	1	**2.2**
CO4	3	3	2	3	2	3	3	2	3	2	**2.5**
CO5	2	2	3	2	1	3	2	3	2	1	**2.4**
										Mean Overall Score	**2.4 (High)**

Semester	Course Code	Title of the Course	Hours	Credits
VI	25USS630212	**Core Course -IX:** Python Programming	4	4

Course Objectives
Understand fundamental underlying principles of computer networking
Investigate the hardware, software, components of a network and the interrelations.
Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and Technologies
Familiarity with the basic protocols of computer networks and how they can assist in network design and implementation
Construct various types of networks for processing data

UNIT I: Introduction to Python (12 Hours)

Essential Python Libraries – Installation and setup python basics: Data Types, Variables, Basic Input-Output Operations, Basic Operators, Boolean Values, Conditional Execution, Loops, Arrays and Methods.

UNIT II: Sequence (12 Hours)

String, Tuples, List, Dictionaries- Working with Files-, Error and Exception Handling- Modules- Classes and OOPs.

UNIT III: Introduction to NumPy (12 Hours)

Understanding Data Types in Python, The Basics of NumPy Arrays, Computation of NumPy Arrays, Aggregations, Comparisons, Masks, Boolean Logic, Fancy Indexing, Sorting Arrays, Structured Data.

UNIT IV: Getting Started with Pandas (12 Hours)

Introduction to pandas Data Structures - Essential Functionality - Summarizing and Computing Descriptive Statistics - Handling Missing Data -Hierarchical Indexing.

UNIT V: Flask Web Framework in Python (12 Hours)

Introduction to frame work –Flash overview-Environment- basic application structure: Initialization, Routes and View Functions, Server Startup ,A Complete Application ,The Request-Response Cycle, Flask Extensions-Templates: The Jinja2 Template Engine ,Rendering Templates ,Variables, Control Structures - Web Forms: Cross-Site Request Forgery (CSRF) Protection ,Form Classes ,HTML Rendering of Forms ,Form Handling in View Functions, Redirects and User Sessions ,Message Flashing-Database: Database Operations.

Teaching Methodology	Code demonstration, Project based learnings, Lectures
Assessment Methods	Seminar, Gamified Quizzes, Group Activities

Books for Study:

1. McKinney, W. (2022). *Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Jupyter* (3rd Ed.). O'Reilly.
2. VanderPlas, J. (2023). *Python Data Science Handbook* (2nd Ed.). O'Reilly.
3. Guttag, J. (2022). *Introduction to Computation and Programming Using Python* (3rd Ed.). MIT Press.

Books for Reference:

1. Manas, A. (2023). *Practical Data Science with Jupyter, Pandas, Matplotlib & NumPy* (1st Ed.). Packt Publishing.
2. Sharma, S. (2022). *Data Science with Python: Step by Step Guide* (2nd Ed.). BPB Publications

Websites and eLearning Sources:

1. NPTEL Python Course – https://nptel.ac.in/courses/
2. Coursera Python for Data Science – https://www.coursera.org/courses?query=python
3. Udemy Python Bootcamp – https://www.udemy.com/course/complete-python-bootcamp/
4. edX Python for Data Science – https://www.edx.org/learn/python
5. Kaggle Python Tutorials – https://www.kaggle.com/learn/python

CO NO.	CO- Statements
	On successful completion of this course, the students will be able to
CO-1	Understand the important features of Python.
CO-2	Define the fundamentals of the most widely used Python packages and Functions.
CO-3	Perform data preprocessing using NumPy, Pandas
CO-4	Analyze the various scientific problems and provide suitable solutions using various techniques with Python.
CO-5	Visualizing the results of analytics effectively

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
VI	**25USS630212**			**Core Course -IX:** Python Programming						**4**	**4**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	3	2	2	3	2	2	3	2	**2.9**
CO2	2	3	2	3	2	3	2	3	2	1	**2.8**
CO3	2	2	3	2	1	3	3	2	3	1	**2.9**
CO4	3	3	2	3	2	3	3	2	3	2	**2.9**
CO5	2	2	3	2	1	3	2	3	2	1	**2.8**
Mean Overall Score											**2.86 (High)**

Semester	Course Code	Title of the Course	Hours	Credits
VI	25USS630213	**Core Course – X:** Android Programming	4	4

Course objectives
To introduce the fundamental concepts of Mobile App Development and familiarize with the Android development environment.
To develop proficiency in designing UI layouts, handling user interactions, and working with Android components.
To provide hands-on experience with local data storage, SQLite databases, and content providers.
To explore networking in Android applications, including RESTful APIs, JSON parsing, and background task management.
To explore networking in Android applications, including RESTful APIs, JSON parsing, and background task management.

UNIT I: App Development **(12 Hours)**

Overview of Mobile App Development - Introduction to Android: Features and Architecture - Setting up the Development Environment: Android Studio and SDK - Creating a Simple Android Application Understanding Android Project Structure.

UNIT II: Life cycle **(12 Hours)**

Activity, Intent, and Fragment Lifecycle - UI Layouts: Linear Layout, Relative Layout, Constraint Layout - UI Components: Text View, Edit Text, Button, Check Box, Radio Button, Image View - Event Handling: Click and Touch Events.

UNIT III: Local storage **(12 Hours)**

Shared Preferences for Local Data Storage - SQLite Database: Creating and Managing Databases Content Providers: Accessing Data from Other Apps - File Handling and Internal/External Storage

UNIT IV: Internet **(12 Hours)**

Connecting to the Internet in Android Apps - RESTful APIs and JSON Parsing - Volley and Retrofit for Networking - Handling Background Tasks: Async Task and Work Manager

UNIT V: Sensors **(12 Hours)**

Using Sensors and Location Services - Notifications in Android -Publishing an App on the Play Store - Introduction to Firebase for Authentication and Cloud Storage

Teaching Methodology	Code demonstration, Project based learnings, Lectures
Assessment Methods	Seminar, Lab evaluation, Group Based activities

Books for Study:

1. Meier, R. (2018). *Professional Android Development.* Wrox, 4th Edition.
2. Horton, J. (2021). *Android Programming for Beginners.* Packt Publishing, 3rd Edition.

Books for References:

1. Phillips, B., Stewart, C., & Marsicano, K. (2019). *Android Programming: The Big Nerd Ranch Guide.* Big Nerd Ranch, 4th Edition.
2. Griffiths, D., & Griffiths, D. (2021). *Head First Android Development: A Learner's Guide to Building Android Apps with Kotlin.* O'Reilly Media, 3rd Edition.

Websites and e-learning Sources:

1. https://developer.android.com/
2. https://nptel.ac.in/courses/
3. https://www.coursera.org/courses?query=android
4. https://www.udemy.com/course/android-development/
5. https://www.edx.org/learn/android
6. https://www.kaggle.com/learn/android

CO NO.	CO- Statements
	On successful completion of this course, the students will be able to
CO-1	Understand the fundamental concepts of Android development.
CO-2	Learn about Android components, UI design, and layouts.
CO-3	Develop interactive Android applications with event handling.
CO-4	Implement data storage techniques, including SQLite and Shared Preferences.
CO-5	Utilize APIs, networking, and third-party libraries in Android applications.

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
VI	**25USS630213**			**Core Course – X:** Android Programming						**4**	**4**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	3	2	2	3	2	2	3	2	**2.4**
CO2	2	3	2	3	2	3	2	3	2	1	**2.3**
CO3	2	2	3	2	1	3	3	2	3	1	**2.3**
CO4	3	3	2	3	2	3	3	2	3	2	**2.3**
CO5	2	2	3	2	1	3	2	3	2	1	**2.2**
										Mean Overall Score	**2.3 (High)**