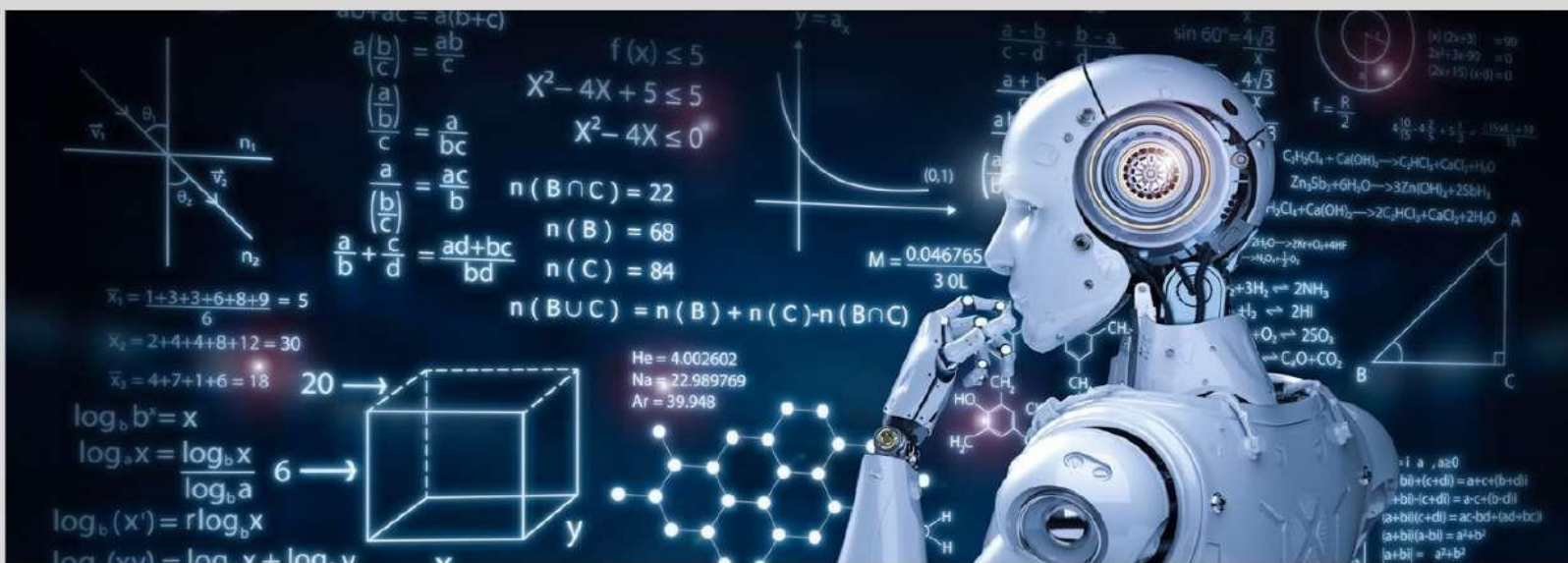


B.E Computer Science and Engineering (Artificial Intelligence and Machine Learning)



BATCH 2025

VISION AND MISSION OF THE INSTITUTION

Vision

✚ To be leading Institution in Academic excellence, Multidisciplinary Research, Innovation, Entrepreneurship and Industry relation in order to mould true citizens of the country

Mission

- ✚ To create innovative and vibrant young leaders in Engineering and Technology field for building India as a knowledge power by improving the teaching-learning process.
- ✚ To enhance employability, entrepreneurship and to improve the research competence to address Societal needs.
- ✚ To generate engineering graduates who use knowledge as a powerful tool to drive societal transformation and inculcate in them ethical and moral values.

DEPARTMENT OF CSE- ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Vision

- ✚ To be a center of excellence in Information Science & Technology with a focus on Artificial Intelligence and Machine Learning through Research & Innovations embedding ethics to solve societal problems with advanced intelligent systems to have a global impact.

Mission

- ✚ **Impart strong theoretical and experiential knowledge** in Computer Science, Artificial Intelligence, and Machine Learning to develop innovative and sustainable solutions.
- ✚ **Encourage research, innovation, and ethical practices** by fostering critical and Creative thinking, multidisciplinary learning, to develop and contribute for the societal growth.
- ✚ **Strengthen industry and community engagement** through collaborative projects, internships, and partnerships to prepare students for real-world challenges and global impact

Program Educational Objectives (PEOs)

The CSE- Artificial Intelligence and Machine Learning graduate can

PEO 1: To equip graduates with strong foundations in AI and ML to design intelligent and sustainable solutions.

PEO 2: To foster research, innovation, ethical values and social responsibility for technological and societal advancement.

PEO 3: To prepare graduates for global careers through industry collaboration and multidisciplinary skills.

Program Outcomes

PO1: Engineering Knowledge

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis

Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design / Development of Solutions

Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, and the cultural, societal, and environmental aspects.

PO4: Conduct Investigations of Complex Problems

Use research-based knowledge and research methods including the design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

PO5: Modern Tool Usage

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities with an understanding of their limitations.

PO6: The Engineer and Society

Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to professional engineering practice.

PO7: Environment and Sustainability

Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for, sustainable development.

PO8: Ethics

Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

PO9: Individual and Team Work

Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.

PO10: Communication

Communicate effectively on complex engineering activities with the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance

Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.

PO12: Life-long Learning

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broad context of technological change.

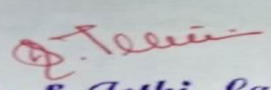
Programme Specific Outcomes (PSOs)

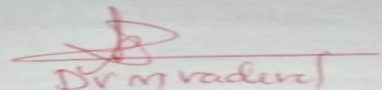
PSO 1: Apply Artificial Intelligence and Machine Learning techniques to design intelligent, data-driven solutions for real-world problems.

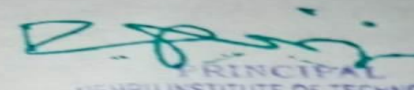
PSO 2: Demonstrate ethical responsibility, innovation, and effective use of modern tools to address societal and industrial challenges.

PSO 3: Develop and deploy reliable, scalable, and sustainable AI-based systems using appropriate technologies and best practices.

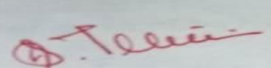
SEMESTER-I								
S.No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
	U23IP101	Induction Program	MC	-	-	-	-	0
THEORY								
1	U23MA102	Calculus for Engineers	BSC	3	1	0	4	4
2	U23PH203	Physics for Information Science	BSC	3	0	0	3	3
3	U23CS101	C-Programming	ESC	3	0	0	3	3
4	U23HS101	Heritage of Tamil	HSMC	1	0	0	1	1
THEORY WITH LAB COMPONENT								
5	U23IT101	Application Design and Development	ESC	3	0	2	5	4
6	U23EN102	Effective English for Engineers	HSMC	2	0	2	4	3
PRACTICAL								
7	U23BS111	Basic Science Laboratory	BSC	0	0	4	4	2
8	U23CS111	C-Programming Laboratory	ESC	0	0	4	4	2
9	U23EE101	Career Enhancement Training I	EEC	0	0	3	3	1
10	U23VECx1	Vocational Enhancement Training-I	VEC	0	0	2	2	1*
Total				14	1	17	33	23


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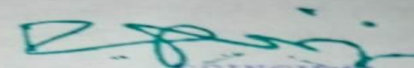

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SEMESTER-II								
S.No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	U23CY101	Engineering chemistry	BSC	3	0	0	3	3
2	U23HS202	Tamil &Technology	HSMC	1	0	0	1	1
3	U23CS201	Python Programming and Practices	ESC	3	0	0	3	3
4	U23AL201	Digital Principles and System Design	ESC	3	0	0	3	3
5	U23MA204	Probability theory and Statistics	BSC	3	1	0	5	4
THEORYWITHLABCOMPONENT								
6	U23EN202	Proficiency in English	HSMC	2	0	2	4	3
PRACTICAL								
7	U23CS211	Python Programming Lab	ESC	0	0	2	2	1
8	U23GE213	Engineering Graphics Lab	ESC	0	0	2	2	1
9	U23EE212	Career Enhancement Training II	EEC	0	0	2	2	1
10	U23VECx2	Vocational Enhancement Training-II	VEC	0	0	2	2	1*
Total				16	0	14	30	20

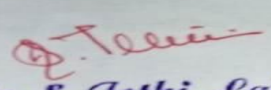

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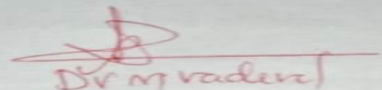

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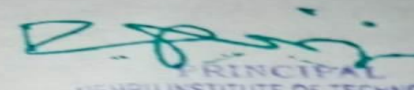

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SEMESTER-III								
S.No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	U23MA309	Discrete Mathematics for computing	BSC	3	1	0	4	4
2	U23AL301	Data Structures and Algorithms	PCC	3	0	0	3	3
3	U23IT301	Object oriented Programming Using JAVA	PCC	3	0	0	3	3
THEORY WITH LAB COMPONENT								
4	U23AL303	Computer Organization and Architecture	ESC	3	0	2	5	4
5	U23IT405	Foundations of Data Science	PCC	3	0	2	5	4
PRACTICAL								
6	U23AL311	Data Structures Laboratory	PCC	0	0	4	4	2
7	U23AL312	JAVA Programming Laboratory	PCC	0	0	4	4	2
8	U23EE313	Aptitude and Communications for Engineers - I	EEC	0	0	2	2	1
9	U23VECx3	Vocational Enhancement Training-III	VEC	0	0	2	2	1*
10	U23MC301	Life Skills and Ethics	MC	2	0	0	2	NC
Total				17	1	16	34	23

SEMESTER-IV


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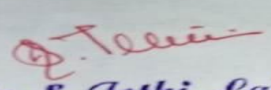
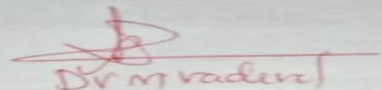
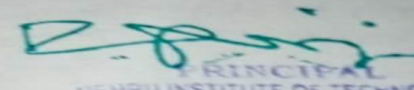

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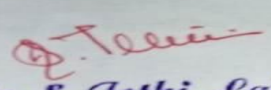
S.No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	U23MA410	Linear Algebra and Number Theory	BSC	3	1	0	4	4
2	U23AL401	Theory of Computation	PCC	3	0	0	3	3
3	U23AL402	Artificial Intelligence	PCC	3	0	0	3	3
4	U23AL403	Machine Learning	PCC	3	0	0	3	3
THEORY WITH LAB COMPONENT								
5	U23AL404	Operating Systems	PCC	3	0	2	5	4
6	U23AL405	Database Design and Management	PCC	3	0	2	5	4
PRACTICAL								
7	U23AL411	Artificial Intelligence Laboratory	PCC	0	0	4	4	2
8	U23AL412	Machine Learning Laboratory	PCC	0	0	4	4	2
9	U23EE415	Aptitude and communication for Engineering -II	EEC	0	0	2	2	1
10	U23VECx4	Vocational Enhancement Training-IV	VEC	0	0	2	2	1*
11	U23MC402	Environmental Ecosystem and Sustainability	MC	2	0	0	2	NC
Total				20	0	16	37	26

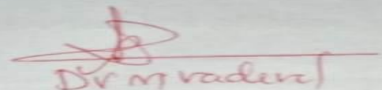
SEMESTER-V

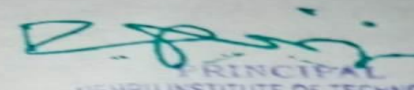

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S.No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	U23AL501	Deep Learning for vision	PCC	3	0	0	3	3
2	U23AL502	Cryptography and Cyber Security	PCC	3	0	0	3	3
3		Professional Elective I	PEC	3	0	0	3	3
4		Professional Elective-II	PEC	3	0	0	3	3
5	U23AL503	Compiler Design	PCC	3	0	0	3	3
THEORY WITH LAB COMPONENT								
6	U23AL504	Computer Networks	PCC	3	0	2	5	4
PRACTICAL								
7	U23AL511	Deep Learning Laboratory	PCC	0	0	4	4	2
8	U23AL512	Compiler Design Laboratory	PCC	0	0	4	4	2
8	U23EE517	Campus to Corporate - I	EEC	0	0	2	2	1
9	U23VECx5	Vocational Enhancement Training- V	VEC	0	0	2	2	1*
10	U23MC504	Entrepreneurship and Innovation	MC	2	0	0	2	NC
Total				20	0	14	34	24

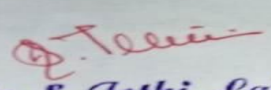
SEMESTER-VI

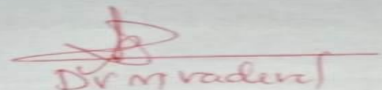

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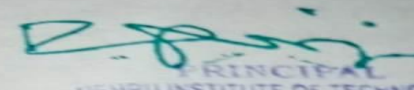

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S.No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1		Open Elective I	OEC	3	0	0	3	3
2		Professional Elective III	PEC	3	0	0	3	3
3		Professional Elective IV	PEC	3	0	0	3	3
4		Professional Elective V	PEC	3	0	0	3	3
THEORY WITH LAB COMPONENT								
5	U23AL602	Embedded Systems and IoT	PCC	3	0	2	5	4
6	U23AL601	Natural Language Processing	PCC	3	0	2	5	4
PRACTICAL								
7	U23AL611	Mini Project	PCC	0	0	2	2	1
8	U23EE618	Campus to Corporate - II	EEC	0	0	2	2	1
9	U23VECx6	Vocational Enhancement Training- VI	VEC	0	0	2	2	1*
10	U23MC605	Intellectual Property Rights	MC	2	0	0	2	NC
Total				20	0	10	30	22

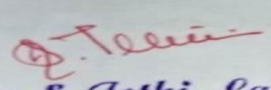

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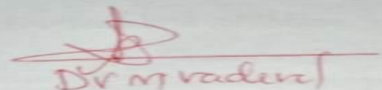

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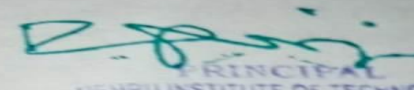

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SEMESTER-VII								
S.No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1		Management Elective	HSMC	3	0	0	3	3
2		Professional Elective VI	PEC	3	0	0	3	3
3		Open Elective II	OEC	3	0	0	3	3
4		Open Elective III	OEC	3	0	0	3	3
5		Open Elective IV	OEC	3	0	0	3	3
PRACTICAL								
6	U23AL711	Project Phase I	EEC	0	0	4	4	2
Total				15	0	4	19	17

SEMESTER-VIII								
S.No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
PRACTICAL								
1	U23AL811	Project Phase II	EEC	0	0	20	20	10
Total				0	0	20	20	10

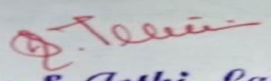
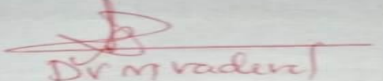

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Vertical I Data Science	Vertical II Full Stack Development	Vertical III Cloud Computing and Data Center Technologies	Vertical IV Cyber Security and Data Privacy	Vertical V Emerging Technologies	Vertical VI Artificial Intelligence
Exploratory Data Analysis	Web Technologies	Cloud Computing	Ethical Hacking	Augmented Reality/Virtual Reality	Genetic Algorithms and its Applications
Recommender Systems	App Development	Virtualization	Digital and Mobile Forensics	Robotic Process Automation	Artificial Neural Networks
Neural Networks and Deep Learning	Cloud Services Management	Cloud Services Management	Social Network Security	Neural Networks and Deep Learning	Fuzzy logic and its Applications
Text and Speech Analysis	UI and UX Design	Data Warehousing	Modern Cryptography	Cyber security	Digital Image Processing
Business Analytics	Software Testing and Automation	Storage Technologies	Engineering Secure software systems	Quantum Computing	Statistical Machine Learning
Image and Video Analytics	Web Application Security	Software Defined Networks	Crypto currency andBlockchain Technologies	Crypto currency andBlockchain Technologies	Applied Machine Learning
Computer Vision	DevOps	Stream Processing	Network Security	Generative AI	Computational Neuro Science
BigData Analytics	Principles of Programming Languages	Security and Privacy in Cloud	Security and Privacy in Cloud	3D Printing and Design	Intelligent Machining

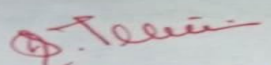
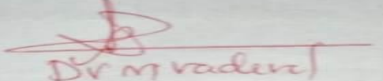
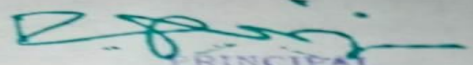

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RATIFICATION -1

OPEN ELECTIVE OFFERED BY AI&ML								
S.NO	COURSE CODE	COURSE NAME	CATEGORY	PERIODS PERWEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	U23ALO11	Introduction to Artificial Intelligence	OE	3	0	0	3	3
2	U23ALO12	Introduction to Machine Learning	OE	3	0	0	3	3
3	U23ALO13	Basics of Deep Learning	OE	3	0	0	3	3
4	U23ALO14	Computer Vision Basics	OE	3	0	0	3	3
5	U23ALO15	Introduction to Natural Language Processing	OE	3	0	0	3	3
6	U23ALO16	AI for Healthcare	OE	3	0	0	3	3

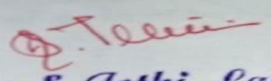
MANAGEMENT ELECTIVE								
S.NO	COURSE CODE	COURSE NAME	CATEGORY	PERIODS PERWEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	U23ALM01	Principles of Management	HSMC	3	0	0	3	3

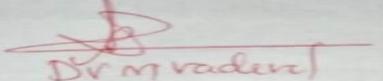

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Artificial Intelligence and Machine Learning - Batch 2025

RATIFICATION -1

2	U23ALM02	Total Quality Management	HSMC	3	0	0	3	3
3	U23ALM03	Human Resource Management	HSMC	3	0	0	3	3
4	U23ALM04	Knowledge Management	HSMC	3	0	0	3	3
5	U23ALM05	Industrial Management	HSMC	3	0	0	3	3

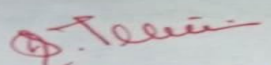
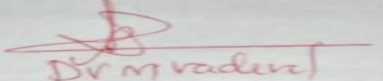

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"JAWAHAR GARDEN" KALIYADIPURAM,
THIRUMALAYANPALAYAM (PO)
COIMBATORE - 641 195.

RATIFICATION -1

S.No.	Stream									NIT	AICTE Norms	Anna University
		I	II	III	IV	V	VI	VII	VIII			
1.	Humanities and Management Courses(HSMC)	4	4					3		11	12	12
2.	Basic Science Course (BSC)	9	7	4	4					24	24	25
3.	Engineering Science Course(ESC)	9	8	4						21	29	18
4.	Professional Core Course(PCC)			14	21	17	9			61	49	61
5.	Professional Elective Course(PEC)					6	9	3		18	18	18
6.	Open Elective Course(OEC)						3	9		12	12	12
7.	Employability Enhancement Course (EEC)	1	1	1	1	1	1	2	10	18	15	16
8.	Vocational Enhancement Course (VEC)	1	1	1	1					4*		
9.	Mandatory Course(MC)			✓	✓	✓	✓				Non Credit	

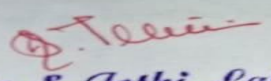

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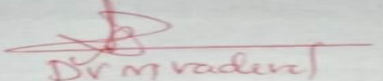
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Artificial Intelligence and Machine Learning - Batch 2025

RATIFICATION -1

NIT	23	20	23	26	24	22	17	10	165		
AICTE	17.5	20.5	24	22	21	22	18	15		159	
Anna University	22	26	23.5	22	22	20.5	16	10			162


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ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING REGULATION 2023

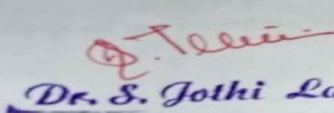
RATIFICATION 1 - Batch 2025

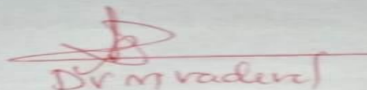
Vertical I

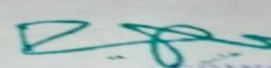
Data Science	
Course Code	Course Name
U23ALP11	Exploratory Data Analysis
U23ALP12	Recommender Systems
U23ALP13	Neural Networks and Deep Learning
U23ALP14	Text and Speech Analysis
U23ALP15	Business Analytics
U23ALP16	Image and Video Analytics
U23ALP17	Computer Vision
U23ALP18	BigData Analytics

Vertical II

Full Stack Development	
Course Code	Course Name
U23ALP21	Web Technologies
U23ALP22	App Development
U23ALP23	Cloud Services Management
U23ALP24	UI and UX Design
U23ALP25	Software Testing and Automation
U23ALP26	Web Application Security
U23ALP27	DevOps
U23ALP28	Principles of Programming Languages


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ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING REGULATION 2023

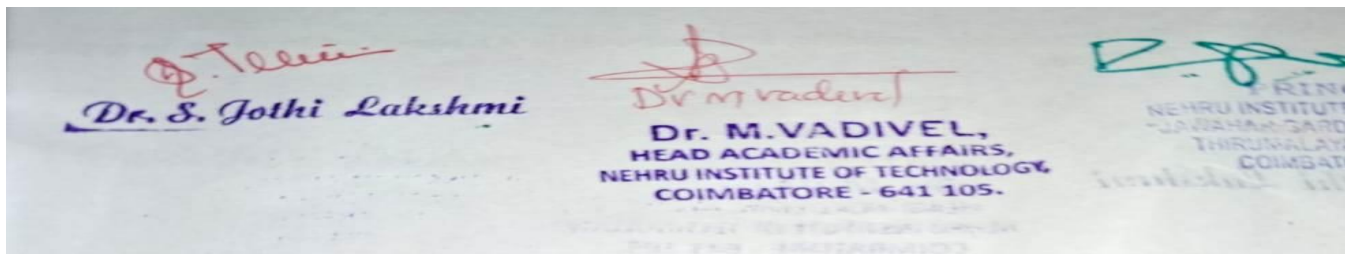
RATIFICATION 1 - Batch 2025

Cloud Computing and Data Center Technologies	
Course Code	Course Name
U23ALP31	Cloud Computing
U23ALP32	Virtualization
U23ALP33	Cloud Services Management
U23ALP34	Data Warehousing
U23ALP35	Storage Technologies
U23ALP36	Software Defined Networks
U23ALP37	Stream Processing
U23ALP38	Security and Privacy in Cloud

Vertical III

Cyber Security and Data Privacy	
Course Code	Course Name
U23ALP41	Ethical Hacking
U23ALP42	Digital and Mobile Forensics
U23ALP43	Social Network Security
U23ALP44	Modern Cryptography
U23ALP45	Engineering Secure software systems
U23ALP46	Crypto currency and Blockchain Technologies
U23ALP47	Network Security
U23ALP48	Security and Privacy in Cloud

Vertical IV

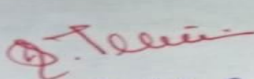


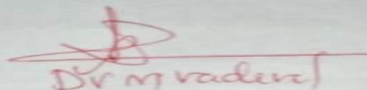
ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING REGULATION 2023

RATIFICATION 1 - Batch 2025

Course Code	Course Name
U23ALP51	Augmented Reality/Virtual Reality
U23ALP52	Robotic Process Automation
U23ALP53	Neural Networks and Deep Learning
U23ALP54	Cyber security
U23ALP55	Quantum Computing
U23ALP56	Crypto currency andBlockchain Technologies
U23ALP57	Game Development
U23ALP58	3D Printing and Design

Vertical V


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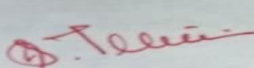

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ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING REGULATION 2023

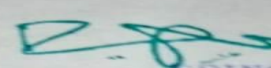
RATIFICATION 1 - Batch 2025

Vertical VI

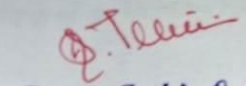
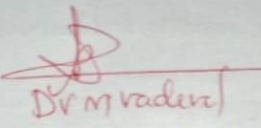
Course Code	Course Name
U23ALP61	Knowledge Engineering
U23ALP62	Soft Computing
U23ALP63	Neural Networks and Deep Learning
U23ALP64	Text and Speech Analysis
U23ALP65	Optimization Techniques
U23ALP66	Game Theory
U23ALP67	Cognitive Science
U23ALP68	Ethics and AI

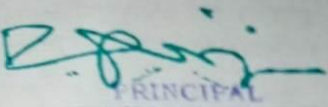

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SEMESTER I					
U23MA102 SDG : 4	CALCULUS FOR ENGINEERS	Category:HSMC			
		L	T	P	C
		3	1	0	4
COURSE OBJECTIVE: 1. To develop the use of matrix algebra techniques that is needed by engineers for practical applications. 2. To familiarize the students with differential calculus. 3. To enlighten the students with functions of several variables. This is needed in many branches of engineering. 4. To acquaint the knowledge of various techniques and methods of solving ordinary differential equations. 5. To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.					
UNIT 1	MATRICES			9 +3	
Characteristic equation – Eigen values and Eigen vectors of a real matrix– Cayley –Hamilton theorem (Statement and applications only) – Orthogonal matrices –Diagonalization using orthogonal transformation of a symmetric matrix. Applications: Stretching of an elastic membrane.					
UNIT 2	DIFFERENTIAL CALCULUS			9 +3	
Limit of a function - Continuity - Derivatives - Differentiation rules (sum, product, quotient, chain rules) - Implicit differentiation - Applications: Maxima and Minima of functions of one variable.					
UNIT 3	MULTIVARIABLE CALCULUS			9 +3	
Functions of two variables – Partial derivatives – Taylor's series for functions of two variables – Jacobian’s – Application: maxima and minima – Lagrange's multiplier and its applications.					
UNIT 4	ORDINARY DIFFERENTIAL EQUATIONS			9 +3	
Linear differential equations of second order with constant coefficients - Linear differential Equations of second order with variable coefficients – Euler - Cauchy’s linear differential equation - Method of variation of parameters for second order differential equations					
UNIT 5	MULTIPLE INTEGRALS			9 +3	
Double integration with constant and variable limits - Region of integration- Area as double integral in Cartesian coordinates. Triple integral in Cartesian coordinates. Application: Moments and centres of mass, moment of inertia.					


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COURSE OUTCOMES:

At the end of the course, students would

CO1:Comprehend the concepts of Eigen values, Eigen vectors, limits, continuity, functions of several variables, Characteristics of ODE, double integration and region of integration for solving complex problems

CO2:Use the Cayley-Hamilton theorem and properties of diagonalizable symmetric matrices and apply differentiation rules, to solve problems involving maxima and minima.

CO3: Develop various techniques in solving ordinary differential equations for practical applications

CO4: Make use of differential and integral calculus tools in modeling problems

CO5: Utilize integrals to compute areas and volumes of solids and solve real-world problems involving multiple integration.

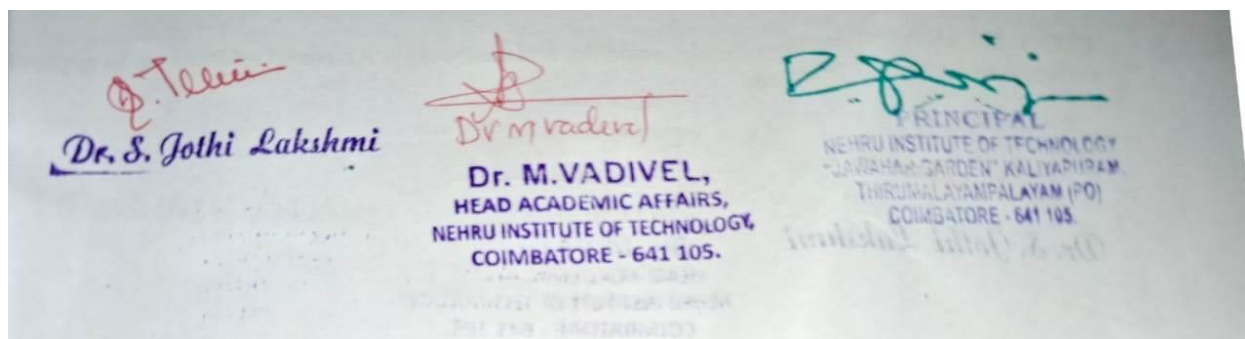
TOTAL: 60 PERIODS

TEXT BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, New Delhi, 2018.
2. Kreyszig E, "Advanced Engineering Mathematics ", 10th Edition, John Wiley, New Delhi, India, 2018.
3. James Stewart, "Calculus : Early Transcendentals", Cengage Learning, 8th Edition, New Delhi, 2015.

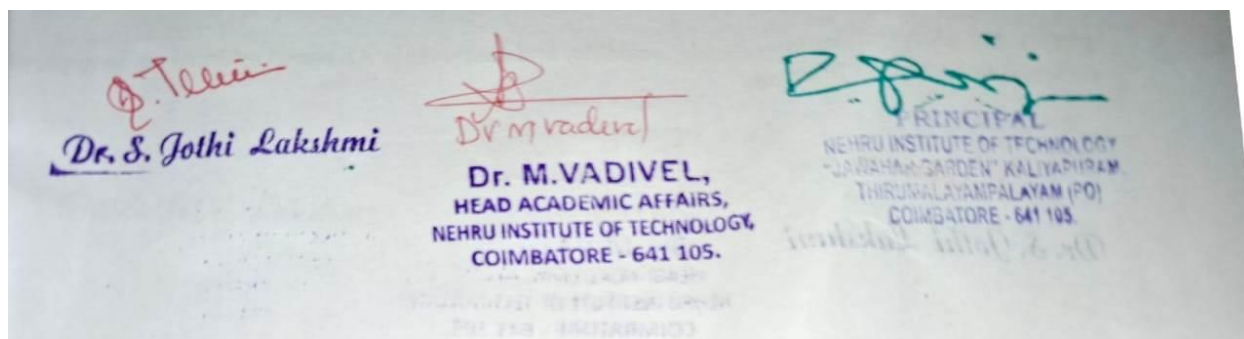
REFERENCES:

1. Ramana B.V., "Higher Engineering Mathematics", Tata McGraw Hill Co. Ltd., New Delhi, 11th Reprint, 2010.
2. James. G., "Advanced Modern Engineering Mathematics", 4th Edition, Pearson Education, New Delhi, 2016
3. Bali. N.P and Manish Goyal, "A Textbook of Engineering Mathematics", 10th Edition, Laxmi Publications Pvt. Ltd, 2021.
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.

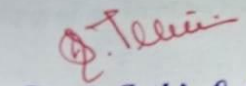


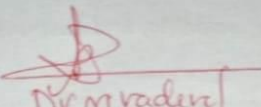
CO's-PO's & PSO's MAPPING															
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	1	1	-	-	-	-	-	-	-		3	3
CO2	3	3	1	-	-	-	-	-	-	-	-	-		3	3
CO3	3	3	2	-	1	-	-	-	-	-	-	-			
CO4	3	3	3	-	-	-	-	-	-	-	-	-			
Correlation levels: 1 – low 2 –medium 3 – high “-“ – no correlation															

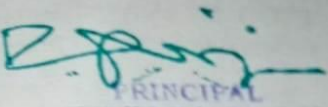
U23PH206 SDG : 4	PHYSICS FOR INFORMATION SCIENCE (Common to CSE&IT)	Category:HSMC			
		L	T	P	C
		3	0	0	3
COURSEOBJECTIVE: 6. Make the students understand the importance in studying electrical properties of materials. 7. Enable the students to gain knowledge in semiconductor physics. 8. Make the students to learn the origin of magnetism in magnetic materials andtheir classifications; to learn the physics of superconductivity and various properties exhibited by superconductors. 9. Make the students to learn the mechanisms of polarization in dielectric materials, and about classification and properties of dielectric materials; familiarize with the optical properties of materials. 10. Inculcate an idea of significance of Nanostructures, quantum confinement, ensuing Nanomaterials preparation and applications.					
UNIT 1	ELECTRICAL PROPERTIES OF MATERIALS				9
Introduction - Classical free electron theory - Expressions for Electrical and Thermal conductivity - Wiedemann-Franz law–Lorentz Number-Quantum free electron theory–Fermi distribution function – Effect of temperature on fermi function-Density of energy states – Carrier concentration in metals - Electron effective mass- concept of hole.					
UNIT 2	SEMICONDUCTOR PHYSICS				9



Elemental and compound semiconductors-Intrinsic semiconductor-carrier concentration derivation – Fermi level – Variation of Fermi level with temperature – electrical conductivity – band gap determination – Extrinsic semiconductor - Derivation of carrier concentration in n-type and p-type semiconductor – variation of Fermi level with temperature and impurity concentration — Hall effect-Determination of Hall coefficient–Applications.		
UNIT 3	MAGNETISM AND SUPERCONDUCTIVITY	9
Origin of magnetic moment – Bohr magneton – Comparison of Dia, Para and Ferro magnetism – Domain theory-Hysteresis-soft and hard magnetic materials-anti-ferro magnetic materials-Ferrites and its applications. Superconductivity: properties – Type I and Type II superconductors – High T _c superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.		
UNIT 4	DIELECTRIC AND OPTICAL PROPERTIES OF MATERIALS	9
Electrical susceptibility – Dielectric constant – Electronic, ionic, orientational and space charge polarization – Frequency and temperature dependence of polarisation – Internal field – Claussius – Mosottirelation(derivation)-Dielectricloss-Lightabsorption-Luminescence,Phosphorsand White LEDs-Birefringence, Dichroism-Electro-optic effect and amplitude modulators.		
UNIT 5	NANO DEVICES	9
Introduction - Quantum confinement – Quantum structures: quantum wells, wires and dots — Band gap of nano-materials - Classification of nanomaterials - Thin Film Growth, Ball Milling, Sol-Gel – Properties and applications – Carbon nanotubes: types and applications.		


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COURSE OUTCOMES:

At the end of the course, students would

CO1: Grasp the fundamental principles of classical and quantum mechanics, semiconductor physics, magnetic properties of materials, dielectric materials, superconducting materials, optical and nano materials and acquire insights into the essentials of emerging engineering materials.

CO2: Demonstrate a comprehensive understanding of classical and quantum mechanics, semiconductor physics, magnetic properties of materials, dielectric materials, and superconducting materials optical and nanomaterials, enabling the adept resolution of practical engineering challenges.

CO3: Apply the foundational theories of classical and quantum mechanics, semiconductor physics, and the properties of magnetic, dielectric, superconducting materials, optical and nano materials to seamlessly integrate knowledge into diverse engineering applications.

CO4: Classify the semiconductor, magnetic, dielectric, and superconducting properties of materials, utilizing this systematic categorization to effectively addressing in eering problems in Material Science.

CO5: Analyze the foundational knowledge of conductors, semiconductors, magnetic, dielectric, superconducting materials, optical and nano materials to formulate and implement solutions for contemporary engineering issues.

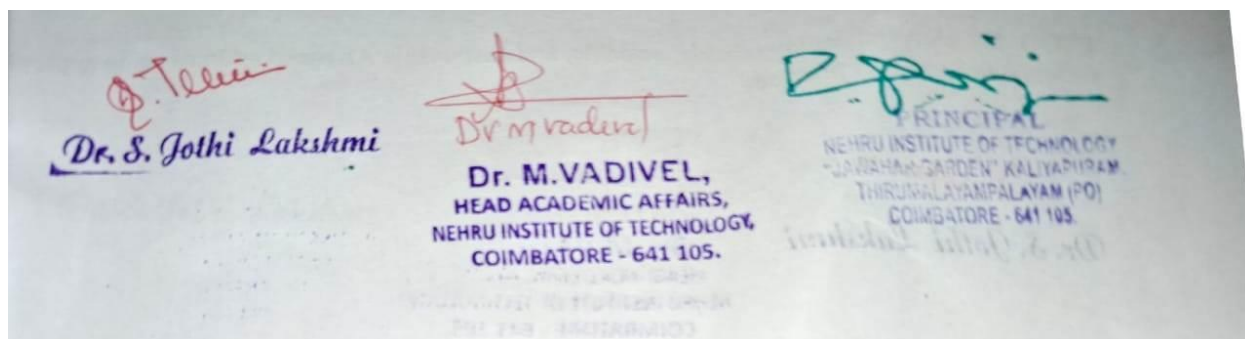
TOTAL:45 PERIODS

TEXT BOOKS:

1. Arumugam.M., Materials Science. Anuradha publishers, 2010.
2. S.O.Kasap.Principles of Electronic Materials and Devices, McGraw Hill Education(Indian Edition), 2020.
3. The Physics and Chemistry of Nano Solids by FrankJ.Owensand CharlesP. pooleJr, Wiley-Interscience,2006

REFERENCES:

1. Palanisamy, P. K. Materials Science. SCITECH Publishers, 2011.
2. Senthilkumar, G. Engineering Physics II. VRB Publishers, 2011.
3. W. Gaddand, D. Bernner, S. L. Solnki & G. J. Infrate (Eds). Handbook of Nanoscience, Engineering & Technology. CRC Press, 2002.
4. Charles Kittel. Introduction to Solid State Physics. Wiley India Edition, 2019.
5. Amnon Yariv & P. Yeh. Photonics: Optical Electronics in Modern Communications. Oxford University Press, 2007.



6. Nanostructure and Nanomaterials: Synthesis, Properties and Applications. Imperial College Press, 2004.

CO's-PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	-	-	-	1	-	-	-	-	1	-	-
CO2	3	2	-	-	1	-	1	-	-	-	-	-	-	-
CO3	3	2	1	-	1	-	1	-	-	1	-	1	-	-
CO4	3	2	1	-	1	-	1	-	-	1	-	1	-	-
CO5	3	2	1	-	1	-	1	-	-	1	-	1	-	-
Correlation levels: 1 – low 2 –medium 3 – high “-“ – no correlation														

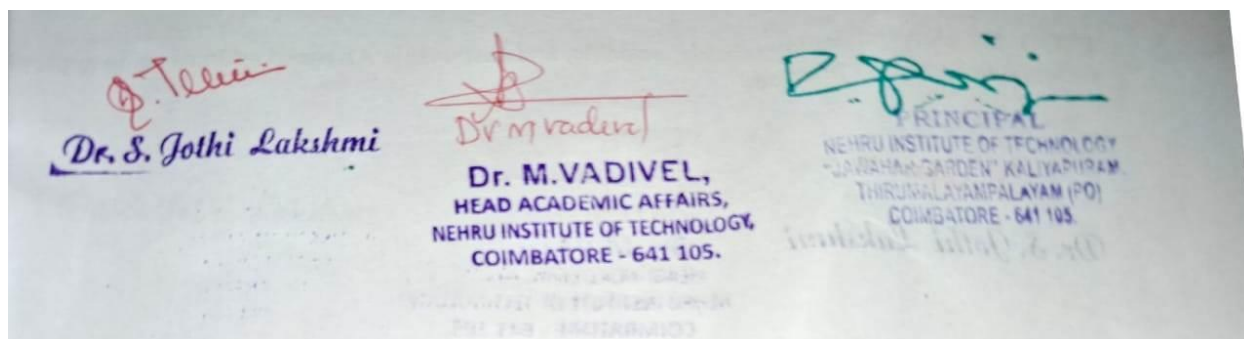
SEMESTER I

U23CS101 SDG: 8	C-PROGRAMMING (Common to CSE &IT)				Category: ESC			
					L	T	P	C
					3	0	0	3

COURSE OBJECTIVE:

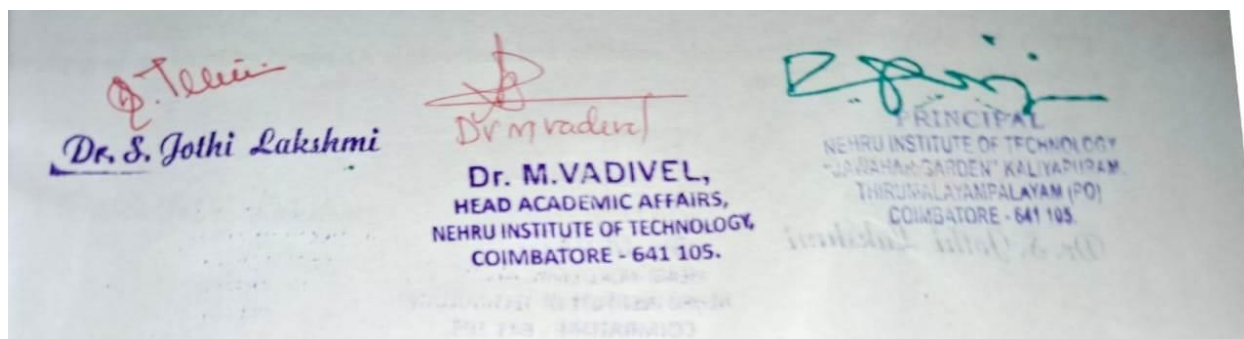
1. To acquire knowledge about the concept of C programming, keywords and operators.
2. To classify the data types, structure of C program, looping statements, arrays and strings.
3. To identify the basics of functions, structures, nested structure and Union.
4. To the concept of searching, recursion and array of structure with dynamic memory allocation
5. To defund the pointers, file fundamentals of sequential, random access file and command line arguments.

UNIT 1	BASICS OF C PROGRAMMING	9
Introduction to Computer and programming paradigms – Applications of C Language - Structure of C program-C programming: Data Types-Constants–Enumeration Constants–Keywords Operators: Precedence and Associativity-Expressions-Input/Output statements, Assignment statements –Decision making statements - Switch statement - Looping statements – Preprocessor directives -Compilation process.		
UNIT 2	ARRAYS AND STRINGS	9
Introduction to Arrays: Declaration, Initialization–One dimensional array–Two dimensional arrays-String operations: length, compare, concatenate, copy–Selection sort, linear and binary search.		
UNIT 3	FUNCTIONS AND POINTERS	9
Modular programming - Function prototype, function definition, function call, Built-in functions (string functions, math functions) – Recursion, Binary Search using recursive functions –Pointers –Pointer operators–Pointer arithmetic–Arrays and pointers–Array of pointers–Parameter passing: Pass by value, Pass by reference.		



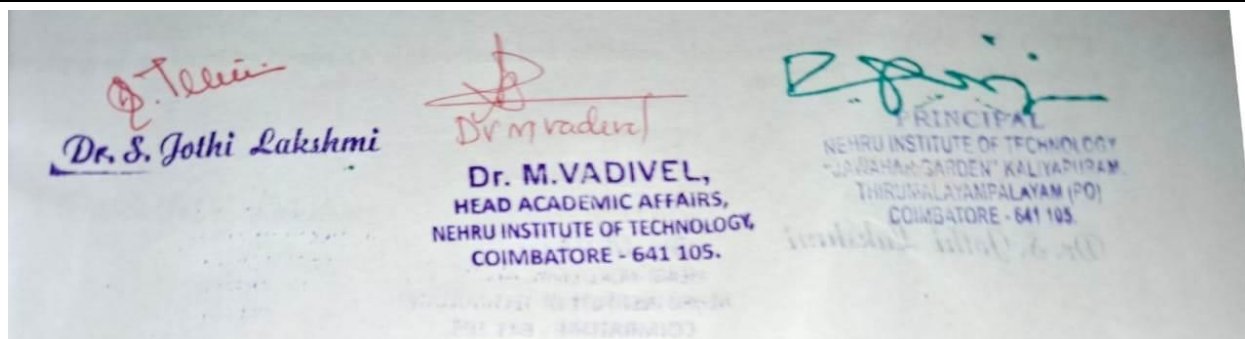
UNIT 4	STRUCTURES AND UNION	9
Structure-Nested structures–Pointer and Structures–Array of structures–Self-referential structures – Dynamic memory allocation - Union - Storage classes and Visibility.		
UNIT 5	FILE PROCESSING	9
Files–Types of file processing: Sequential access, Random access–Sequential access file- Random access file - Command line arguments.		
COURSE OUTCOMES: At the end of the course, students would CO1: Remember the concept of C programming to understand the functional knowledge about operators and the keywords used. CO2: Demonstrate C program for data types, looping & array. CO3: Illustrate the basics for functions, structures, pointers and union. CO4: Make use of the concept to perform the operations dynamic memory allocation, searching and recursion. CO5: Examine the file processing for sequential, random access and command line arguments. TOTAL:45 PERIODS		
TEXT BOOKS: 1. Reema Thareja, “Programming in C”, Oxford University Press, Second Edition, 2016. 2. Kernighan, B.W and Ritchie, D.M, “The C Programming language”, Second Edition, Pearson Education, 2015.		
REFERENCES: 1. Paul Deitel and Harvey Deitel, “C How to Program with an Introduction to C++”, Eighth edition, Pearson Education, 2018. 2. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020. 3. Byron S. Gottfried, “Schaum’s Outline of Theory and Problems of Programming with C”, McGraw-Hill Education, 1996. 4. Pradip Dey, Manas Ghosh, “Computer Fundamentals and Programming in C”, Second Edition, Oxford University Press, 2013. 5. Anita Goeland Ajay Mittal, “Computer Fundamentals and Programming in C”, 1st Edition, Pearson Education, 2013		

CO's-PO's & PSO's MAPPING														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	2	-	2	-	-	-	2	-	-	2	1	2
CO2	2	2	2	-	2	-	-	-	2	-	-	3	2	2
CO3	3	3	2	-	2	-	-	-	2	-	-	2	2	2
CO4	2	2	2	-	3	-	-	-	2	-	-	3	2	2

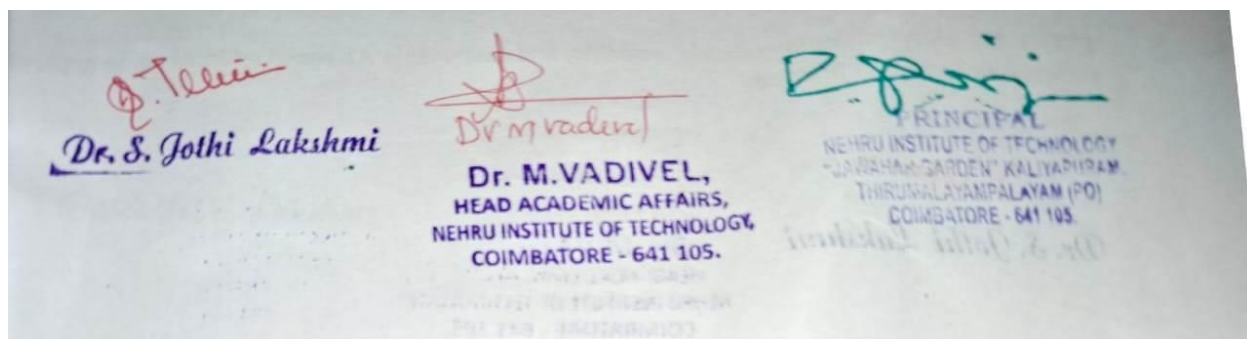


CO5	2	3	3	-	2	-	-	-	2	-	-	2	2	3
Correlation levels: 1 – low 2 –medium 3 – high “-“ – no correlation														

U23HS101	HERITAGE OF TAMIL (Common to all Branches)	Category: HSMC			
		L	T	P	C
		1	0	0	1
COURSEOBJECTIVE: 1. To learn the extensive literature of classical Tamil. 2. To review the fine arts heritage of Tamil culture. 3. To realize the contribution in Indian freedom struggle					
UNIT 1	LANGUAGE AND LITERATURE				3
Language Families in India - Dravidian Languages – Tamil as a Classical Language – Classical LiteratureinTamil–SecularNatureofSangamLiterature–DistributiveJusticeinSangamLiterature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land-BakthiLiteratureAzhwarsandNayanmars-FormsofminorPoetry-DevelopmentofModern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.					
UNIT 2	HERITAGE-ROCKARTPAINTINGSTOMODERNART–SCULPTURE				3
Hero stone to modern sculpture -Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.					
UNIT 3	FOLK AND MARTIAL ARTS				3
Therukoothu, Karagattam, VilluPattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.					



UNIT 4	THINAI CONCEPT OF TAMILS	3
Flora and Fauna of Tamils & AhamandPuram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.		
UNIT 5	CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE	3
Contribution of Tamils to Indian Freedom Struggle-The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.		
COURSE OUTCOMES: At the end of the course, students would CO1: Remember the extensive literature of tamil and its classical nature, musical instruments, Folk, thinai concept, Indian Freedom Struggle& Aham, Puram and Aram Concept. CO2: Remember the principles in Thirukural, Bakthi Literature Azhwars and Nayanmars , heritage of sculpture, painting and musical instruments of ancient people, victory of chozha dynasty. CO3: Understand on folk and martial arts of tamil people, Justice in Sangam Literature, Development of Modern literature in Tamil, Making of musical instruments. CO4: Understand the role of Temples in Social and Economic Life of Tamils, Ancient Cities and Ports of Sangam Age, Conquest of Cholas. CO5: Understand the Cultural Influence of Tamils over the other parts of India, contribution of Tamils self-esteem movement and siddha medicine, Print History of Tamil Books.		
TOTAL:15 PERIODS		
TEXT BOOKS: 1. தமிழ் வரலாறு – மக்கள் பண்பாடுகள் (வாய்ப்பாடு): தமிழகப்பாடல்கள் மற்றும் கலைப்பணிகள்கழகம் 2. கணினித்தமிழ் – பயன்பாடு மற்றும் இலக்கணம் (அடிப்படைப்பரிமாணம்) 3. தமிழ் மொழிவளர்ச்சி – நகரங்களின் உருவாக்கம் மற்றும் சங்ககால நகரநாகரிகம் (வாய்ப்பாடு)		



REFERENCES:

1. Social Life of Tamils (Dr. K. K. Pillay) A joint publication of TNTB & ESC and RMRL(in print)
2. Historical Heritage of the Tamils (Dr. S. V. Subaramanian, Dr. K. D. Thirunavukkarasu)
(Published by: International Institute of Tamil Studies).
3. The Contributions of the Tamils to Indian Culture (Dr. M. Valarmathi) (Published by: International Institute of Tamil Studies)
4. 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)
5. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)

CO's-PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5	-	-	-	-	-	-	3	3	-	2	-	3	-	-
Correlation levels: 1 – low 2 –medium 3 – high “-“ – no correlation														

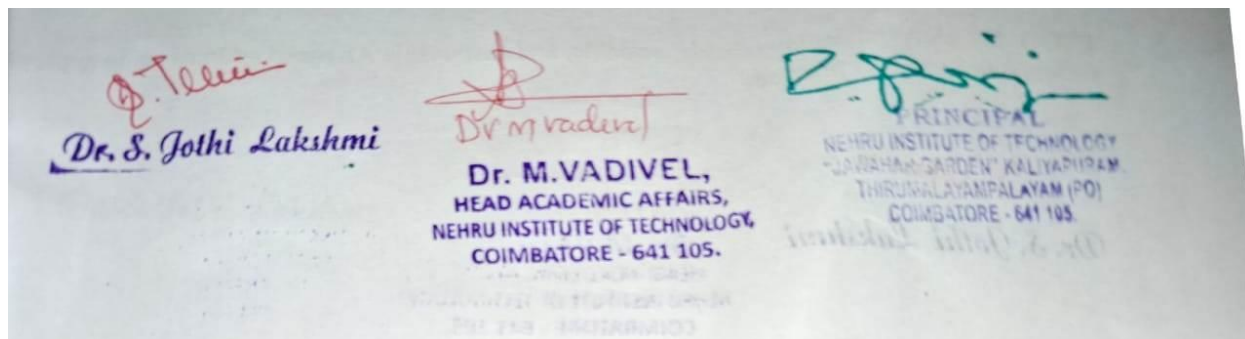
U23IT101 SDG: 4	APPLICATION DESIGN AND DEVELOPMENT				Category: HSMC			
					L	T	P	C
					3	0	2	4

COURSE OBJECTIVE:

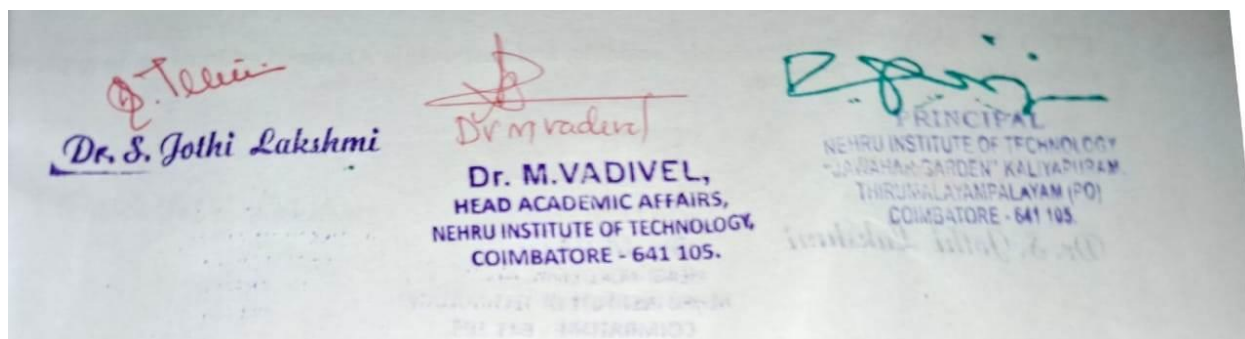
1. To study HTML, CSS and JavaScript concepts to develop dynamic web pages
2. To learn GIT and GIT HUB repository and to apply the version control concepts
3. To understand MIT app inventor to develop mobile applications
4. To learn Construct 2 tool to develop gaming applications and blender tools to edit images and videos

UNIT 1	HTML AND CSS	9
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Software Development: SDLC (Waterfall Model)- Phases Methods and Practices-Introduction to web-Standards and Terminologies.HTML.: Introduction and versions-HTML 5-standards and tags-Head and Body-



List-Labels-Tables-Forms-Videos and Audios-Figure, Figure Captions, Images CSS: Introduction-Embedded Types-CSS Selectors-Borders, Margins, Paddings-Colors and Backgrounds- Introduction to Bootstrap-Tailwind CSS		
UNIT 2	INTERACTIVE WEB DESIGN USING JAVASCRIPT	9
Introduction-Java Script adding Techniques-Variables and Operators- Conditional and Control Statements- Data Types and Functions-Events-Form Validation-Page Redirect-Java Script Exception Handling-Document Object Model (DOM)		
UNIT 3	GIT, GIT HUB AND SHELL SCRIPTING	9
Introduction to Git and GitHub-Terminologies-Local Repository Actions- Remote Repository Actions Advanced Repository Actions-Branching-Merging-Software Development Communities: Google Developers Group, Google Student Developers Community, Linux Developer Community, Stack Overflow, Kaggle Shell Scripting: Processing (PS) and Listing (LS)- File Creations and Handling-Users and Groups		
UNIT 4	MOBILE APPLICATION DEVELOPMENT WITH MITAI	9
Listening–watching videos / documentaries and responding to the questions based on them, Scientific lectures; and educational videos. Speaking–Small Talk; Mini presentations (Activity)-Reading– Journal reports, predicting content of reading habits, Reading articles (Activity) -Writing –Memos to colleagues or friends; Opinion Blogs; Grammar –Articles; Pronouns –Possessive & Relative pronouns, Cause and Effect.		
UNIT 5	TEMPLATE DRIVEN APPLICATIONS AND MULTIMEDIA	9
Content Management System: Dynamic content-Web flow Collection fields Search Engine Optimization, Multimedia: Design with Canva and Blender- Image and Video Editing Game Development with Construct 2		
COURSE OUTCOMES: At the end of the course, students would CO1: Utilize HTML5 and CSS to develop responsive web CO2: Create Interactive web applications using java script CO3: Analyze and apply GIT and GIT HUB operations and advanced repository actions CO4: Create mobile applications using MIT app inventor CO5: Create simple game applications using Construct TOTAL:45 PERIODS		

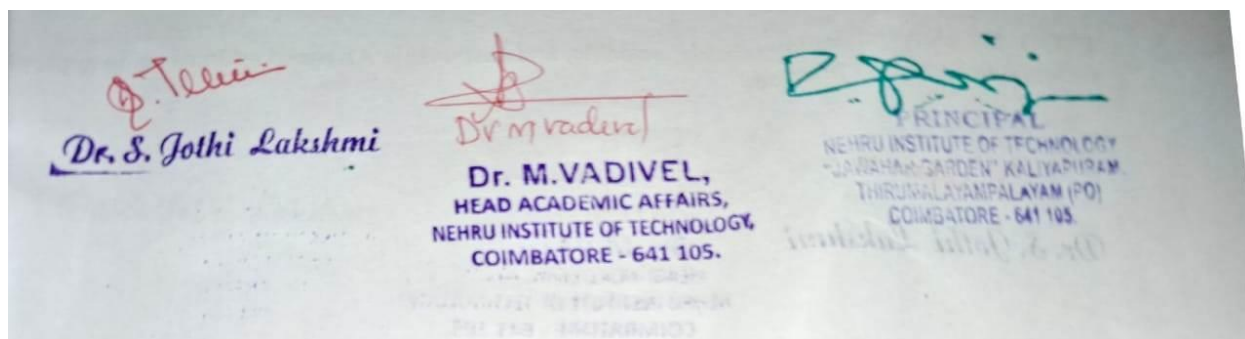


LIST OF LABORATORY EXPERIMENTS:

1. Develop a visually appealing static website with an intuitive user interface with multimedia content such as text, images and videos using HTML, CSS and JavaScript
2. Create a simple form to collect the name, address, email ID and phone number from the user and use JavaScript to validate each field before submitting the form
3. Create an interactive quiz that allows the user to select answers to multiple-choice questions. Use JavaScript to calculate the user's score and provide feedback based on their performance
4. Create a simple animation using CSS and JavaScript. Use CSS to define the animation's properties, such as duration and timing and use JavaScript to trigger the animation in response to user input or other events.
5. Create a local repository using Git and perform basic operations such as initializing the repository, adding files, committing changes, creating and managing multiple branches to organize and track changes
6. Create a shell script that can automate file management tasks such as processing, listing, creation and handling of files and user and group management tasks
7. Develop mobile applications using MITAI (Simple calculator, Step counter, Weather app that retrieves current weather information from an API, Talk to Me, TranslationApp)
8. Design a poster for an event using Canva templates graphic using Canva tools to present data and information
9. Create a visual infographic using Canva tools to present data and information
10. Develop a simple 2D game using Construct visual interface and event system
11. Model a 3D object using Blender modelling tools and techniques
12. Animate a short scene or character using Blender animation tools and timeline.

TOTAL:30PERIODS**TEXT BOOKS:**

1. Internet & World Wide Web How to Program, 5th edition, by Paul Deitel Harvey Deitel, Abbey Deitel, Pearson Publication, 2018.
2. App Inventor 2: Create Your Own Android Apps 2nd Edition by David Wolber, Hal Abelson, Ellen Spertus, Liz Looney, 2014.

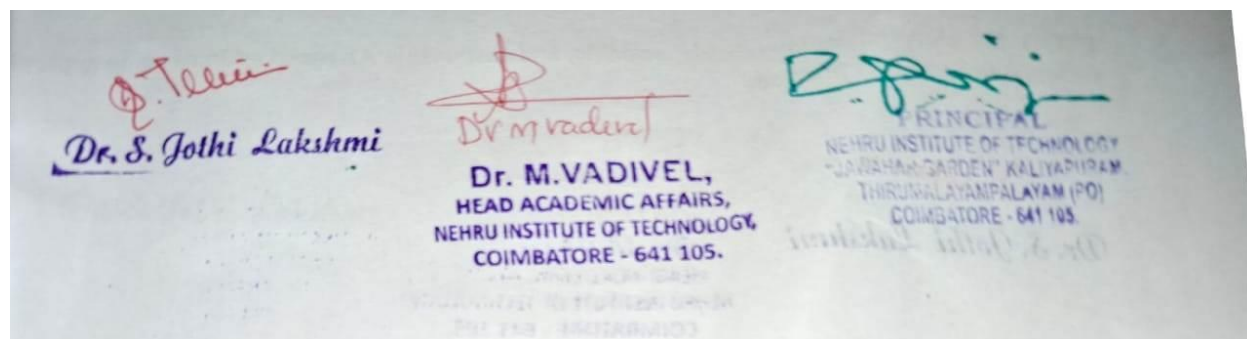


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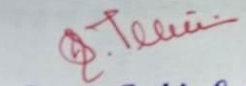
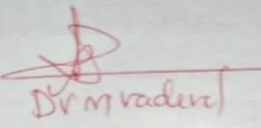
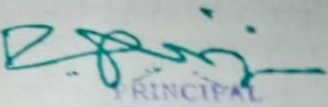
1. CS50's Web Programming <https://cs50.harvard.edu/web/2020> with Python and JavaScript
2. Get Coding! Learn HTML, CSS & JavaScript & Build a Website, App & Game - by Young Rewired State, Walker Books, 2016.
3. Version Control with Git, by Jon Loeliger, Matthew McCullough, 2nd Edition, 2012
develop responsive web Utilize HTML5 and CSS to [4h/amigoscode.com/p/git-githubsera.org/learn/html-css-javascript-for-web-developers](https://4h.amigoscode.com/p/git-githubsera.org/learn/html-css-javascript-for-web-developers)

CO's-PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	2	-	2	-	-	-	2	-	-	2	1	2
CO2	2	2	2	-	2	-	-	-	2	-	-	3	2	2
CO3	3	3	2	-	2	-	-	-	2	-	-	2	2	2
CO4	2	2	2	-	3	-	-	-	2	-	-	3	2	2
CO5	2	3	3	-	2	-	-	-	2	-	-	2	2	3
Correlation levels: 1 – low 2 –medium 3 – high “-“ – no correlation														



U23EN102 SDG: 4	EFFECTIVE ENGLISH FOR ENGINEERS(Common to all Branches)	Category: HSMC			
		L	T	P	C
		2	0	2	3
COURSEOBJECTIVE: 1.To enable learners of engineering and technology to develop their basic communication skills in English. 2.To acquire, command in both the respective skills (listening and reading) and the productive skills (writing and speaking) of the English language. 3.To understand the key concepts of values, life skills and business communication and motivate students to look within and create a better version of themselves. 4.To focus on the development of basic fluency in English, usage of vocabulary in the technical field, and strengthening reading and official written communication skills. 5. Touse language efficientlyinexpressingtheiropinionsviaavarioumedia.					
UNIT 1	INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION				6
Listening -Gap-Fill listening, Introducing a classmate (Activity) Speaking - Making telephone calls, Self Introduction.Reading - Reading brochures (technical context)- Social media messages relevant to technical contexts.Writing - Writing oneself, Writing Definition; Jumbled sentences.Grammar – Simple present tense, Present continuous, Present perfect, Present perfect continuous; Question types: Wh/ Yes or No/ and Tags; One-word substitution.					
UNIT 2	NARRATION AND SUMMATION				6
Listening - Listening to documentaries, Interviews with celebrities. Speaking - Narrating personal experiences, Publick speaking (Activity).Reading -Biographies, Newspaper reports. Writing - Paragraph writing, Report Writing (Project Survey Report).Grammar – Simple past tense, Past continuous, Past perfect, Past perfect continuous, Subject-Verb Agreement, Word forms (prefixes& suffixes), Error Correction.					
UNIT 3	DESCRIPTION OF PROCESS / PRODUCT				6
Listening - Listen to product and process description - product advertisements. (Activity).Speaking – Picture description, Instructions to use the product: explaining uses and purposes.Reading – Reading gadget reviews: finding key information from a given text.Writing – Instructions, Process description.Grammar - Simple future tense, Future continuous, Future perfect, Future perfect continuous, Adjectives: Degrees of comparison, Compound Words.					
UNIT 4	CLASSIFICATIONANDRECOMMENDATIONS				6


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Listening –Listening to lectures & educational videos.

Speaking – Small Talk: Discussing & making plans- Talking about tasks-talking about travel preparations.

Reading –Reading articles (Activity), Data interpretation (Tables, pie chart and Bar chart).

Writing –Memos to colleagues or friends, Recommendations.

Grammar – Articles, Pronouns: Possessive & Relative pronouns, Cause and Effect

UNIT 5	EXPRESSION	6
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Listening – Listening to discussions: panel discussions.

Speaking –Making predictions, Talking about a given topic & giving opinion.

Reading – Reading editorials, Reading excerpts of interviews with professionals (Activity)

Writing – Creative Writing, Checklist.

Grammar –Punctuation, Homonyms & Homophones, Simple, Compound & Complex Sentences.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Remember the meanings of commonly used words and phrases in academic and professional contexts.

CO2: Understand the basics of listening and interpret key ideas and supporting details from academic and professional audio content

CO3: Understand the fundamental grammatical structures and use them to interpret the meaning and function of sentences in technical and academic contexts.

CO4: Apply descriptive, narrative, and expository writing and speaking techniques to communicate effectively on various real-life and academic topics.

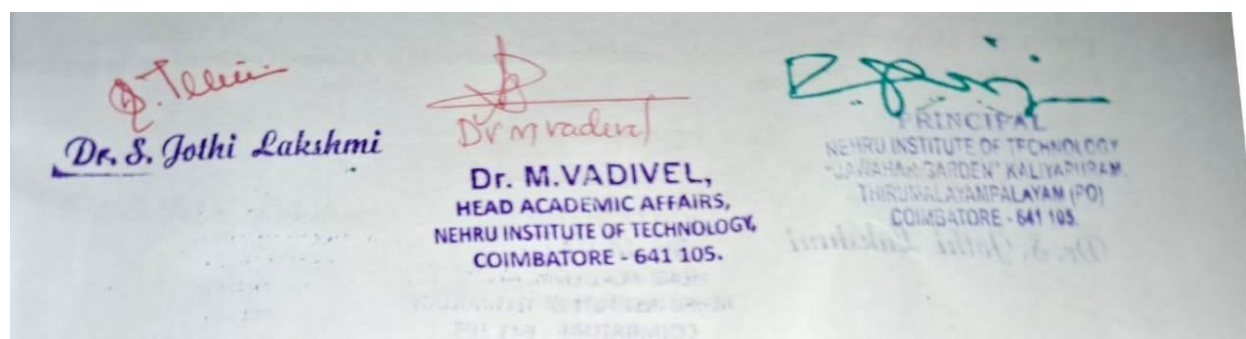
CO5: Analyse the structure and organization of academic and professional texts to interpret meaning effectively through reading skills

TOTAL:30 PERIODS

LAB COMPONENTS: 30 HOURS

USING DLM SOFTWARE

S.NO	LIST OF EXPERIMENTS
1.	Listening; Conversation with friend.



2.	Self-Introduction
3.	Listening to telephonic Conversation
4.	Narrating personal experiences
5.	Listening to Lectures
6.	Presenting a given topic

TEXT BOOKS:

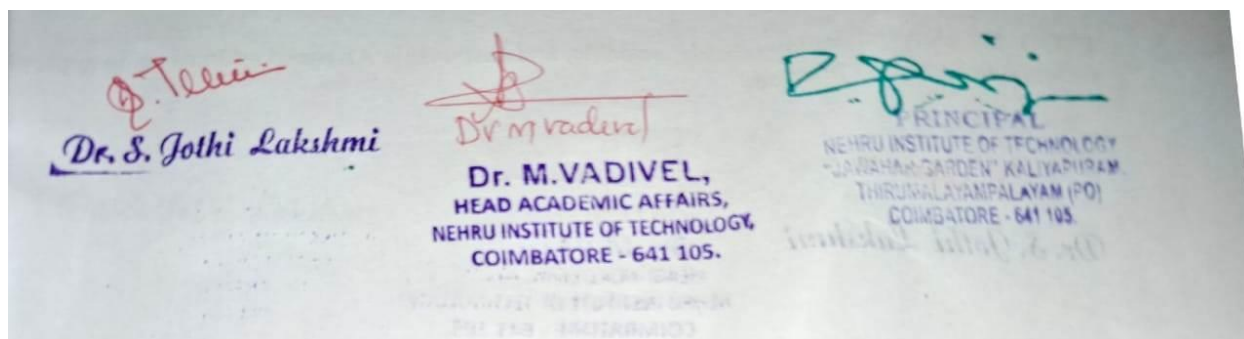
1. English for Engineers & Technologists Orient Blackswan Private Ltd. Department of English, Anna University (2020 edition).
2. English for Science & Technology Cambridge University Press, 2021. Authored by Dr.VeenaSelvam, Dr.Sujatha Priyadarshini, Dr.Deepa Mary Francis, Dr.KN.Shoba and Dr.Lourdes Jeevani, Department of English, Anna University.

REFERENCES:

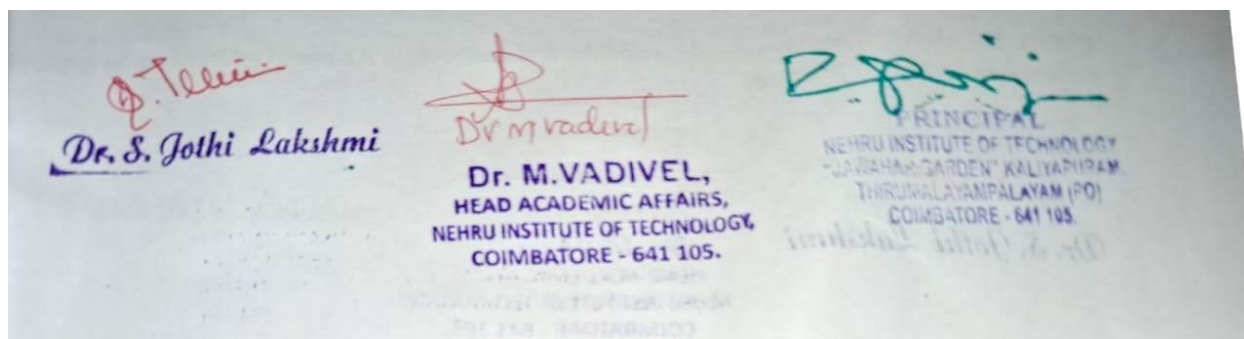
1. Technical Communication – Principles and Practices By Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2016, New Delhi.
2. A Course Book on Technical English by Lakshmi Narayanan, Scitech Publications (India) Pvt.Ltd.
3. English for Technical Communication (with CD) by Aysha Viswamohan, McGraw-Hill Education, ISBN:0070264244.
4. Effective Communication Skill, Kulbhusan Kumar, RSSalaria, Khanna Publishing House. Learning to Communicate – Dr.V.Chellammal, Allied Publishing House, New Delhi, 2003.

CO's-PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	-	-	-	-	-	1	-	2	3	-	2	-	-
CO2	1	-	-	-	-	-	1	-	3	3	-	3	-	-
CO3	1	-	-	-	-	-	1	-	3	3	-	3	-	-
CO4	1	-	-	-	-	-	2	-	3	3	-	2	-	-
CO5	1	-	-	-	-	-	2	-	3	3	-	3	-	-
Correlation levels: 1 – low 2 – medium 3 – high “-“ – no correlation														



U23BS111 SDG:4	BASICS SCIENCE LABORATORY	Category: BSC			
		L	T	P	C
		0	0	4	2
COURSE OBJECTIVE: COURSE OBJECTIVE: 1. Realize the fundamental engineering ideas of matter, optics, heat, sound, and quantum theory. 2. Demonstrate a solid understanding of fundamental matter properties, Laser and Fiber optics classification, Quantum concepts and apply them successfully to solve practical engineering problems. 3. Apply the elastic modulus theory, Fiber Optic Sensors, Ultrasonics and thermal applications to integrate knowledge and problem solve at an advanced level. 4. Categorize the Elastic module concepts, Fiber optic lasers and Crystal structures to implement in Engineer problems in Material Science and electronics. 5. Analyse the foundational Quantum and Crystal Physics concepts to implement solutions for modern engineering problems.					
PHYSICS-LIST OF EXPERIMENTS(Any 5 Experiments) 1. Determination of rigidity modulus–Torsion pendulum 2. Determination of Young’s modulus–Nonuniform bending method.					



3. Determination of Young's modulus-Uniform bending method.
4. Determination of thickness of a thin wire-Air wedge method.
5. Determination of the wavelength of the laser using grating.
6. Determination of Numerical Aperture and acceptance angle using Optical fibre.
7. Determination of velocity of sound and compressibility of liquid-Ultrasonic interferometer.
8. Determination of thermal conductivity of a bad conductor-Lee's Disc method.
9. Melde's string experiment.
10. Determination of Band gap of a semiconductor.

CHEMISTRY- LIST OF EXPERIMENTS (Any 5 Experiments)

1. Estimation of total, temporary and permanent hardness of water by EDTA method.
2. Estimation of alkalinity of the given water sample.
3. Determination of chloride content of water sample by Argentometric method.
4. Determination of strength of given hydrochloric acid using pH meter
5. Determination of DO content of water sample by Winkler's method.
6. Conductometric titration strong acid Vs Strong Base.
7. Estimation of BOD of the given water sample.
8. Estimation of iron content of the given solution using potentiometer.
9. Estimation of Iron content by spectrophotometer.
10. Estimation of sodium present in water using flame photometer.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Apply Physics principles of elasticity to evaluate engineering properties of materials.

CO2: Analyze the physical principles involved in various instruments in acoustics, optics, and thermal physics.

CO3: Characterize the quality of water samples with respect to their acidity, alkalinity, and hardness.

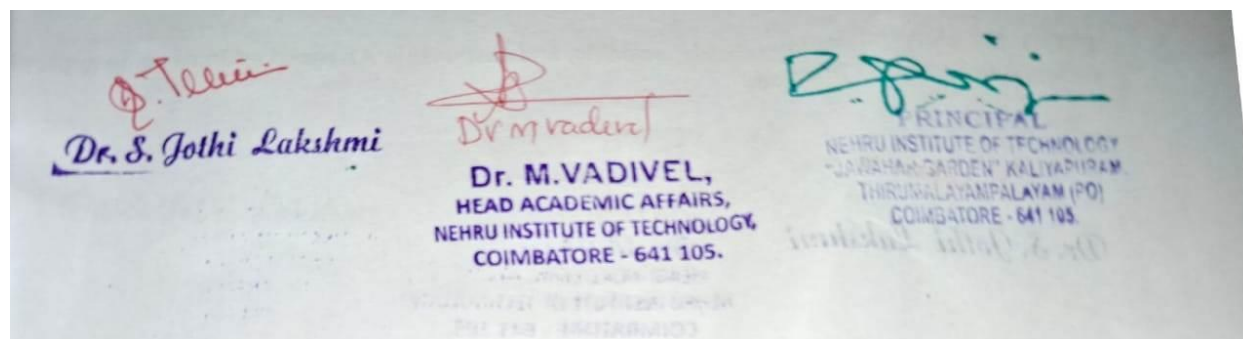
CO4: Apply Chemistry principles to evaluate DO, BOD, and Iron content of the given samples.

CO5: Analyze the strength and amount of acids using pH meter, potentiometer, and conductivity meter, and determine the amount of chloride and sodium ions using Argentometric method and flame photometer for the given solution.

TOTAL: 60 PERIODS

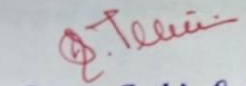
CO's-PO's & PSO's MAPPING

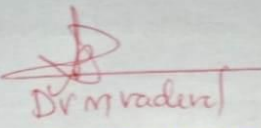
PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
3	2	1	1	-	-	1	-	1	-	-	-	-
3	2	1	1	-	-	1	-	1	-	-	1	-
3	2	1	1	-	-	1	-	1	-	-	-	-
3	2	1	1	-	-	1	-	1	-	-	1	-

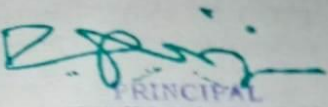


3	2	-	1	-	-	1	-	1	-	-	1	-
Correlation levels: 1 – low 2 –medium 3 – high “-“ – no correlation												

U23CS111 SDG: 4	C-PROGRAMMING LABORATORY	Category: ESC			
		L	T	P	C
		0	0	4	2
COURSEOBJECTIVE: 1. To familiarize students with C programming constructs. 2. To develop programs in C using basic constructs. 3. To develop programs in C using arrays. 4. To develop applications in C using strings, pointers, and functions. 5. To develop applications in C using structures.					


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6. To develop applications in C using file processing.

LIST OF EXPERIMENTS

1. Writing algorithms, flowcharts, and pseudocodes for simple problems.
2. Programs on expressions and conversions.
3. Programs using if, if-else, switch, and nested if statements.
4. Programs using while, do-while, and for loops.
5. Programs on one-dimensional arrays, passing arrays to functions, and array operations.
6. Programs using two-dimensional arrays and passing 2D arrays to functions.
7. Programs using string functions.
8. Programs using function calls, recursion, and call by value.
9. Programs on pointer operators, call by reference, and pointers with arrays.
10. Programs using structures and unions.
11. Programs on file operations and file modes.
12. Working with text files, random access files, and binary files.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Demonstrate knowledge of C programming constructs.

CO2: Develop programs in C using arrays.

CO3: Develop applications in C using strings, pointers, and functions.

CO4: Develop applications in C using structures.

CO5: Develop applications in C using file processing.

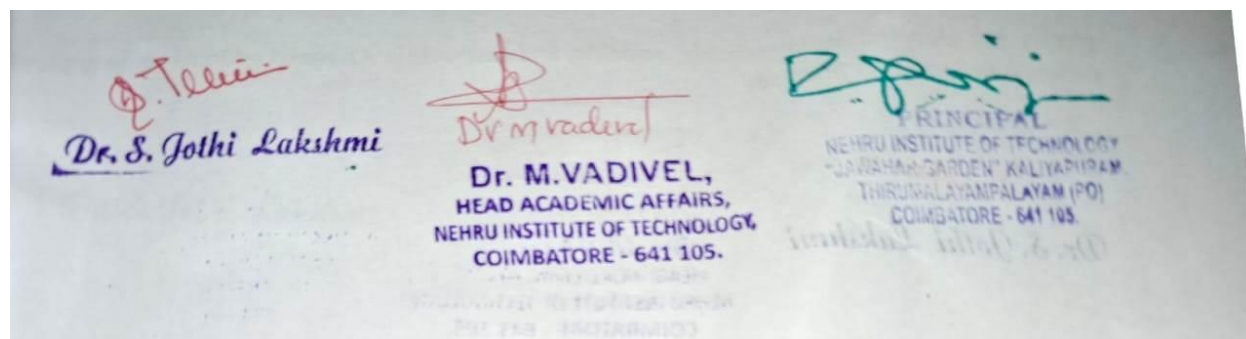
TOTAL:60 PERIODS

CO's-PO's & PSO's MAPPING

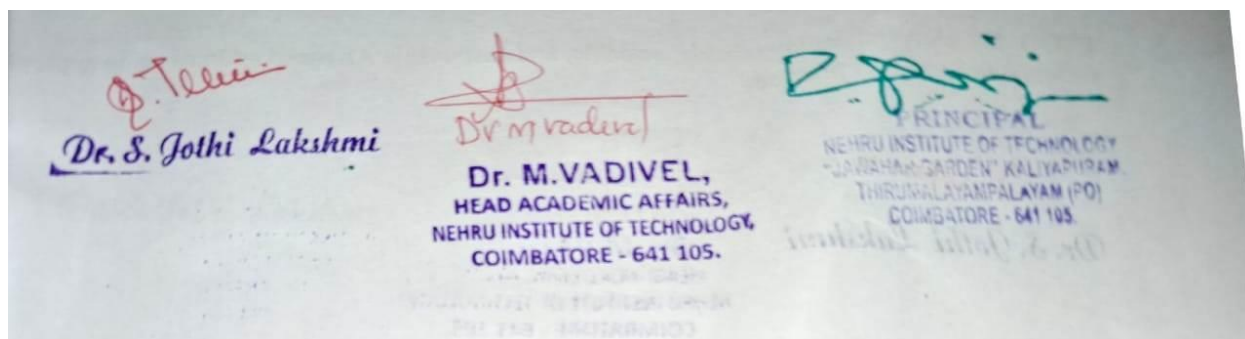
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	1	1	1	-	-	2	-	2	2	2	2
CO2	3	2	2	2	1	1	-	-	2	-	2	2	3	3
CO3	3	2	3	2	1	2	-	-	2	-	2	2	2	2
CO4	3	2	2	2	1	2	-	-	3	-	2	3	3	3
CO5	3	2	3	1	1	2	-	-	3	-	2	3	2	3

Correlation levels: 1 – low 2 –medium 3 – high “-“ – no correlation

U23EE101 SDG: 17	CAREER ENHANCEMENT TRAINING (Common to all Branches)	L	T	P	C
		3	0	0	1



COURSE OBJECTIVE:		
1. To improve mathematical and analytical abilities of students, particularly in the context of comprehending engineering concepts and making data-driven decision. 2. To develop critical thinking skills including problem solving, logic, patterns, and reasoning. 3. To Comprehend and appreciate mathematical terminologies and concepts in order to understand, interpret, and represent science and technology.		
UNIT 1	FUNDAMENTALS	6
Divisibility Test-Square root and Cube roots-HCF & LCM-problems on Numbers		
UNIT 2	ALGEBRA	5
Simplification-Surds & Indices-Linear & Quadratic Equations		
UNIT 3	BANKING ESSENTIALS	8
Average-Percentage-Profit & Loss-Simple Interest-Compound Interest		
UNIT 4	TIME AND EFFICIENCY	8
Time Speed Distance-Problems on Trains-Boats & Streams-Time & Work-Pipes & Cisterns		
UNIT 5	LOGICAL REASONING	3
Number & letter series -Analogy-Pattern classification-Coding & Decoding		
COURSE OUTCOMES: At the end of the course, students would CO1: Exhibit a clear understanding of fundamental concepts of aptitude for engineering. CO2: Demonstrate problem-solving skills and critical thinking abilities in the context of recruitment aptitude tests. CO3: To use appropriate strategies and shortcuts to improve speed and accuracy in solving aptitude problems during recruitment processes. CO4: Evaluate and interpret aptitude test results to identify areas of improvement and develop a personalized study plan for further enhancement.		
TOTAL: 30 PERIODS		
TEXT BOOKS: 1. The Pearson Guide to Quantitative Aptitude for Competitive Examinations, Dinesh Khattar. Pearson 2. Quantitative Aptitude Dr. R.S. Aggarwal S. Chand Publication. 3. A modern Approach to Verbal and Non-Verbal Reasoning R.s. Aggarwal.		
REFERENCES: 6. Quantitative Aptitude for CAT, Arun Sharma. 7. Fast Track Objective Arithmetic, Rajesh Verma, Arihant Publication. 8. Quantitative Aptitude Quantum CAT Common Admission Tests for Admission into IIMs,		

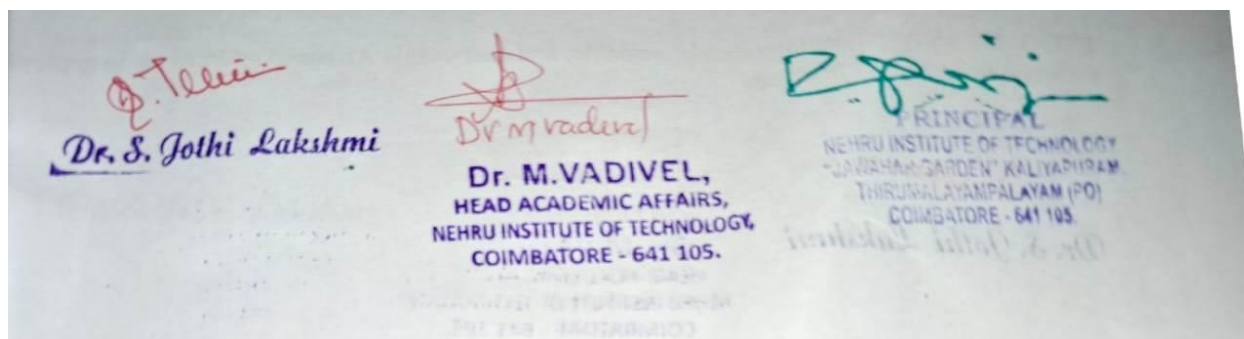


Sarvesh K. Verma.

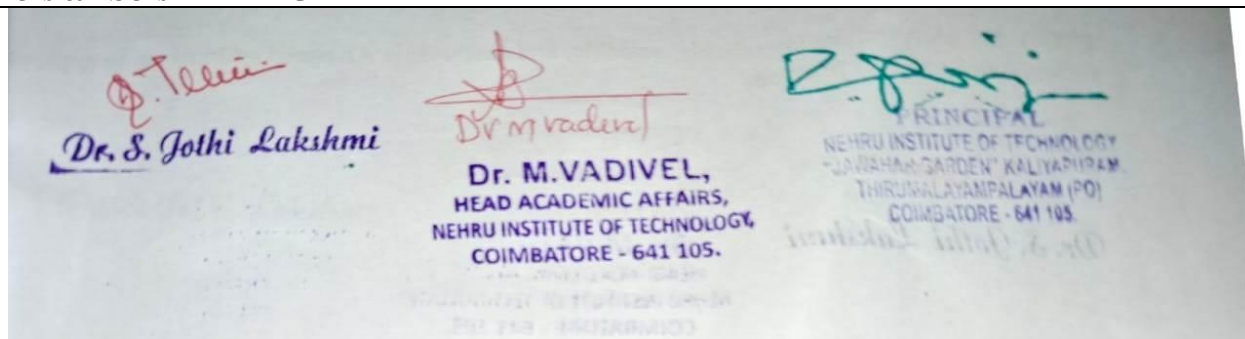
9. Effective Communication Skill, Kulbhusan Kumar, R S Salaria, Khanna Publishing House.

10. Wiley's Exam Expert Quantitative Ability for CAT, 2ed, Ashu Jain.

U23CY101 SDG: 9	ENGINEERING CHEMISTRY (Common to all Branches)	Category: BSC			
		L	T	P	C
		3	0	0	3
COURSE OBJECTIVE: 1. Learn boiler feed water requirements, and water treatment techniques. 2. To acquire knowledge about the preparation, properties and applications of polymers. 3. Understand the basic concepts of electro chemistry and its applications. 4. Learn corrosion control and protective techniques. 5. Acquire the knowledge about the fuels and properties of energy storage devices.					
UNIT 1	WATER TECHNOLOGY				9
Introduction - Sources of water - Impurities in water - Types of water –Hardness of water - Expression of hardness - Units of hardness - Estimation of hardness of water by EDTA method - Disadvantages of using hard water-Boiler troubles-Scale and sludge-Softening of water-External treatment method-Demineralization process-Internal treatment process–Carbonate, Phosphate and Calgon conditioning Desalination by reverse osmosis method.					
UNIT 2	POLYMERS				9
Introduction: Classification of polymers – Natural and synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerization. Types: Addition, condensation and copolymerization and mechanism of Addition polymerization (Free Radical); Techniques of polymerization: Bulk, emulsion, solution and suspension. Preparation, properties and uses of Nylon (6,6 and 11) and Epoxy resin. Engineering application of plastics- PVC, PTFE and Bakelite. Types of compounding Of plastics- Moulding, injection moulding.					
UNIT 3	ELECTROCHEMISTRY				9
Electrochemistry: Introduction-Cells-Representation of a galvanic cell-Reversible and irreversible cells - Electrode potential - Nernst equation - Reference electrode (Calomel electrode) - Standard hydrogen electrode-Glass electrode-Electro chemical series and its applications –Battery: Introduction, Types of batteries-alkaline battery-lead storage battery-H ₂ -O ₂ fuel cell- applications. Construction of solar cells and E-Vehicle.					
UNIT 4	CORROSION AND ITS CONTROL				9

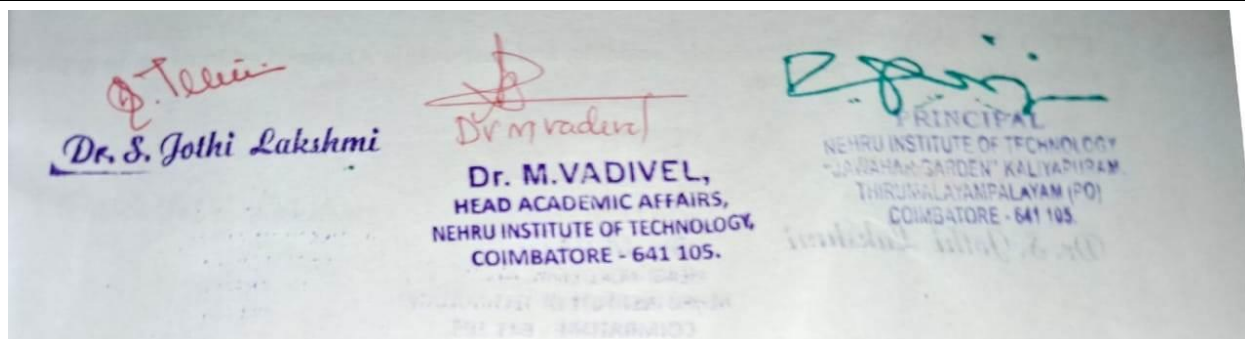


Introduction - Chemical corrosion and Wet corrosion - Galvanic and differential aeration (Pitting, Crevice and Pipeline) - Factors influencing rate of corrosion - Corrosion- causes- factors- corrosion control materials election and design aspects-electro chemical protection–sacrificial anode method and impressed current cathodic method-Cathodic protection method.		
UNIT 5	FUELS AND COMBUSTION	9
Introduction - Classification of fuels - Requirements of a good fuel – Combustion: Principle of combustion- Calorificvalue-Grossandnetcalorificvalues-Explosiverange-Spontaneousignition temperature. Fuels: Solid fuels - Coal and its varieties - Proximate analysis - Significance – Metallurgical coke-Otto-Hoffman by product method- Liquid fuel: Manufacture of synthetic petrol-Bergius method- Knocking- Octane number- Cetane number- Gaseous fuel: Liquefied petroleum gas (LPG), Compressed natural gas (CNG).		
COURSE OUTCOMES: At the end of the course, students would CO1: Recall the concept about water technology, engineering polymers, electrodes, corrosion and combustion of fuels. CO2: Understand the boiler problems and categorize the polymers. CO3: Classify plastics, batteries, corrosion, and the calorific value of fuels. CO4: Apply enough knowledge of contemporary water softening, polymerization, fuel cell, electrochemical protection, and fuel manufacturing procedures. CO5: Analyze the hardness of water using the EDTA technique and characterization of coal. TOTAL:45 PERIODS		
TEXT BOOKS: 1. Jain P C and Monica Jain, “Engineering Chemistry”, 17th Edition, Dhanpat Rai Publishing Co., 2018. 2. Sivasankar B., “Engineering Chemistry”, Tata Mc Graw-Hill Publishing Company Ltd, New Delhi, 2017.		
REFERENCES: 11. B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, “Textbook of nanoscience and nanotechnology”, Universities Press-IIM Series in Metallurgy and Materials Science, 2018. 12. O.G.Palanna, “EngineeringChemistry”McGrawHillEducation(India)PrivateLimited,2nd Edition, 2017. 13. FriedrichEmich, “EngineeringChemistry”,ScientificInternationalPvt,Ltd,NewDelhi,2017. 14. ShikhaAgarwal, “EngineeringChemistry-Fundamentalsand Applications”,Cambridge University Press, Delhi, Second Edition, 2019. 15. R.D.Madan, “ModernInorganicChemistry”,S.Chand,NewDelhi,2012 16. S.S.Dara, “ATextbook ofEngineeringChemistry”,S.ChandPublishing,12 th Edition, 2018.		

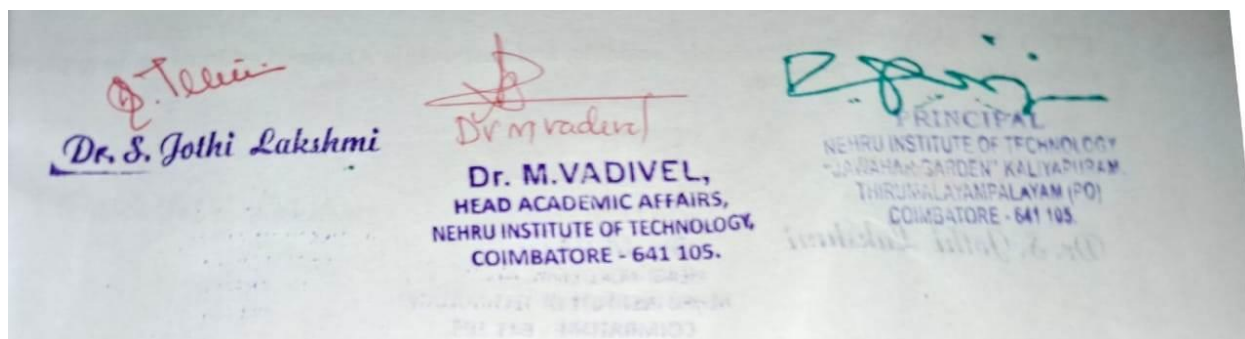
CO's-PO's & PSO's MAPPING


CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	2	-	-	2	-	-	-	-	1	-	-
CO2	3	-	-	2	2	-	2	-	-	-	-	2	-	-
CO3	3	-	-	2	2	-	2	-	-	-	-	2	-	-
CO4	3	-	-	2	3	-	2	-	-	-	-	3	-	-
CO5	3	-	-	2	3	-	2	-	-	-	-	3	-	-
Correlation levels: 1 – low 2 –medium 3 – high “-“ – no correlation														

U23HS202	TAMIL AND TECHNOLOGY	Category:HSMC			
		L	T	P	C
		1	0	0	1
COURSEOBJECTIVE: 1. To learn the extensive literature of classical Tamil. 2. To review the fine arts heritage of Tamil culture. 3. To realize the contribution in Indian freedom struggle.					
UNIT 1	TAMIL AND TECHNOLOGY				3
Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.					
UNIT 2	DESIGN AND CONSTRUCTION TECHNOLOGY				3
Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age– Details of Stage Constructions in Silappathikaram– SculpturesandTemplesofMamallapuram-GreatTemplesofCholasandotherworshipplaces-Temples ofNayakaPeriod-Typestudy(MaduraiMeenakshiTemple)-ThirumalaiNayakarMahal-ChettiNadu Houses,Indo–SaracenicarchitectureatMadrasduringBritish Period.					
UNIT 3	MANUFACTURING TECHNOLOGY				3
Art of Ship Building-Metallurgical studies-Iron industry-Iron smelting, steel-Copper and gold-Coins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads - Terracotta beads- Shell beads/bone beads-Archeological evidences-Gemstone types described in Silappathikaram.					



UNIT 4	AGRICULTURE AND IRRIGATION TECHNOLOGY	3
Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry- Wells designed for cattleuse- Agriculture and Agro Processing –Knowledge of Sea-Fisheries –Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.		
UNIT 5	SCIENTIFIC TAMIL & TAMIL COMPUTING	3
Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software–Tamil Virtual Academy–Tamil Digital Library–Online Tamil Dictionaries–Sorkuvai Project.		
COURSE OUTCOMES: At the end of the course, students would CO1: Understand the extensive literature of Tamil and its classical nature (U). CO2: Understand the heritage of sculpture, painting and musical instruments of ancient people (U). CO3: Review on folk and martial arts of Tamil people (U). CO4: Realization of thinai concepts, trade and victory of chozha dynasty (understand). CO5: Understand the contribution of Tamils in Indian freedom struggle, self-esteem movement and siddha medicine (U). TOTAL: 15 PERIODS		
TEXT BOOKS: 1. ததழகவரலா-மக்கம்பண்பாம்-.கக.ககமள்ளை (வைaP): ததழநாபாடல்மற்றம்கல்aயல்பணிகள்கழகம். 2. கணினித்ததழ-எனவரில.பந்தரம்.(ாகடன்மரபரம்). 3. ழு-எவளகநுக்களரல்சங்ககாலநகரநாகரிகம்(வதால்aயல்Fளை(வைaP).		
REFERENCES: 1. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print) 2. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies). 3. National The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: InterlInstitute of Tamil Studies). 4. 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. 5. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and 6. Journey of Civilization Industo Vaigai (R.Balakrishnan) (Published by: RMRL)–Reference Book.		



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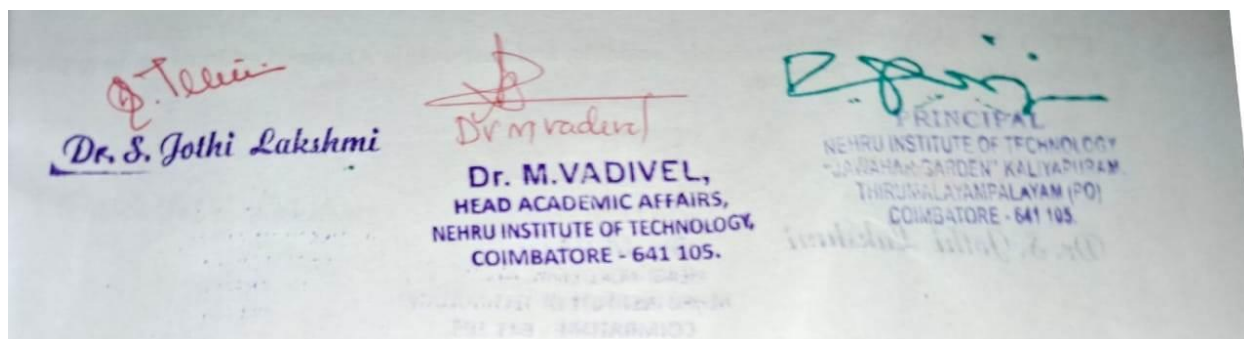
CO's-PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5	-	-	-	-	-	-	3	3	-	2	-	3	-	-
Correlation levels: 1 – low 2 –medium 3 – high “-“ – no correlation														

U23CS201 SDG:4	PYTHON PROGRAMMING AND PRACTICES	Category: H			
		L	T	P	C
		3	0	0	3
COURSE OBJECTIVE:					
1. To understand and develop programs using Python.					

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2. To use the concepts of strings, control flow, data types in python programs. 3. To create programs using list,tuples,dictionaries,and files concept in Python. 4. To analyze image processing,net working and object-oriented programming in Python. 5. To create new ideas for proble msin real world application using python		
UNIT 1	INTRODUCTION TO PYTHON PROGRAMMING	6
Introduction to Python Programming- Python Interpreter and Interactive Mode -Variables- Numerical types- Arithmetic operators and Expressions-Psuedo Code-Values and types:int,float, Boolean - Variables, Expressions, Statements -Illustrative Problems.		
UNIT 2	DATA TYPES,CONTROL FLOW,STRINGS	8
Control Flow -conditional (if), Alternative (if-else), Chained conditional (if-else if-else)- Iteration: state, while, for, break, continue, pass - Strings: string slices, immutability, string functions and methods, string module, Regular expression, Pattern matching. - Illustrative Problems.		
UNIT 3	LISTS,TUPLES DICTIONARIES AND FUNCTIONS	10
Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists,list parameters- Tuples: tuple assignment, tuple as return value- Dictionaries: operations and methods, advanced list processing – list comprehension. Functions and User Defined Functions: Simple and Mathematical Built– in Functions, Recursion -Illustrative Problems.		
UNIT 4	FILES AND OOPS CONCEPT IN PYTHON	10
Files, Text files, reading and writing files-format operator; Files and exception handling - Introduction to Object Oriented Programming – Basic principles of Object Oriented Programming in Python – Class Definition-Object Creation - Inheritance, Composition, Operator Overloading.		
UNIT 5	IMAGE PROCESSING & NETWORKING WITH PYTHON AND APPLICATIONS	11
Basics of Image processing-Image File Formats–Introduction to Classic Image Processing Algorithm-Image Processing Tools-Fundamentals of Net working-Introduction to Python Sockets- Simple Client/Server Programming-Python Applications.		
COURSE OUTCOMES: At the end of the course,students would CO1 : Explain the concepts of Python. CO2 : Use appropriate construct store present data. CO3 : Write programs using different constructs in Python. CO4 : Develop real world applications in image processing and net working. CO5 : Develop various simple programs for real world application using python.		



TOTAL:45 PERIODS

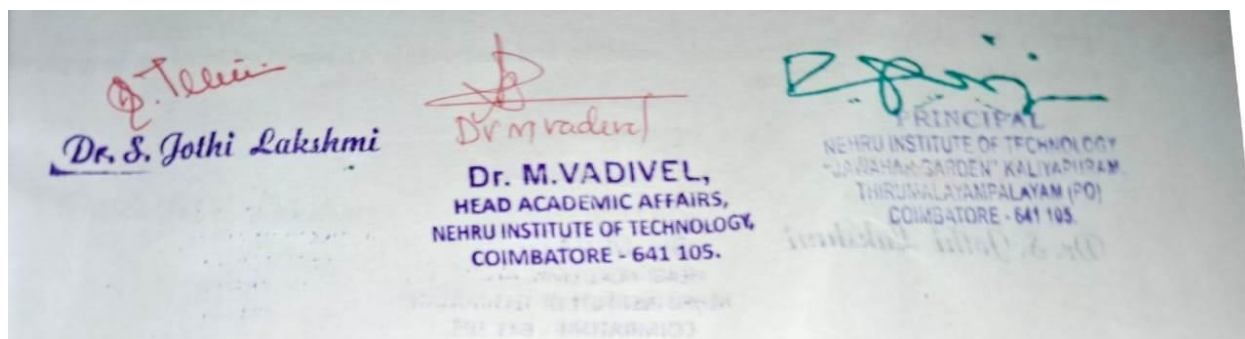
TEXT BOOKS:

1. Python Programming for Beginners: Skyrocket Your Code and Master Python in Less than a Week.
2. Discover the Fool proof, Practical Route to Uncover Insider Hacks,Unlock New Opportunities, and Revolution Kindle Edition by Kit Jackson (Author), 31 May 20232.Introducing Python, 2nd Edition, by Bill Lubanovic, O'Reilly Media, Inc., 2019.

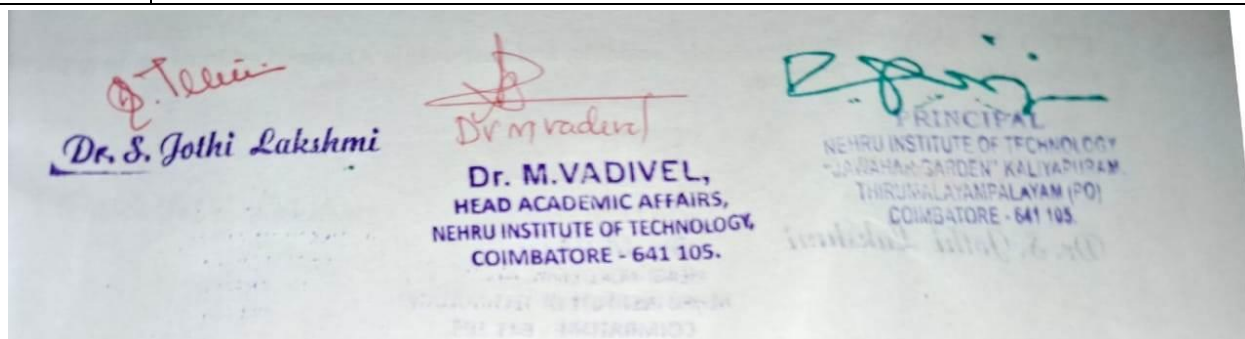
REFERENCES:

1. Python Programming for Beginners,ISBN-13-979-8870875248,Narry Prince, 2023.
2. Python Programming,West Mc Kinney,ISBN-13-979-8870534817,2023.
3. Python Quick Start Guide:The Simplified Beginner's Guide to Python Programming Using Hands-On Projects and Real-World Applications,by Robert Oliver,ISBN-13-978-163610037,2023.
4. Mastering Python Net working:Utilize Python packages and frame works for net work automation, monitoring, cloud, and management by Eric Chou,2023.

CO's-PO's&PSO'Smpping															
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	2	3	2	-	-	-	1	1	-	3	2	2	2
CO2	3	3	2	3	3	-	-	-	1	1	-	3	3	2	3
CO3	3	3	2	3	3	-	-	-	1	1	-	3	3	3	3
CO4	3	3	3	3	3	-	-	1	1	1	3	3	3	3	3
CO5	3	3	3	3	3	-	-	1	3	1	3	3	3	3	3
Correlation levels: 1 – low 2 –medium 3 – high “-“-nocorrelation															



U23AL201 SDG:4	DIGITAL PRINCIPLES AND SYSTEM DESIGN	Category:ESC			
		L	T	P	C
		3	0	0	3
COURSE OBJECTIVE: Learn the various number systems. 1. Learn Boolean Algebra 2. Understand the various logic gates. 3. Be familiar with various combinational circuits. 4. Be familiar with designing synchronous and asynchronous sequential circuits. 5. Be exposed to designing using PLD					
UNIT 1	BOOLEAN ALGEBRA AND LOGIC GATES				9
Review of Number Systems – Arithmetic Operations – Binary Codes – Boolean Algebra and Theorems – Boolean Functions – Simplification of Boolean Functions using Karnaugh Map and Tabulation Methods – Logic Gates – NAND and NOR Implementations.					
UNIT 2	COMBINATIONAL LOGIC				9
Combinational Circuits – Analysis and Design Procedures – Circuits for Arithmetic Operations, Code Conversion – Decoders and Encoders – Multiplexers and Demultiplexers – Introduction to HDL – HDL Models of Combinational circuits.					
UNIT 3	SYNCHRONOUS SEQUENTIAL LOGIC				9
Sequential Circuits – Latches and Flip Flops – Analysis and Design Procedures – State Reduction and State Assignment – Shift Registers – Counters – HDL for Sequential Logic Circuits.					
UNIT 4	ASYNCHRONOUS SEQUENTIAL LOGIC				9
Analysis and Design of Asynchronous Sequential Circuits – Reduction of State and Flow Tables – Race-free State Assignment – Hazards.					
UNIT 5	MEMORY AND PROGRAMMABLE LOGIC				9



RAM and ROM – Memory Decoding – Error Detection and Correction – Programmable Logic Array –Programmable Array Logic – Sequential Programmable Devices – Application Specific Integrated Circuits.

COURSE OUTCOMES:

At the end of the course, students would

1. Perform arithmetic operations in any number system.
2. Simplify the Boolean expression using K-Map and Tabulation techniques.
3. Use boolean simplification techniques to design a combinational hardware circuit.
4. Design and Analysis of a given digital circuit – combinational and sequential.
5. Design using PLD.

TOTAL:45 PERIODS

TEXT BOOKS:

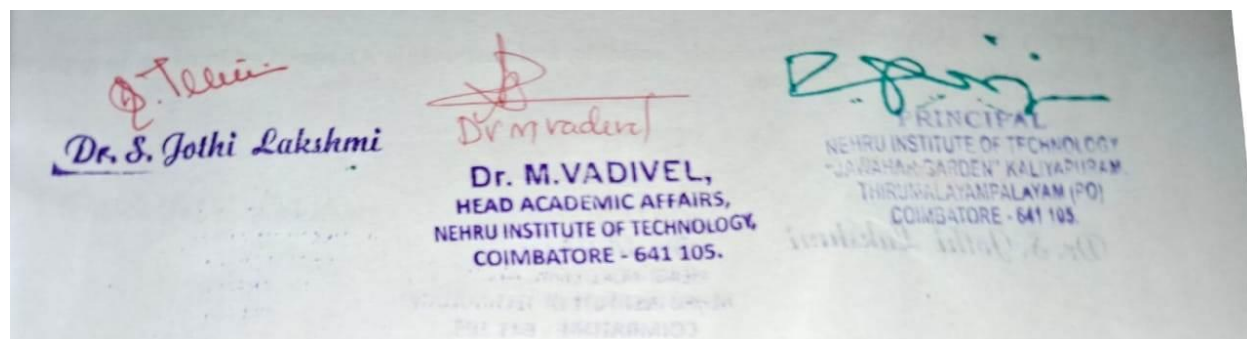
1. Morris Mano M. and Michael D. Ciletti, “Digital Design”, IV Edition, Pearson Education, 2008

REFERENCES:

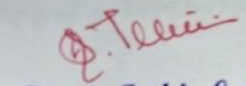
1. John F. Wakerly, “Digital Design Principles and Practices”, Fourth Edition, Pearson Education, 2007.
2. Charles H. Roth Jr, “Fundamentals of Logic Design”, Fifth Edition – Jaico Publishing House, Mumbai, 2003.
3. Donald D. Givone, “Digital Principles and Design”, Tata Mcgraw Hill, 2003.
4. Kharate G. K., “Digital Electronics”, Oxford University Press, 2010.

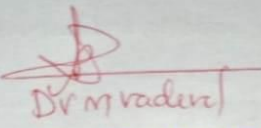
CO's-PO's&PSO'Smapping

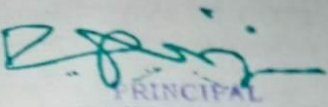
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	-	1	-	-	-	-	-	1	1	-	3	1	1	-
CO2	2	-	1	-	-	-	-	-	1	1	-	3	1	1	-
CO3	2	-	1	-	-	-	-	-	1	1	-	3	1	1	-
CO4	2	3	1	-	3	-	-	1	1	1	3	3	1	1	-
CO5	2	3	1	1	3	-	-	1	3	1	3	3	1	1	-
Correlation levels: 1 – low 2 –medium 3 – high “-“-nocorrelation															



U23EN202 SDG:4	PROFICIENCY IN ENGLISH (For CIVIL,AGRI,AERO&IT Branches)	Category: BSC			
		L	T	P	C
		2	0	0	2
COURSE OBJECTIVES:					
1.	To engage learners in meaningful language activities to improve their LSRW skills.				
2.	To identify personality traits and evolve as a better team player				
3.	To develop analytical thinking skills for problem-solving in communicative contexts				
4.	To demonstrate an understanding of job applications and interviews for internships and placements				
5.	To identify varied group discussion skills and apply them to take part in effective discussions in a professional context				
UNIT 1	MAKING COMPARISONS				
	Listening – Listening to informal conversations (Activity) Speaking – Role Play - talking about experiences- talking about events in life- discussing past events Reading - Reading advertisements, Extensive Reading (Activity) Writing – Reading Comprehension, Writing a review/ summary of story/article. Grammar – Active voice & Passive voice, Prepositional phrases				6


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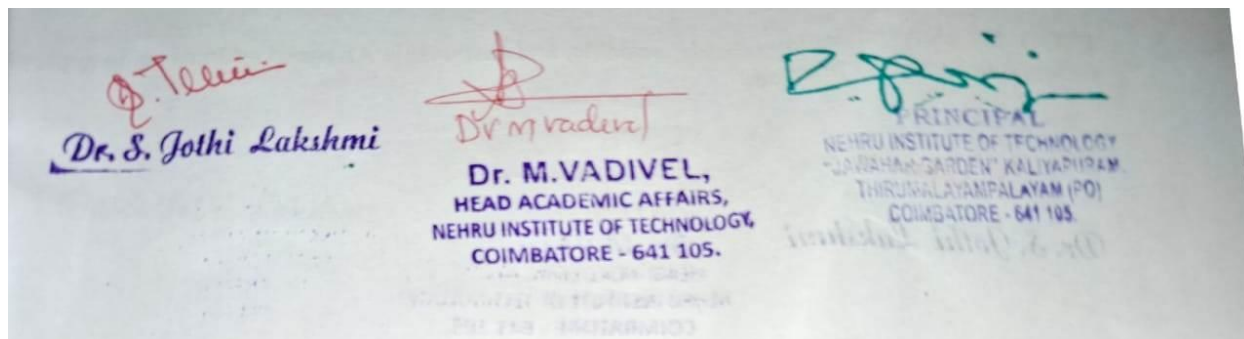

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UNIT 2	EXPRESSING CASUAL RELATIONS IN SPEAKING AND WRITING	
	Listening - Listening to longer technical speech, Listening to situation-based dialogues Speaking – discussing news stories -talking about travel problems and procedures Reading - Reading longer technical texts, Reading a short story Writing - Personal letter (Inviting your friend), Congratulating letter, Writing responses to complaints and adjustment letter Grammar - Infinitive and Gerunds, Modals	6
UNIT 3	PROBLEM-SOLVING	
	Listening – Listening to movie scenes/ documentaries depicting a technical problem and suggesting solutions (Activity). Speaking – Conversation skills with a sense of stress, intonation, pronunciation, Welcome address - vote of thanks Reading - Case Studies, news reports, reading passages with a time limit Writing – Letter to the Editor, Short report on an event (field trip) Grammar -- If conditional sentence, Phrasal Verbs	6
UNIT 4	REPORTING OF EVENTS AND RESEARCH	
	Listening – Listening Comprehension based on news reports Speaking – Presenting an oral report, Talking about the past, present and future (Activity) Reading – Newspaper articles; Reading the job advertisements and the profile of the company Writing – Essay writing and its types (Compare & Contrast, Cause & Effect, Problem & Solution) Grammar – Reported Speech, Conjunctions	6
UNIT 5	THE ABILITY TO PUT IDEAS OR INFORMATION TO COGENTLY	
	Listening – Listening to Presentations Speaking – Participating in a Role, Talking about environmental issues, Talking about everyday services (Activity) Reading – Note-making skills – making notes from books Writing – Email Writing, Biographical sketches of famous personalities Grammar – Relative Clauses, Collocation, Fixed & Semi-fixed expressions	6
COURSE OUTCOMES: Upon completion of this course, students will be able to: CO1: Identify causes and effects in events, and industrial processes through technical text CO2: Understand and use tools of structured written communication CO3: Identify individual personality types and roles in a team CO4: Understand the basic concepts of morality and diversity CO5: Present their opinion in a planned and logical manner, and draft effective resumes in the context of job search		

TEXT BOOKS:

- English for Engineers & Technologists, Orient Blackswan Private Ltd. Department of English, Anna University, 2020



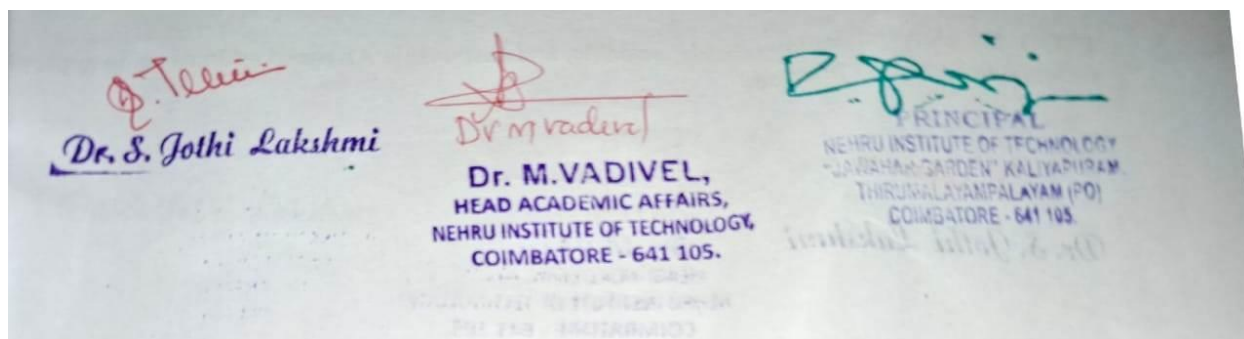
2. Barun.K.Mithra, Personality Development and Soft Skills, OUP India, 2019

REFERENCE BOOKS:

1. Jack C. Richards, "Interchange, Student's Book", 4th Edition, Cambridge University Press, New York, 2017.
2. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi
3. Muralikrishna & Sunitha Mishra, Communication Skills for Engineers and Scientists, PH Learning, new Delhi, 2009.
4. Developing Communication Skills by Krishna Mohan, Meera Bannerji-Macmillan India Ltd. 1990, Delhi.
5. Shalini Varma, "Development of Life Skills and Professional Practice", 1st Edition, Vikas Publishing House Pvt. Ltd., 2014

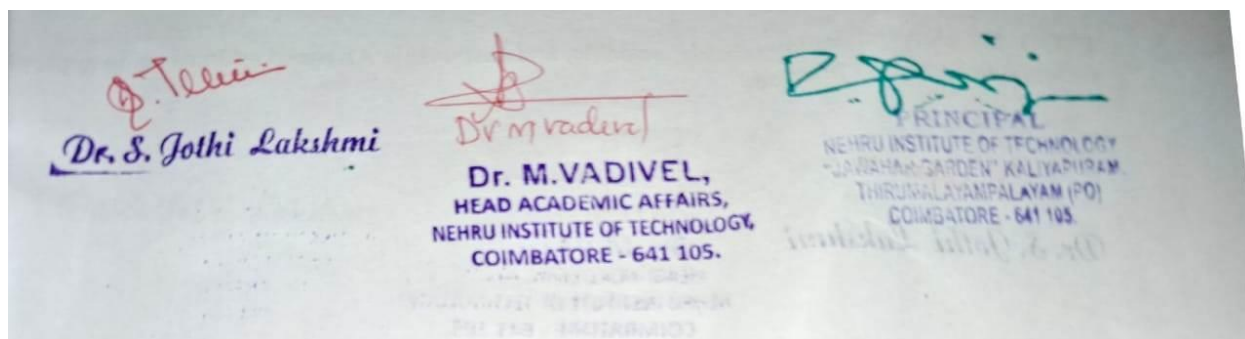
CO's-PO's & PSO's MAPPING															
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CO 2	-	-	-	-	-	1	1	-	3	2	-	2	-	-	-
CO 3	-	-	-	-	-	2	2	-	3	2	-	3	-	-	-
CO 4	-	-	-	-	-	2	2	-	3	1	-	2	-	-	-
CO 5	-	-	-	-	-	1	2	-	3	3	-	3	-	-	-
Correlation levels: 1 – low 2 – medium 3 – high “-“ no correlation															

U23MA204 SDG:9	PROBABILITY THEORY AND STATISTICS	Category: BSC			
		L	T	P	C
		3	1	0	4
COURSE OBJECTIVE:					



- To develop a fundamental understanding of probability theory.
- To acquire the basic concept of discrete and continuous random variables.
- To equip students with the necessary skills to apply statistical tools in engineering problems.
- To understand the theory of hypothesis testing for both small and large samples, which is essential for solving real-life problems.
- To introduce the basic concepts and classifications of the design of experiments, which play a crucial role in statistical quality control.

UNIT	BASICS OF PROBABILITY	9 +3
Probability –Axioms of probability – Conditional probability- Equally Likely - Mutually Exclusive events - Law of Total Probability – Baye’s theorem.		
UNIT	RANDOM VARIABLES	9 +3
Random Variables – Discrete and Continuous random variables – Probability Mass functions – Mean and Variance. Application of Random Variables in Data Handling in Engineering Filed		
UNIT	CORRELATION AND LINEAR REGRESSION	9 +3
Correlation – Karl Pearson’s correlation coefficients – Spearman’s Rank Correlation – Regression – Estimation of Regression line – Application: Measuring the influences between factors- Estimation of association among the variables.		
UNIT	HYPOTHESIS TESTING	9 +3
Large and Small sample tests: Student t-test - Single mean and difference of two means – F Test for Variance - Chi square test for goodness of fit. Application: Performance analysis- Comparative analysis – Quality testing		
UNIT	DESIGN OF EXPERIMENTS	9 +3
Analysis of Variance: One way and two-way classifications - Completely randomized design – Randomized block design. Application: Response Surface Methodology.		



COURSE OUTCOMES:

At the end of the course, students would

CO1:Apply the concepts of probability to solve real-life problems.

CO2:Understand the fundamental principles of probability and statistics.

CO3: Analyze data relationships, evaluate correlation models, and interpret the results of hypothesis testing to support decision-making.

CO4: Analyze and interpret statistical results obtained from hypothesis testing and experimental designs to validate conclusions.

CO5:Apply one-way and two-way classification methods to analyze and interpret data from real-world experiments and practical scenarios.**TOTAL: 60 PERIODS**

TEXT BOOKS:

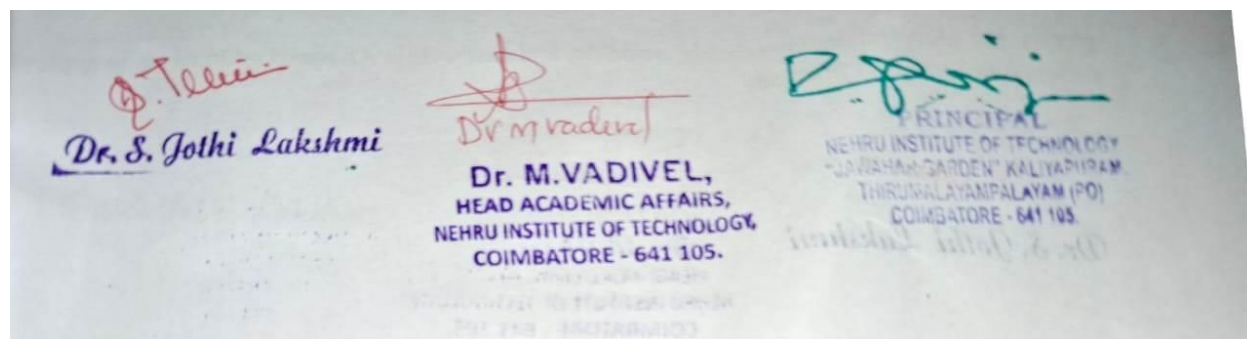
1. Veerarajan, T, “Probability, Statistics, Random Processes and Queuing Theory ”, 1st Edition, Tata McGraw-Hill, New Delhi, 2019
2. Johnson, R.A., Miller, I and Freund J., “Miller and Freund’ s Probability and Statistics forEngineers”, Pearson Education, Asia, 8th Edition, 2015.
3. Gupta S.C, and KapurV.K “Fundamentals of Applied Statistics”, Sultan Chand, New Delhi, 4th Edition, 2014.

REFERENCES:

1. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014
2. Veerarajan, T, “Probability, Statistics, Random Processes ”, 3rd Edition, Tata McGraw-Hill, New Delhi, 2008.
3. Gupta S.C. and Kapoor V. K., “ Fundamentals of Mathematical Statistics” , Sultan Chand & Sons, New Delhi, 12th Edition, 2020

CO's-PO's & PSO's MAPPING

CO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	3	3	3	2	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	2	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	3	2	-	-	-	-	-	-	-	-	-	-	-



CO5	3	3	3	2	-	-	-	-	-	-	-	-	-	-	-
Correlation levels:					1 – low			2 – medium			3 – high			“-“- no correlation	

SEMESTER III

CODEU23MA3 DISCRETE MATHEMATICS FOR COMPUTING
09

Category : PCC

L	T	P	C
3	1	0	4

SDG: 9

COURSEOBJECTIVE:

- 1.To build problem solving skills by enhancing students logical and mathematical maturity
2. To acquire the knowledge of combinatorics
3. To gain the knowledge of graph theory and to solve the practical problems.
4. To familiarize the applications of algebraic structures.
5. To Understand the basic concepts in sets and relations

UNIT 1

LOGIC

12

Truth Tables, Tautology and Contradiction - Logical Equivalence: The Laws of Logic, Logical Implication, - Disjunctive and Conjunctive Normal Form. Application: Knowledge representation in artificial intelligence using Basic Connectives.

UNIT 2

COMBINATORICS

12

Mathematical induction – Strong induction and well ordering – The basics of counting – Permutations and combinations – Recurrence relations - Solving linear recurrence relations. Application : Pigeon hole principle.

UNIT 3

GRAPH THEORY

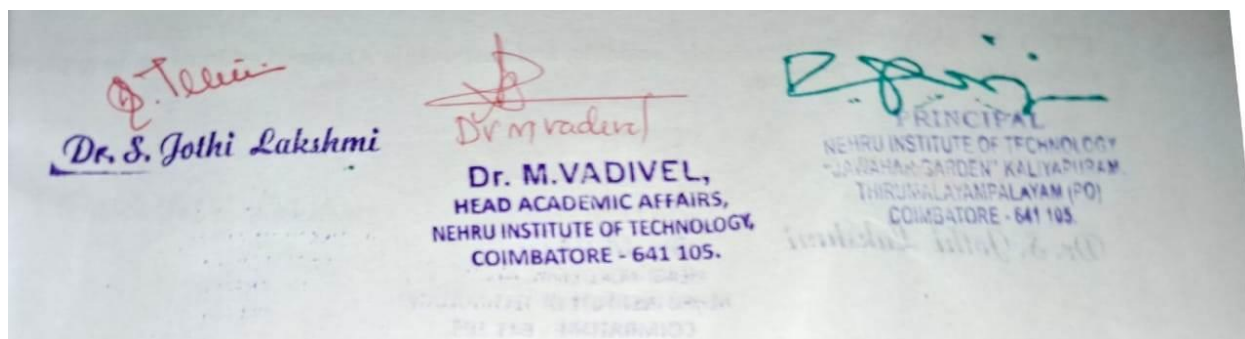
12

Graphs and graph models – Graph terminology and special type of graph – Matrix representation of graphs and graph isomorphism – Degree, Connectivity – Path – Cycle – Sub Graph, Isomorphism – Eulerian and Hamiltonian paths and circuits. Application: Map for Online Food Delivery System

UNIT 4

ALGEBRAIC STRUCTURES

12



Algebraic systems – Semi groups and monoids – Groups – Subgroups – Normal subgroup and cosets – Lagrange's theorem. Application: Error detection and encoding functions.

UNIT 5

SET THEORY AND LATTICES¹²

Set theory –Operations and Laws of Sets - Cartesian Product, Binary Relation - Equivalence Relation - Partial ordering – Poset – Lattices as Posets –Hasse diagram. Application: Vehicle Model Catalogue

COURSE OUTCOMES:

At the end of the course, students would

CO1:Solve the problems using the concepts of sets, Truth Tables, counting techniques, properties of algebraic structures and graph network techniques to solve engineering problems.

CO2: Comprehend the concepts needed to test the relations, laws of logic, Strong induction, Groups and Properties of Graphs

CO3:Demonstrate the knowledge in functions, Logical Implication, Mathematical induction, Subgroups and Graph Coloring

CO4:Analyze the concepts and Poset, Normal Form , Permutations and combinations, Normal subgroup and Eulerian and Hamiltonian paths and circuits

CO5:Apply and Analyze Hasse diagram, Rules of Inference, linear recurrence relations, Lagrange's theorem and Matrices of Graph Isomorphism

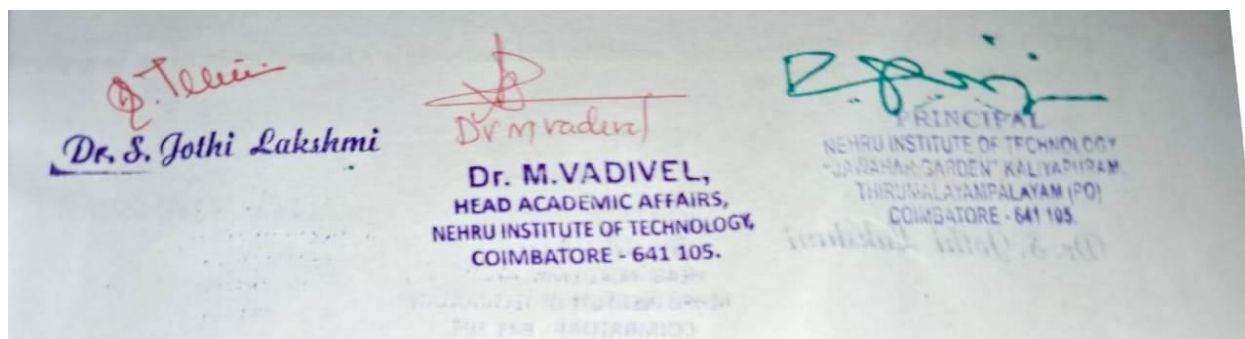
TOTAL:60 PERIODS

TEXT BOOKS:

1. Rosen. K.H., "Discrete Mathematics and its Applications", 7th Edition, Tata McGraw Hill Pub. Co. Ltd., New Delhi, Special Indian Edition, 2017.
2. Tremblay. J.P. and Manohar. R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill Pub. Co. Ltd, New Delhi, 30th Reprint, 2011.
3. Venkatraman M.K, Sridharan. N and Chandrasekaran N. Discrete Mathematics, The National Publishing Company, Chennai, Fourth edition, 2014.

REFERENCES:

1. Grimaldi. R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", 5th Edition, Pearson Education Asia, Delhi, 2013.
2. Lipschutz. S. and Mark Lipson., "Discrete Mathematics", Schaum's Outlines, Tata McGraw Hill Pub. Co. Ltd., New Delhi, 3rd Edition, 2010.
3. Koshy. T. "Discrete Mathematics with Applications", Elsevier Publications, 2006.
4. Kenneth. H. Rosen, Discrete Mathematics and its Applications, Tata McGraw Hill P.Co, New Delhi, Seventh Edition, 2014.
5. Bernard Kolman, Robert C. Busby, Sharan Cutler Ross, Discrete Mathematical Structures, Pearson Education Pvt Ltd ,New Delhi, Sixth Edition, 2013.



CO's-PO's & PSO's MAPPING														
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO 1	3	3	3	1	-	-	-	-	-	-	-	-	-	-
CO 2	3	3	3	1	-	-	-	-	-	-	-	-	-	-
CO 3	3	3	3	1	-	-	-	-	-	-	-	-	-	-
CO 4	3	3	3	1	-	-	-	-	-	-	-	-	-	-
CO 5	3	3	3	1	-	-	-	-	-	-	-	-	-	-
Correlation levels: 1 – low 2 – medium 3 – high “-“- no correlation														

CODE: U23AL301

DATA STRUCTURES AND ALGORITHMS

Category : PCC

SDG: 4

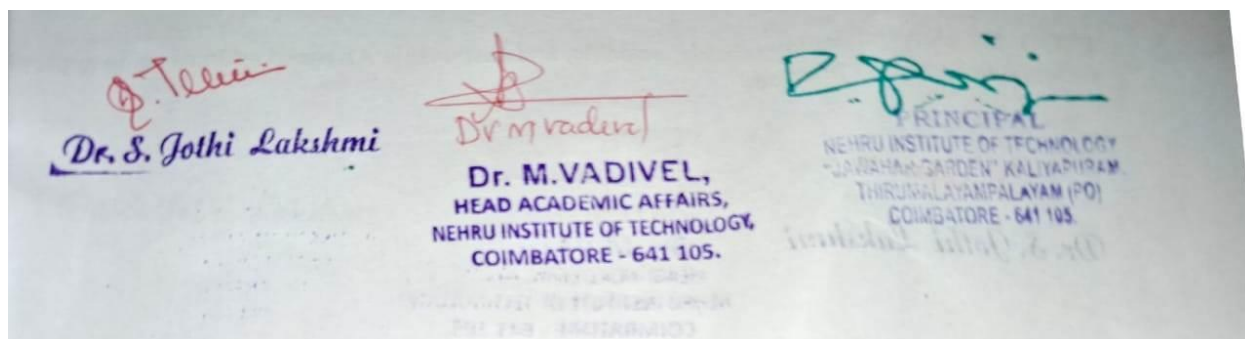
L	T	P	C
3	0	0	3

COURSEOBJECTIVE:

5. To get exposure to the various algorithm design and analysis techniques
6. To design linear data structures – lists, stacks, and queues
7. To implement Tree structures
8. To understand the graph structures
9. To introduce the concepts of searching, sorting and hashing

UNIT 1**INTRODUCTION TO ALGORITHMS AND ANALYSIS****9**

Fundamentals of algorithm analysis, Space and time complexity of an algorithm, Types of asymptotic notations and orders of growth, Algorithm efficiency – best case, worst case, average case, Analysis of non-recursive and recursive algorithms, Asymptotic analysis for recurrence relation – Recursive Tree Method.

UNIT 2**LINEAR DATA STRUCTURES****9**

List ADT – array-based implementations – linked list implementations – singly linked lists – circularly linked lists – doubly linked lists – Stack ADT – Queue ADT – double ended queues – applications

UNIT 3**NON- LINEAR DATA STRUCTURES – TREES****9**

Tree Traversals – Binary Tree ADT – Expression trees – Applications of trees – Binary Search Tree ADT – Threaded Binary Trees – AVL Trees – B Tree – B+ Tree – Heap – Applications of heap.

UNIT 4**GRAPHS****9**

Graph – basic definition and Terminology – Representation of Graph – Graph Traversal: Breadth First Search (BFS), Depth First Search (DFS) - Minimum Spanning Tree: Prim's, Kruskal's- Single Source Shortest Path: Dijkstra's Algorithm.

UNIT 5**SEARCHING AND SORTING****9**

Searching: Linear Search – Binary Search – Sorting : Bubble Sort – Selection Sort – Insertion Sort – Shell Sort – Radix Sort – Hashing: Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Understand various algorithm design and analysis techniques[U]

CO2: Design, implement, and analyze linear data structures, such as lists, queues, and stacks, according to the needs of different applications [C]

CO3:Construct the efficient tree structures to meet requirements such as searching, indexing, and sorting [C]

CO4: Model problems as graph problems and implement efficient graph algorithms [A]

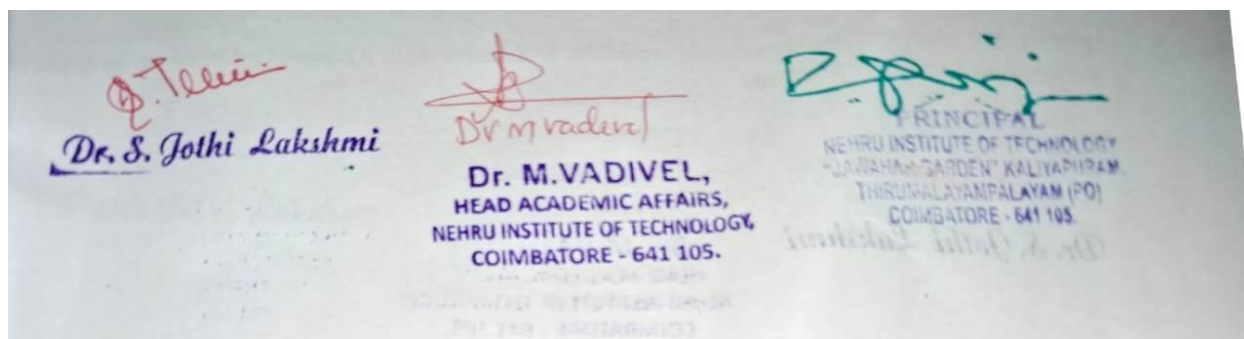
CO5: Implement various sorting, searching and hashing [A]

TOTAL:45 PERIODS**TEXT BOOKS**

1. M.A.Weiss, Data Structures and Algorithm Analysis in C, Second Edition, Pearson Education, 2016.
2. Aaron M. Tenenbaum , Yedidiah Langsam, Moshe J. Augenstein, “Data Structures Using C”,Pearson India, 2019.

REFERENCE BOOKS

1. R. F. Gilberg, B.A. Forouzan, “Data Structures: A Pseudocode approach with C”, Second Edition, Cengage India, 2007.
2. A. V. Aho, J. E. Hopcroft, and J. D. Ullman, “Data Structures and Algorithms”, Pearson India, 2009.



CO-PO MAPPING

CO	PO												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2	3	1	2	2	-	-	-	-	-	-	-	2	1
2	1	2	1	2	1	-	-	-	-	-	-	-	2	2
3	2	3	1	2	2	-	-	-	-	-	-	-	2	1
4	2	1	1	1	2	-	-	-	-	-	-	-	2	3
5	1	2	1	2	2	-	-	-	-	-	-	-	2	2
Correlation levels: 1 –low 2 – medium 3 – high “-“-no correlation														

CODE: U23IT301

OBJECT ORIENTED PROGRAMMING USING JAVA

Category : PCC

SDG: 4

L	T	P	C
3	0	0	3

COURSEOBJECTIVE:

1. To understand the Object Oriented Programming concepts
2. To implement Java program using methods and inheritance
3. To know the principles of packages, exception handling and interfaces.
4. To demonstrate the use of threads and I/O.
5. To familiarize students with GUI based application development and database connectivity.

UNIT 1

INTRODUCTION TO OOP

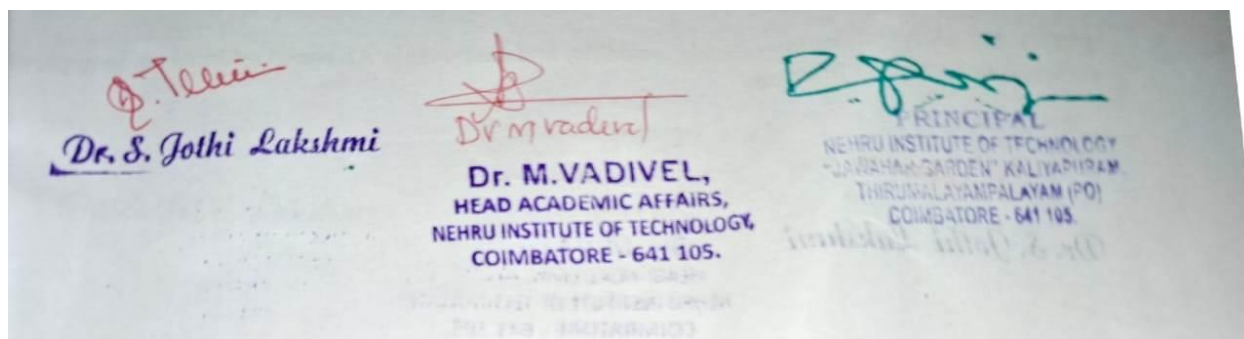
9

Object Oriented Programming concepts - Features – Benefits of Object Oriented Methodology- Input and Output statements - Decision control and looping statements-Functions-Arrays-Classes and Objects-Memory allocation - Array of objects – Constructors - Destructors

UNIT 2

OVERVIEW TO JAVA

9



Introduction to Java Programming –Features of Java- Classes and Objects - Arrays – Methods – Constructor - Access Specifier – Static members - Command Line Arguments - Strings Handling - Method Overloading– Method Overriding - Inheritance

UNIT 3 **PACKAGES , INTERFACES AND EXCEPTION HANDLING** **9**

Packages - Access Protection - Importing Packages – Interfaces - Exception Handling basics – Multiple catch Clauses- Nested try Statements – Java’s Built-in Exceptions – User defined Exception

UNIT 4 **MULTITHREADING AND I/O** **9**

Java Thread Model - Creating a Thread –Creating Multiple Threads – Synchronization – Interthread Communication. Enumerations – Type Wrappers - Auto Boxing. I/O Basics - Reading and Writing Console I/O – PrintWriter Class - Reading and Writing Files..

UNIT 5 **EVENT HANDLING** **9**

Event Handling – Mechanisms - Event Classes –Action Event – Sources of Events - Event Listener Interfaces – Action Listener. AWT Fundamentals Introduction to Java Applets - Accessing Databases with JDBC –Case Study: ATM System, Payroll System.

COURSE OUTCOMES:

At the end of the course, students would

1. Understand the concepts of classes and objects [U]
2. Develop simple applications using JAVA programming paradigm [A]
3. Build applications making use of packages, interfaces and exception handling in Java [A]
4. Implement Java programs with multithreading and I/O streams [A]
5. Exhibit the functions of JAVA collections and JDBC [A]

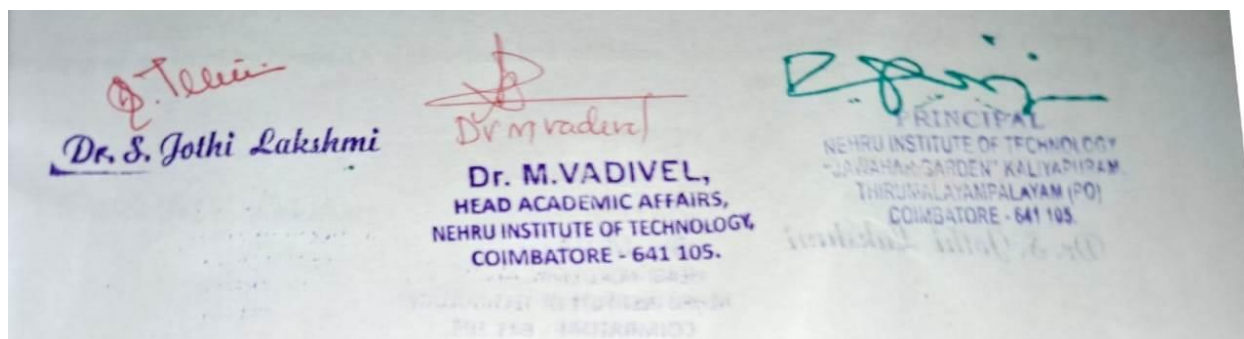
TOTAL:45 PERIODS

TEXT BOOKS

1. ReemaThareja, "Object Oriented Programming with C++",Third Edition, Oxford University Press,New Delhi,2018 (UNIT 1)
2. Herbert Schildt, "Java: The Complete Reference", 12th Edition, McGraw Hill Education, New Delhi, 2021.(UNIT 2 to 5)

REFERENCE BOOKS

1. BuyyaRajkumar, ThamaraiSelvi S. and Xingchen Chu, "Object Oriented Programming with Java Essentials and Applications",1st Edition, Tata McGraw Hill, New Delhi, 2009.
2. Deitel Paul and Deitel Harvey, "Java How to Program", 11th Edition, Pearson Education, New Delhi, 2018.
3. Cay S. Horstmann, "Core Java: Volume I Fundamentals", 11th Edition, Addison Wesley, New Delhi, 2019.



CO-PO MAPPING

CO	PO												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	2	1	1	2	-	-	-	-	-	-	-	3	2
2	3	2	1	2	1	-	-	-	-	-	-	-	3	2
3	3	2	1	2	2	-	-	-	-	-	-	-	3	2
4	3	2	1	2	2	-	-	-	-	-	-	-	3	2
5	3	2	1	3	2	-	-	-	-	-	-	-	3	2
Correlation levels: 1 – low 2 – medium 3 – high “-“ – no correlation														

U23AL303

COMPUTER ARCHITECTURE

L T P C

3 0 0 3

OBJECTIVES:

- To learn the basic structure and operations of a computer.
- To learn the arithmetic and logic unit and implementation of fixed-point and floating point arithmetic unit.
- To learn the basics of pipelined execution.
- To understand parallelism and multi-core processors.
- To understand the memory hierarchies, cache memories and virtual memories.
- To learn the different ways of communication with I/O devices.

UNIT I BASIC STRUCTURE OF A COMPUTER SYSTEM

9

Functional Units – Basic Operational Concepts – Performance – Instructions: Language of the Computer – Operations, Operands – Instruction representation – Logical operations – decision making – MIPS Addressing.

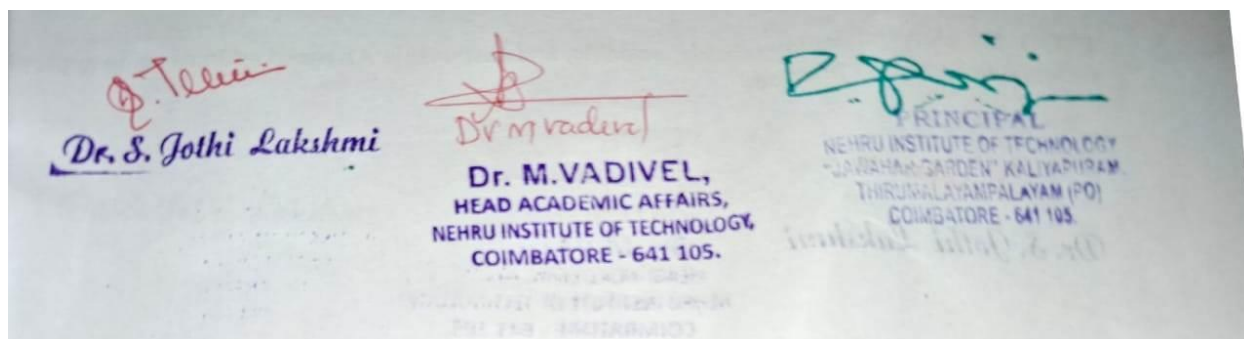
UNIT II ARITHMETIC FOR COMPUTERS

9

Addition and Subtraction – Multiplication – Division – Floating Point Representation – Floating Point Operations – Subword Parallelism

UNIT III PROCESSOR AND CONTROL UNIT

9



A Basic MIPS implementation – Building a Datapath – Control Implementation Scheme – Pipelining – Pipelined datapath and control – Handling Data Hazards & Control Hazards – Exceptions.

UNIT IV PARALLELISIM

9

Parallel processing challenges – Flynn's classification – SISD, MIMD, SIMD, SPMD, and Vector Architectures - Hardware multithreading – Multi-core processors and other Shared Memory Multiprocessors - Introduction to Graphics Processing Units, Clusters, Warehouse Scale Computers and other Message-Passing Multiprocessors.

UNIT V MEMORY & I/O SYSTEMS

9

Memory Hierarchy - memory technologies – cache memory – measuring and improving cache performance – virtual memory, TLB's – Accessing I/O Devices – Interrupts – Direct Memory Access – Bus structure – Bus operation – Arbitration – Interface circuits - USB.

TOTAL : 45

PERIODS OUTCOMES: On Completion of the course, the students should be able to:

Understand the basics structure of computers, operations and instructions.

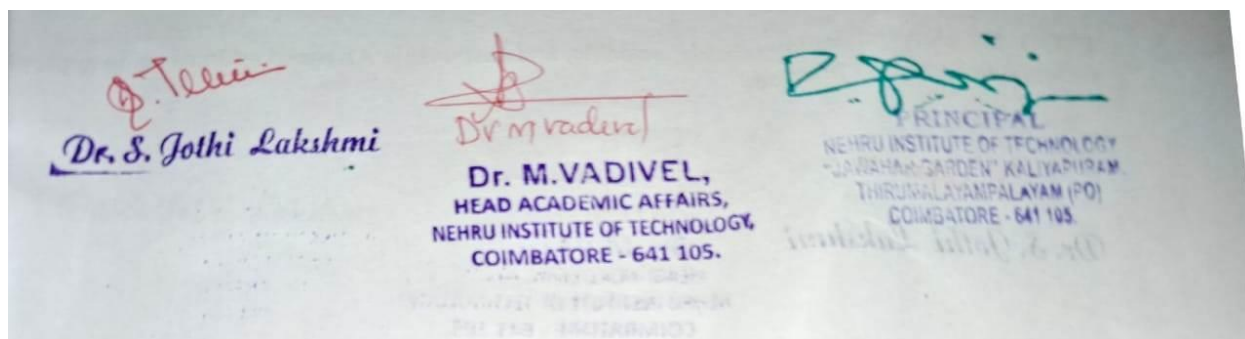
- Design arithmetic and logic unit.
- Understand pipelined execution and design control unit.
- Understand parallel processing architectures.
- Understand the various memory systems and I/O communication.

TEXT BOOKS:

1. David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware/Software Interface, Fifth Edition, Morgan Kaufmann / Elsevier, 2014.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, Computer Organization and Embedded Systems, Sixth Edition, Tata McGraw Hill, 2012.

REFERENCES:

1. William Stallings, Computer Organization and Architecture – Designing for Performance, Eighth Edition, Pearson Education, 2010.
2. John P. Hayes, Computer Architecture and Organization, Third Edition, Tata McGraw Hill, 2012.
3. John L. Hennessey and David A. Patterson, Computer Architecture – A Quantitative Approach, Morgan Kaufmann / Elsevier Publishers, Fifth Edition, 2012.



CODE:U23IT405

FOUNDATIONS OF DATA SCIENCE

SDG: 4

Category : PCC

L	T	P	C
3	0	2	4

COURSE OBJECTIVE:

1. To understand the data science fundamentals and process.
2. To learn to describe the data for the data science process.
3. To learn to describe the relationship between data.
4. To utilize the Python libraries for Data Wrangling.
5. To present and interpret data using visualization libraries in Python.

UNIT 1

INTRODUCTION

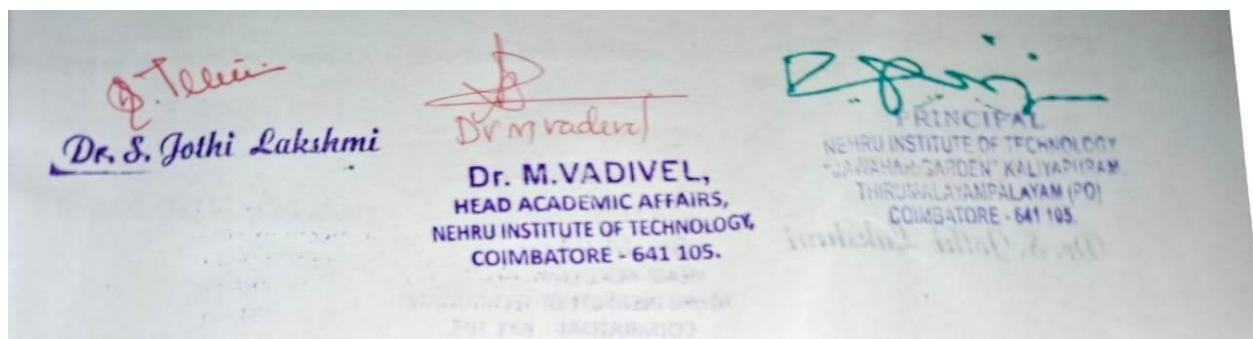
9

Data Science: What is Data Science -Benefits and uses - -Data Science Process: Overview – Defining research goals – Retrieving data – Data preparation - Exploratory Data analysis – building the model– Prerequisites for a Data Scientist-Tools and Skills required-presenting findings and Building applications– Basics of NumPy Array

UNIT 2

DESCRIBING DATA

9



Types of Data-Types of Variables –Describing Data with Tables and Graphs–Describing Data with Averages - Describing Variability - Normal Distributions and Standard (z) Scores, Basics – Pandas data frames. Case Study: Population (Sample Size Estimating the statistics of given population).

UNIT 3**DESCRIBING RELATIONSHIPS****9**

Correlation –Scatter plots –correlation coefficient for quantitative data –computational formula for correlation coefficient – Regression –regression line –least squares regression line – Standard error of estimate – interpretation of r^2 –multiple regression equations –regression towards the mean. Case Study: Prediction Regression Methodologies with example.

UNIT 4**PYTHON LIBRARIES FOR DATA WRANGLING****9**

Python for Data Science –Python Libraries – Data Frame Manipulation with numpy and pandas – Exploration Data Analysis – Time Series Dataset – Clustering with Python – Dimensionality Reduction. Python integrated Development Environments (IDE) for Data Science.

UNIT 5**DATA VISUALIZATION****9**

Importing Matplotlib – Line plots – Scatter plots – visualizing errors – density and contour plots – Histograms – legends – colors – subplots – text and annotation – customization – three-dimensional plotting-Geographic Data with Basemap-Visualization with Seaborn. Case Study: Graph of Sine and Cosine function.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Define the data science process.

[U]

CO2: Understand different types of data descriptions for the data science process.

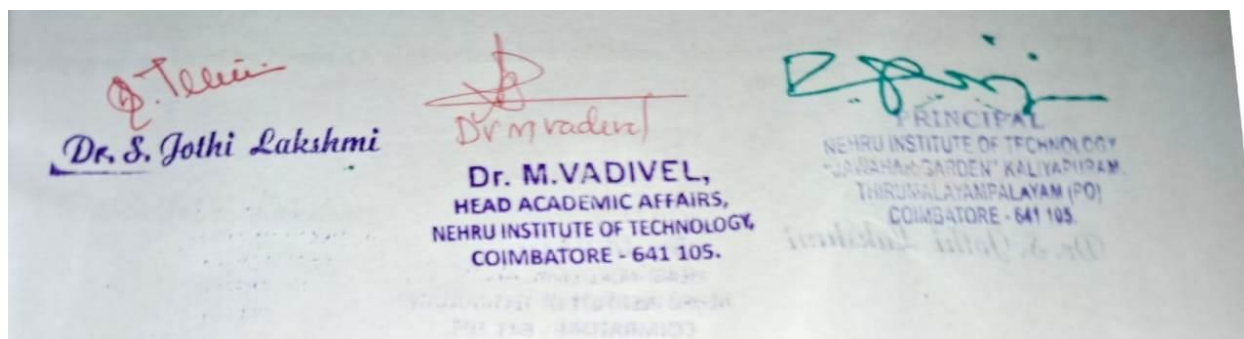
[U]

CO3: Gain knowledge on relationships between data.

[U]

CO4: Use the Python libraries for data wrangling.[A]

CO5: Apply visualization libraries in Python to interpret and explore data.[A]

TOTAL:45 PERIODS**PRACTICAL EXERCISES:**

1. Download, install and explore the features of NumPy, SciPy, Jupyter, Stats models and Pandas packages.
 2. Working with Numpy arrays
 3. Working with Pandas data frames
 4. Reading data from textfiles, Excel and the web and exploring various commands for doing descriptive analytics on the Iris data set.
 5. Use the diabetes dataset from UCI and Pima Indians Diabetes dataset for performing the following:
 - a. Univariate analysis: Frequency, Mean, Median, Mode, Variance, Standard Deviation, Skewness and Kurtosis.
 - b. Bivariate analysis: Linear and logistic regression modeling
 - c. Multiple Regression analysis.
 - d. Also compare the results of the above analysis for the two data sets.
 6. Apply and explore various plotting functions on UCI datasets.
 - a. Normal curves
 - b. Density and contour plots
 - c. Correlation and scatter plots
 - d. Histograms
 - e. Three-dimensional plotting
- Visualizing Geographic Data with Basemap.

TEXT BOOKS

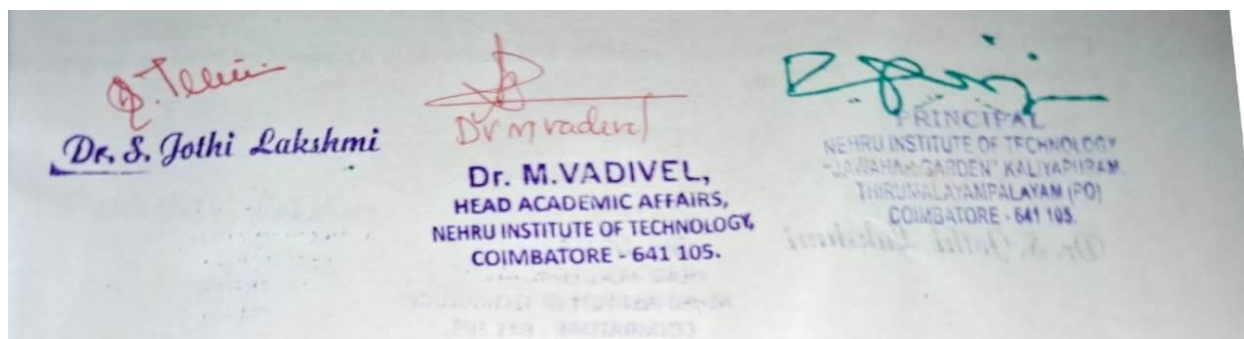
- .David Cielien, Arno D. B. Meysman, and Mohamed Ali, “Introducing Data Science”,ManningPublications, 2016. (Unit I)
- .RobertS.WitteandJohnS.Witte,“Statistics”,EleventhEdition,WileyPublications,2017. (Units II and III)
- akeVanderPlas,“PythonDataScienceHandbook”,O’Reilly,2016. (Units IVandV).

REFERENCE BOOKS

1. Allen B.Downey,“Think Stats: Exploratory Data Analysis in Python”, GreenTea Press,2014.

CO-PO MAPPING

CO	PO												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2	2	1	-	-	-	-	-	-	-	-	-	2	2
2	2	1	2	-	-	-	-	-	-	-	-	-	2	1
3	2	2	1	-	-	-	-	-	-	-	-	-	2	2
4	3	2	2	-	-	-	-	-	-	-	-	-	3	2



5	2	2	1	-	-	-	-	-	-	-	-	-	2	2
Correlation levels: 1 – low 2 – medium 3 – high “-“ – no correlation														

CODE:

Category: PCC

U23AL311SDG:4 &8

DATA STRUCTURES LABORATORY

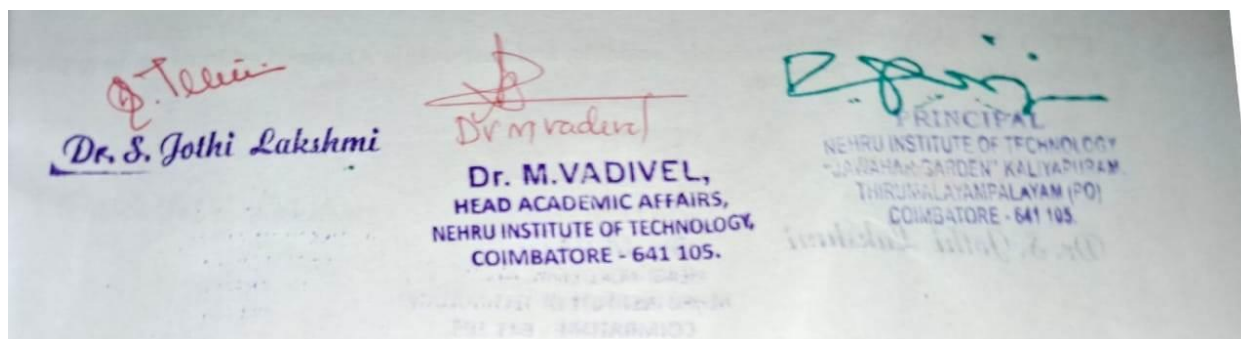
L	T	P	C
0	0	4	2

COURSE OBJECTIVE:

1. To introduce and learn about the concepts of linear data structures.
2. To introduce and learn about the concept of non-linear data structures.
3. To learn about the concept of the graph traversal structures.
4. To understand the concept of sorting and searching.
5. To get exposure on various algorithm design and analysis techniques.

LIST OF EXPERIMENTS

1. Program to implement Stack.
2. Program to implement Queue.
3. Singly linked list implementations.
4. Program to implement Infix to Postfix conversion using stack
5. Program to evaluate postfix evaluation using stack
6. Binary search tree implementations and its operations.
7. Breath first search implementation.
8. Depth first search implementation.
9. Selection sort implementation.
10. Graph representation and Traversal algorithms
11. Bubble sort implementation
12. Insertion sort implementation
13. Program to implement shell sort
14. Binary and Linear Search Implementations.
15. Mini Project.
 - Array & String Based (**Text Editor Features** → Implement undo/redo using stacks. **String Pattern Matching** → Naïve, KMP, Rabin-Karp comparison.)
 - Stack & Queue Based (Balanced Parentheses Checker → Stack-based validator, Infix to Postfix Converter → Evaluate postfix expressions, Job Scheduling Simulator → Implement Round Robin, FCFS, Priority (using Queues).
 - Linked List Based (**Music Playlist Manager** → Play next, previous, repeat (Doubly Linked List))



- Tree & Graph Based (**Binary Search Tree Visualizer** → Insert, delete, traverse with visualization.)

COURSEOUTCOMES:

At the end of the course, students would

CO1: Design and implement linear data structures, such as lists, queues, and stacks, according to the needs of different applications.

CO2: Design and analyze tree structures and Heap.

CO3: Apply graph algorithms to solve problems and analyze their efficiency.

CO4: Critically analyze and implement various searching, sorting algorithms with its competence.

CO5: Develop the ability to design and implement efficient data structure-based solutions using arrays, strings, stacks, queues, linked lists, trees, and graphs for real-world applications.

TOTAL: 60 PERIODS

CO's-PO's&PSO'sMAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	2	1	-	-	-	1	-	2	3	2	3
CO2	3	2	3	2	2	-	-	-	2	-	2	2	1	2
CO3	3	3	2	2	3	-	-	-	2	-	1	2	2	3
CO4	3	3	2	2	1	-	-	-	1	-	2	3	1	2
CO5	3	3	2	2	1	-	-	-	1	-	2	3	2	1
Correlation levels: 1 – low 2 – medium 3 – high “-“ – no correlation														

CODE : U23AL312

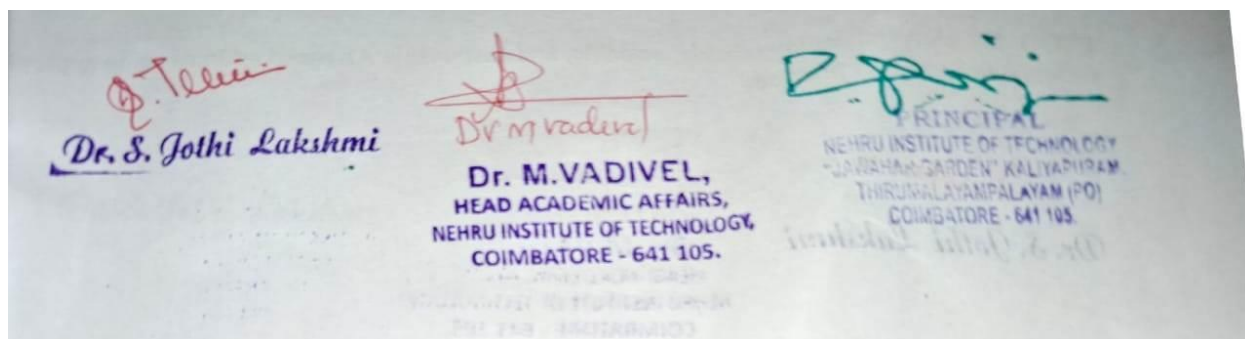
SDG:4

**JAVA PROGRAMMING
LABORATORY**

Category: PCC

L T P C

0 0 4 2



COURSEOBJECTIVE:

1. To understand and develop programs using Java, leveraging object-oriented programming principles
2. To create and manage Java programs utilizing constructors, destructors, member functions, static members, and nested classes.
3. To use the concepts of classes, objects, inheritance, polymorphism, and function overloading in Java programs.
4. To handle exceptions and implement multithreading in Java for efficient and robust application development.
5. To perform file operations and implement networking using Java, applying relevant classes and Techniques for real-world applications.

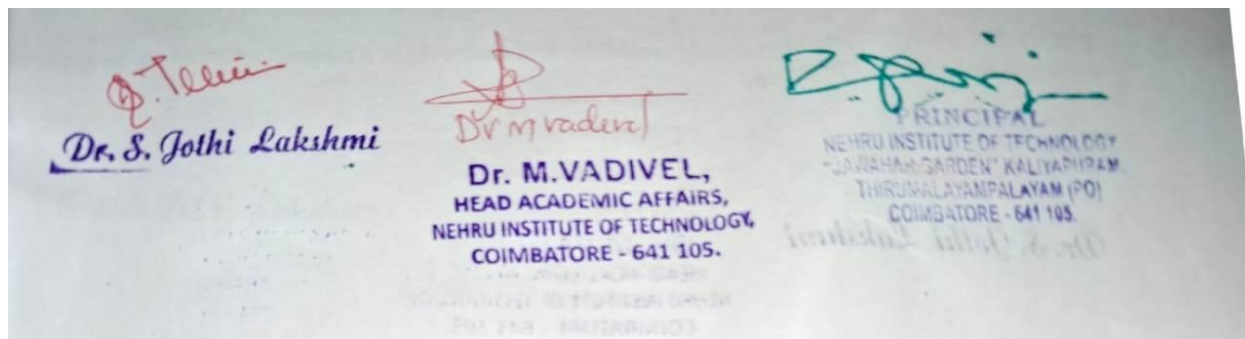
LIST OF EXPERIMENTS

1. Develop simple Java programs using control statements and arrays
2. Demonstrate inheritance using Java programs
3. Develop Java applications using interfaces and packages
4. Demonstrate exception handling in Java
5. Develop multithreaded applications in Java
6. Develop programs in Java using java.io packages
7. Demonstrate string manipulation in Java
8. Develop applications in Java using collections classes
9. Design a GUI based simple application using AWT classes
10. Write a program to register students data using JDBC with MySQL Database
11. Mini Projects.
 - a. **Student Record System** – Store, search, and update student details.
 - b. **Library Management System** – Book issue/return and user management.
 - c. **Simple Banking Application** – Deposit, withdraw, check balance.
 - d. **Online Quiz System** – Multiple choice quiz with score calculation.
 - e. **To-Do List Application** – Add, update, delete daily tasks.
 - f. **Hotel Reservation System** – Room booking and availability check.
 - g. **Currency Converter** – Convert between currencies using fixed rates.

COURSE OUTCOMES:

At the end of the course, students would

CO1: Explain the fundamental concepts of Object- Oriented Programming and Java, including key



OOP principles and Java basics

CO2: Use appropriate Java constructs such as classes, objects, to represent and manage data.

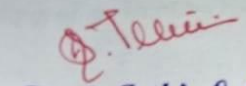
CO3: Write Java programs incorporating control structures, arrays, inheritance, and polymorphism to solve complex problems.

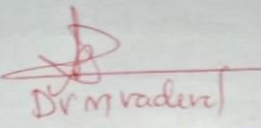
CO4: Handle exceptions and implement exception handling, and multithreading in Java to develop efficient and robust applications.

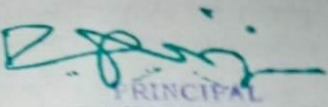
CO5: Perform file operations and implement networking using Java to create practical, real-world applications.

TOTAL: 60 PERIODS

CO's-PO's&PSO's MAPPING														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO 1	PSO 2
CO1	2	1	1		2	-	-	-	-	1	-	-	3	-
CO2	2	1	1	1	2	-	-	-	-	1	-	-	3	-
CO3	2	1	1	1	2	-	-	-	-	1	-	-	3	-
CO4	2	1	1	1	2	-	-	-	-	1	-	-	3	-
CO5	2	1	1	1	2	-	-	-	-	1	-	-	3	-
Correlation levels: 1 – low 2 – medium 3 – high “-” – no correlation														


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