

# DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

## I & II SEMESTER CURRICULUM AND SYLLABI

Applicable to the students admitted from  
the Academic year 2025-2026 onwards

**R-2025: CBCS**



### VEL TECH HIGH TECH

Dr. RANGARAJAN Dr. SAKUNTHALA ENGINEERING COLLEGE

***An Autonomous Institution***

#60, Avadi – Vel Tech Road, Vel Nagar,  
Avadi, Tamil Nadu 600062

**B.Tech. – Artificial Intelligence and Data Science**  
**Curriculum R-2025**

SEMESTER I												
S. No.	Course Code	Course Title	Category	CIE Marks	SEE Marks	Total marks	Credits					
							L	T	P	TW+SL	TH	C
<b>THEORY</b>												
1	25EN01T	COMMUNICATIVE ENGLISH	HSMC	40	60	100	45	0	0	45	90	3
2	25MA01IT	MATRICES AND CALCULUS (INTEGRATED)	BSC	50	50	100	30	15	30	45	120	4
3	25PH01T	ENGINEERING PHYSICS I	BSC	40	60	100	45	0	0	45	90	3
4	25CY01T	ENGINEERING CHEMISTRY	BSC	40	60	100	45	0	0	45	90	3
5	25MC01T	தமிழர் மரபு / HERITAGE OF TAMILS	MC	40	60	100	15	0	0	15	30	1
6	25HEC01T	DIGITAL LOGIC CIRCUITS	ESC	40	60	100	45	0	0	45	90	3
7	25HCS01IT	PROGRAMMING IN C (INTEGRATED)	ESC	50	50	100	30	0	60	30	120	4
<b>PRACTICAL</b>												
8	25BS01P	PHYSICS AND CHEMISTRY LABORATORY	BSC	60	40	100	0	0	60	0	60	2
9	25MC05P	YOGA FOR YOUTH EMPOWERMENT	MC	100	0	100	0	0	60	0	60	0
10	25EEC01P	INTEGRATED COMPETENCY DEVELOPMENT FOR ENGINEERS I	EEC	100	0	100	0	0	30	0	30	1
<b>TOTAL</b>												<b>24</b>

SEMESTER II												
S. No.	Course Code	Course Title	Category	CIE Marks	SEE Marks	Total marks	Credits					
							L	T	P	TW+SL	TH	C
<b>THEORY</b>												
1	25EN02T	TECHNICAL ENGLISH	HSMC	40	60	100	45	0	0	45	90	3
2	25MA02IT	VECTOR CALCULUS AND COMPLEX INTEGRATION (INTEGRATED)	BSC	50	50	100	30	15	30	45	120	4
3	25PH02T	ENGINEERING PHYSICS II	BSC	40	60	100	45	0	0	45	90	3
4	25MC03T	ENVIRONMENTAL SCIENCES	MC	40	60	100	30	0	0	0	30	0
5	25MC02T	தமிழரும் தொழில் நுட்பமும் / TAMILS AND TECHNOLOGY	MC	40	60	100	15	0	0	15	30	1
6	25HME01IT	ENGINEERING GRAPHICS (INTEGRATED)	ESC	50	50	100	45	15	30	30	120	4
7	25HML01IT	PROBLEM SOLVING AND PYTHON PROGRAMMING (INTEGRATED)	ESC	50	50	100	30	0	60	30	120	4
<b>PRACTICAL</b>												
8	25HME02P	DESIGN THINKING LABORATORY	ESC	60	40	100	0	0	60	0	60	2
9	25EEC02P	INTEGRATED COMPETENCY DEVELOPMENT FOR ENGINEERS II	EEC	100	0	100	0	0	30	0	30	1
10	25VAC01P	FUNDAMENTALS OF MATLAB/SIMULINK PROGRAMMING	VAC	100	0	100	0	0	30	0	30	1
<b>TOTAL</b>												<b>23</b>



# **I SEMESTER**

SEMESTER I												
S. No.	Course Code	Course Title	Category	CIE Marks	SEE Marks	Total marks	Credits					
							L	T	P	TW+SL	TH	C
<b>THEORY</b>												
1	25EN01T	COMMUNICATIVE ENGLISH	HSMC	40	60	100	45	0	0	45	90	3
2	25MA01IT	MATRICES AND CALCULUS (INTEGRATED)	BSC	50	50	100	30	15	30	45	120	4
3	25PH01T	ENGINEERING PHYSICS I	BSC	40	60	100	45	0	0	45	90	3
4	25CY01T	ENGINEERING CHEMISTRY	BSC	40	60	100	45	0	0	45	90	3
5	25MC01T	தமிழர் மரபு / HERITAGE OF TAMILS	MC	40	60	100	15	0	0	15	30	1
6	25HEC01T	DIGITAL LOGIC CIRCUITS	ESC	40	60	100	45	0	0	45	90	3
7	25HCS01IT	PROGRAMMING IN C (INTEGRATED)	ESC	50	50	100	30	0	60	30	120	4
<b>PRACTICAL</b>												
8	25BS01P	PHYSICS AND CHEMISTRY LABORATORY	BSC	60	40	100	0	0	60	0	60	2
9	25MC05P	YOGA FOR YOUTH EMPOWERMENT	MC	100	0	100	0	0	60	0	60	0
10	25EEC01P	INTEGRATED COMPETENCY DEVELOPMENT FOR ENGINEERS I	EEC	100	0	100	0	0	30	0	30	1
<b>TOTAL</b>												<b>24</b>



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COURSE CODE	<b>25EN01T</b>	SEMESTER	<b>I</b>	REGULATION			R-2025		
CATEGORY	<b>HUMANITIES AND SOCIAL SCIENCES INCLUDING MANAGEMENT COURSE (HSMC)</b>			L	T	P	TW+SL	TH	C
COURSE TITLE	<b>COMMUNICATIVE ENGLISH (COMMON FOR ALL BRANCHES)</b>			45	0	0	45	90	3

### COURSE OBJECTIVES:

- To support students of Engineering and Technology in cultivating sharper listening skills and boosting their memory of listening patterns.
- To assist in building speaking abilities that allow clear expression of ideas and views in everyday conversations.
- To develop reading skills and grasp the central ideas of the text.
- To encourage the development of writing techniques using basic grammar.

### PREREQUISITE:

- Foundation of language with Basic English Grammar.

### COURSE OUTCOMES:

CO. No.	Course Outcomes	Blooms level
<b>On successful completion of this Course, students will be able to</b>		
<b>C101.1</b>	<i>Remember</i> the basics in LSRW skills.	K1
<b>C101.2</b>	<i>Listen &amp; Read</i> different types of texts, grasp the meaning and understand them easily.	K2
<b>C101.3</b>	<i>Apply</i> the appropriate vocabulary to communicate efficiently in all forms of communication.	K3
<b>C101.4</b>	<i>Communicate</i> their thoughts confidently using communicative strategies	K3
<b>C101.5</b>	<i>Write</i> grammatically correct academic, business and technical texts	K3

### COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2	PSO-3
<b>C101.1</b>	-	-	-	-	-	-	-	2	3	-	1	-	-	-
<b>C101.2</b>	-	-	-	-	-	-	-	2	3	-	1	-	-	-
<b>C101.3</b>	-	-	-	-	-	-	-	2	3	-	1	-	-	-
<b>C101.4</b>	-	-	-	-	-	-	-	2	3	-	1	-	-	-
<b>C101.5</b>	-	-	-	-	-	-	-	2	3	-	1	-	-	-

**Note:** 1: Slight, 2: Moderate, 3: Substantial

SYLLABUS		No. of Credits: 3
UNIT I	FUNDAMENTALS OF COMMUNICATION	9
<p><b>LISTENING:</b> Listening to short dialogues with good accent.</p> <p><b>SPEAKING:</b> Self-introduction, Exchanging personal information</p> <p><b>READING:</b> Reading short comprehension passages- practice skimming and scanning for specific information</p> <p><b>WRITING:</b> Letter writing (formal/informal letters)-Personal Emails and Etiquette</p> <p><b>GRAMMAR:</b> Parts of Speech- Noun and its types– Regular and Irregular verbs-Tenses– ‘WH’- questions- Yes/No questions</p> <p><b>VOCABULARY:</b> Affixation(prefix &amp; suffix)–Word formations</p> <p><b>Self-learning :</b> <a href="https://www.youtube.com/watch?v=ApLJj6BU8xg">https://www.youtube.com/watch?v=ApLJj6BU8xg</a>  <a href="https://ielts-up.com/reading/skimming-scanning.html">https://ielts-up.com/reading/skimming-scanning.html</a></p>		
UNIT II	NARRATION AND SHARING INFORMATION	9
<p><b>LISTENING:</b> Listening to documentaries, inspiring speeches of great leaders</p> <p><b>SPEAKING:</b> Summarizing documentaries / events-Role play</p> <p><b>READING:</b> Critical reading finding key information in a given text - shifting facts from opinions and paraphrasing</p> <p><b>WRITING:</b> Autobiographical writing (writing about one’s leisure time activities, hometown, favourite place and school life) – Biographical writing (place, people),</p> <p><b>GRAMMAR:</b> Subject-verb Agreement-Pronouns</p> <p><b>VOCABULARY:</b> Compound Words-One Word Substitutions</p> <p><b>Self-learning:</b> <a href="https://www.youtube.com/watch?v=iBBB-vJZB50">https://www.youtube.com/watch?v=iBBB-vJZB50</a>  <a href="https://www.examsuccess.com.au/courses/reading-comprehension/checkpoints/7-autobiographical-extract">https://www.examsuccess.com.au/courses/reading-comprehension/checkpoints/7-autobiographical-extract</a></p>		
UNIT III	BASIC GRAMMAR AND FREE WRITING	9
<p><b>LISTENING:</b> News Bulletins, Ted talks, Telephonic conversations</p> <p><b>SPEAKING:</b> Talking about future plans, comparing and contrasting, making suggestions</p> <p><b>READING:</b> Current Affairs –reading news websites/newspapers –loud in the classroom</p> <p><b>WRITING:</b> Discourse Marker-Cohesion and Coherence-Paragraph Writing (compare &amp; contrast / narrative/analytical)</p> <p><b>GRAMMAR:</b> Adjective, Adverbs-Simple, Compound and Complex Sentences</p> <p><b>VOCABULARY:</b> Homonyms &amp; Homophones</p> <p><b>Self- learning :</b> <a href="https://www.youtube.com/watch?v=Ge7c7otG2mk">https://www.youtube.com/watch?v=Ge7c7otG2mk</a>  <a href="https://www.thehindu.com/">https://www.thehindu.com/</a>  <a href="https://www.teachingenglish.org.uk/teaching-resources/teaching-adults/activities/upper-intermediate-b2/newspaper-reading-activities">https://www.teachingenglish.org.uk/teaching-resources/teaching-adults/activities/upper-intermediate-b2/newspaper-reading-activities</a></p>		
UNIT IV	UNDERSTANDING THE LOGIC AND CONNOTATION	9
<p><b>LISTENING:</b> Listen to audio/Conversation from BEC/IELTS/TOFEL.</p> <p><b>SPEAKING:</b> Group discussion/debate</p> <p><b>READING:</b> Understanding logic and sequencing in reading inferring the exact meaning of text</p> <p><b>WRITING:</b> Dialogue Writing-Jumbled Sentences</p> <p><b>GRAMMAR:</b> Modal Verbs-Conjunctions, Preposition</p> <p><b>VOCABULARY:</b> Abbreviations and Acronyms (technical contexts)</p> <p><b>Self- learning :</b> <a href="https://www.youtube.com/watch?v=r5eiUU3EpHE">https://www.youtube.com/watch?v=r5eiUU3EpHE</a>  <a href="https://www.lawctopus.com/clatalogue/ailet-pg/logical-reasoning-comprehension-based-practice-questions/">https://www.lawctopus.com/clatalogue/ailet-pg/logical-reasoning-comprehension-based-practice-questions/</a></p>		
UNIT V	VOCABULARY AND LANGUAGE DEVELOPMENT	9

<b>LISTENING:</b> Listening to / stories / event narration and interviews with celebrities		
<b>SPEAKING:</b> Narrating stories and personal experiences		
<b>READING:</b> Reading excerpts from literature, and travel & technical blogs		
<b>WRITING:</b> Essay writing (different types of essays)		
<b>GRAMMAR:</b> Articles-Spelling-Punctuation-Editing		
<b>VOCABULARY:</b> Synonyms and Antonyms		
<b>Self- learning :</b> <a href="https://www.youtube.com/watch?v=_jGjPZuBMZ">https://www.youtube.com/watch?v=_jGjPZuBMZ</a> <a href="https://learnenglish.britishcouncil.org/skills/reading/b1-reading/travel-guide">https://learnenglish.britishcouncil.org/skills/reading/b1-reading/travel-guide</a>		
<b>LECTURE : 45 PERIODS</b>	<b>TERM WORK(TW) + SELF LEARNING(SL) : 45 PERIODS</b>	<b>TOTAL: 90 PERIODS</b>

<b>LEARNING RESOURCES:</b>	
<b>TEXT BOOKS:</b>	
1.	Dubey, S. J., Kumar, M., & Chaudhary, S. (2020). English for engineers - As per AICTE. Vikas Publishing House.
2.	Murthy, J. D. (2020). Contemporary English grammar for scholars and students (Paperback ed.). Book Palace.
<b>REFERENCES:</b>	
1.	Shoba, K. N., & Rayen, L. J. (2018). Communicative English: A workbook. Cambridge University Press.
2.	Prabhu, N. S. (2019). English for engineers and technologists. McGraw-Hill.
3.	Celentano, T. (2020). The Big Book of English Grammar for ESL and English Learners. Focus on English Books.
4.	Bansal, R. K., & Harrison, J. B. (2021). Communicative English for engineers and technologists. Orient BlackSwan.
5.	Bhatnagar, N., & Bhatnagar, M. (2022). Communicative English for engineers and professionals (12th ed.). Pearson.
<b>ONLINE RESOURCES:</b>	
1.	<a href="https://www.youtubeeducation.com/watch?v=3II3R9_Z1HY">https://www.youtubeeducation.com/watch?v=3II3R9_Z1HY</a>
2.	<a href="https://www.hitbullseye.com/Vocab/One-Word-Substitute-List.php">https://www.hitbullseye.com/Vocab/One-Word-Substitute-List.php</a>
3.	<a href="https://byjus.com/govt-exams/list-homophones-homonyms-homographs/">https://byjus.com/govt-exams/list-homophones-homonyms-homographs/</a>
4.	<a href="https://flexpowermodules.com/technical-abbreviations">https://flexpowermodules.com/technical-abbreviations</a>
5.	<a href="https://www.enago.com/academy/types-of-essay/">https://www.enago.com/academy/types-of-essay/</a>
<b>EXTENSIVE READING:</b>	
1.	Obama, Michelle. (2018). <i>Becoming</i> . Crown Publishing.
<b>VIRTUAL LAB:</b>	
1.	<a href="https://www.englishlab.co.in/">https://www.englishlab.co.in/</a>





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COURSE CODE	25MA01IT	Semester	I	REGULATION			R-2025		
CATEGORY	BASIC SCIENCE COURSE (BSC)			L	T	P	TW+SL	TH	C
COURSE TITLE	MATRICES AND CALCULUS (INTEGRATED) (COMMON FOR ALL BRANCHES)			30	15	30	45	120	4

### COURSE OBJECTIVES:

- To apply advanced matrix algebra techniques that are needed by engineers for practical applications.
- To develop insight on the application of integral calculus in solving real-world problems.
- To explore the mathematical techniques involved in evaluating multiple integrals and applying them to various problems.

### PREREQUISITE:

- Basic concepts of matrix and calculus.

### COURSE OUTCOMES:

CO. No.	Course Outcomes	Blooms level
<b>On successful completion of this Course, students will be able to</b>		
C102.1	<i>Solve</i> engineering problems using matrices.	K3
C102.2	<i>Implement</i> various methods for testing convergence on infinite series to find its behaviour.	K3
C102.3	<i>Construct</i> the geometrical concepts to solve differential calculus.	K3
C102.4	<i>Compute</i> partial derivatives by applying rules of differentiation to multivariable functions.	K3
C102.5	<i>Utilize</i> the concepts of multiple integrals to solve engineering and physical applications.	K3

### COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2	PSO-3
C102.1	3	3	-	-	-	-	-	-	2	-	2	-	-	-
C102.2	3	2	-	-	-	-	-	-	2	-	2	-	-	-
C102.3	3	3	-	-	-	-	-	-	2	-	2	-	-	-
C102.4	3	3	-	-	-	-	-	-	2	-	2	-	-	-
C102.5	3	3	-	-	-	-	-	-	2	-	2	-	-	-

**Note:** 1: Slight, 2: Moderate, 3: Substantial

SYLLABUS		No. of Credits: 4
<b>UNIT I</b>	<b>MATRICES</b>	<b>9</b>
Matrix operations – special types of matrices, linear independence, Eigenvalues and Eigenvectors of a real matrix – Properties of Eigen values – Cayley Hamilton theorem – Orthogonal reduction of a symmetric matrix to diagonal form – Orthogonal matrices – Reduction of quadratic form to canonical form by Orthogonal transformations – Nature of quadratic forms. <b>Case study:</b> Eigenvalue and Eigenvector		
<b>UNIT II</b>	<b>INFINITE SERIES</b>	<b>9</b>
Sequences of real numbers – Series – General properties of series, Comparison test, Integral test, D’Alemberts ratio test and Cauchy’s root test – Power series, radius and interval of convergence of power series – Convergence of exponential, logarithmic and Binomial Series. <b>Case study:</b> D’Alemberts ratio test		
<b>UNIT III</b>	<b>APPLICATIONS OF DIFFERENTIAL CALCULUS</b>	<b>9</b>
Curvature in Cartesian coordinates – Centre and radius of curvature – Circle of curvature – Evolutes – Envelops. <b>Case study:</b> Circle of Curvature		
<b>UNIT IV</b>	<b>DIFFERENTIAL CALCULUS OF SEVERAL VARIABLES</b>	<b>9</b>
Partial derivatives – Homogeneous Functions – Total derivative – Change of variables – Jacobian and properties – Taylor’s series for functions of two variables – Maxima and Minima of functions of two variables – Lagrange’s method of undetermined multipliers. <b>Case study:</b> Maxima and Minima		
<b>UNIT V</b>	<b>MULTIPLE INTEGRALS</b>	<b>9</b>
Double integration in Cartesian and polar coordinates – Change of order of integration – Area as double integral – Triple integration in Cartesian coordinates – Conversion from Cartesian to polar coordinates. <b>Case study:</b> Area of integration		
<b>LECTURE : 45 PERIODS</b>	<b>TERM WORK(TW) + SELF LEARNING(SL) : 45 PERIODS</b>	<b>TOTAL: 90 PERIODS</b>

List of Experiment		No. of Credits: 1
1.	To create and initialize matrices using built-in MATLAB commands such as zeros, ones, eye, and rand.	
2.	To compute Matrix Addition, Subtraction, Multiplication and Element-wise Computation.	
3.	To find Eigenvalues and Eigenvectors of a Square Matrix Using MATLAB.	
4.	To find Maximizing Efficiency of Material in Rectangular Frame Design using MATLAB.	
5.	To determine the Mass of a Thin Laminar Sheet using double integrals.	
6.	To find Area Calculation over a Region Using Double Integration.	
		<b>TOTAL: 30 PERIODS</b>

LEARNING RESOURCES:	
TEXT BOOKS:	
1.	Grewal .B. S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 45th Edition , 2020.
2.	Kreyszig. E, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.
3.	Bali. N., Goyal. M. and Watkins. C., “Advanced Engineering Mathematics”, Firewall

	Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7th Edition, 2009.
<b>REFERENCES:</b>	
1.	Mauric D. Weir, Joel Hass, Christopher Heil, Przemyslaw Bogacki, "Thomas Calculus", Pearson, 15th Edition, 2024.
2.	Dr. Hari Arora, "A Textbook of Engineering Mathematics-II", S.K. Kataria & Sons, Re print 2024.
3.	Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2016.
4.	Anton. H, Bivens. I and Davis. S, "Calculus", Wiley, 10th Edition, 2016
5.	Jain. R.K. and Iyengar. S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition, 2016.
<b>ONLINE RESOURCES:</b>	
1.	<a href="https://youtu.be/8XOF3ePoJdI?list=PL_A4M5IAkMafsNaawDfrQl6EhgdEiWVD6">https://youtu.be/8XOF3ePoJdI?list=PL_A4M5IAkMafsNaawDfrQl6EhgdEiWVD6</a>
2.	<a href="https://youtu.be/dArimJR5zak?si=fXDFbeQww9XqgXts">https://youtu.be/dArimJR5zak?si=fXDFbeQww9XqgXts</a>
3.	<a href="https://youtu.be/BSfGK5c_RzI?si=QEmr2XSM8d--40He">https://youtu.be/BSfGK5c_RzI?si=QEmr2XSM8d--40He</a>
4.	<a href="https://youtu.be/r6lDwJZmfGA?si=Xl0op_Tx8c3aYEte">https://youtu.be/r6lDwJZmfGA?si=Xl0op_Tx8c3aYEte</a>
5.	<a href="https://youtu.be/OEulPUmEGAw?si=IVGq71Y4Lcih2tvY">https://youtu.be/OEulPUmEGAw?si=IVGq71Y4Lcih2tvY</a>
6.	<a href="https://nptel.ac.in/courses/122101003">https://nptel.ac.in/courses/122101003</a>





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COURSE CODE	25PH01T	Semester	I	REGULATION			R-2025		
CATEGORY	BASIC SCIENCE COURSE (BSC)			L	T	P	TW+SL	TH	C
COURSE TITLE	ENGINEERING PHYSICS - I (COMMON FOR ALL BRANCHES)			45	0	0	45	90	3

### COURSE OBJECTIVES:

- To enhance the fundamental knowledge in oscillations, optics and electromagnetism.
- To explore the profound impact of quantum physics and present an in-depth overview of the foundational concepts driving the fast-evolving field of quantum computing.
- To improve the basic understanding of thermodynamic principles and crystal physics.

### PREREQUISITE:

- Basic Mathematics and Physics Knowledge.

### COURSE OUTCOMES:

CO. No.	Course Outcomes	Blooms level
<b>On successful completion of this Course, students will be able to</b>		
C103.1	<i>Utilize</i> the principles of optical fibre and Lasers for solving engineering problems.	K3
C103.2	<i>Implement</i> the knowledge of electromagnetism and its applications in various science and engineering.	K3
C103.3	<i>Apply</i> the understanding of quantum phenomena to solve problems in modern science and engineering.	K3
C103.4	<i>Use</i> the concepts of heat and thermodynamics in real-world situations.	K3
C103.5	<i>Employ</i> the basic principles of crystal physics for the analysis and interpretation of material properties.	K3

### COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2	PSO-3
C103.1	3	3	-	-	-	-	-	-	2	-	2	-	-	-
C103.2	3	2	-	-	-	-	-	-	2	-	2	-	-	-
C103.3	3	3	-	-	-	-	-	-	2	-	2	-	-	-
C103.4	3	3	-	-	-	-	-	-	2	-	2	-	-	-
C103.5	3	3	-	-	-	-	-	-	2	-	2	-	-	-

**Note:** 1: Slight, 2: Moderate, 3: Substantial

SYLLABUS		No. of Credits: 3
UNIT I	OSCILLATION AND OPTICS	9
<p><b>Oscillatory motion:</b> Simple Harmonic motion - Differential equation of SHM- Damped oscillations - Differential equation - Condition for light, heavy and critical damping - Analogy with LCR circuits and oscillators</p> <p><b>Fiber Optics:</b> Principle of operation - acceptance angle and numerical aperture - Applications of fiber optics</p> <p><b>Optical Sources:</b> Characteristics of Lasers - Spontaneous and Stimulated Emission of Radiation - Population Inversion - Einstein Coefficients and Relation between them - Applications of Lasers.</p> <p><b>Case study:</b> Fiber optic communication system</p>		
UNIT II	ELECTROMAGNETIC THEORY	9
<p><b>Electrostatics:</b> Gauss's law and its applications - Laplace and Poisson's equations</p> <p><b>Magnetostatics:</b> Biot-Savart law, Ampere's theorem. Divergence and curl of static magnetic field - Equation of continuity - Displacement current - Maxwell's equations in free space and linear isotropic media. Electromagnetic waves - wave equation - Poynting theorem - Reflection and transmission of EM waves from a non-conducting medium - vacuum interface for normal incidence.</p> <p><b>Case study:</b> EM waves propagation in micro strip antenna.</p>		
UNIT III	QUANTUM MECHANICS	9
<p>Need for Quantum Physics -Wave nature of Particles- Photo electric effect (qualitatively) - Heisenberg's uncertainty principle - Interpretation and applications - Physical significance of wave function - Schrödinger's time dependent and time independent equations - Operators - Eigen values and Eigen functions - Expectation values -. Eigen value problems (particle in a 1D box and harmonic oscillator). Quantum computing: quantum states - classical bits - quantum bits or qubits - Quantum superposition and entanglement.</p> <p><b>Case study:</b> Quantum logic gates for quantum computing.</p>		
UNIT IV	HEAT AND THERMODYNAMICS	9
<p>Laws of thermodynamics - internal energy - specific heat - heat engine - Carnot's cycle and its efficiency - Carnot's theorem -Thermal expansion of solids, liquids and its Applications - Bimetallic strip – Expansion joints - Differential equation of one-dimensional heat flow - Lee's disc apparatus for determination of thermal conductivity - Thermal Insulation - Heat dissipation and heat sinking of electronic devices - solid state refrigerators (qualitatively)</p> <p><b>Case study:</b> Thermal insulation design for protecting the satellites.</p>		
UNIT V	CRYSTAL PHYSICS	9
<p>Introduction - Crystal Systems - Bravais Lattices - Miller Indices and its applications - Crystal Planes and Directions - Inter Planar Spacing of Orthogonal Crystal Systems - Atomic Radius - Co-ordination Number and Packing Factor of SC, BCC, FCC. Crystal growth - Melt growth - Structure determination by X-ray diffraction method (cubic structure).</p> <p><b>Case study:</b> Growth and characterization of single crystal Silicon for IC applications.</p>		
LECTURE : 45 PERIODS	TERM WORK(TW) + SELF LEARNING(SL) : 45 PERIODS	TOTAL: 90 PERIODS

<b>LEARNING RESOURCES:</b>	
<b>TEXT BOOKS:</b>	
1.	Richard Wolfson, “Essential University Physics, 4th Global Edition”, Vols. 1 and 2. Pearson Education, Singapore, 2021.
2.	Gaur R K, Gupta S L, “Engineering Physics”, Dhanpat Rai Publications, 2024 edition.
3.	D. J. Griffiths, Introduction to Electrodynamics, 5th Edition, Prentice Hall of India, 2025.
<b>REFERENCES:</b>	
1.	Halliday D., Resnick R. and Walker J., “Fundamentals Of Physics Extended, 10th Edition” Wiley Publications, 2024.
2.	Avadhanulu M.N., “Engineering Physics”, S.Chand & Co., 2007.
3.	Purcell E.M., “Electricity and Magnetism–Berkeley Physics Course”, Vol. 2, Tata McGraw-Hill, 2008.
4.	Paul A. Tipler and Gene Mosca, “Physics for Scientists and Engineers”, W.H. Freeman and Company, New York, 2004.
<b>ONLINE RESOURCES:</b>	
1.	<a href="https://www.youtube.com/watch?v=FXnNprfCI_g">https://www.youtube.com/watch?v=FXnNprfCI_g</a>
2.	<a href="https://nptel.ac.in/courses/117101056">https://nptel.ac.in/courses/117101056</a>
3.	<a href="https://nptel.ac.in/courses/115102023">https://nptel.ac.in/courses/115102023</a>
4.	<a href="https://www.youtube.com/watch?v=7W-eX3yx1gM">https://www.youtube.com/watch?v=7W-eX3yx1gM</a>
5.	<a href="https://www.youtube.com/watch?v=pRwv3kiAkOQ&amp;t=3s">https://www.youtube.com/watch?v=pRwv3kiAkOQ&amp;t=3s</a>





# VEL TECH HIGH TECH

**Dr. RANGARAJAN Dr. SAKUNTHALA ENGINEERING COLLEGE**

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COURSE CODE	25CY01T	Semester	I/II	REGULATION			R-2025		
CATEGORY	BASIC SCIENCE COURSE (BSC)			L	T	P	TW+SL	TH	C
COURSE TITLE	ENGINEERING CHEMISTRY (COMMON FOR CSE(AI&ML), AI&DS,CSE,CIVIL,ECE,IT AND MECHANICAL BRANCHES)			45	0	0	45	90	3

### COURSE OBJECTIVES:

- To impart basic and advanced knowledge of chemistry with relevance to engineering applications.
- To relate chemical principles to real-world engineering processes such as water treatment, fuel analysis and material synthesis.
- To encourage collaborative lab work, scientific reporting and effective communication of technical information.

### PREREQUISITE:

- Basic knowledge in chemistry along with strong problem-solving and analytical skills.

### COURSE OUTCOMES:

CO. No.	Course Outcomes	Blooms level
<b>On successful completion of this Course, students will be able to</b>		
C104.1	<i>Illustrate</i> the water related problems and their treatment techniques.	K3
C104.2	<i>Examine</i> the applications of polymers and reinforced plastics.	K3
C104.3	<i>Develop</i> the knowledge on nanochemistry and its applications.	K3
C104.4	<i>Summarize</i> the types of fuels & its production and calculate the calorific values.	K2
C104.5	<i>Distinguish</i> the conventional, non-conventional energy sources and its applications.	K3

### COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2	PSO-3
C104.1	2	1	-	-	-	-	1	-	-	-	-	-	2	-
C104.2	2	1	-	-	-	-	1	-	-	-	-	-	2	-
C104.3	2	1	-	-	-	-	1	-	-	-	-	-	2	-
C104.4	2	1	-	-	-	-	1	-	-	-	-	-	2	-
C104.5	2	1	-	-	-	-	1	-	-	-	-	-	2	-

**Note:** 1: Slight, 2: Moderate, 3: Substantial

SYLLABUS		No. of Credits: 3
<b>UNIT I</b>	<b>WATER AND ITS TREATMENT</b>	<b>9</b>
<p><b>Water</b> - Quality parameters: definition and significance of color, odour, turbidity, pH, alkalinity, TDS, COD, BOD, fluoride and arsenic. Types and determination: hardness, units, estimation of hardness of water by EDTA method and numerical problems.</p> <p><b>Treatments</b> - Boiler feed water: requirements, treatment of boiler feed water: internal treatment - boiler compounds - phosphate, calgon, sodium aluminate and colloidal conditioning methods - external treatment: demineralization and zeolite process. Desalination of brackish water: reverse osmosis.</p> <p><b>Case Study</b> : Purification process of municipal water.</p>		
<b>UNIT II</b>	<b>POLYMERS AND REINFORCED PLASTICS</b>	<b>9</b>
<p><b>Polymers</b> - Classification of polymers: Natural and synthetic, thermoplastic and thermosetting. Properties of polymers: Functionality, degree of polymerization, T<sub>g</sub>, tacticity, molecular weight - weight average, number average and polydispersity index. Types of polymerization: Addition, condensation and copolymerization – mechanism of free radical polymerization. Preparation, properties and uses of PVC, nylon - 6,6 and Polylactic acid. Plastics: Compounding of plastics, moulding methods – compression, injection and extrusion.</p> <p><b>Reinforced plastics</b> - Engineering plastics: Fibre-reinforced plastics (FRP), carbon and glass – applications.</p> <p><b>Case Study</b>: Sustainable biopolymers in packaging.</p>		
<b>UNIT III</b>	<b>NANOCHEMISTRY</b>	<b>9</b>
<p><b>Nanotechnology</b>: Distinction between molecules, nanomaterials and bulk materials. Size-dependent properties: Optical, electrical, mechanical and magnetic. Types of nanomaterials: Properties and uses of nanoparticle, nanocluster, nanorod, nanowire and nanotube. Preparation of nanomaterials: Sol-gel, laser ablation, chemical vapour deposition and electrochemical deposition. Applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.</p> <p><b>Case Study</b>: Nano particles in cancer treatment.</p>		
<b>UNIT IV</b>	<b>FUELS AND COMBUSTION</b>	<b>9</b>
<p><b>Fuels</b>: Classification of fuels. Analysis of coal: Proximate and ultimate. Carbonization: Manufacture of metallurgical coke (Otto Hoffmann method). Petroleum: Manufacture of synthetic petrol (Bergius process), power alcohol and biodiesel. Knocking: Octane number and cetane number. CNG: Composition and uses.</p> <p><b>Combustion of fuels</b>: Calorific value, higher and lower calorific values - Theoretical calculation of calorific value - problems. Ignition temperature, spontaneous ignition temperature, explosive range. Flue gas analysis: ORSAT method. CO<sub>2</sub> emission and carbon footprint.</p> <p><b>Case study</b>: Crude oil refining in CPCL.</p>		
<b>UNIT V</b>	<b>ENERGY SOURCES AND STORAGE DEVICES</b>	<b>9</b>
<p><b>Energy sources</b>: Non-renewable energy: nuclear energy, nuclear power plant, breeder reactor and methods in disposal of spent nuclear wastes.</p> <p>Renewable energy : Solar energy - solar cells and recent developments in solar cell materials.</p> <p><b>Storage devices</b> : Types of batteries - Primary battery- Alkaline battery. Secondary battery: lead acid battery and lithium-ion battery. Fuel cells: H<sub>2</sub>-O<sub>2</sub> fuel cell and microbial fuel cell.</p> <p><b>Case Study</b>: Applications of secondary batteries in E-Vehicles.</p>		
<b>LECTURE : 45 PERIODS</b>	<b>TERM WORK(TW) + SELF LEARNING(SL) : 45 PERIODS</b>	<b>TOTAL: 90 PERIODS</b>

<b>LEARNING RESOURCES:</b>	
<b>TEXT BOOKS:</b>	
1.	P.C. Jain and Monika Jain, Engineering Chemistry, Dhanpat Rai, Publishing Company (P) Ltd., New Delhi, 2020.
2.	S.S Dara & S.S Umare, Aruna M Sudame, A Text book of Engineering Chemistry, S.Chand & Company Ltd., New Delhi, 2024.
3.	Dr. Jayshree A and Parikh, Engineering Chemistry, Techknowledge Publications, Pune, Maharashtra, India, 2024.
4.	Y.R.Sharma., P.Mitra, Text book of Engineering Chemistry, Kalyani Publishers, 2023.
<b>REFERENCES:</b>	
1.	B.K. Sharma, Engineering Chemistry, Krishna Prakashan Media Pvt. Ltd., 2020.
2.	Prasanta Rath, Engineering Chemistry, Cengage Learning India Pvt. Ltd, Delhi, 2015.
3.	Shikha Agarwal, Engineering Chemistry-Fundamentals and Applications, Cambridge University Press, Delhi, 2015.
4.	S. Vairam, P. Kalyani and Suba Ramesh., Engineering Chemistry, Wiley India Pvt. Ltd, New Delhi, 2013
<b>ONLINE RESOURCES:</b>	
1.	<a href="https://nptel.ac.in/courses/105106205">https://nptel.ac.in/courses/105106205</a>
2.	<a href="https://nptel.ac.in/courses/113104102">https://nptel.ac.in/courses/113104102</a>
3.	<a href="https://nptel.ac.in/courses/103103206">https://nptel.ac.in/courses/103103206</a>





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COURSE CODE	25MC01T	Semester	I	REGULATION			R-2025		
CATEGORY	MANDATORY COURSE (MC)			L	T	P	TW+SL	TH	C
COURSE TITLE	தமிழர் மரபு / HERITAGE OF TAMILS (COMMON FOR ALL BRANCHES)			15	0	0	15	30	1

### COURSE OBJECTIVES:

- To analyze the contributions of Tamil literature, language and arts in shaping Tamil identity and heritage.
- To appreciate the artistic and architectural achievements of the Tamils in the fields of temple architecture, sculpture, music, dance and crafts.
- To examine the richness of Tamil language, literature and inscriptions as reflections of Tamil heritage.

### PREREQUISITE:

- Basic knowledge of Indian history and culture is recommended to better understand the historical context of Tamil heritage.

### COURSE OUTCOMES:

CO. No.	Course Outcomes	Blooms level
<b>On successful completion of this Course, students will be able to</b>		
C105.1	<i>Summarize</i> the languages and literature of sangam age.	K2
C105.2	<i>Outline</i> the arts and musical instruments used by ancient Tamils.	K2
C105.3	<i>Illustrate</i> the folk arts and songs of ancient Tamils.	K2
C105.4	<i>Understand</i> the thinai concept of sangam literature, ancient cities and ports of sangam age.	K2
C105.5	<i>Explain</i> the role of Siddha and Ayurvedha in Indigenous System of Medicine and development in history of Tamil books.	K2

### COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2	PSO-3
C105.1	2							2						
C105.2	2					1	1	1						
C105.3							1	2						
C105.4							1	2						
C105.5	2						2	2						

**Note:** 1: Slight, 2: Moderate, 3: Substantial

SYLLABUS		No. of Credits: 1
அலகு 1	மொழி மற்றும் இலக்கியம்	3
<p>திராவிட மொழிகள்- சங்க இலக்கியம்- திருக்குறள் மேலாண்மை கருத்துக்கள்; தமிழ் காப்பியங்கள்; ஐம்பெருங் காப்பியங்களில் தமிழர் பண்பாடு- தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம்</p>		
அலகு 2	பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக் கலை	3
<p>ஐம்பொன் சிலைகள்: பழங்குடியினர் தயாரிக்கும் கைவினை பொருட்கள்; தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள்: இசை கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம்.</p>		
அலகு 3	நாட்டுப்புற கலைகள் மற்றும் வீர விளையாட்டுகள்	3
<p>தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, ஓயிலாட்டம், சிலம்பாட்டம், நாட்டுப்புற பாடல்கள்.</p>		
அலகு 4	தமிழர்களின் தினை கோட்பாடுகள்	3
<p>தொல்காப்பியமும் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புற கோட்பாடுகள்: சங்ககால நகரங்களும் துறைமுகங்களும்.</p>		
அலகு 5	இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்கு தமிழர்களின் பங்களிப்பு	3
<p>இந்திய மருத்துவத்தில் சித்த மருத்துவம் மற்றும் ஆயுர்வேத மருத்துவத்தின் பங்கு: தமிழ் புத்தகங்களின் அச்சு வரலாறு.</p>		
LECTURE : 15 PERIODS	TERM WORK(TW) + SELF LEARNING(SL) : 15 PERIODS	TOTAL: 30 PERIODS

SYLLABUS		No. of Credits: 1
<b>UNIT I</b>	<b>LANGUAGE AND LITERATURE</b>	<b>3</b>
Dravidian Languages – Tamil as Classical Language – Sangam Literature- Aimperum kappiyangalil tamilar panbaadu ; Tamil Epics and Impact of Buddhism & Jainism in Tamil Land.		
<b>UNIT II</b>	<b>HERITAGE – ROCK ART PAINTINGS TO MODERN ART – SCULPTURE</b>	<b>3</b>
Art of Temple Making – Massive Terracotta Sculptures – Art of Temple Care Making; Making of Musical Instruments – Mridhangam, Parai, Veenai, Yazh, Nadhaswaram.		
<b>UNIT III</b>	<b>FOLK AND MARTIAL ARTS</b>	<b>3</b>
Therukoothu, Karagattam, Villu Pattu, Oyillatam, Silambattam, nattupura padalgal.		
<b>UNIT IV</b>	<b>THINAI CONCEPTS OF TAMIL</b>	<b>3</b>
Sangam Literature – Education and Literacy During Sangam Age – Ancient Cities and Ports of Sangam Age – Export and Import during Sangam Age.		
<b>UNIT V</b>	<b>CONTRIBUTIONS OF TAMIL TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE</b>	<b>3</b>
Culturals Influence of Tamil over the Other Parts of India – Role of Siddha and Ayurvedha in Indigenous System of Medicine – History of Tamil Books.		
		<b>Total: 15 Periods</b>

அடிகுறிப்புகள்:	
1.	தமிழக வரலாறு – மக்களும் பண்பாடும் – கே. கே. பிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2.	கீழடி வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
3.	பெருநை – ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை )

REFERENCES:	
1.	Social Life of Tamils (Dr. K. K. Pillay) A Joint Publications of Tntb & Esc and Rmrl – (in Print)
2.	Social Life of the Tamils – The Classical Period (Dr. S Singaravelu)
3.	Historical Heritage of Tamils (Dr. S.V Subatamanian, Dr. K.D Thirunavukkarasu)



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COURSE CODE	25HEC01T	Semester	I/II	REGULATION			R-2025		
CATEGORY	ENGINEERING SCIENCE COURSE (ESC)			L	T	P	TW+SL	TH	C
COURSE TITLE	DIGITAL LOGIC CIRCUITS (COMMON FOR CSE, IT, AI&DS & CSE(AI&ML) BRANCHES)			45	0	0	45	90	3

### COURSE OBJECTIVES:

- To Simplify Digital logic Circuits using Boolean Functions.
- To Design Combinational and Sequential logic Circuits.
- To Learn Memory and logic devices.
- To understand VHDL model for digital circuits

### PREREQUISITE:

- Basic Sciences

### COURSE OUTCOMES:

CO. No.	Course Outcomes	Blooms level
<b>On successful completion of this Course, students will be able to</b>		
C106.1	<i>Understand</i> logic expressions through Boolean rules and Karnaugh Maps.	K2
C106.2	<i>Apply</i> procedures to design combinational digital circuits using logic gates	K3
C106.3	<i>Design</i> sequential circuits and simulate using VHDL tool.	K3
C106.4	<i>Apply</i> the design procedures of asynchronous sequential circuits.	K3
C106.5	<i>Illustrate</i> logic function realization using programmable hardware.	K2

### COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
C106.1	3	3	3	-	-	-	-	-	-	-	-	2	1
C106.2	3	3	3	-	-	-	-	-	-	-	-	2	1
C106.3	3	3	3	-	-	-	-	-	-	-	-	2	1
C106.4	3	2	-	-	-	-	-	-	-	-	-	2	1
C106.5	3	3	3	-	-	-	-	-	-	-	-	2	1

**Note:** 1: Slight, 2: Moderate, 3: Substantial

<b>SYLLABUS</b>		<b>No. of Credits: 3</b>
<b>UNIT I</b>	<b>BOOLEAN ALGEBRA AND LOGIC GATES</b>	<b>9</b>
Number Systems – Arithmetic Operations – Binary Codes- Theorems and Properties of Boolean Algebra – Boolean Functions – Canonical and Standard Forms – Simplification of Boolean Functions using Karnaugh Map – Logic Gates – Universal gates Implementations.		
<b>UNIT II</b>	<b>COMBINATIONAL LOGIC CIRCUITS</b>	<b>9</b>
Combinational Circuits – Analysis and Design Procedures - Half and Full Adders, Half and Full Subtractors, Magnitude Comparator-Decoders – Encoders – Multiplexers –Demultiplexers.		
<b>UNIT III</b>	<b>SYNCHRONOUS SEQUENTIAL LOGIC CIRCUITS</b>	<b>9</b>
Sequential Circuits – Storage Elements: Latches –SR-JK-D-T –Design Procedure & Analysis of Clocked Sequential Circuits – State Reduction and Assignment –Registers and counters.		
<b>UNIT IV</b>	<b>ASYNCHRONOUS SEQUENTIAL LOGIC CIRCUITS</b>	<b>9</b>
Design of Asynchronous Sequential Circuits – Moore and Mealy Model- Reduction of State and Flow Tables – Race-free State Assignment – Hazards.		
<b>UNIT V</b>	<b>MEMORY AND LOGIC DEVICES</b>	<b>9</b>
Classifications of RAM, ROM– Memory Decoding – Programmable Logic Array – Programmable Array Logic – Sequential Programmable Devices.		
<b>LECTURE:45 PERIODS</b>	<b>TERMWORK(TW)+ SELF LEARNING(SL): 45 PERIODS</b>	<b>TOTAL: 90 PERIODS</b>

<b>LEARNING RESOURCES:</b>	
<b>TEXT BOOKS:</b>	
1.	M. Morris R. Mano, Michael D. Ciletti, —Digital Design: With an Introduction to the Verilog HDL, 5th Edition, Pearson Education, 2023.
2.	John F. Wakerly, Digital Design Principles and Practices, Fifth Edition, Pearson Education, 2017.
<b>REFERENCES:</b>	
1.	G. K. Kharate, Digital Electronics, Oxford University Press, 2012.
2.	Charles H. Roth Jr, Larry L. Kinney, Fundamentals of Logic Design, Sixth Edition, CENGAGE Learning, 2013.
3.	Donald D. Givone, Digital Principles and Designl, Tata McGraw Hill, 2003.
<b>ONLINE RESOURCES:</b>	
1.	<a href="https://onlinecourses.nptel.ac.in/noc22_ee110/preview">https://onlinecourses.nptel.ac.in/noc22_ee110/preview</a> <a href="https://nptel.ac.in/courses/108105113">https://nptel.ac.in/courses/108105113</a>
2.	<a href="https://archive.nptel.ac.in/content/storage2/courses/106108099/Digital%20Systems.pdf">https://archive.nptel.ac.in/content/storage2/courses/106108099/Digital%20Systems.pdf</a>



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Accredited by NBA, New Delhi & Accredited by NAAC with "A" Grade & CGPA of 3.27

COURSE CODE	<b>25HCS01IT</b>	Semester	I/II	REGULATION			R-2025		
CATEGORY	<b>ENGINEERING SCIENCE COURSE (ESC)</b>			L	T	P	TW+SL	TH	C
COURSE TITLE	<b>PROGRAMMING IN C (INTEGRATED) (COMMON FOR ALL BRANCHES)</b>			<b>30</b>	<b>0</b>	<b>60</b>	<b>30</b>	<b>120</b>	<b>4</b>

### COURSE OBJECTIVES:

- Understand the Fundamentals of C Programming
- Apply Problem-Solving Techniques Using C
- Develop Logical Thinking and Code Optimization Skills

### PREREQUISITE:

- Basic Mathematics Skills and Computer Knowledge

### COURSE OUTCOMES:

CO. No.	Course Outcomes	Blooms level
<b>On successful completion of this Course, students will be able to</b>		
<b>C107.1</b>	<i>Understand</i> and apply the basic syntax and semantics of the C programming language.	K2
<b>C107.2</b>	<i>Apply</i> arrays and strings effectively in C programs.	K3
<b>C107.3</b>	<i>Develop</i> modular programs using Functions and Pointers.	K3
<b>C107.4</b>	<i>Implement</i> structured data types and file handling techniques.	K4
<b>C107.5</b>	<i>Analyse</i> and debug C programs for correctness and performance.	K4

### COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2	PSO-3
<b>C107.1</b>	3	2	2	1	1	1	1	1	1	1	1	2	2	3
<b>C107.2</b>	3	3	2	1	1	1	1	1	1	1	1	2	2	3
<b>C107.3</b>	3	3	2	1	2	1	1	1	1	1	1	2	2	3
<b>C107.4</b>	3	3	3	1	2	1	1	1	1	1	3	2	2	3
<b>C107.5</b>	3	3	3	1	2	1	1	1	2	1	3	2	2	3

**Note:** 1: Slight, 2: Moderate, 3: Substantial

<b>SYLLABUS</b>		<b>No. of Credits: 4</b>
<b>UNIT I</b>	<b>BASICS OF C PROGRAMMING</b>	<b>8</b>
Introduction to programming paradigms – Applications of C Language - Structure of C program - C programming: Data Types, Constants, Variables, and Keywords - Operators and Expressions - Storage Classes - Input and Output Statements – Decision Making Statements-Switch Statement-Looping Statements.		
<b>UNIT II</b>	<b>ARRAYS AND STRINGS</b>	<b>7</b>
Arrays: One-Dimensional and Two-Dimensional - Array Manipulations and Applications - Strings: Declaration, Initialization, and Standard String Functions.		
<b>UNIT III</b>	<b>FUNCTIONS AND POINTERS</b>	<b>7</b>
Functions: Declaration, Definition, and Calling – Types of Functions - Function prototype, Function Arguments: Call by Value and Call by Reference – Recursion - Introduction to Pointers: Declaration and Initialization - Pointer Arithmetic – Arrays of Pointers - Pointers to Functions - Pointers to Pointers.		
<b>UNIT IV</b>	<b>STRUCTURES, UNION AND DYNAMIC MEMORY ALLOCATION</b>	<b>7</b>
Structure: Declaration, Initialization, and Accessing Members - Nested Structures and Arrays of Structures - Pointer and Structures - Unions: Declaration and Usage - Dynamic Memory Allocation.		
<b>UNIT V</b>	<b>File Handling</b>	<b>6</b>
File Operations: Opening, Closing, Reading, Writing Files – File Modes - Types of file processing - File I/O Functions: fopen(), fclose(), fscanf(), fprintf(), fread(), fwrite() - Command-line Arguments - Error Handling in C.		
<b>LECTURE : 30 PERIODS</b>	<b>TERM WORK(TW)+ SELF LEARNING(SL) : 30 PERIODS</b>	<b>TOTAL: 120 PERIODS</b>

<b>List of Experiment</b>	<b>No. of Credits: 2</b>
<p><b>DECISION MAKING STATEMENTS</b></p> <p><b>i) Voting Eligibility Checker</b> Write a C program that checks if a person is eligible to vote. A person can vote if they are 18 years or older and hold a valid ID. <b>Inputs:</b></p> <ul style="list-style-type: none"> <li>• Age</li> <li>• Has valid ID (1 for Yes, 0 for No)</li> <li>• Implement the decision logic using if-else to print "Eligible to vote" or "Not eligible".</li> </ul> <p><b>ii) Discount Decision in Online Shopping</b></p> <p>1. An e-commerce platform offers discounts:</p> <ul style="list-style-type: none"> <li>• If purchase &gt; ₹10,000 → 20% discount</li> <li>• ₹5000–10,000 → 10% discount</li> <li>• Below ₹5000 → No discount</li> </ul> <p><b>Input:</b></p> <ul style="list-style-type: none"> <li>• Purchase amount</li> </ul> <p>Write a C program to calculate and print the final payable amount after applying the discount.</p> <p><b>iii) Billing Software</b> You are creating a billing software for a small grocery store. At the end of billing, the cashier needs to calculate the total price of two items entered by the user. Write a C program that:</p>	

	<ul style="list-style-type: none"> <li>• Takes the price of two items as input from the user</li> <li>• Adds the two prices</li> <li>• Displays the total bill amount</li> </ul> <p><b>Input:</b></p> <ul style="list-style-type: none"> <li>• item1_price = 45.50</li> <li>• item2_price = 30.00</li> <li>•</li> </ul>
2.	<p><b>LOOPING STATEMENTS</b></p> <p><b>i) Electricity Bill Generator for Multiple Houses</b>  You need to calculate the bill for N houses. For each house, the number of units is entered, and the bill is computed.  Write a C program using a <code>for</code> loop to:</p> <ul style="list-style-type: none"> <li>• Take input of units for N houses</li> <li>• Calculate the bill using: <ul style="list-style-type: none"> <li>◦ ₹5/unit if units &lt; 100</li> <li>◦ ₹7/unit if units &gt;= 100</li> </ul> </li> <li>• Display the bill for each house.</li> </ul> <p><b>ii) Exam Result Processing System</b>  A class has N students. The teacher wants to enter marks of each student and find the average.  Write a C program using a <code>for</code> loop to:</p> <ul style="list-style-type: none"> <li>• Accept marks for N students</li> <li>• Calculate and print the average marks</li> </ul> <p><b>iii) Menu-Driven Calculator</b>  Create a basic calculator that repeatedly asks the user to select an operation (add, subtract, multiply, divide) until they choose exit.  Use a <code>do-while</code> loop to:</p> <ul style="list-style-type: none"> <li>• Display a menu</li> <li>• Perform the selected operation</li> <li>• Repeat until user chooses to exit</li> </ul> <p><b>iv) ATM Withdrawal Simulation</b>  A user keeps withdrawing amounts until the balance becomes less than ₹500.  Write a C program using a <code>while</code> loop to:</p> <ul style="list-style-type: none"> <li>• Allow withdrawals</li> <li>• Stop once balance &lt; ₹500</li> <li>• Print remaining balance</li> </ul>
3.	<p><b>ARRAY</b></p> <p><b>i) Voter Age Validator</b>  A polling center receives the age of 10 people. They want to know how many are eligible to vote (age ≥ 18).  Use a 1D array to:</p> <ul style="list-style-type: none"> <li>• Input the ages of 10 people</li> <li>• Count and print the number of eligible voters</li> </ul> <p><b>ii) Bank Account Balances</b>  A bank stores balances of 10 customers. It wants to find the richest customer.  Use an array to:</p> <ul style="list-style-type: none"> <li>• Input 10 account balances</li> <li>• Find and print the highest balance</li> </ul>

	<p><b>iii) Hospital Bed Occupancy Tracker</b>  A hospital has 4 wards, each with 5 beds. You need to record whether a bed is occupied (1) or not (0).  Use a 2D array to input bed occupancy status. Count and display the <b>total number of occupied and vacant beds</b>.</p> <p><b>iv) Student Marks Management System</b>  A school records marks of 5 students in 3 subjects. You need to compute the total marks for each student.  Use a 2D array to input marks and calculate the <b>total marks of each student</b>.</p>
4.	<p><b>STRINGS</b></p> <p><b>i) User Login System</b>  You are developing a login system. A valid username is "admin" and the password is "1234". Write a C program to:</p> <ul style="list-style-type: none"> <li>• Take input for username and password</li> <li>• Check whether they match predefined values using strcmp()</li> <li>• Print "Login Successful" or "Invalid Credentials" accordingly</li> </ul> <p><b>ii) Palindrome Checker</b>  Your app checks whether a word is a palindrome (same forward and backward), such as "madam" or "level".  Write a C program to:</p> <ul style="list-style-type: none"> <li>• Input a string</li> <li>• Check and display whether it is a <b>palindrome</b></li> </ul> <p><b>iii) String Reversal</b>  You are working on a text-based puzzle game where the user must reverse strings to solve clues.  Write a C program to:</p> <ul style="list-style-type: none"> <li>• Input a string</li> <li>• Reverse the string <b>manually (without strrev())</b></li> <li>• Print the reversed string</li> </ul>
5.	<p><b>FUNCTIONS</b></p> <p><b>i) Prime Number Checker</b>  An online coding platform checks if the input number is prime.  Write a function <code>int isPrime(int num)</code> that returns 1 if prime, 0 otherwise.  In <code>main()</code>, input a number and print the result.</p> <p><b>ii) Factorial Calculator</b>  A math quiz app needs to compute factorials of user-entered numbers.  Write a recursive function <code>long factorial(int n)</code> and display <code>n! int main()</code>.</p> <p><b>iii) Billing System with Function</b>  A store wants to calculate the final bill by taking price and quantity as input.  Write a function <code>float calculateBill(float price, int quantity)</code> that returns the total amount.  In <code>main()</code>, get user input and display the total using the function.</p> <p><b>iv) Electricity Bill Calculator</b>  An electricity board wants to automate billing. The rates are:</p> <ul style="list-style-type: none"> <li>• Up to 100 units: ₹1.5/unit</li> <li>• 101–300 units: ₹2.5/unit</li> <li>• Above 300 units: ₹4/unit</li> </ul> <p>Write a function <code>float calculateBill(int units)</code> to compute and return the bill amount.</p>

## **POINTERS**

### **i) Bank Transaction Adjustment**

You're developing software for a bank's transaction system. Two accounts have balances stored in variables `acc1_balance` and `acc2_balance`. Due to a data entry error, the balances got assigned incorrectly. Your task is to **swap** these balances to correct the mistake.

- Write a C function `void swapBalances(int *balance1, int *balance2)` that swaps the values of the two account balances using pointers.
- In the `main()` function, initialize the balances with two integers, print the balances before swapping, call the swap function, and then print the balances after swapping.

### **ii) Sensor Data Analysis**

You are developing software to analyze temperature sensor data collected hourly over a day. The sensor data is stored in an array of 24 integer values, each representing the temperature at that hour.

Your task is to use **pointer arithmetic** to:

- Traverse the array and print all temperature readings.
- Calculate and print the average temperature.
- Print all temperatures recorded at even hours only (i.e., indices 0, 2, 4, ...).

6.

Write a C program that:

- Uses a pointer to traverse the temperature array.
- Uses pointer arithmetic (i.e., incrementing the pointer) instead of array indexing.
- Performs the tasks described above.

### **iii) Configuration Manager for a Software System**

You are writing a configuration manager for a software system that stores the current version number as an integer.

- The version number is stored in a variable `version`.
- You have a pointer `ptr` pointing to `version`.
- You also have a pointer to this pointer, called `pptr`.

Your task is to update the version number by accessing it through the pointer to pointer `pptr`.

- Declare an integer variable `version` and initialize it to 1.
- Declare a pointer `ptr` that points to `version`.
- Declare a pointer to pointer `pptr` that points to `ptr`.
- Using `pptr`, update the version number to 2.
- Print the value of `version` before and after the update.

## **STRUCTURES**

### **Student Record Management System (Structure)**

You are tasked with designing a simple system to store and display student information for a college.

Each student has the following details:

- Roll Number (integer)
- Name (string)
- Marks in 3 subjects (3 integers)

7.

Your program should:

- Define a struct named `Student` to hold the above information.
  - Input details for `N` students.
  - Calculate and store the total marks for each student inside the struct.
  - Display each student's roll number, name, and total marks.
1. Define a structure `Student` with appropriate fields.
  2. Use an array of `Student` to store information for `N` students.
  3. Write functions to:
    - Input student details.
    - Calculate total marks.

	<ul style="list-style-type: none"> <li>○ Display the student records.</li> </ul> <p>4. Display all student records with total marks.</p>
8.	<p><b>UNION</b></p> <p><b>Sensor Data Logger (union)</b></p> <p>A device logs sensor data that can be of different types but only one type at a time, to save memory.</p> <ul style="list-style-type: none"> <li>○ The sensor can store either an <b>integer temperature</b>, a <b>float humidity percentage</b>, or a <b>character status code</b> ('N' for normal, 'A' for alert).</li> <li>○ Use a <code>union</code> to store these different types in the same memory location.</li> </ul> <ol style="list-style-type: none"> <li>1. Define a union <code>SensorData</code> that can hold an <code>int temperature</code>, a <code>float humidity</code>, or a <code>char status</code>.</li> <li>2. Create a program that: <ul style="list-style-type: none"> <li>○ Accepts the type of data to enter ('t' for temperature, 'h' for humidity, 's' for status).</li> <li>○ Reads the corresponding value.</li> <li>○ Prints the stored value.</li> </ul> </li> </ol>
9.	<p><b>FILE HANDLING IN C</b></p> <p><b>Bank Account Manager</b></p> <p>You need to create a program that stores bank account details (Account Number, Name, Balance) in a file "bank.dat" and allows you to:</p> <ul style="list-style-type: none"> <li>• Add new accounts,</li> <li>• View all accounts,</li> <li>• Search for a specific account.</li> </ul>
10.	<p><b>Simple Library Management System</b></p> <p>You need to create a program to store and manage book records with:</p> <ul style="list-style-type: none"> <li>• ISBN (unique identifier),</li> <li>• Title,</li> <li>• Author,</li> <li>• Number of copies available.</li> </ul> <p>The data should be stored in a file "library.dat" using binary file handling.</p>
11.	<p><b>Hospital Patient Management System</b></p> <p>You need to manage patient information with the following details:</p> <p>Patient ID (integer),  Name (string),  Age (integer),  Disease (string).</p> <p>All records should be stored in a file "patients.dat" using binary file operations.</p>
1	<p><b>PRACTICAL PROJECTS:</b></p> <p><b>1. Student Report Card Generator</b></p> <p>Create a program that accepts a student's name, roll number, and marks in 3 subjects. Calculate total, average, and assign grades. Store and retrieve data from a text file.</p> <p><b>2. Simple ATM Interface</b></p> <p>Simulate ATM operations like balance enquiry, deposit, withdrawal, and PIN change. Use functions and file handling for data persistence.</p> <p><b>3. Library Management System</b></p> <p>2. Develop a system to manage books: add new books, view all books, and search by title or author. Use structures and file I/O.</p> <p><b>4. Hospital Patient Record System</b></p> <p>Create a program to add, display, and search patient records (ID, name, age, disease). Use structures and dynamic memory allocation.</p> <p><b>1. Online Exam Simulator</b></p> <p>Build a quiz with multiple-choice questions. Calculate and display the final score and remarks (pass/fail). Use loops, if-else, and switch.</p>

<p><b>6. Bus Reservation System</b> Design a simple bus ticket booking system. Allow seat booking, cancellation, and status check. Use arrays and structures.</p> <p><b>7. Billing System for Stationery Shop</b> Accept item names, price, and quantity. Generate a bill showing total, tax, and grand total. Use arrays and formatted output.</p> <p><b>8. Employee Salary Management</b> Manage employee data like ID, name, and basic salary. Compute net salary using allowances and deductions. Save details in a file.</p> <p><b>9. Marks Analysis System</b> Input marks of n students, compute highest, lowest, and average marks. Display summary and statistics using arrays.</p> <p><b>10. Movie Ticket Booking System</b> Simulate a basic movie ticket booking app: choose movie, showtime, number of tickets, and calculate the total amount.</p>
<b>Total: 60 Periods</b>

<b>LEARNING RESOURCES:</b>	
<b>TEXT BOOKS:</b>	
1.	“Let Us C”, Yashavant Kanetkar, BPB Publications, 17th Edition (2020).
2.	“Programming in ANSI C”, E. Balagurusamy, McGraw Hill Education, 8th Edition (2020).
<b>REFERENCES:</b>	
1.	“The C Programming Language”, Brian W. Kernighan, Dennis M. Ritchie, Pearson, 2nd Edition, 2022 reprint.
2.	“Programming with C”, Byron Gottfried, McGraw Hill Education, 4th Edition, 2021.
3.	“Expert C Programming: Deep C Secrets”, Peter van der Linden, Pearson Education, 1st Edition (latest reprint 2022), 2022.
<b>ONLINE RESOURCES:</b>	
1.	GeeksforGeeks – C Programming Language <b>URL:</b> <a href="https://www.geeksforgeeks.org/c-programming-language/">https://www.geeksforgeeks.org/c-programming-language/</a>
2.	TutorialsPoint – C Programming Tutorial <b>URL:</b> <a href="https://www.tutorialspoint.com/cprogramming/">https://www.tutorialspoint.com/cprogramming/</a>
3.	Harvard’s CS50 (Introduction to Computer Science) <b>URL:</b> <a href="https://cs50.harvard.edu/x/">https://cs50.harvard.edu/x/</a>



# VEL TECH HIGH TECH

**Dr. RANGARAJAN Dr. SAKUNTHALA ENGINEERING COLLEGE**

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<b>COURSE CODE</b>	<b>25BS01P</b>	<b>Semester</b>	<b>I/II</b>	<b>REGULATION</b>			<b>R-2025</b>		
<b>CATEGORY</b>	<b>BASIC SCIENCE COURSE (BSC)</b>			<b>L</b>	<b>T</b>	<b>P</b>	<b>TW +SL</b>	<b>TH</b>	<b>C</b>
<b>COURSE TITLE</b>	<b>PHYSICS AND CHEMISTRY LABORATORY (COMMON FOR ALL BRANCHES)</b>			<b>0</b>	<b>0</b>	<b>60</b>	<b>0</b>	<b>60</b>	<b>2</b>

### COURSE OBJECTIVES:

- To learn problem solving skills related to physics principles and interpretation of experimental data
- To learn how data can be collected, presented and interpreted in a clear and concise manner.
- To observe the physical characteristics of the material using thermal radiation.
- To learn how to use basic laboratory equipment in a Chemistry lab (e.g., burettes, pipettes, balances).
- To perform quantitative measurements and calculate results accurately.

### PREREQUISITE:

- Basic Measurement and knowledge of chemistry laboratory techniques and terminology

### COURSE OUTCOMES:

<b>CO. No.</b>	<b>Course Outcomes</b>	<b>Blooms level</b>
<b>On successful completion of this Course, students will be able to</b>		
<b>C108.1</b>	<i>Examine</i> moduli of elasticity and also various thermal and optical properties of materials.	<b>K4</b>
<b>C108.2</b>	<i>Categorize</i> on radiation and variation using Solar cell modules.	<b>K4</b>
<b>C108.3</b>	<i>Estimate</i> the various water quality parameters like hardness (total, permanent & temporary) and iron content.	<b>K4</b>
<b>C108.4</b>	<i>Evaluate</i> the nanoparticles, metals and ions in any given sample using various analytical techniques.	<b>K4</b>
<b>C108.5</b>	<i>Analyze</i> the properties such as conductance of solutions and redox potentials.	<b>K4</b>

### COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2	PSO-3
<b>C108.1</b>	3	2	-	-	-	-	2	-	2	-	1	-	-	-
<b>C108.2</b>	3	2	-	-	-	-	2	-	2	-	1	-	-	-
<b>C108.3</b>	3	2	-	-	-	-	3	-	2	-	2	-	-	-
<b>C108.4</b>	3	2	-	-	-	-	2	-	2	-	1	-	-	-
<b>C108.5</b>	3	2	-	-	-	-	2	-	2	-	2	-	-	-

**Note:** 1: Slight, 2: Moderate, 3: Substantial

List of Experiments		No. of Credits: 2
<b>Physics Laboratory</b>		
1.	Torsional pendulum - Determination of Rigidity modulus of wire and moment of inertia of disc	
2.	(i) Laser - Determination of the wavelength of the laser using grating (ii) Optical fibre - Determination of Acceptance Angle and Numerical Aperture	
3.	Photoelectric cell - Determination of Planck's constant	
4.	Lee's disc - Determination of thermal conductivity of a bad conductor	
5.	Solar Cell - V-I Characteristics	
6.	Band Gap of a Semiconductor - Determination of a Band Gap of Semiconducting Material	
<b>Additional Experiment</b>		
1.	Determination of motion of electrons in a homogeneous magnetic field using Helmholtz coils-Virtual <a href="http://virtuelle-experimente.de/en/b-feld/b-feld/vergleich.php">http://virtuelle-experimente.de/en/b-feld/b-feld/vergleich.php</a>	
<b>Chemistry Laboratory</b>		
1.	Preparation of nanoparticle (ZnO).	
2.	Determination of total, permanent and temporary hardness of water sample.	
3.	Conductometric titrations of strong acid Vs strong base.	
4.	Estimation of Fe <sup>2+</sup> by Potentiometric titration.	
5.	Estimation of Iron content in water sample using spectrophotometer (1,10 - Phenanthroline/thiocyanate method).	
6.	Determination of chloride content of water sample by Argentometric method.	
<b>Additional Experiment</b>		
1.	Determination of viscosity average molecular weight of polymer-Virtual <a href="https://pcv-amrt.vlabs.ac.in/exp/average-molecular-weight-polymer/">https://pcv-amrt.vlabs.ac.in/exp/average-molecular-weight-polymer/</a>	
<b>PRACTICAL: 60 PERIODS</b>		<b>TERM WORK (TW)+SELF LEARNING (SL): 0</b>
<b>TOTAL: 60 PERIODS</b>		

<b>LEARNING RESOURCES:</b>	
<b>TEXT BOOKS:</b>	
1.	Physics Laboratory,R-2025, Department of Physics, Vel Tech High Tech Dr.Rangarajan Dr.Sakunthala Engineering College, 2025.
2.	R.Jayaraman, V.Umadevi, S.Maruthamuthu, B.Saravanakumar, Engineering Physics Laboratory Manual, Pearson Education Ltd, 2025
3.	Furniss B.S. Hannaford A.J, Smith P.W.G and Tatchel A.R., "Vogel's Textbook of Practical organic chemistry", LBS Singapore, 2014.
4.	J Mendham, R C Denney, J D Barnes, M Thomas, B Sivasankar, Text Book of Quantitative Analysis, 6th Edition, Pearson, 2014.
<b>REFERENCES:</b>	
1.	Indu Prakash, Ram Krishna, A. K. Jha,A Textbook of Practical Physics , 2012.
2.	Wilson J.D. and Hernandez C.A., "Physics Laboratory Experiments", Houghton Mifflin, Physics laboratory experiments,Publisher Stamford, CT : Cengage Learning,2015.
3.	S.K. Bhasin, S. Rani, Laboratory Manual on Engineering Chemistry, Dhanpat Rai Publishing Company, New Delhi, 2011.
4.	Dr.A.Ravikrishnan,Chemistry Laboratory I&II, Sri Krishna Hitech Publishing Company Pvt, Ltd , 2013.

**ONLINE RESOURCES:**

1.	<a href="https://nptel.ac.in/courses/115105110">https://nptel.ac.in/courses/115105110</a>
2.	<a href="https://nptel.ac.in/courses/115105120">https://nptel.ac.in/courses/115105120</a>
3.	<a href="https://ph1-nitk.vlabs.ac.in">https://ph1-nitk.vlabs.ac.in</a>
4.	<a href="https://ocw.mit.edu/search/?t=Atomic%2C+Molecular%2C+Optical+Physics">https://ocw.mit.edu/search/?t=Atomic%2C+Molecular%2C+Optical+Physics</a>
5.	<a href="https://inoc-amrt.vlabs.ac.in/exp/water-analysis-chemical-parameters/simulation.html">https://inoc-amrt.vlabs.ac.in/exp/water-analysis-chemical-parameters/simulation.html</a>
6.	<a href="https://pcv-amrt.vlabs.ac.in/exp/average-molecular-weight-polymer/">https://pcv-amrt.vlabs.ac.in/exp/average-molecular-weight-polymer/</a>
7.	<a href="https://youtu.be/63oGsPgsT0k?feature=shared">https://youtu.be/63oGsPgsT0k?feature=shared</a>
8.	<a href="https://pcv-amrt.vlabs.ac.in/exp/spectrophotometry/simulation.html">https://pcv-amrt.vlabs.ac.in/exp/spectrophotometry/simulation.html</a>





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COURSE CODE	<b>25MC05P</b>	Semester	I/II	REGULATION			R-2025		
CATEGORY	<b>MANDATORY COURSE (MC)</b>			L	T	P	TW+SL	TH	C
COURSE TITLE	<b>YOGA FOR YOUTH EMPOWERMENT (COMMON FOR ALL BRANCHES)</b>			<b>0</b>	<b>0</b>	<b>60</b>	<b>0</b>	<b>60</b>	<b>0</b>

### COURSE OBJECTIVES:

- To learn the physical practices to ensure physical fitness and immunity.
- To oxygenize the body cells and brain cells with breathing techniques.
- To learn meditation, relaxation and mental practices for streamlining mind processes.
- To realize the need of sound health in body and mind so as to excel in academics

### PREREQUISITE:

- Basic Physical Fitness

### COURSE OUTCOMES:

CO. No.	Course Outcomes	Blooms level
<b>On successful completion of this Course, students will be able to</b>		
<b>C109.1</b>	<i>Understand</i> the fundamental principles and philosophy of Yoga.	K2
<b>C109.2</b>	<i>Demonstrate</i> various Yoga postures (Asanas) and breathing techniques (Pranayama).	K3
<b>C109.3</b>	<i>Perform</i> simplified physical exercises and relaxation practices to improve personal wellness	K3
<b>C109.4</b>	<i>Practice</i> breathing techniques and meditation for emotional regulation and concentration.	K3
<b>C109.5</b>	<i>Apply</i> knowledge of mudras and bandhas for enhancing physical, mental, and spiritual well-being.	K3

### COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2	PSO-3
C109.1	2	-	-	-	-	-	2	2	-	-	-	2	-	-
C109.2	-	-	3	-	-	-	-	2	-	-	-	-	-	3
C109.3	-	2	-	2	-	2	3	2	-	-	-	-	2	-
C109.4	-	2	-	-	-	-	3	3	-	-	-	-	2	-
C109.5	-	-	-	-	-	2	3	3	-	-	-	-	-	-

**Note:** 1: Slight, 2: Moderate, 3: Substantial

SYLLABUS		No. of Credits: 0
<b>UNIT I</b>	<b>INTRODUCTION</b>	
Introduction to Yoga - Definition and History of Yoga - Benefits and Types of Yoga – Rules for Yogasanas – Warm up practices – Surya Namaskar – Chandra Namaskar – Standing Asanas: Tadasana – Eka padasana – Trikonasana – Ardha Chakrasana – Utkadasana.		
Practice 1:	Explain origin, types and benefits of Yoga.	
Practice 2:	Write the steps and benefits of Surya Namaskar.	
Practice 3:	Write the steps and benefits of Chandra Namaskar.	
<b>UNIT II</b>	<b>ASANAS</b>	
Sitting Asanas: Dandasana – Padmasana – Vajrasana – Mandugasana – Maha mudrasana – Vakrasana – Pachimothasana – Prone Asanas: Bujangasana – Dhanurasana – Naukasana – Supine Asanas: Chakrasana – Sarvangasana – Navasana – Supta vajrasana – Halasana.		
Practice 4:	Explain any five Standing Asanas.	
Practice 5:	Explain any five Sitting Asanas.	
Practice 6:	Illustrate any five Prone Asanas.	
<b>UNIT III</b>	<b>PHYSICAL EXERCISES</b>	
Simplified Physical Exercises: – Importance and Benefits – Hand Exercises – Leg Exercises – Neuro Muscular Breathing Exercises – Eye Yoga Exercises – Kapalabathi – Makarasana Spinal Exercises Part 1 & 2 – Self Massage – Acu Pressure - Relaxation Practice.		
Practice 7:	Write notes on nine Simplified Physical Exercises.	
Practice 8:	Explain Neuro Muscular breathing exercises.	
<b>UNIT IV</b>	<b>MEDITATIONS</b>	
Meditations: Definition, Rules and Benefits – Chanting meditation - Chakra meditation – Breathing meditation – Pranayama: Definition, Rules and Benefits – Naadi Suddhi – Ujjayi – Seetali – Seethkari – Basthrika.		
Practice 9:	Elucidate concepts of Chanting and Chakra meditation.	
Practice 10:	Explain and demonstrate any three Pranayama.	
<b>UNIT V</b>	<b>MUDRAS AND BANDHAS</b>	
Mudras: Definition and Benefits - Chin mudra – Vaayu mudra – Surya mudra – Varuna mudra – Linga mudra – Apana mudra – Prithvi mudra – Bandhas: Definition and Benefits – Jalandhara bandha - Uddiyana bandha – Moola bandha – Maha bandha.		
Practice 11:	Explain any five types of Mudras.	
Practice 12:	Explain three types of Bandhas.	
PRACTICAL:60 PERIODS		TERM WORK (TW)+SELF LEARNING (SL): 0
		TOTAL: 60 PERIODS

LEARNING RESOURCES:	
<b>TEXT BOOKS:</b>	
1.	Yoga Practices, Vethathiri Publications, Erode, Tamil nadu, India, May 2024.
2.	Simplified Physical Exercises, Vethathiri Publications, Erode, Tamil nadu, India, Jan 2024.
<b>REFERENCES:</b>	
1.	Yoga for Modern Age, Vethathiri Maharishi, Vethathiri Publications, Erode, Tamil nadu, India, Jan 2020.
2.	Karma Yoga, Vethathiri Maharishi, Vethathiri Publications, Erode, Tamil nadu, India, Aug, 2019.
<b>ONLINE RESOURCES:</b>	
1.	<a href="http://www.vethathiri.edu.in">www.vethathiri.edu.in</a>
2.	<a href="http://www.kundaliniyoga.edu.in">www.kundaliniyoga.edu.in</a>



# VEL TECH HIGH TECH

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COURSE CODE	<b>25EEC01P</b>	Semester	<b>I</b>	REGULATION			R-2025		
CATEGORY	<b>EMPLOYABILITY ENHANCEMENT COURSE (EEC)</b>			L	T	P	TW+SL	TH	C
COURSE TITLE	<b>INTEGRATED COMPETENCY DEVELOPMENT FOR ENGINEERS- I (COMMON FOR ALL BRANCHES)</b>			<b>0</b>	<b>0</b>	<b>30</b>	<b>0</b>	<b>30</b>	<b>1</b>

### COURSE OBJECTIVES:

- Develop problem-solving skills using mathematical concepts and logical reasoning.
- Enhance communication skills in English for professional and social interactions.
- Apply mathematical concepts to real-world problems

### PREREQUISITE:

- Basic English
- Basic Mathematical Calculations

### COURSE OUTCOMES:

CO. No.	Course Outcomes	Blooms level
<b>On successful completion of this Course, students will be able to</b>		
<b>C110.1</b>	<b>Recall</b> mathematical concepts, including number systems, percentages, and profit/loss calculations.	K1
<b>C110.2</b>	<b>Apply</b> mathematical concepts to solve real-world problems and scenarios.	K3
<b>C110.3</b>	<b>Relate</b> logical reasoning concepts, including blood relations and direction sense.	K2
<b>C110.4</b>	<b>Demonstrate</b> effective communication skills, including conversational analysis, vocabulary, and expression.	K2
<b>C110.5</b>	<b>Analyze</b> conversations and identify effective communication strategies.	K4

### COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2	PSO-3
C110.1	3	-	-	-	-	-	-	-	-	-	1			3
C110.2	2	-	-	-	-	-	-	-	-	-	1			2
C110.3	-	-	-	-	-	-	-	-	3	-	2			-
C110.4	-	-	-	-	-	-	-	2	3	-	2			-
C110.5	3	-	-	-	-	-	-	2	-	-	1			3

**Note:** 1: Slight, 2: Moderate, 3: Substantial

<b>SYLLABUS</b>		<b>No. of Credits: 1</b>
<b>UNIT I</b>	<b>NUMBER SYSTEM</b>	<b>6</b>
Classification of decimal number system - Even and Odd numbers - Prime and Co - prime Number - Divisibility test - Factors - HCF and LCM - Fractions and Decimals - Remainders - surds and indices - unit digit problems - factorial problems - Progressions.		
<b>UNIT II</b>	<b>PERCENTAGE, PROFIT &amp; LOSS</b>	<b>5</b>
Fundamentals of percentage - percentage calculation - Percentage to fraction and fraction to percentage conversion - percentage increase and decrease - Terminologies of profit and loss concepts - marked price and discounts - successive discounts - false weight problems.		
<b>UNIT III</b>	<b>BLOOD RELATIONS, DISTANCE &amp; DIRECTION SENSE</b>	<b>5</b>
Blood relations - generations and relations - puzzle model - dialogue model - mathematical symbol model. Direction sense - angle orientation - shadow based model - shortest distance models.		
<b>UNIT IV</b>	<b>ENGLISH COMMUNICATION ESSENTIALS – I</b>	<b>8</b>
Conversational Analysis, Word Substitution, Reference Agreement , The Art of Interaction - Responding to greetings, Sending greetings, Introducing people and responding to introductions, Asking about identity, Offering help, Accepting help, Role play, Verb Search, Listen and Complete the missing word, Situational Action Practice, Peer Connection Exercise, Mastering Social Interactions- Introducing a conversational topic, Making an invitation, Accepting an invitation, Refusing an invitation.		
<b>UNIT V</b>	<b>ENGLISH COMMUNICATION ESSENTIALS – II</b>	<b>6</b>
Telephonic Conversation, Business English, Effective Agreement and Disagreement - Giving an opinion, Not giving an opinion, Asking someone's opinion, Agreeing with an opinion, Disagreeing with an opinion, Listen & Speak Replay Activity, Improving Self-Expression- Expressing preference, Reporting progress, Expressing regret, Agreeing to/Accepting a request, Repeat and Reflect- Open ended and close ended questions, Speech Relay.		
<b>LECTURE:30 PERIODS</b>	<b>TERMWORK(TW)+ SELF LEARNING(SL): 0</b>	<b>TOTAL: 30 PERIODS</b>

<b>LEARNING RESOURCES:</b>	
<b>TEXT BOOKS:</b>	
1.	Quantitative Aptitude and Logical reasoning (Revised Edition 2025)" by R.S.Agarwal, S Chand Exam Book Year - 2025
2.	Essential English Grammar – Raymond Murphy Edition: 4th Edition (Elementary A1– B1) Publisher: Cambridge University Press- Year 2024
<b>REFERENCES:</b>	
1.	Objective Quantitative aptitude" by Oswaal Editorial Board April 2024
2.	Farmer, A. (2022). Effective Communication Skills. Notion Press.
<b>ONLINE RESOURCES:</b>	
1.	<a href="https://www.indiabix.com/">https://www.indiabix.com/</a>

SEMESTER II												
S. No.	Course Code	Course Title	Category	CIE Marks	SEE Marks	Total marks	Credits					
							L	T	P	TW+ SL	TH	C
<b>THEORY</b>												
1	25EN02T	TECHNICAL ENGLISH	HSMC	40	60	100	45	0	0	45	90	3
2	25MA02IT	VECTOR CALCULUS AND COMPLEX INTEGRATION (INTEGRATED)	BSC	50	50	100	30	15	30	45	120	4
3	25PH02T	ENGINEERING PHYSICS II	BSC	40	60	100	45	0	0	45	90	3
4	25MC03T	ENVIRONMENTAL SCIENCES	MC	40	60	100	30	0	0	0	30	0
5	25MC02T	தமிழரும் தொழில் நுட்பமும் / TAMILS AND TECHNOLOGY	MC	40	60	100	15	0	0	15	30	1
6	25HME01IT	ENGINEERING GRAPHICS (INTEGRATED)	ESC	50	50	100	45	15	30	30	120	4
7	25HML01IT	PROBLEM SOLVING AND PYTHON PROGRAMMING (INTEGRATED)	ESC	50	50	100	30	0	60	30	120	4
<b>PRACTICAL</b>												
8	25HME02P	DESIGN THINKING LABORATORY	ESC	60	40	100	0	0	60	0	60	2
9	25EEC02P	INTEGRATED COMPETENCY DEVELOPMENT FOR ENGINEERS II	EEC	100	0	100	0	0	30	0	30	1
10	25VAC01P	FUNDAMENTALS OF MATLAB/SIMULINK PROGRAMMING	VAC	100	0	100	0	0	30	0	30	1
<b>TOTAL</b>											<b>23</b>	



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COURSE CODE	25EN02T	Semester	II	REGULATION			R-2025		
CATEGORY	HUMANITIES AND SOCIAL SCIENCES INCLUDING MANAGEMENT COURSE (HSMC)			L	T	P	TW +SL	TH	C
COURSE TITLE	TECHNICAL ENGLISH (COMMON FOR ALL BRANCHES)			45	0	0	45	90	3

### COURSE OBJECTIVES:

- To develop stronger reading and comprehension skills across diverse texts.
- To enhance listening skills to hone the soft skills.
- To provide skills necessary for writing convincing job applications and well-structured reports.
- To build proficiency in speaking for technical presentations and collaborative group discussions.

### PREREQUISITE:

- Basic language and fundamental English grammar.

### COURSE OUTCOMES:

CO. No.	Course Outcomes	Blooms level
<b>On successful completion of this Course, students will be able to</b>		
C201.1	<i>Read</i> and understand general and technical texts	K2
C201.2	<i>Understand</i> how to use creative and critical thinking to communicate their ideas efficiently	K2
C201.3	<i>Participate</i> in group discussions and deliver short speeches effectively	K3
C201.4	<i>Write</i> persuasively in academic and workplace contexts	K3
C201.5	<i>Experiment with</i> the future challenges confidently and successfully	K3

### COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2	PSO-3
C201.1	-	-	-	-	-	-	-	2	3	-	1	-	-	-
C201.2	-	-	-	-	-	-	-	2	3	-	1	-	-	-
C201.3	-	-	-	-	-	-	-	2	3	-	1	-	-	-
C201.4	-	-	-	-	-	-	-	2	3	-	1	-	-	-
C201.5	-	-	-	-	-	-	-	2	3	-	1	-	-	-

**Note:** 1: Slight, 2: Moderate, 3: Substantial

SYLLABUS		No. of Credits: 3
<b>UNIT I</b>	<b>FUNDAMENTALS OF TECHNICAL WRITING</b>	<b>9</b>
<p><b>LISTENING:</b> Listening to various pre-recorded conversations and speeches  <b>SPEAKING:</b> Making out the meaning of pictorial and graphical representations.  <b>READING:</b> Reading advertisements, user manuals, brochures.  <b>WRITING:</b> One Sentence Definition- Extended Definition-Writing Instructions-Checklists  <b>GRAMMAR:</b> Active &amp; Passive Voice, Impersonal passive voice  <b>VOCABULARY:</b> Technical vocabulary  <b>Self- Learning:</b> <a href="https://www.youtube.com/watch?v=oX7OduG1YmI">https://www.youtube.com/watch?v=oX7OduG1YmI</a>  <a href="https://www.cambridgeenglish.org/learning-english/activities-for-learners/b1w001-an-advertisement">https://www.cambridgeenglish.org/learning-english/activities-for-learners/b1w001-an-advertisement</a></p>		
<b>UNIT II</b>	<b>PROCESS DESCRIPTION AND RECOMMENDATION</b>	<b>9</b>
<p><b>LISTENING:</b> Listening to pronunciation of longer words.  <b>SPEAKING:</b> Delivering short speeches in the class.  <b>READING:</b> Technical reading on innovations and innovators.  <b>WRITING:</b> Recommendations-Process Description- Purpose statements  <b>GRAMMAR:</b> Conditional Clauses-Numerical adjectives  <b>VOCABULARY:</b> Collocation  <b>Self-Learning:</b> <a href="https://www.youtube.com/watch?v=AKydcBTm8xE">https://www.youtube.com/watch?v=AKydcBTm8xE</a>  <a href="https://www.kanan.co/ielts/company-innovation-reading-answers/">https://www.kanan.co/ielts/company-innovation-reading-answers/</a></p>		
<b>UNIT III</b>	<b>INTERPRETATION AND SUMMATION</b>	<b>9</b>
<p><b>LISTENING:</b> Listening to documentaries and making notes.  <b>SPEAKING:</b> Basic speaking practice based on TOEFL.  <b>READING:</b> Longer text both general and technical–practice in speed reading  <b>WRITING:</b> Interpretation of Graphs and Charts-Preparing a memo, - Email itinerary.  <b>GRAMMAR:</b> Words used as nouns and verbs- Embedded sentences.  <b>VOCABULARY :</b> Sequence words  <b>Self- Learning:</b> <a href="https://www.youtube.com/watch?v=WrlYndozEVg">https://www.youtube.com/watch?v=WrlYndozEVg</a>  <a href="https://learnenglish.britishcouncil.org/skills/reading/c1-reading/life-mars">https://learnenglish.britishcouncil.org/skills/reading/c1-reading/life-mars</a></p>		
<b>UNIT IV</b>	<b>RESUME PREPARATION AND BUSINESS CORRESPONDENCE</b>	<b>9</b>
<p><b>LISTENING:</b> Listening to native accents (Interviews, BBC News, etc.).  <b>SPEAKING:</b> Group Discussions (Skills, Guidelines, Evaluation) - Oral Presentation (Planning, Preparing, Organizing and Presenting)  <b>READING:</b> Reading different types of texts /genres for comprehension  <b>WRITING:</b> Cause and effect expressions -Job application Letters (Cover Letter &amp; Resume/CV), Requisition Letter(Testimonial &amp; Academic Admission ) -Business correspondence (calling for quotations, placing order, complaint letters)  <b>GRAMMAR:</b> Infinitives and Gerunds-Degrees of comparison  <b>VOCABULARY:</b> Idioms and phrases  <b>Self- Learning:</b> <a href="https://www.youtube.com/watch?v=cHZirxxmSlc">https://www.youtube.com/watch?v=cHZirxxmSlc</a>  <a href="https://byjus.com/english/application-for-college-admission/">https://byjus.com/english/application-for-college-admission/</a>  <a href="https://www.marum.de/Binaries/Binary21904/Onceuponatime-scientific-tale-vol2-Eng.pdf">https://www.marum.de/Binaries/Binary21904/Onceuponatime-scientific-tale-vol2-Eng.pdf</a></p>		
<b>UNIT V</b>	<b>TECHNICAL WRITING AND REPORT WRITING</b>	<b>9</b>
<p><b>LISTENING:</b> TED/Josh/ink talks  <b>SPEAKING:</b> Starting a Career—vision statement, preparing logo and tagline, making short term and long-term goals, setting plans.  <b>READING:</b> Reading and understanding technical articles.  <b>WRITING:</b> Report writing survey, feasibility, industrial visit, reporting various incidents and accidents- Notice, Agenda &amp; Minutes of meeting  <b>GRAMMAR:</b> Direct and Indirect Speech  <b>VOCABULARY:</b> Verbal Analogies- Phrasal Verbs</p>		

<b>Self- Learning:</b> <a href="https://www.youtube.com/watch?v=7m_XpKA3GCg">https://www.youtube.com/watch?v=7m_XpKA3GCg</a> <a href="http://www.most.org/wp-content/uploads/2016/04/Technical_Reading-1.pdf">http://www.most.org/wp-content/uploads/2016/04/Technical_Reading-1.pdf</a>		
<b>LECTURE : 45 PERIODS</b>	<b>TERM WORK(TW) + SELF LEARNING(SL) : 45 PERIODS</b>	<b>TOTAL: 90 PERIODS</b>

<b>LEARNING RESOURCES:</b>	
<b>TEXT BOOKS:</b>	
1.	Department of English, Anna University, Chennai. (2013). <i>Mindscapes: English for Technologists and Engineers</i> . Orient Black Swan.
2.	Wren & Martin. (2025). <i>Middle School English Grammar and Composition</i> . S Chand Publishing.
<b>REFERENCES:</b>	
1.	Verma, S. (2015). <i>Technical Communication for Engineers</i> . India: Vikas Publishing House.
2.	Mahalakshmi, S. N. (2017). <i>Technical English for engineers: Workbook</i> (7th ed.). V.K. Publication.
3.	Murphy, R. (2019). <i>English Grammar in Use: A self-study reference and practice book for intermediate learners of English</i> (5th ed.). Cambridge University Press.
4.	Dubey, S. J., Kumar, M., & Chaudhary, S. (2020). <i>English for engineers - As per AICTE</i> . Vikas Publishing.
5.	Lakshmana Perumal, N. (2024). <i>Professional English – II</i> (1st ed.). Sri Krishna High tech Publishing Company.
<b>ONLINE RESOURCES:</b>	
1.	<a href="https://learnenglish.britishcouncil.org/skills/reading/a1-reading/holiday-home-adverts">https://learnenglish.britishcouncil.org/skills/reading/a1-reading/holiday-home-adverts</a>
2.	<a href="https://youtu.be/KLyIS0Tbr20">https://youtu.be/KLyIS0Tbr20</a>
3.	<a href="https://www.lhschools.org/Downloads/Parts%20of%20Speech%20Review.pdf">https://www.lhschools.org/Downloads/Parts%20of%20Speech%20Review.pdf</a>
4.	<a href="https://luis-vives.es/docs/aula-virtual/ingles/practica_vocabulario.pdf">https://luis-vives.es/docs/aula-virtual/ingles/practica_vocabulario.pdf</a>
5.	<a href="https://www.youtube.com/watch?v=Xp2PVO3do34">https://www.youtube.com/watch?v=Xp2PVO3do34</a>
<b>EXTENSIVE READING:</b>	
1.	Rowling, J. K. (2020). <i>The Ickabog</i> . Hachette UK.
<b>VIRTUAL LAB:</b>	
1.	<a href="https://www.englishlab.co.in/">https://www.englishlab.co.in/</a>





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COURSE CODE	25MA02IT	Semester	II	REGULATION			R-2025		
CATEGORY	BASIC SCIENCE COURSE (BSC)			L	T	P	TW+SL	TH	C
COURSE TITLE	VECTOR CALCULUS AND COMPLEX INTEGRATION (INTEGRATED) (COMMON FOR ALL BRANCHES)			30	15	30	45	120	4

### COURSE OBJECTIVES:

- To explore and comprehend the principles of vector calculus.
- To acquaint with the concepts of analytical functions and complex integration.
- To analyze and solve differential equations by applying Laplace transform concepts.

### PREREQUISITE:

- Basic Concept vector calculus and differential equations.

### COURSE OUTCOMES:

CO. No.	Course Outcomes	Blooms level
<b>On successful completion of this Course, students will be able to</b>		
C202.1	<i>Utilize</i> vector calculus principles to address real-world engineering problems.	K3
C202.2	<i>Employ</i> the mapping approach to solve systems of linear equations.	K3
C202.3	<i>Implement</i> methods of complex integration to find solutions in engineering contexts.	K3
C202.4	<i>Construct</i> solutions for engineering problems involving initial and boundary values using ordinary differential equations.	K3
C202.5	<i>Execute</i> the solution of differential equations by applying Laplace transformation techniques.	K3

### COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2	PSO-3
C202.1	3	2	-	-	-	-	-	-	2	-	2	-	-	-
C202.2	3	2	-	-	-	-	-	-	2	-	2	-	-	-
C202.3	3	2	-	-	-	-	-	-	2	-	2	-	-	-
C202.4	2	2	-	-	-	-	-	-	2	-	2	-	-	-
C202.5	3	2	-	-	-	-	-	-	2	-	2	-	-	-

**Note:** 1: Slight, 2: Moderate, 3: Substantial

SYLLABUS		No. of Credits: 4
<b>UNIT I</b>	<b>VECTOR CALCULUS</b>	<b>9</b>
Gradient, Divergence, Curl – Solenoidal and irrotational fields – Vector identities – Directional derivatives – Green’s, Gauss divergence and stoke’s theorems (without proof). <b>Case study:</b> Gauss divergence theorem		
<b>UNIT II</b>	<b>ANALYTIC FUNCTIONS</b>	<b>9</b>
Limit of a complex functions – Derivative of $f(z)$ – Definition of analytic function – Cauchy Riemann equations – Properties of analytic functions – Determination of harmonic conjugate – Milne –Thomson’s method – Bilinear transformation. <b>Case Study :</b> Milne –Thomson’s method		
<b>UNIT III</b>	<b>COMPLEX INTEGRATION</b>	<b>9</b>
Cauchy’s integral theorem (statements only) – Cauchy’s integral formulae and its applications – Taylor’s and Laurent’s expansions Residues – Cauchy’s residue theorem – Contour integration – Unit circle and semicircular contour. <b>Case Study :</b> Cauchy’s integral formulae		
<b>UNIT IV</b>	<b>ORDINARY DIFFERENTIAL EQUATIONS</b>	<b>9</b>
Second order differential equations – homogeneous and non-homogeneous linear equations and linear systems with constant coefficients – Method of variation of parameters – Equations reducible to linear equations with constant coefficients. <b>Case Study :</b> Homogeneous and Non-Homogeneous linear equations		
<b>UNIT V</b>	<b>LAPLACE TRANSFORMS</b>	<b>9</b>
Transforms of elementary functions – Properties of Laplace Transform – Transforms of periodic functions – Transforms of derivatives and integrals – Inverse transforms – Convolution theorem – Applications of Laplace transforms for solving linear ordinary differential equations up to second order with constant coefficients only. <b>Case Study :</b> Convolution theorem		
<b>LECTURE : 45 PERIODS</b>	<b>TERM WORK(TW) + SELF LEARNING(SL) : 45 PERIODS</b>	<b>TOTAL: 90 PERIODS</b>

List of Experiment		No. of Credits: 1
1.	To implement Green’s Theorem in MATLAB.	
2.	To illustrate Milne-Thomson theorem in fluid flow using MATLAB.	
3.	To study Population Fluctuations with Time-Varying Immigration Rates.	
4.	To demonstrate the Cauchy Integral Formula with Numerical Examples.	
5.	To simulate the Second-Order Differential Equations in MATLAB.	
6.	Transfer Function Representation of First-Order Systems using MATLAB.	
		<b>Total: 30 Periods</b>

LEARNING RESOURCES:	
TEXT BOOKS:	
1.	Grewal. B. S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 45th Edition , 2020.
2.	Kreyszig. E, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.
3.	Bali. N., Goyal. M. and Watkins. C., “Advanced Engineering Mathematics”, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7th Edition, 2009.

<b>REFERENCES:</b>	
1.	Mauric D. Weir, Joel Hass, Christopher Heil, Przemyslaw Bogacki, "Thomas Calculus", Pearson, 15th Edition, 2024.
2.	Dr. Hari Arora, "A Textbook of Engineering Mathematics-II", S.K. Kataria & Sons, Re print 2024.
3.	Dr. T. K. V. Iyengar, Dr. B. Krishna Gandhi, S. Ranganatham, Dr. M. V. S. S. N. Prasad "Engineering Mathematics-II" S. Chand and Company Ltd., 2023.
4.	Ravish R, Singh & Mukul Bhatt "Mathematics II" S. Chand Publishing, 20th edition, 2023.
5.	Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2016.
<b>ONLINE RESOURCES:</b>	
1.	<a href="https://youtu.be/qSeYksmwjZc?si=7hNwU7yPOI5-qVc0">https://youtu.be/qSeYksmwjZc?si=7hNwU7yPOI5-qVc0</a>
2.	<a href="https://youtu.be/5RoPKr94-w?si=IbdTmv9Q5UQPU7YS">https://youtu.be/5RoPKr94-w?si=IbdTmv9Q5UQPU7YS</a>
3.	<a href="https://youtu.be/AGC39Weq8Iw">https://youtu.be/AGC39Weq8Iw</a>
4.	<a href="https://youtu.be/9zTMaM2leEg">https://youtu.be/9zTMaM2leEg</a>
5.	<a href="https://youtu.be/4kb4QeDQnFc">https://youtu.be/4kb4QeDQnFc</a>
6.	<a href="https://youtu.be/ZLbnIdA-h0s">https://youtu.be/ZLbnIdA-h0s</a>





# VEL TECH HIGH TECH

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COURSE CODE	25PH02T	Semester	II	REGULATION			R-2025		
CATEGORY	BASIC SCIENCE COURSE (BSC)			L	T	P	TW+SL	TH	C
COURSE TITLE	ENGINEERING PHYSICS - II (COMMON TO AI&DS, CSE, CSE (AI&ML), ECE, IT, MECHANICAL, BIO TECHNOLOGY, CIVIL)			45	0	0	45	90	3

### COURSE OBJECTIVES:

- To enable students to comprehend the importance of studying the electrical properties of materials and to develop a thorough understanding of their magnetic and superconducting behaviors.
- To impart a deep understanding of semiconductor physics, facilitating its effective application in electronic device technology.
- To distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.

### PREREQUISITE:

- Basic Mathematics and Physics Knowledge.

### COURSE OUTCOMES:

CO. No.	Course Outcomes	Blooms level
<b>On successful completion of this Course, students will be able to</b>		
C203.1	<i>Implement</i> classical and quantum theories to examine electronic states and the development of energy band structures.	K3
C203.2	<i>Demonstrate</i> the practical significance of carrier concentration and doping in modifying semiconductor properties.	K3
C203.3	<i>Illustrate</i> the functioning of solar cells and emerging photovoltaic technologies.	K3
C203.4	<i>Execute</i> the methods that leverage magnetic and superconducting behaviors for quantum computing applications.	K3
C203.5	<i>Recognize</i> the fundamentals of spectroscopy and investigate different spectroscopic methods.	K3

### COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2	PSO-3
C203.1	3	3	-	-	-	-	-	-	2	-	2	-	-	-
C203.2	3	2	-	-	-	-	-	-	2	-	2	-	-	-
C203.3	3	3	-	-	-	-	-	-	2	-	2	-	-	-
C203.4	3	3	-	-	-	-	-	-	2	-	2	-	-	-
C203.5	3	3	-	-	-	-	-	-	2	-	2	-	-	-

**Note:** 1: Slight, 2: Moderate, 3: Substantial

SYLLABUS		No. of Credits: 3
<b>UNIT I</b>	<b>SOLID STATE ELECTRONICS</b>	<b>9</b>
<p>Band theory of solids - Classification of solids on the basis of band theory - Classical free electron theory - expression for electrical conductivity - thermal conductivity - Wiedemann-Franz law - electrons in metals - Fermi-Dirac distribution function - Density of energy states - Carrier concentration in metals - Expression for Fermi Energy.</p> <p><b>Case Study:</b> Temperature and Doping effects on Carrier Concentration of metals for materials performance.</p>		
<b>UNIT II</b>	<b>SEMICONDUCTING MATERIALS AND DEVICES</b>	<b>9</b>
<p>Elemental and compound semiconductors - Intrinsic and extrinsic semiconductors - Properties. Carrier concentration in intrinsic semiconductor - Variation of Fermi level with temperature - Electrical conductivity – Band gap determination - Hall effect - experimental determination of Hall coefficient, Applications</p> <p><b>Case Study:</b> Hall effect sensors for magnetic fields and proximity detection.</p>		
<b>UNIT III</b>	<b>ENERGY DEVICES</b>	<b>9</b>
<p>Photovoltaic Cell - Energy challenges and crisis -Solar radiation - Photovoltaic cell - evolution of solar cells - Silicon solar cell, I-V characteristics and its efficiency - Dye-sensitized solar cells (DSSCs), Quantum dot solar cells (QDSCs) - Photodiode - Light-dependent resistor (LDR), Light-emitting diode (LED), Organic light emitting diode (OLED), Quantum light emitting diode (QLED).</p> <p><b>Case Study:</b> Solar Powered Electric Vehicles.</p>		
<b>UNIT IV</b>	<b>MAGNETIC AND SUPERCONDUCTING MATERIALS</b>	<b>9</b>
<p>Magnetism - The Langevin theory of Diamagnetism and Paramagnetism: deriving the magnetic susceptibility and Curie's law - Weiss theory of ferromagnetism. Superconducting phenomena - properties of superconductors - Meissner effect, isotope effect and Josephson junctions - Superfluid (Qualitative) - Type-I and Type-II superconductors, High <math>T_C</math> superconductors - Magnetic levitation and SQUID.</p> <p><b>Case Study:</b> Josephson Junctions as Qubits in Quantum Computing.</p>		
<b>UNIT V</b>	<b>SPECTROMETRY</b>	<b>9</b>
<p>Theory of UV-Vis Spectroscopy - Absorption and Intensity Shift - Band gap measurement - Applications - Theory of Infrared absorption spectrometry - Quantum treatment- Instrumentation - Infrared sources and detectors. Applications - Theory of Raman spectroscopy - excitation mechanism. Instrumentation - Sources and detectors. Nuclear Magnetic Resonance - Relaxation process in NMR - Free induction decay - Chemical Shift - Instrumentation and components of NMR</p> <p><b>Case Study:</b> Functional Analysis of materials by Infra-Red Spectroscopy.</p>		
<b>LECTURE : 45 PERIODS</b>		<b>TERM WORK(TW) + SELF LEARNING(SL) : 45 PERIODS</b>
<b>TOTAL: 90 PERIODS</b>		

<b>LEARNING RESOURCES:</b>	
<b>TEXT BOOKS:</b>	
1.	A Textbook of Engineering Physics - M N Avadhanulu, P G Kshirsagar, TVS Arun Murthy - 11th Edition - S. Chand Publishers, 2018.
2.	Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, "Concepts of Modern Physics", McGraw Hill Publications, Seventh edition, 2023
3.	Aruldas Molecular Structure and Spectroscopy Prentice, 2 <sup>nd</sup> Edition Hall 2008.
<b>REFERENCES:</b>	
1.	S. M. Sze, Physics of Semiconductor Devices, 3rd ed., John Wiley (2012)
2.	David A.Bell , "Electronic Devices and Circuits", Oxford University Press , New Delhi, 2021

3.	C.N.Banwell Fundamentals of Molecular Spectroscopy , Fourth edition Tata Mc.Graw Hill', 2022
4.	Willard H H, Meritt L L Dean J A and Settle F A, "Instrumental Methods of Analysis", 6 <sup>th</sup> Edition, CBS Publishers and Distributions, New Delhi, 2014.
5.	W.D. Callister (Adapted by R. Balasubramaniam), Materials Science and Engineering,Wiley India,NewDelhi, 2014, 9th edition.
<b>ONLINE RESOURCES:</b>	
1.	<a href="https://youtu.be/L-eOdZFt9BY?si=LJyfUJyg2_pAdX47">https://youtu.be/L-eOdZFt9BY?si=LJyfUJyg2_pAdX47</a>
2.	<a href="https://youtu.be/-ga2S2LOtjs?si=19STWLjzkNxoRMa4">https://youtu.be/-ga2S2LOtjs?si=19STWLjzkNxoRMa4</a>
3.	<a href="https://youtu.be/zUF7xxmPu-o">https://youtu.be/zUF7xxmPu-o</a>
4.	<a href="https://youtu.be/-fttE1SzpD8?si=Qln4DzCMVy7yVort">https://youtu.be/-fttE1SzpD8?si=Qln4DzCMVy7yVort</a>
5.	<a href="https://nptel.ac.in/courses/104106075">https://nptel.ac.in/courses/104106075</a>





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COURSE CODE	25MC03T	Semester	I/II	REGULATION			R-2025		
CATEGORY	MANDATORY COURSE (MC)			L	T	P	TW+SL	TH	C
COURSE TITLE	ENVIRONMENTAL SCIENCES (COMMON FOR CSE(AI ML), AI&DS,CSE,ECE,IT AND MECHANICAL BRANCHES)			30	0	0	0	30	0

### COURSE OBJECTIVES:

- To develop a basic understanding of ecosystems, biodiversity and the interdependence of organisms and their environment.
- To raise awareness about environmental pollution, control measures and green engineering solutions.
- To encourage sustainable living and responsible use of resources through conservation and renewable energy.

### PREREQUISITE:

- Basic understanding of human society, economy and culture.

### COURSE OUTCOMES:

CO. No.	Course Outcomes	Blooms level
<b>On successful completion of this Course, students will be able to</b>		
C204.1	<i>Illustrate</i> the interrelationship between living organisms and the environment.	K2
C204.2	<i>Classify</i> the dynamic processes and the features of natural resources.	K2
C204.3	<i>Relate</i> public awareness, environmental pollution and its problem.	K3
C204.4	<i>Measure</i> the development and improvement in standard of living.	K2
C204.5	<i>Summarize</i> the knowledge about human health and welfare.	K2

### COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2	PSO-3
C204.1	1	-	-	-	-	-	1	-	-	-	-	1	1	-
C204.2	1	-	-	-	-	-	1	-	-	-	-	1	1	-
C204.3	2	-	-	-	-	-	1	-	-	-	-	1	2	-
C204.4	1	-	-	-	-	-	2	1	-	-	-	1	1	-
C204.5	1	-	-	-	-	-	1	1	-	-	-	1	1	-

**Note:** 1: Slight, 2: Moderate, 3: Substantial

SYLLABUS		No. of Credits: 0
<b>UNIT I</b>	<b>ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY</b>	<b>7</b>
<p><b>Environment:</b> Definition, scope, importance and need for public awareness.</p> <p><b>Ecosystems:</b> Biotic and abiotic components, carbon and nitrogen cycle, ecological succession, food chain and food web - structure and function of forest ecosystem.</p> <p><b>Biodiversity:</b> Introduction and types: genetic, species and ecosystem diversity – values of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - threats to biodiversity: habitat loss, poaching of wildlife and man-wildlife conflicts – endangered and endemic species of India. Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.</p> <p>Case Study: Field study of lake ecosystems in your area.</p>		
<b>UNIT II</b>	<b>NATURAL RESOURCES</b>	<b>7</b>
<p><b>Forest resources:</b> Deforestation - causes, effects and control measures.</p> <p><b>Mineral resources:</b> Environmental effects of extracting and using mineral resources and case studies.</p> <p><b>Food resources:</b> Agriculture and overgrazing, effects of modern agriculture - fertilizers, pesticides, water logging, salinity and case studies.</p> <p><b>Energy resources:</b> Renewable - solar, wind, geothermal, tidal, ocean thermal energy and biomass. Role of an individual in conservation of natural resources.</p> <p>Case study: Field study of Indian agricultural water management.</p>		
<b>UNIT III</b>	<b>ENVIRONMENTAL POLLUTION AND DISASTER MANAGEMENT</b>	<b>7</b>
<p>Definition – causes, effects and control measures of (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution. Solid waste management: causes, effects and control measures of municipal solid wastes - E-wastes, scrap tyres, biomedical waste, metallic wastes, non-metallic wastes - lubricants, plastics and rubber from industries. Role of an individual in prevention of pollution.</p> <p><b>Disaster management:</b> floods, earthquake, cyclone, landslides and case studies.</p> <p>Case study: Analyze the effects of noise pollution in industries.</p>		
<b>UNIT IV</b>	<b>SOCIAL ISSUES AND THE ENVIRONMENT</b>	<b>5</b>
<p><b>Social issues:</b> Sustainability: Concept, needs and challenges - circular economy - sustainable development goals. Water conservation: rain water harvesting. Climate change: global warming and ozone layer depletion.</p> <p><b>Environment protection acts:</b> Air (Prevention and control of pollution) act – Water (Prevention and control of pollution) act –Wildlife protection act – Forest conservation act – environmental impact assessment - enforcement of machinery involved in environmental legislation.</p> <p>Case study: Organic farming in sustainable agriculture of India.</p>		
<b>UNIT V</b>	<b>HUMAN POPULATION AND THE ENVIRONMENT</b>	<b>4</b>
<p><b>Human population and the environment:</b> Population growth, variation among nations and population explosion – family welfare programme – human rights – value education – women and child welfare - role of information technology in environment and human health.</p> <p>Case study: Pandemics of the 21<sup>st</sup> century.</p>		
<b>LECTURE : 30 PERIODS</b>		<b>TERM WORK(TW) + SELF LEARNING(SL) : 0 PERIODS</b>
<b>TOTAL: 30 PERIODS</b>		

<b>LEARNING RESOURCES:</b>	
<b>TEXT BOOKS:</b>	
1.	Benny Joseph, Environmental Science and Engineering, Tata McGraw-Hill, New Delhi, 2017.
2.	Anubha Kaushik, and Kaushik, C. P., Environmental Science and Engineering, New Age International Publishers, 8 <sup>th</sup> Edition, 2023.
3.	Peter H Raven, David M Hessenzahl and Linda R Berg, Environment, John Wiley & Sons, 2012.
4.	Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, 2015.
<b>REFERENCES:</b>	
1.	Erach Bharucha, Textbook of Environmental Studies for Undergraduate Courses, 3 <sup>rd</sup> Edition, University Grants Commission, Universities Press, 2021.
2.	Gilbert M. Masters, Wendell P. Ela, Introduction to Environmental Engineering and Science, 3 <sup>rd</sup> Edition, Pearson Education, 2020.
3.	Tyler Miller, G., and Scott E. Spoolman, Environmental Science, Cengage Learning India Pvt, Ltd, Delhi, 16 <sup>th</sup> Edition, 2023.
4.	Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 8 <sup>th</sup> Edition, New Age International Publishers ,2024.
<b>ONLINE RESOURCES:</b>	
1.	<a href="https://nptel.ac.in/courses/103107215">https://nptel.ac.in/courses/103107215</a>
2.	<a href="https://nptel.ac.in/courses/109105203">https://nptel.ac.in/courses/109105203</a>





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COURSE CODE	25MC02T	Semester	II	REGULATION			R-2025		
CATEGORY	MANDATORY COURSE (MC)			L	T	P	TW+SL	TH	C
COURSE TITLE	தமிழரும் தொழில்நுட்பமும் / TAMILS AND TECHNOLOGY (COMMON FOR ALL BRANCHES)			15	0	0	15	30	1

## COURSE OBJECTIVES:

- To examine the historical and contemporary contributions of Tamils in the fields of science, technology and engineering.
- To study the architectural and artistic achievements of Tamil society, including temples, sculptures, music and dance forms.
- To study the classification of land and different types of soil used for cultivation during the ancient Tamil period.

## PREREQUISITE:

- Familiarity with Tamil history and culture will help contextualize the role of Tamils in technological advancements.

## COURSE OUTCOMES:

CO. No.	Course Outcomes	Blooms level
<b>On successful completion of this Course, students will be able to</b>		
C205.1	<i>Learn</i> the weaving industry during Sangam age and graffiti on potteries.	K2
C205.2	<i>Conclude</i> the design and construction technologies of Cholars and Pallavars.	K2
C205.3	<i>Understand</i> the manufacturing technologies used in iron industry and beads making industry.	K2
C205.4	<i>Illustrate</i> the ancient Tamils land classification, crops, irrigation, crop rotation and marketing in Tamil literature.	K2
C205.5	<i>Interpret</i> the need of Tamil words in scientific studies, Tamil computation and digitalization of Tamil books.	K2

## COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2	PSO-3
C205.1	2						1	1						
C205.2	2		1			1	1	1						
C205.3	2					1	1	1						
C205.4	2					1	1	1						
C205.5	2						1	1						

**Note:** 1: Slight, 2: Moderate, 3: Substantial

SYLLABUS		No. of Credits: 1
அலகு 1	நெசவு மற்றும் பானை தொழில்நுட்பம்:	3
சங்க காலத்தில் நெசவு தொழில் - பாண்டங்களின் கீறல் குறியீடுகள்		
அலகு 2	வடிவமைப்பு மற்றும் கட்டிட தொழில்நுட்பம்:	3
சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள். சோழர் காலக் கட்டிடக்கலை, மாமல்லபுரம் சிற்பங்களும், கோவில்களும்		
அலகு 3	உற்பத்தி தொழில் நுட்பம்:	3
கப்பல் கட்டும் கலை - இரும்பு தொழிற்சாலை - இரும்பை உருக்குதல் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்		
அலகு 4	வேளாண்மை மற்றும் நீர்ப்பாசன தொழில் நுட்பம்:	3
பண்டைய தமிழ் சகாப்தத்தில் விவசாயம் - நில வகைப்பாடு - பயிர்கள் - நீர்ப்பாசனம் - பயிர் சுழற்சி முறை - சந்தைப்படுத்தல் - தமிழ் இலக்கியத்தில் விவசாயம்.		
அலகு 5	அறிவியல் தமிழ் மற்றும் கணினித்தமிழ்:	3
தமிழின் வளர்ச்சி - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் மின் நூலகம்		
LECTURE : 15 PERIODS	TERM WORK(TW) + SELF LEARNING(SL) : 15 PERIODS	TOTAL: 30 PERIODS

SYLLABUS		No. of Credits: 1
<b>UNIT I</b>	<b>WEAVING AND CERAMIC TECHNOLOGY:</b>	<b>3</b>
Weaving Industry During Sangam Age - Graffiti on Potteries.		
<b>UNIT II</b>	<b>DESIGN AND CONSTRUCTION TECHNOLOGY:</b>	<b>3</b>
Dravidian Architecture; Contemporary Architecture; Cholar kala kattida kalai, Pallava Architecture; Motifs; Temple Architecture.		
<b>UNIT III</b>	<b>MANUFACTURING TECHNOLOGY:</b>	<b>3</b>
Metallurgical Studies- Iron Industry Steel; Beads Making Industry.		
<b>UNIT IV</b>	<b>AGRICULTURE AND IRRIGATION TECHNOLOGY:</b>	<b>3</b>
Agriculture in Ancient Tamil Era; Land Classification; Crops; Irrigation; Crop Rotation; Marketing; Agriculture in Tamil Literature.		
<b>UNIT V</b>	<b>SCIENTIFIC TAMIL &amp; TAMIL COMPUTING:</b>	<b>3</b>
Digitalization of Tamil Books		
<b>LECTURE : 15 PERIODS</b>	<b>TERM WORK(TW) + SELF LEARNING(SL) : 15 PERIODS</b>	<b>TOTAL: 30 PERIODS</b>

அடிசூறிப்புகள்:	
1.	தமிழக வரலாறு - மக்களும் பண்பாடும் - கே . கே பிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்)
2.	கணினி தமிழ் - முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்)
3.	கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம்

REFERENCES:	
1.	Historical Heritage of the Tamils (Dr. S. Subatamanian, Dr. K. D Thirunavukkarasu) (Published By: International of Tamil Studies)
2.	The Contributions of Tamil to Indian Culture (Dr. M. Valarmathi) (Published By: International Institute of Tamil Studies.)
3.	Keeladi - 'Sangam City Civilization on the Banks of River Vaigai' (Jointly Published By: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)



# VEL TECH HIGH TECH

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COURSE CODE	25HME01IT	Semester	I/II	REGULATION			R-2025		
CATEGORY	ENGINEERING SCIENCE COURSE (ESC)			L	T	P	TW+SL	TH	C
COURSE TITLE	ENGINEERING GRAPHICS (INTEGRATED) (COMMON FOR ALL BRANCHES)			45	15	30	30	120	4

## COURSE OBJECTIVES:

- To develop in students, graphic skills for communication of designs, technical drawing standards and projection techniques.
- To expose them to existing national standards CAD tools in engineering design.

## PREREQUISITE:

- Basic Mathematics Skills

## COURSE OUTCOMES:

CO. No.	Course Outcomes	Blooms level
<b>On successful completion of this Course, students will be able to</b>		
C206.1	<i>Familiarize</i> with the fundamentals and standards of engineering graphics.	K3
C206.2	<i>Draw</i> orthographic projection of lines and plane surfaces.	K3
C206.3	<i>Construct</i> projection of solids of prisms, pyramids, cylinder and cone.	K3
C206.4	<i>Construct</i> section and development of surfaces.	K3
C206.5	<i>Visualize</i> isometric and perspective projections.	K3

## COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2	PSO-3
C206.1	3	2		-	-	-	-	-	-	-	-	1	1	-
C206.2	3	2	1	-	-	1	-	1	-	1	-	1	1	-
C206.3	3	2	1	-	-	1	-	1	-	1	-	1	1	-
C206.4	3	2	1	-	-	1	-	1	-	1	-	1	1	-
C206.5	3	2	1	-	-	1	-	1	-	1	-	1	1	-

**Note:** 1: Slight, 2: Moderate, 3: Substantial

SYLLABUS		No. of Credits: 3
<b>UNIT I</b>	<b>BASICS OF ENGINEERING GRAPHICS AND PLANE CURVES</b>	<b>9+3</b>
Basic Geometrical constructions, Dimensioning; Curves used in engineering practices: Conics - Construction of ellipse, parabola and hyperbola by eccentricity method - Construction of cycloid -construction of involutes of square and circle - Drawing of tangents and normal to the above curves- <b>Real world applications of Engineering curves: Elliptical domes, Car headlights and flashlight reflectors, Nuclear plant cooling towers, Spur gear tooth profile, Sprocket-wheel design in conveyors.</b>		
<b>UNIT II</b>	<b>PROJECTION OF POINTS, LINES AND PLANE SURFACE</b>	<b>9+3</b>
Orthographic projection- Principal planes - First angle projection - projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.		
<b>UNIT III</b>	<b>PROJECTION OF SOLIDS</b>	<b>9+3</b>
Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to both the principal planes by rotating object method. <b>Application of solids in real world: Electrical switch boxes, Heat sinks, Roof trusses, Monuments, Pipes and tanks, Roller components, Funnels, Jet engine nozzles.</b>		
<b>UNIT IV</b>	<b>PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT</b>	<b>9+3</b>
Sectioning of simple solids like prisms, pyramids, cylinder, and cone in simple vertical position when the cutting plane is inclined to the horizontal planes and perpendicular to the other - obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids - Prisms, pyramids cylinders and cones in simple vertical position when the cutting plane is inclined to the horizontal planes and perpendicular to the other.		
<b>UNIT V</b>	<b>VISUALIZATION TECHNIQUES</b>	<b>9+3</b>
Principles of isometric projection - isometric scale - Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones - Perspective projection of simple solids- Prisms, pyramids, cone and cylinders by visual ray method. <b>Case studies in isometric projection of Industrial product design of engineering components and perspective projection of simple house.</b>		
Lecture : 45 Periods	Tutorial :15 Periods	Term Work(TW) + Self Learning(SL) : 30 Periods
		Total: 90 Periods

List of Experiment		No. of Credits: 1
1.	Basics of CAD software.	
2.	Creation of 2D drawings: Dimensioning, annotation and symbols.	
3.	Modeling of simple engineering components using Extrusion tool.	
4.	Modeling of simple engineering components using Revolve tool.	
5.	Developing assembly drawings for simple engineering components.	
6.	Extraction of 2D views from 3D models.	
		<b>Total: 30 Periods</b>

<b>LEARNING RESOURCES:</b>	
<b>TEXT BOOKS:</b>	
1.	Natrajan K.V., “A text book of Engineering Graphics”, 35th Revised Edition, Dhanalakshmi Publishers, Chennai, 2022.
2.	Bhatt N.D. and Panchal V.M., “Engineering Drawing”, Charotar Publishing House, 55th Edition, 2025.
3.	K.L.Narayan, P.Kannaiah and K.Venkata Reddy, “Machine Drawing”, New Age publications, 3rd edition reprint, 2019.
<b>REFERENCES:</b>	
1.	Venugopal K. and Prabhu Raja V., “Engineering Graphics”, Sixteenth edition, New Age International (P) Limited, 2022.
2.	Basant Agarwal and Agarwal C.M., “Engineering Drawing”, 3 <sup>rd</sup> edition, Tata McGraw Hill Publishing Company Limited, New Delhi, 2019.
3.	Gopalakrishna K.R., “Engineering Drawing” (Vol. I&II combined), 30 <sup>th</sup> edition Subhas Stores, Bangalore, 2017.
4.	Sharad K. Pradhan and K. K. Jain., “Engineering Graphics”, First edition, Khanna Publishing House, 2025.
5.	N S Parthasarathy and Vela Murali, “Engineering Graphics”, Oxford University, Press, New Delhi, 2015.
6.	Shah M.B., and Rana B.C., “Engineering Drawing”, Pearson, 3rd Edition, 2022.
<b>ONLINE RESOURCES:</b>	
1.	<a href="https://nptel.ac.in/courses/112/107/112107211">https://nptel.ac.in/courses/112/107/112107211</a>
2.	<a href="https://nptel.ac.in/courses/112103019">https://nptel.ac.in/courses/112103019</a>
3.	<a href="https://academy.autodesk.com">https://academy.autodesk.com</a>





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COURSE CODE	25HML01IT	Semester	I/II	REGULATION			R-2025		
CATEGORY	ENGINEERING SCIENCE COURSE (ESC)			L	T	P	TW+SL	TH	C
COURSE TITLE	PROBLEM SOLVING AND PYTHON PROGRAMMING (INTEGRATED) (COMMON FOR ALL BRANCHES)			30	0	60	30	120	4

### COURSE OBJECTIVES:

- To introduce the fundamentals of Python programming.
- To develop the ability to solve real-world problems using Python functions.
- To enable students to efficiently use list and tuples.
- To impart knowledge on data handling using dictionary and strings.
- To expose students to file handling and Python libraries.

### PREREQUISITE:

- Basic Mathematics Skills and Computer Knowledge.

### COURSE OUTCOMES:

CO. No.	Course Outcomes	Blooms level
<b>On successful completion of this Course, students will be able to</b>		
C207.1	<i>Understand</i> Fundamentals of Python programming, including syntax, data types, control structures, and functions.	K2
C207.2	<i>Apply</i> problem-solving techniques to write efficient and readable Python code.	K3
C207.3	<i>Use</i> built-in data structures like lists and tuples sets for algorithmic problem solving.	K3
C207.4	<i>Implement</i> dictionaries, sets, and string operations for data handling	K4
C207.5	<i>Demonstrate</i> file handling and use Python libraries for data analysis and visualization	K3

### COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
C207.1	3	2	2	1	2	1	-	-	1	-	1	2	1
C207.2	3	3	3	2	3	1	-	-	1	-	1	3	3
C207.3	3	3	3	2	3	1	-	-	2	-	1	3	3
C207.4	2	2	2	2	3	1	-	1	1	-	2	2	2
C207.5	2	3	3	2	3	1	-	1	2	-	2	3	3

**Note:** 1: Slight, 2: Moderate, 3: Substantial

SYLLABUS		No. of Credits: 2
<b>UNIT I</b>	<b>INTRODUCTION TO PYTHON</b>	<b>6</b>
Fundamentals of Problem-Solving Techniques - Introduction to Python: Features, Introduction to various IDEs -Variables and Assignments - Data Types - Input/Output Statements – Operators – Expressions -Type Casting – Importing Modules – Working with Modules (math, random).		
<b>UNIT II</b>	<b>FLOW OF CONTROLS AND FUNCTIONS</b>	<b>6</b>
Statement Flow Control (Sequence, Selection, Repetition), Conditional Statements – Looping Statements – Jump Statements - range(), enumerate() - Defining and Calling Functions – Types of Function – Passing Parameters in function - Return Values – Recursion - Lambda Functions – Scope of Variables.		
<b>UNIT III</b>	<b>LISTS AND TUPLES</b>	<b>6</b>
Mutable and Immutable types – List: Creating and Accessing List – List Operations – List Functions and Manipulations, Tuples: Creating and Accessing Tuples – Tuple Operations – Tuple Functions and Manipulations.		
<b>UNIT IV</b>	<b>DICTIONARY AND STRINGS</b>	<b>6</b>
Dictionary: Creating Dictionary – Accessing Elements of Dictionary – Dictionary Functions and Manipulations - Sets: Working with Sets – Set Operations, String Manipulation: Traversing a String – String Operators – String Slices – String Functions.		
<b>UNIT V</b>	<b>FILE HANDLING AND LIBRARIES</b>	<b>6</b>
Introduction to Data Files – Opening and Closing Files (Text File,.csv,.xlsx)-reading and writing files- flush () function-with Statement – Introduction about Python Libraries: Numpy, Scipy, Matplotlib, Pandas, Seaborn and Scikit-learn.		
<b>LECTURE : 30 PERIODS</b>	<b>TEAM WORK(TW) + SELF LEARNING(SL) : 30 PERIODS</b>	<b>TOTAL: 60 PERIODS</b>

List of Experiment		No. of Credits: 2
1.	<b>User Bio-Data Formatter</b> Take multiple user inputs and create a profile card using multiline string formatting.	
2.	<b>Math Operations Demo</b> Display the result of trigonometric, logarithmic, and exponential functions using the math module.	
3.	<b>Conversion App</b> Convert Celsius/Fahrenheit, meters/feet, kg/pounds and vice versa using formulae with input/output formatting.	
4.	<b>Pattern Printing using Recursion</b> Print following patterns using recursion Star Pyramid Hollow Pyramid Diamond using Stars Number Triangle Alphabet Triangle	
5.	<b>Product Inventory Using 2D Tuples</b> Create a 2D tuple containing Product ID, Name, Quantity, and Price. Allow the user to search for a product, sort based on price and display its details.	
6.	<b>Multi-Subject Quiz using Dictionary</b> The program should store questions and answers for multiple subjects in nested dictionaries. Allow the user to select a subject and attempt the quiz. Evaluate and display the user's score.	
7.	<b>Contact Manager</b> Accept a list of names, update, Search and sort them alphabetically using list sort functions.	
8.	<b>Word Formatter and Analyzer</b> For a given input a sentence and perform following operations	

	Replace a word Remove unwanted spaces Count Number of Substrings Find Number of Palindrome words Find number of Anagram words.
9.	<b>Text Processing and Analysis Using Python</b> Create and write data to an Excel (.xlsx) file containing employee salary details and read the file to display the top 5 records and calculate total salary payout.
10.	<b>Numerical Analysis using Numpy and Scipy</b> Generate a NumPy array to store marks of students in 5 subjects, then perform array operations like mean, median, max, min, and reshaping.
11.	<b>Visual Analytics with Matplotlib and Seaborn</b> Plot different kind of graphs to visualize monthly temperature variations of a city using Matplotlib library.
12.	Develop a <b>project</b> for any application: Library Book Tracking System Health Monitoring System Student Academic Performance Monitoring System Employee Payroll Management System Customer Feedback Sentiment Analyzer Online Bookstore Inventory and Sales Tracker Covid-19 Data Tracker and Visualizer E-commerce Order Management System Online Examination Result Analysis Tool Daily Expense Tracker with Category-wise Visualization Basic Banking Transaction Simulator Air Quality Data Analyzer Movie Rating and Review Analyzer Sales Commission Calculator for Marketing Team Online Food Order and Delivery Tracker Hospital Patient Admission and Billing System Product Review Word Frequency Visualizer Traffic Violation Fine Management System Simple Recommendation System for Books (Rule-Based)
<b>Total: 60 Periods</b>	

<b>LEARNING RESOURCES:</b>	
<b>TEXT BOOKS:</b>	
1.	Mark Lutz, 'Learning Python', O'Reilly Media, 2025
2.	Reema Thareja, 'Python Programming Using Problem Solving Approach', Oxford University Press, 2024
<b>REFERENCES:</b>	
1.	Allen B. Downey, 'Think Python: How to Think Like a Computer Scientist', O'Reilly, 2024
2.	Zed A. Shaw, 'Learn Python the Hard Way', Addison-Wesley, 2024
3.	Paul Barry, 'Head-First Python', O'Reilly, 2023
<b>ONLINE RESOURCES:</b>	
1.	<a href="https://docs.python.org/3/tutorial/">https://docs.python.org/3/tutorial/</a>
2.	<a href="https://realpython.com/">https://realpython.com/</a>
3.	<a href="https://www.codecademy.com/learn/learn-python-3">https://www.codecademy.com/learn/learn-python-3</a>



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COURSE CODE	25HME02P	Semester	I/II	REGULATION			R-2025		
CATEGORY	ENGINEERING SCIENCE COURSE (ESC)			L	T	P	TW+SL	TH	C
COURSE TITLE	DESIGN THINKING LABORATORY (COMMON FOR ALL BRANCHES)			0	0	60	0	60	2

### COURSE OBJECTIVES:

- Encourage out-of-the-box thinking to develop novel solutions. Also provide an environment for experimentation and iterative development.
- To bring together diverse student teams from various backgrounds to enhance idea generation and solution development. Also students to create viable solutions with potential for real-world application or commercialization.
- To bridge the gap between academic learning and real-world practice through hands-on projects.

### PREREQUISITE:

- Basic Engineering Knowledge

### COURSE OUTCOMES:

CO. No.	Course Outcomes	Blooms level
<b>On successful completion of this Course, students will be able to</b>		
C208.1	<i>Identify</i> and analyze real-world problems through empathy and user research techniques.	K4
C208.2	<i>Formulate</i> problem statements and define user needs using structured design thinking frameworks.	K3
C208.3	<i>Collaborate</i> effectively in multidisciplinary teams and communicate design processes and outcomes clearly.	K3
C208.4	<i>Apply</i> design thinking principles to create sustainable, user-centric, and feasible solutions.	K3
C208.5	<i>Develop</i> and iterate low-fidelity and high-fidelity prototypes to validate design concepts and conduct user testing and interpret feedback to refine design solutions.	K4

### COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2
C208.1	2	3	-	2	-	-	-	-	-	1	-	2	2
C208.2	2	2	2	-	-	-	-	-	-	-	-	2	2
C208.3	-	-	-	-	-	-	-	-	3	2	1	1	-
C208.4	2	2	3	-	-	-	2	-	-	1	-	2	3
C208.5	2	2	3	2	2	-	-	-	-	1	1	2	2

**Note:** 1: Slight, 2: Moderate, 3: Substantial

List of Experiment		No. of Credits: 2
1.	Fabrication of a Relay board to control a motor	
2.	Fabrication of a Wooden Sliding door	
3.	Design and Fabrication of Wooden Compound Gear Train	
4.	Fabrication of a Model of crank and slotted lever Mechanism	
5.	Fabrication of a Simple Scotch Yoke Mechanism Model	
6.	Design of Smart Dust Bin	
7.	Design of Automatic Street Light	
8.	Design of Touch-Free Door Bell	
9.	Design of Temperature-Based Fan Control	
10.	Design of Rain Alert System	
11.	Design of Smart Plant Watering System	
12.	Micro Level Project: <ol style="list-style-type: none"> <li>i. Redesigning Waste Management in College Campuses</li> <li>ii. Design Innovative Water Conservation Techniques for Urban Homes</li> <li>iii. Design Smart Solutions for Reducing Food Wastage in Hostels</li> <li>iv. Design Affordable Assistive Devices for the Elderly</li> <li>v. Design a suitable technique for Reducing Single-Use Plastics in College Canteens</li> <li>vi. Suggest a suitable innovative Energy-Saving Solutions for Student Hostels</li> <li>vii. Designing Low-Cost Solar Lighting Solutions for Rural Homes</li> <li>viii. Designing Portable Water Filters for Safe Drinking Water</li> <li>ix. Design Affordable Automatic Irrigation Systems for Small-Scale Farmers</li> <li>x. Suggest Eco-Friendly Sanitation Solutions for Villages</li> <li>xi. Design a Low-Cost Mobile Apps for Farmers to Access Weather &amp; Market Prices</li> <li>xii. Design a Low-Cost Science Lab Kits for Government Schools</li> <li>xiii. Design a Gamified Learning Tools for Enhancing Math Skills in Primary Classes</li> <li>xiv. Design a Mobile App for Parent-Teacher Communication in Rural Areas</li> <li>xv. Design a Low-Cost Solar-Powered Hearing Aid Charging Solutions</li> <li>xvi. Designing Low-Cost Walking Aids for Uneven Rural Terrain</li> <li>xvii. Design a Voice-Assisted Devices for Non-Tech-Savvy Senior Citizens</li> <li>xviii. Design of a Community Alert System for Elderly Emergencies</li> </ol>	
PRACTICAL: 60 PERIODS		TERM WORK (TW)+SELF LEARNING (SL): 0
TOTAL: 60 PERIODS		

LEARNING RESOURCES:	
<b>TEXT BOOKS:</b>	
1.	Tim Brown., "Change by Design: How Design Thinking Creates New Alternatives for Business and Society", Harper Business, 2009.
2.	Don Norman., "The Design of Everyday Things", Basic Books, Revised and Expanded Edition, 2013.
<b>REFERENCES:</b>	
1.	Marc Stickdorn, Jakob Schneider, "This is Service Design Thinking", Wiley, 2011.
2.	Vijay Kumar., "101 Design Methods: A Structured Approach for Driving Innovation in Your Organization", Wiley, 2012.
3.	Van Der Pijl, Patrick; Lokitz, Justin; Solomon, Lisa Kay., "Design a Better Business: New Tools, Skills, and Mindset for Strategy and Innovation", Wiley, 2016.
<b>ONLINE RESOURCES:</b>	
1.	<a href="https://www.ideo.com/">https://www.ideo.com/</a>
2.	<a href="https://dschool.stanford.edu/resources">https://dschool.stanford.edu/resources</a>
3.	<a href="https://ocw.mit.edu/">https://ocw.mit.edu/</a>



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COURSE CODE	<b>25EEC02P</b>	Semester	II	REGULATION			R-2025		
CATEGORY	<b>EMPLOYABILITY ENHANCEMENT COURSE (EEC)</b>			L	T	P	TW+SL	TH	C
COURSE TITLE	<b>INTEGRATED COMPETENCY DEVELOPMENT FOR ENGINEERS-II (COMMON FOR ALL BRANCHES)</b>			0	0	30	0	30	1

### COURSE OBJECTIVES:

- Apply mathematical concepts to solve problems (SI, CI, ratios).
- Develop coding-decoding and spatial reasoning skills.
- Enhance English communication skills for effective conversation and presentation.

### PREREQUISITE:

- Basic English
- Basic Mathematical Calculations

### COURSE OUTCOMES:

CO. No.	Course Outcomes	Blooms level
<b>On successful completion of this Course, students will be able to</b>		
C209.1	<i>How</i> to use ratio and proportion concepts to solve problems and Calculate simple and compound interest	K1
C209.2	<i>Apply</i> mathematical concepts, including interest, ratios, and proportions, to real-world scenarios.	K3
C209.3	<i>Interpret</i> coding-decoding problems, and visualize 3D shapes like cubes and cuboids to identify patterns and relationships.	K2
C209.4	<i>Illustrate</i> effective communication skills in English, including conversation, narration, and persuasion.	K2
C209.5	<i>Utilize</i> information, identify errors, and make informed decisions in linguistic contexts	K3

### COURSE OUTCOMES MAPPING WITH PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO-1	PSO-2	PSO-3
C209.1	3	-	-	-	-	-	-	-	-	-	1	-	-	-
C209.2	2	-	-	-	-	-	-	-	-	-	1	-	-	-
C209.3	-	-	-	-	-	-	-	-	3	-	2	-	-	-
C209.4	3	-	-	-	-	-	-	-	-	-	1	-	-	-
C209.5	-	-	-	-	-	-	-	2	3	-	2	-	-	-

**Note:** 1: Slight, 2: Moderate, 3: Substantial

SYLLABUS		No. of Credits: 1
<b>UNIT I</b>	<b>SIMPLE INTEREST &amp; COMPOUND INTEREST</b>	<b>6</b>
Simple interest - key terminologies - dividing principal for different rate and duration - amount doubles, triples in t years - amount changes in t1 years and t2 years. Compound interest - compounding annually, half yearly and quarterly - duration in mixed fraction. Combined - relation between SI and CI - difference between SI and CI.		
<b>UNIT II</b>	<b>RATIO &amp; PROPORTION, AGES, PARTNERSHIP</b>	<b>5</b>
Introduction - ratios as fractions - duplicate and triplicate ratios - compounded ratio - dividendo and componendo - proportions - mean and extreme proportions - problems on ages - partnership concepts.		
<b>UNIT III</b>	<b>CODING &amp; DECODING, CUBES &amp; CUBOIDS, DICE</b>	<b>6</b>
Coding decoding concepts - .Alphabet coding - number coding - word coding - sentence coding - mixed coding. Cubes and cuboids - cutting cubes and cuboids into smaller cubes - painted same colors and different colors - Dice - standard and general dice - folding and opening of a dice.		
<b>UNIT IV</b>	<b>PRACTICAL ENGLISH – I</b>	<b>6</b>
Listen and write, Follow the lead, Fact Trio, Chatting about Our Routines, Our Lives in the Present, Sentence Transformation, Rapid Fire Tense Change, Finish the Thoughts, Life Experience Sharing, Spot the Error, On the Spot Role Play, Past Continuous Challenge.		
<b>UNIT V</b>	<b>PRACTICAL ENGLISH – II</b>	<b>7</b>
Presenting a product-giving instruction to use the product, Understanding by brain storming, Conversing with Confidence -Narrating personal experiences/ events, Interviewing a celebrity, Speaking about Future plans, Influencing Others through Speech-Making suggestions, Agreeing with (or accepting) a suggestion, Disagreeing with (or refusing to accept) a suggestion, Asking for a suggestion - Asking for a permission.		
<b>PRACTICAL:30 PERIODS</b>	<b>TERMWORK(TW)+ SELF LEARNING(SL): 0</b>	<b>TOTAL: 30 PERIODS</b>

<b>LEARNING RESOURCES:</b>	
<b>TEXT BOOKS:</b>	
1.	A Modern Approach to Verbal & Non-Verbal Reasoning (Revised Edition 2025)" by R.S.Agarwal, S Chand Publications.
2.	Essential English Grammar – Raymond Murphy Edition: 4th Edition (Elementary A1– B1) Publisher: Cambridge University Press- Year 2024.
<b>REFERENCES:</b>	
1.	Fast Track Objective Arithmetic"-by Rajesh verma, Arihant Publications-2025.
2.	Basics of Communication skills – Ashok Sharma – 2025 – IIP Iterative International publishers.
<b>ONLINE RESOURCES:</b>	
1.	<a href="https://www.indiabix.com/">https://www.indiabix.com/</a>