Sri
SAI RAM
ENGINEERING COLLEGE
An Autonomous Institution

West Tambaram, Chennai - 44

www.sairam.edu.in

Approved by AICTE, New Delhi
Affiliated to Anna University

DEPARTMENT OF

COMPUTER SCIENCE & BUSINESS SYSTEMS

REGULATIONS 2024

For Students Admitted from the Academic Year 2026-2027 onwards

AUTONOMOUS

CURRICULUM AND

SYLLABUS

I - II

SEMESTERS

SRI SAIRAM ENGINEERING COLLEGE

VISION

To emerge as a "Centre of excellence " offering Technical Education and Research opportunities of very high standards to students, develop the total personality of the individual and instil high levels of discipline and strive to set global standards, making our students technologically superior and ethically stronger, who in turn shall contribute to the advancement of society and humankind.

MISSION

We dedicate and commit ourselves to achieve, sustain and foster unmatched excellence in Technical Education. To this end, we will pursue continuous development of infra-structure and enhance state-of-the-art equipment to provide our students a technologically up-to date and intellectually inspiring environment of learning, research, creativity, innovation and professional activity and inculcate in them ethical and moral values.

Educational Organization Management System (EOMS) Policy

We at Sri Sai Ram Engineering College are committed to empower our students not only to excel academically but also imbibe essential values, enabling them to become exemplary global citizens. We build a better nation by fostering excellence and innovative practices in Engineering, Technology and Management Education. We are dedicated to consistently enhancing our systems, infrastructure and services to meet the needs and expectations of all our stakeholders for sustainable growth

DEPARTMENT OF COMPUTER SCIENCE AND BUSINESS SYSTEMS

VISION

To impart competent industry relevant education, skillful research and innovative computer science professionals with managerial skills, human and social values.

MISSION

Department of Computer Science & Business Systems, Sri Sairam Engineering College is committed to

M1 Produce highly proficient Computer Science Professionals with managerial knowledge of global standards and practices.

M2 Ascertain new technologies through ethical and innovative research and developments

M3 Impart knowledge through learning, creativity and inculcate in them critical thinking with moral values.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1 The Graduants will explore and excel in emerging domains such as Analytics, Machine Learning, Cloud Computing, and Internet of Things and apply the knowledge to design and develop solutions to business and societal needs.

PEO 2 Graduates will perform Research by designing & developing solutions using modern tools for complex problems in the field of IT by adapting to the rapid technological advancements.

PEO 3 The students graduating will have profound knowledge in Computer Science with equal appreciation of humanities, management sciences and human values.

PEO 4 The Graduants will be industry ready with required business skills in service orientated industries.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1 Ability to create innovative software professionals with the emerging technologies and service orientations.

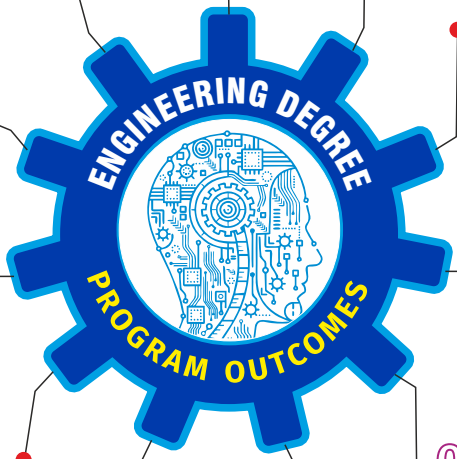
PSO 2 Ability to design and implement industry demand professionals with business principles aligned with equivalent knowledge in humanities and business systems.

COMPONENTS OF THE CURRICULUM (COC)

Course Component	Curriculum Content (% of total number of credits of the program)	Total number of contact hours	Total Number of credits
Basic Sciences (BS)	18	33	30
Engineering Sciences (ES)	5	14	09
Humanities and Social Sciences (HS)	7	11	11
Professional Electives (EL)	12	21	21
Program Core + Program Lab (PC+PL)	27	56	45
Program theory with Lab (PW) / Program Lab With Theory (PT)	10	23	17
Open Elective (OE)	7	12	12
Training & Placement (TP)	2	14	4
Innovation & Development (ID) / Project (PJ)	10	32	16
Internships (IN)	2	9	3
Mandatory Courses (MC)	NA	2	NA
Total		**227**	**168**

PROGRAMME OUTCOMES(POs)

PROGRAM OUTCOME REPRESENTS THE KNOWLEDGE, SKILLS AND ATTITUDES THAT THE STUDENTS WOULD BE EXPECTED TO HAVE AT THE END OF THE 4 YEAR ENGINEERING DEGREE PROGRAM



01 Engineering knowledge

Apply math, science, computing, and engineering knowledge to solve complex engineering problems.

02 Problem Analysis

Identify and analyze complex problems using research to draw valid conclusions.

03 Design / Development of solutions

Design practical and innovative solutions considering safety, cost, culture, and the environment.

04 Investigate complex problems

Use research methods—experiments, modeling, and data analysis—to investigate complex problems.

05 Engineering Tool Usage

Apply modern engineering and IT tools for analysis and problem solving with awareness of their limits.

06 The Engineer and the World

Assess societal, environmental, legal, health, and cultural impacts of engineering solutions.

07 Ethics

Follow professional ethics, human values, diversity, inclusion, and legal responsibilities.

08 Individual & Teamwork

Work effectively as an individual and as a team member or leader in multidisciplinary groups.

09 Communication

Communicate clearly in writing and presentations for diverse technical and non-technical audiences.

10 Project Management and Finance

Apply management and financial principles to plan and execute projects effectively.

11 Life-long learning

Engage in independent lifelong learning and adapt to new technologies with critical thinking.

AUTONOMOUS CURRICULA AND SYLLABI
Regulations 2024

SEMESTER I

S. NO	COURSE CODE	COURSE TITLE	WEEK HOURS			CONTACT PERIODS	CREDITS
			L	T	P		
THEORY							
1	24HSEN102	Business Communication and Value Science - I	3	0	0	3	3
2	24BSMA102	Introductory Topics in Calculus, Probability and Statistic	3	0	0	3	3
3	24BSPH102	Physics for Computing Science	3	0	0	3	3
4	24EEPW101	Principles of Electric Engineering with Laboratory	3	0	2	5	4
5	24HSTA101	Heritage of Tamils	1	0	0	1	1
PRACTICALS							
1	24ESGE104	Engineering Practices Laboratory (TVET)	0	0	7	7	2
2	24BSPL102	Physics for Computing Science Laboratory	0	0	2	2	1
3	24CSPT101	Hands-On Course on Programming C	1	0	4	5	3
VALUE ADDITIONS - I							
1	24ESID102	Idea Engineering laboratory - I	0	0	2	2	1
2	24ENTP101	Functional Life Skills	0	0	1	1	1
3	24HSTP101	Take Charge: College Readiness - I	1	0	0	1	0
ONLINE SUPPLEMENTARY							
		As Recommended by BOS					
						33	**22**

SEMESTER II

S. NO	COURSE CODE	COURSE TITLE	WEEK HOURS			CONTACT PERIODS	CREDITS
			L	T	P		
THEORY							
1	24HSEN202	Business Communication and Value Science - II	3	0	0	3	3
2	24BSMA204	Discrete Mathematics for Computer Science	3	1	0	4	4
3	24BSMA205	Statistical Methods with Laboratory	3	0	2	5	4
4	24BSPH205	Principles of Electronics Engineering	3	0	0	3	3
5	24CBPC201	Data Structures and Algorithms	3	0	0	3	3
6	24CYMC201	Environmental Studies	2	0	0	2	0
7	24HSTA201	Tamils And Technology	1	0	0	1	1
8	24HSNC201	NCC Course level - I	2	0	0	2	0
VALUE ADDITIONS - II							
1	24CBPL201	Data Structures and Algorithms Laboratory	0	0	4	4	2
2	24BSPL201	Principles of Electronic Engineering laboratory	0	0	2	2	1
PRACTICALS							
1	24ESID202	Idea Engineering Laboratory	0	0	2	2	1
2	24ENTP201	Digital Dynamics	0	0	2	2	0
3	24HSTP201	Take Charge: College Readiness - II	1	0	0	1	0
ONLINE SUPPLEMENTARY							
	24ESMC201	MS OFFICE(Mandatory Non Credit)	0	0	0	0	0
						34	**22**

*only for NCC cadets

SEMESTER - I

COURSE CODE: 24HSEN102	BUSINESS COMMUNICATION & VALUE SCIENCE – I	L	T	P	CP	C
		3	0	0	3	3
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 4				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- To motivate the learners to look within and create a better version of themselves
- To develop the basic LSRW skills of the learners
- To understand and use the tools of structural written communication
- To help students to identify personality traits and to gain social awareness
- To understand and apply the values of life skills

MODULE - I SELF AWARENESS 8

Self Intro - Self Awareness - Activity: Who Am I? - SWOT - TOWS - Reading Newspaper (Skimming & Scanning) - Writing Newspaper Report - Listening to TED Talks - Activity: Speaking: Peer Awareness

MODULE - II BASIC TENETS OF COMMUNICATION 8

Overview of Communication Skills - Barriers in Communication - Verbal/Nonverbal Communication - Critical Reading (Essays) - 7Cs of Communication - Listening to Conversations - Role Play: Interviewing Celebrities

MODULE - III WRITTEN COMMUNICATION 8

Email etiquettes & Email writing - Drafting Resume and Cover letter - Paragraph Writing - Summary Writing - Creative Writing

MODULE - IV PERSONALITY TRAITS 7

Big Five Personality Traits - Introduction to Social Issues - Activity: Skit on Social Issues -- Review Writing - Listening to Audiobooks - Speaking: Group Discussion on Current Affairs

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

MODULE - V LIFE SKILLS 7

Introduction to Life Skills - Skills and Values of a Captain - Belbin's Team Roles - Reading (Stories/Novels) - Story Writing based on Life Skills - Watching videos on Empathy - 'Fish and I'(Babak Habibifar)

MODULE - VI LEADERSHIP TRAITS 7

Intro on leadership traits - role of team member - teamwork - motivating people – Group discussion: TCS Values – respect for individual and integrity - Speaking: Situational Dialogues

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Parikh J P, Anshu Surve, et.al, Business Communication: Basic Concepts and Skills, Orient BlackSwan, 2011.
2. Lawrence G. Fine, The SWOT Analysis: Using Your Strength to Overcome Weaknesses, Using Opportunities to Overcome Threats, 2010.
3. B.Hurn& B. Tomalin, Cross-Cultural Communication Theory and Practice, Palgrave Macmillian, 2013.

REFERENCES:

1. English vocabulary in use – Alan Mccarthy and O'dell
2. The Handbook of Communication in Cross-cultural Perspective, Ed. DonalCarbaugh, Routledge, September 5, 2016
3. Urban Diversity: Space, Culture, and Inclusive Pluralism in Cities Worldwide, Eds. Caroline Wanjiku, Blar A. Rubieet. al, John Hopkins University Press, 2010

WEB REFERENCES:

1. Train your mind to perform under pressure- Simon sinek
   https://curiosity.com/videos/simon-sinek-on-training-your-mind-to-perform- underpressure-capture-your-flag/
2. Brilliant way one CEO rallied his team in the middle of layoffs
   https://www.inc.com/video/simon-sinek-explains-why-you-should-put-people- beforenumbers.html
3. Will Smith's Top Ten rules for success
   https://www.youtube.com/watch?v=bBsT9omTeh0

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

ONLINE RESOURCES:

1. https://www.coursera.org/learn/learning-how-to-learn
2. https://www.coursera.org/specializations/effective-business-communication

OUTCOMES:

Upon completion of the course, the learners will be able to:

1. Analyze their own self and write reports employing grammatically correct sentences (K3)
2. Apply the basic tenets of communication and engage in conversations by expressing appropriate verbal and non-verbal cues and methods (K3)
3. Summarize the given passage and to construct resume and emails in a convincing manner (K3)
4. Apply positive personality traits and recognize social issues (K3)
5. Apply life skills for different situations and developing a positive self image (K3)
6. Exhibit leadership qualities and display team spirit (K3)

CO- PO, PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	3	-	2	-	-
CO2	-	-	-	-	-	-	-	-	3	-	2	-	-
CO3	-	-	-	-	-	-	-	-	3	-	2	-	-
CO4	-	-	-	-	-	-	-	-	3	-	2	-	-
CO5	-	-	-	-	-	-	-	3	3	-	2	-	-
CO6	-	-	-	-	-	-	-	3	3	-	2	-	-

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

SEMESTER - I

COURSE CODE: 24BSMA102	INTRODUCTORY TOPICS IN CALCULUS, PROBABILITY AND STATISTICS	L	T	P	CP	C
		3	0	0	4	3
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 4				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- To impart basic knowledge in differential and integral calculus and apply it to solve a
- wide variety of engineering problems.
- To introduce the fundamental concepts in the theory of probability and statistics for studying engineering subjects.

MODULE - I DIFFERENTIAL CALCULUS 8

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules - Maxima and Minima of functions of one variable.

MODULE - II INTEGRAL CALCULUS 8

Definite and Indefinite Integrals - Types of Integration: Integration by substitution, Integration by parts, Bernoulli's formula - Double and Triple Integrals (Cartesian coordinates) - Applications of double and triple Integrals - Area and Volume.

MODULE - III PROBABILITY AND RANDOM VARIABLES 8

Concept of experiments, sample space, event - Definition of Combinatorial Probability - Conditional Probability - Bayes theorem - Expected values and moments: mathematical expectation and its properties - Moments (including variance) and their properties, interpretation - Moment generating function.

MODULE - IV DISCRETE PROBABILITY DISTRIBUTIONS 5

Binomial, Poisson and Geometric distributions.

MODULE - V CONTINUOUS PROBABILITY DISTRIBUTIONS 8

Uniform, Exponential, Normal, Chi-square, t and F distributions.

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

MODULE - VI INTRODUCTION TO STATISTICS 8

Definition of Statistics - Basic objectives. Applications in various branches of science with example - Collection of data: Internal and external data, primary and secondary data - Population and sample, representative sample - Descriptive statistics: Classification and tabulation of univariate data, graphical representation, frequency curves - Descriptive measures - central tendency and dispersion - Bivariate data, summarization, marginal and conditional frequency distribution.

TOTAL: 45 PERIODS

TEXTBOOKS:

1. Higher Engineering Mathematics, B. S. Grewal, 44th Edition, Khanna Publishers, New Delhi, 2023.
2. Introduction of Probability Models, S. M. Ross, 12th Edition, Academic Press, N.Y., 2019.
3. Fundamentals of Statistics, vol. I & II, A. Goon, M. Gupta and B. Dasgupta, 3rd Edition, World Press Private Ltd., 1968.

REFERENCES:

1. Advanced Engineering Mathematics, Peter V. O'Neil, 7th Edition, Cengage Learning, 2011.
2. Advanced Engineering Mathematics, M. D. Greenberg, 2nd Edition, Pearson Education, 1998.
3. Applied Mathematics, Vol. I & II, P. N. Wartikar and J. N. Wartikar, Pune Vidyarthi ,Ghriha Prakashan, 1999.
4. A first course in Probability, S. M. Ross, 8th Edition, Pearson, 2010.
5. Probability and Statistics for Engineers, I. R. Miller, J. E. Freund and R. Johnson 8th Edition, PHI, 2011.
6. Introduction to the Theory of Statistics, A. M. Mood, F. A. Graybill and D. C. Boes, 3rd Edition, McGraw Hill Education, 2017.

WEB RESOURCES:

1. https://tinyurl.com/2uyw3eys
2. https://amsi.org.au/ESA_Senior_Years/PDF/IntroDiffCall3b.pdf
3. https://mlerma54.github.io/courses/math214-2-02f/notes/c2-all.pdf
4. https://www.gpnngr.org.in/lms/1st%20Year%20Integral%20calculus.pdf
5. https://www.ebookbou.edu.bd/Books/Text/SOB/MBA/mba_2306/Unit-10.pdf

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

6. https://www.schoollearningresources.com/PDF/_Basics%20of%20Statistics.pdf
7. http://eflorakkl.in/staff/uploads2/Multiple%20Integrals%20and%20their%20Applications.

ONLINE RESOURCES

1. https://www.khanacademy.org/math/statistics-probability
2. https://www.khanacademy.org/math/differential-calculus
3. https://www.khanacademy.org/math/integral-calculus
4. https://www.youtube.com/watch?v=mIeeVrv447s&t=55s
5. https://www.youtube.com/playlist?list=PLpklqhIbn1jq348mSrMmmWMQlixyG8Snk

OUTCOMES:

1. Determine limits and continuity of functions, and apply derivatives to find extreme values. (K3)
2. Compute definite and indefinite integrals, and apply multiple integrals to determine area and volume in engineering applications. (CO2) (K3)
3. Compute probabilities, conditional probabilities, and expected values of random variables. (K3)
4. Apply standard discrete probability distributions to solve real-life problems. (CO4) (K3)
5. Apply standard continuous probability distributions to solve real-life problems. (CO5) (K3)
6. Compute measures of central tendency and dispersion for statistical data. (CO6) (K3)

CO – PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	2	1
CO2	3	-	-	-	-	-	-	-	-	-	-	2	1
CO3	3	-	-	-	-	-	-	-	-	-	-	3	2
CO4	3	-	-	-	-	-	-	-	-	-	-	3	2
CO5	3	-	-	-	-	-	-	-	-	-	-	3	2
CO6	3	-	-	-	-	-	-	-	-	-	-	2	3

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

SEMESTER - I

COURSE CODE: 24BSPH102	PHYSICS FOR COMPUTING SCIENCE	L	T	P	CP	C
		3	0	0	3	3
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 5,7,9,11				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- To understand the fundamentals of interference and polarization of light.
- To grasp the basic concepts and laws of thermodynamics.
- To comprehend the principles of mechanical and electrical oscillaTo understand the structure and properties of crystals in crystallography.
- To learn the fundamentals and applications of lasers and fiber optics.
- To understand the basic principles of electromagnetism and electromagnetic waves.

MODULE – I INTERFERENCE - PRINCIPLE OF SUPERPOSITION YOUNG'S EXPERIMENT 8

Introduction- Interference – Conditions - Coherence - Superposition -Young's double slit Experiment - Theory of Interference Fringes – Newton's Rings – Diffraction – Types - Fresnel's biprism–difference between Interference and Diffraction - Fraunhofer Diffraction at Single Slit - Plane Diffraction Grating - Polarization of light: Introduction – Concept of production of polarized beam of light from two SHM acting at right angle; Plane, Elliptical and Circularly Polarized Light- Brewster's Law - Double Refraction.

MODULE - II THERMODYNAMICS 7

Introduction – Difference between dynamics and thermodynamics – Thermodynamic system – Thermodynamic properties (Intensive and Extensive variables) – Zeroth law of thermodynamics, first law of thermodynamics, brief discussion on application of 1st law -second law of thermodynamics and concept of Engine – entropy – change in entropy in reversible and irreversible processes.

MODULE - III OSCILLATION 8

Introduction– Periodic motion – simple harmonic motion – characteristics – Free vibration of simple spring mass system – Resonance – Types – Applications. Damped harmonic oscillator – heavy, critical and light damping – Energy Decay in a Damped Harmonic Oscillator – Quality Factor – Forced Mechanical and Electrical Oscillators.

MODULE - IV CRYSTAL PHYSICS 7

Introduction – Classification – Unit cell – Crystal system – Bravais Lattices–Miller Indices – D – Spacing – Basic parameters for Cubic system (SC, BCC, FCC) and HCP crystal Structures – Crystal defects – Burger vector.

MODULE - V LASER AND FIBER OPTICS 8

Introduction– principle – Characteristics of Laser - Temporal and Spatial Coherence (Qualitative). Einstein's theory of Matter Radiation Interaction and A and B Co-efficient – Amplification of Light by Population Inversion – Different Types of Lasers: CO2 and Neodymium Lasers – Engineering Applications of Lasers. Fiber optics – Types of optical fibers (material, refractive index and mode). Losses associated with optical fibers – applications.

MODULE – VI BASIC IDEA OF ELECTROMAGNETISMS 7

Introduction – Principle – Current Density – Continuity Equation for Current Densities - Maxwell's Equation – Electromagnetic wave equation– Maxwell's Equation in Vacuum and Non-conducting Medium – Transverse nature of electromagnetic waves – Plane electro–magnetic waves in free space – Poynting theorem - applications.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Parikh J P, Anshu Surve, et.al, Business Communication: Basic Concepts and Skills, Orient BlackSwan, 2011.
2. Lawrence G. Fine, The SWOT Analysis: Using Your Strength to Overcome Weaknesses, Using Opportunities to Overcome Threats, 2010.
3. B. Hurn& B. Tomalin, Cross-Cultural Communication Theory and Practice, Palgrave Macmillian, 2013.

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REFERENCES:

1. English vocabulary in use – Alan Mccarthy and O'dell
2. The Handbook of Communication in Cross-cultural Perspective, Ed. DonalCarbaugh, Routledge, September 5, 2016
3. Urban Diversity: Space, Culture, and Inclusive Pluralism in Cities Worldwide, Eds. Caroline Wanjiku, Blar A. Rubieet. al, John Hopkins University Press, 2010

WEB REFERENCES:

1. Train your mind to perform under pressure- Simon sinek
   https://curiosity.com/videos/simon-sinek-on-training-your-mind-to-perform- underpressure-capture-your-flag/
2. Brilliant way one CEO rallied his team in the middle of layoffs
   https://www.inc.com/video/simon-sinek-explains-why-you-should-put-people- beforenumbers.html
3. Will Smith's Top Ten rules for success
   https://www.youtube.com/watch?v=bBsT9omTeh0

ONLINE RESOURCES:

1. https://www.coursera.org/learn/learning-how-to-learn
2. https://www.coursera.org/specializations/effective-business-communication

OUTCOMES:

Upon completion of the course, the learners will be able to:

1. Analyze their own self and write reports employing grammatically correct sentences (K3)
2. Apply the basic tenets of communication and engage in conversations by expressing appropriate verbal and non-verbal cues and methods (K3)
3. Summarize the given passage and to construct resume and emails in a convincing manner (K3)
4. Apply positive personality traits and recognize social issues (K3)
5. Apply life skills for different situations and developing a positive self image (K3)
6. Exhibit leadership qualities and display team spirit (K3)

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

CO- PO, PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	3	-	2	-	-
CO2	-	-	-	-	-	-	-	-	3	-	2	-	-
CO3	-	-	-	-	-	-	-	-	3	-	2	-	-
CO4	-	-	-	-	-	-	-	-	3	-	2	-	-
CO5	-	-	-	-	-	-	-	3	3	-	2	-	-
CO6	-	-	-	-	-	-	-	3	3	-	2	-	-

SEMESTER - I

COURSE CODE: 24EEPW101	PRINCIPLES OF ELECTRICAL ENGINEERING WITH LABORATORY	L	T	P	CP	C
		3	0	0	2	4
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 4,9				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- To fundamental concepts of electrical circuits, circuit elements and measuring devices through theoretical and experimental study.
- To develop the ability to formulate and solve DC circuit problems using Kirchhoff's laws and network theorems, and verify the results experimentally.
- To develop an understanding of AC single-phase and three-phase circuits and apply the concepts through circuit analysis and simulation.
- To the principles of electrostatics and energy storage in capacitors and analyze their charging and discharging characteristics through simulation.
- To introduce the principles of electromagnetism, inductance and electromechanical energy conversion and relate the theoretical concepts to practical electrical applications.
- To develop fundamental skills in electrical measurements, sensors and transducers through the study and practical use of measuring devices.

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

MODULE – I INTRODUCTION 8

Active and passive elements - Current and voltage relationships - Voltage and current sources - Ideal and practical sources - Reduction of networks using series and parallel combinations - Concept of work, power and energy - Kirchhoff's laws.

MODULE – II BASIC CIRCUITS 8

Network reductions using mesh and nodal analysis - Reduction of DC networks using Superposition theorem - Thevenin's theorem - Norton's Theorem - Maximum Power Transfer theorem - Star/Delta transformation

MODULE – III FUNDAMENTALS OF AC 8

AC waveform definitions - Form factor - Peak factor - Phasor representation - Concept of impedance – Admittance-Complex power-Power factor-Single phase and three phase concepts-Study of RL, RC, RLC series and parallel circuit-Series resonance

MODULE – IV ELECTROSTATICS 7

Electrostatic field-Electric field strength-Concept of permittivity in dielectrics-Energy stored in capacitors-Charging and discharging of capacitors

MODULE – V ELECTROMAGNETICS 7

Electromagnetism-Magnetic field and Faraday's law-Magnetic materials and B-H curve-Self and mutual –inductance-Ampere's law-Electromechanical energy conversion-Transformers and its types

MODULE – VI MEASUREMENTS AND TRANSDUCERS 7

Functional block of measuring devices/sensors and transducers-Piezoelectric and thermocouple-Elementary methods for the measurement of electrical quantities-Concept of indicating, integrating and recording instruments

LIST OF EXPERIMENT 15

1. Study of Electrical elements, sources, measuring devices and transducers.
2. Experimental solving of electrical circuit problems using Kirchoff's voltage and current laws.
3. Experimental Solving of electrical circuit problems using Thevenin's theorem.

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

4. Experimental Solving of electrical circuit problems using Norton's theorem.
5. Experimental Solving of electrical circuit problems using Superposition theorem.
6. Simulation of R-C electric circuit transients.

TOTAL: 60 PERIODS

TEXT BOOKS:

1. E. Fitzgerald, Kingsely Jr Charles, D. Umans Stephen, "Electric Machinery", Sixth Edition, Tata McGraw Hill.
2. B.L. Theraja, "A Textbook of Electrical Technology", Vol. I, Chand and Company Ltd., New Delhi.
3. V. K. Mehta, "Basic Electrical Engineering", S. Chand and Company Ltd., New Delhi.
4. J. Nagrath and Kothari, "Theory and problems of Basic Electrical Engineering", Second Edition, Prentice Hall of India Pvt. Ltd.

REFERENCES:

1. T.K. Nagsarkar and M. S. Sukhija, "Basic of Electrical Engineering", Oxford University Press, 2011.
2. D. J. Griffiths, "Introduction to Electrodynamics", Fourth Edition, Cambridge University Press.
3. William H. Hayt & Jack E. Kemmerly, "Engineering Circuit Analysis", McGraw-Hill Book Company Inc.

WEB REFERENCES:

1. www.electrical4u.net/useful-information/top-10-electrical-website-forelectrical-engineering-students/#2_Electrical4ucom
2. www.academia.edu/35125273/Engineering_Principles_and_ Applications_of_Electrical_Engineering

ONLINE RESOURCES:

1. https://swayam.gov.in/nd1_noc19_ee35/preview
2. https://swayam.gov.in/nd1_noc19_ee35/preview
3. https://nptel.ac.in/courses/108105112

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

OUTCOMES:

Upon completion of the course, the learners will be able to:

1. Identify the concepts of basic electrical circuits, series and parallel connections, and Kirchhoff's laws and interpret their applications in electrical circuits. (K3)
2. Apply mesh, nodal, and network theorem techniques to solve DC circuits and verify the results through experimental measurements. (K3)
3. Apply AC circuit concepts to calculate and simulate the characteristics of circuits containing R, L, and C elements. (K3)
4. Utilize the principles of electrostatics and energy storage in capacitors by simulating capacitor charging and discharging characteristics. (K3)
5. Apply the principles of electromagnetism, inductance and electromechanical energy conversion to explain the operation of practical electrical devices. (K3)
6. Select and use appropriate electrical measuring instruments, sensors and transducers for measuring electrical quantities and interpret the experimental results. (K3)

CO- PO &PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	1	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-
CO3	3	3	1	-	-	-	-	-	-	1	-
CO4	3	2	1	-	-	-	-	-	-	-	-
CO5	3	2	2	-	-	1	-	-	-	-	-
CO6	2	2	1	-	-	-	-	-	1	-	-

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

SEMESTER - I

COURSE CODE: 24HSTA101	HERITAGE OF TAMILS	L	T	P	CP	C
		1	0	0	1	1
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 4				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- Develop interest for classical language and literature to promote Tamil heritage
- Understand the ancient Tamil sculptures, folk and martial arts and contribution of Tamil to the freedom of India

அலகு ஐ மொழி மற்றும் இலக்கியம்

இந்திய மொழிக் குடும்பங்கள் ___ திராவிட மொழிகள் ___ தமிழ் ஒரு செம்மொழி ___ தமிழ் செவ்விலக்கியங்கள் ___ சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை ___ சங்க இலக்கியத்தில் பகிர்தல் அறம் ___ திருக்குறளில் மேலாண்மைக் கருத்துகள்

UNIT I LANGUAGE AND LITERATURE 5

Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural

அலகு II இடைகால மற்றும் நவீன இலக்கியங்கள்

தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம்- பக்தி இலக்கியம் ___ ஆழ்வார்கள் மற்றும் நாயன்மார்கள் ___ சிற்றிலக்கியங்கள் ___ தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி ___ தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு

Unit II MEDIEVAL AND MODERN LITERATURE 5

Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

அலகு III மரபு ஓ பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை – சிற்பக் கலை

நடுகல் முதல் நவீன சிற்பங்கள் வரை ___ ஐம்பொன் சிலைகள் ___ பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் ___ தேர் செய்யும் கலை ___ சுடுமண் சிற்பங்கள் ___ நாட்டுப்புறத் தெய்வங்கள் ___ குமரிமுனையில் திருவள்ளுவர் சிலை ___ இசைக் கருவிகள் ___ மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் ___ தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

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UNIT III HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE 5

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.

அலகு IV நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

UNIT IV FOLK AND MARTIAL ARTS 5

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

அலகு V தமிழர்களின் திணைக் கோட்பாடுகள்

தமிழகத்தின் தாவரங்களும், விலங்குகளும் — தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் — தமிழர்கள் போற்றிய அறக்கோட்பாடு — சங்க காலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் — சங்ககால நகரங்களும் துறைமுகங்களும் — சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி — கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

UNIT V THINAI CONCEPT OF TAMILS 5

Flora and Fauna of Tamils & Aham and Puram 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.

அலகு VI இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு — இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் — சுயமரியாதை இயக்கம் — இந்தியமருத்துவத்தில் சித்த மருத்துவத்தின் பங்கு — கல்வெட்டுகள், கையெழுத்துப்படிகள் — தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.

UNIT VI CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE 5

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.

TOTAL: 30 PERIODS

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு — மக்களும் பண்பாடும் — கே.கே. பிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்)
2. கணினித் தமிழ் — முனைவர் இல.சுந்தரம் (விகடன் பிரசுரம்)
3. கீழடி — வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை — ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian> Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. 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)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation> Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

OUTCOMES:

Upon completion of the course, the learners will be able to:

1. மொழிக் குடும்பங்களின் வரலாறு மற்றும் தமிழ் இலக்கியங்களை மதிப்பிடுகிறார்கள் Students evaluate the history of language families and Tamil literatures (K3)
2. பக்தி மரபுகளின் தாக்கம் பெற்ற தமிழ் இலக்கியங்களைப் புரிந்துகொள்கிறார்கள் Students understand Tamil literatures influenced by Philosophical and religious traditions (K3)
3. தமிழகத்தின் பாறை, சிற்பம், ஓவியம்- கலை மரபுகளைப் பகுப்பாய்வு செய்கிறார்கள் Students analyze the artistic traditions of Tamil Nadu such as rock art, sculpture, and painting (K3)
4. தமிழக நாட்டுப்புறக் கலைகள் மற்றும் தற்காப்புக் கலைகளின் மாண்புகளை உணர்ந்து கொள்கிறார்கள் Students realize the significance of Tamil Nadu's folk arts and martial arts (K3)
5. பழந்தமிழரின் திணையியல் வாழ்வியலை மீளாய்வு செய்கிறார்கள் Students re-examine the ecological lifestyle (Thinai-based life) of the ancient Tamils (K3)
6. தேசிய இயக்கம் மற்றும் இந்தியப் பண்பாட்டில் தமிழர்களின் பங்களிப்பினை நினைவுகூர்கிறார்கள் Students recall the contribution of Tamils to the National Movement and Indian culture (K3)

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

CO- PO, PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	3	3	-	-	-	-	-	-	-	2	2	2
CO2	2	3	3	-	-	-	-	-	-	-	2	2	2
CO3	2	3	3	-	-	-	-	-	-	-	2	2	2
CO4	2	3	3	-	-	-	-	-	-	-	2	2	2
CO5	2	3	3	-	-	-	-	-	-	-	2	2	2
CO6	2	3	3	-	-	-	-	-	-	-	2	2	2

SEMESTER - I

COURSE CODE: 24ESGE104	ENGINEERING PRACTICES LABORATORY	L	T	P	CP	C
		0	0	7	7	2
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 4,9,12				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- To provide exposure to the students with hands-on experience on various basic engineering practices in Electrical and Electronics Engineering, Civil and Mechanical Engineering.

ELECTRICAL ENGINEERING PRACTICE

1. Residential house wiring using switches, fuse, indicator, lamp, and energy meter.
2. Fluorescent lamp wiring.
3. Staircase wiring.
4. Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.
5. Measurement of energy using single phase energy meter.
6. Measurement of resistance to earth of electrical equipment.

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ELECTRONICS ENGINEERING PRACTICE

1. Study of Electronic components and equipment – Resistor- colour coding, measurement of AC signal parameter (peak-peak RMS, period, frequency) using CRO.
2. Study of logic gates AND, OR, EX-OR, and NOT.
3. Generation of Clock Signal.
4. Soldering practice – Components, Devices, and Circuits – Using general purpose PCB.
5. Measurement of ripple factor of Half Wave Rectifier and Full Wave Rectifier.
6. Simulation of Half Wave Rectifier and Full Wave Rectifier using TinkerCAD.

CIVIL ENGINEERING PRACTICE

Buildings:

Study of plumbing and carpentry components of residential and industrial buildings, safety aspects.

Plumbing Works:

1. Study of pipeline joints, its location and functions: valves, taps, couplings,unions, reducers, elbows in household fittings.
2. Study of pipe connections requirements for pumps and turbines.
3. Preparation of plumbing line sketches for water supply and sewage works.
4. Hands-on-exercise: Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.
5. Demonstration of plumbing requirements of high-rise buildings.

Carpentry using Power Tools only:

1. Study of the joints in roofs, doors, windows and furniture.
2. Hands-on-exercise: Wood work, joints by sawing, planing and cutting.

MECHANICAL ENGINEERING PRACTICE

Welding:

1. Preparation of butt joints, lap joints and T- joints by Shielded metal arc welding.
2. Gas welding demo practice.

Basic Machining:

1. Simple Turning and Taper turning.
2. Drilling Practice.

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

Sheet Metal Work:

1. Forming & Bending.
2. Model making – Trays and funnels.
3. Different type of joints.

Demonstration on:

1. Smithy operations, upsetting, swaging, setting down and bending. Example – Exercise – Production of hexagonal headed bolt.
2. Foundry operations like mould preparation for gear and step cone pulley.
3. Fitting – Exercises – Preparation of square fitting and V – fitting models.

TOTAL: 60 PERIODS

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

Electrical

1. Assorted electrical components for house wiring	15 Sets
2. Electrical measuring instruments	10 Sets
3. Study purpose items:	
Iron box, fan and regulator, emergency lamp	1 Each
4. Megger (250V/500V)	1 No
5. Power Tools:	
Range Finder	2 Nos
Digital Live-wire detector	2 Nos

Electronics

1. Soldering guns	10 Nos
2. Assorted electronic components for making circuits	50 Nos
3. Small PCBs	10 Nos
4. Multimeters	40 Nos

Civil

1. Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, couplings, unions, elbows, plugs and other fittings.	15 Sets
2. Carpentry vice (fitted to work bench).	15 Nos
3. Standard woodworking tools.	15 Sets
4. Models of industrial trusses, door joints, furniture joints	5 each
5. Power Tools:	

Rotary Hammer	2 Nos
Demolition Hammer	2 Nos
Circular Saw	2 Nos
Planner	2 Nos
Hand Drilling Machine	2 Nos
Jigsaw	2 Nos

Mechanical

1. Arc welding transformer with cables and holders	5 Nos
2. Arc welding transformer with cables and holders	5 Nos
3. Welding accessories like welding shield, chipping hammer, wire brush, etc.	5 Sets
4. Oxygen and acetylene gas cylinders, blow pipe and other welding outfit.	2 Nos
5. Centre lathe.	2 Nos
6. Hearth furnace, anvil and smithy tools.	2 Sets
7. Moulding table, foundry tools.	2 Sets
8. Power Tool: Angle Grinder.	2 Nos
9. Study-purpose items: centrifugal pump, air-conditioner.	1 each

OUTCOMES:

Upon completion of the course, the student will be able to:

1. Infer the values of resistance, peak to peak RMS values, time period, frequency. [K2]
2. Outline the logic gates, rectifier, timer circuits and soldering practices. [K2]
3. Demonstrate the measurement of electrical parameters such as voltage, current, resistance, power and energy. (K2)
4. Illustrate the residential wiring, staircase wiring and fluorescent lamp wiring.[K2]
5. Prepare the carpentry and plumbing joints. (K2)
6. Perform the basic operations of welding, sheet metal work and basic machining operations in Lathe and Drilling (K2)

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	2	2
CO2	3	-	-	-	-	-	-	-	-	-	-	2	2
CO3	3	-	-	-	-	-	-	-	-	-	-	2	2
CO4	3	-		-	-	-	-	-	-	-	-	2	2
CO5	2	-	-	-	-	-	-	-	-	-	-	2	2
CO6	2	-	-	-	-	-	-	-	-	-	-	2	2

SEMESTER - I

COURSE CODE: 24BSPH102	PHYSICS FOR COMPUTING SCIENCE	L	T	P	CP	C
		3	0	0	3	3
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 4,9,12				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- To understand the fundamentals of interference and polarization of light.
- To grasp the basic concepts and laws of thermodynamics.
- To comprehend the principles of mechanical and electrical oscillations
- To understand the structure and properties of crystals in crystallography.
- To learn the fundamentals and applications of lasers and fiber optics.
- To understand the basic principles of electromagnetism and electromagnetic waves.

MODULE – I INTERFERENCE - PRINCIPLE OF SUPERPOSITION YOUNG'S EXPERIMENT 8

Introduction- Interference – Conditions - Coherence - Superposition -Young's double slit Experiment - Theory of Interference Fringes – Newton's Rings – Diffraction – Types - Fresnel's biprism–difference between Interference and

Diffraction - Fraunhofer Diffraction at Single Slit - Plane Diffraction Grating - Polarization of light: Introduction – Concept of production of polarized beam of light from two SHM acting at right angle; Plane, Elliptical and Circularly Polarized Light- Brewster's Law - Double Refraction.

MODULE - II THERMODYNAMICS 7

Introduction – Difference between dynamics and thermodynamics – Thermodynamic system – Thermodynamic properties (Intensive and Extensive variables) – Zeroth law of thermodynamics, first law of thermodynamics, brief discussion on application of 1st law -second law of thermodynamics and concept of Engine – entropy – change in entropy in reversible and irreversible processes.

MODULE - III OSCILLATION 8

Introduction– Periodic motion – simple harmonic motion – characteristics – Free vibration of simple spring mass system – Resonance – Types – Applications. Damped harmonic oscillator – heavy, critical and light damping – Energy Decay in a Damped Harmonic Oscillator – Quality Factor – Forced Mechanical and Electrical Oscillators.

MODULE - IV CRYSTAL PHYSICS 7

Introduction – Classification – Unit cell – Crystal system – Bravais Lattices–Miller Indices – D – Spacing – Basic parameters for Cubic system (SC, BCC, FCC) and HCP crystal Structures – Crystal defects – Burger vector.

MODULE - V LASER AND FIBER OPTICS 8

Introduction– principle – Characteristics of Laser - Temporal and Spatial Coherence (Qualitative). Einstein's theory of Matter Radiation Interaction and A and B Co-efficient – Amplification of Light by Population Inversion – Different Types of Lasers: CO2 and Neodymium Lasers – Engineering Applications of Lasers. Fiber optics – Types of optical fibers (material, refractive index and mode). Losses associated with optical fibers – applications.

MODULE – VI BASIC IDEA OF ELECTROMAGNETISMS 7

Introduction – Principle – Current Density – Continuity Equation for Current Densities - Maxwell's Equation – Electromagnetic wave equation– Maxwell's Equation in Vacuum and Non-conducting Medium – Transverse nature of electromagnetic waves – Plane electro–magnetic waves in free space – Poynting theorem - applications.

TOTAL: 45 PERIODS

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

TEXT BOOKS:

1. A Beiser, "Concepts of Modern Physics", McGraw Hill International, Fifth Edition, 2017.
2. Robert Resnick and Jearl Walker, "Fundamentals of Physics", David Halliday, Wileyplus, 2004.
3. Solid state physics (10th Edition), S. O. Pillai, 2023
4. Heat and Thermodynamics, Brijlal, Subramaniyam.N, 2018

REFERENCE BOOKS:

1. Optics, (Fifth Edition) AjoyGhatak, Tata McGraw Hill.
2. Sears &Zemansky University Physics, Addison-Wesley.
3. Fundamentals of Optics, (Third Edition) Jenkins and White, McGraw-Hill.
4. Introduction to Solid state physics Kittal, Wiley India Edition.
5. Principles of Optics: Electromagnetic Theory of Propagation, Interference and Diffraction of Light, Max Born, Emil Wolf, Cambridge University Press.

OUTCOMES:

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

1. Analyze interference, diffraction, and polarization phenomena to interpret and evaluate optical experiments. (K4)
2. Apply thermodynamic principles to analyze energy, entropy, and the behavior of different systems. (K3)
3. Utilize the principles of simple harmonic motion and oscillations to analyze free, damped, and forced vibrations in mechanical and electrical systems. (K3)
4. Compare the characteristics of various crystal structures and crystal defects. (K3)
5. Apply the principles of lasers and fiber optics to explain different types of lasers and optical fibers and their engineering applications. (K3)
6. Examine Maxwell's equations and electromagnetic wave theory to analyze wave propagation and reflection-transmission phenomena in different media. (K4)

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

CO – PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-
CO6	3	3	-	-	-	-	-	-	-	-	-

SEMESTER - I

COURSE CODE: 24CSPT101	**HANDS ON COURSE ON PROGRAMMING IN C**	**L**	**T**	**P**	**CP**	**C**
		1	**0**	**4**	**5**	**3**
NPTEL CODE: 106105171	**SYLLABUS VERSION 1.1**	**SDG NO. 4,8,9,12**				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- To learn the fundamental concepts and programming constructs of the C programming language.
- To develop C programs using operators, decision-making and looping statements.
- To acquire programming skills using arrays, strings, functions and pointers.
- To understand and implement structures, unions and user-defined data types.

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

MODULE – I FUNDAMENTALS OF C PROGRAMMING 8

Introduction to C – Features of C – Structure of a C Program – Compilation and Execution – Character Set – Tokens – Keywords and Identifiers – Constants and Variables – Data Types – Type Conversion – Input and Output Functions – Operators and Expressions – Arithmetic, Relational, Logical, Assignment, Increment/Decrement and Conditional Operators.

LIST OF EXPERIMENTS

1. Write and execute basic C programs using printf() and scanf().
2. Implement programs using different data types and operators.
3. Write programs to perform arithmetic, relational and logical operations.
4. Develop programs for type conversion and evaluation of expressions.
5. Write a C program to generate Floyd's Triangle for the given number of row.s
6. Write programs to calculate simple mathematical problems such as area, simple interest and temperature conversion.

MODULE – II DECISION MAKING AND LOOPING 8

Decision Making – if, if-else, nested if and else-if ladder – switch-case statement – Conditional operator – Looping Statements – while, do-while and for loops – Nested loops – break and continue statements.

LIST OF EXPERIMENTS

1. Write C programs using if, if-else and nested if statements.
2. Develop a program to find the largest/smallest of given numbers.
3. Implement a menu-driven program using switch-case.
4. Write programs to generate multiplication tables and arithmetic series.
5. Develop programs to find factorial, Fibonacci series and prime numbers.
6. Write programs to check whether a number is palindrome, Armstrong number or perfect number.
7. Develop a menu-driven C program that allows the user to select and display either a normal pyramid or an inverted pyramid based on the user's choice.
8. Implement pattern-generation programs using nested loops.

MODULE – III ARRAYS, STRINGS AND FUNCTIONS 8

Arrays – One-dimensional arrays – Two-dimensional arrays – Array initialization and traversal – Searching and Sorting – Strings – String initialization and manipulation – Standard string functions – User-defined Functions – Function declaration, definition and calling – Function arguments – Return values – Recursive functions – Scope and lifetime of variables.

LIST OF EXPERIMENTS

1. Write a C program to read and display elements of a one-dimensional array.
2. Implement linear search and binary search.
3. Implement bubble sort and selection sort.
4. Perform matrix addition, subtraction and multiplication using two-dimensional arrays.
5. Write programs to find the largest, smallest, sum and average of array elements.
6. Implement string operations such as length, copy, concatenate and compare.
7. Develop programs using user-defined functions.
8. Implement recursive functions for factorial and Fibonacci series.

MODULE – IV POINTERS AND DYNAMIC MEMORY MANAGEMENT 7

Pointers – Pointer declaration and initialization – Address and indirection operators – Pointer arithmetic – Pointers and arrays – Pointers and strings – Pointers as function arguments – Call by value and call by reference – Dynamic Memory Allocation – malloc(), calloc(), realloc() and free().

LIST OF EXPERIMENTS

1. Write a C program to demonstrate the use of pointers and address operators.
2. Implement array operations using pointers.
3. Write a program to swap two numbers using pointers.
4. Develop a program to find the sum and average of array elements using pointers.
5. Implement string manipulation using pointers.
6. Demonstrate dynamic memory allocation using malloc() and calloc().
7. Develop a program using realloc() and free ().

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

MODULE – V STRUCTURES, UNIONS AND FILE HANDLING 7

Structures – Declaration and initialization – Array of structures – Nested structures – Structures and functions – Pointers to structures – Unions – Enumerations – typedef – File Concepts – File opening and closing – Reading and writing files – Character and formatted file operations – File handling functions.

LIST OF EXPERIMENTS

1. Create and display student/employee records using structures.
2. Implement an array of structures to store and process multiple records.
3. Write a program using nested structures.
4. Demonstrate the difference between structures and unions.
5. Develop a program using typedef and enumerated data types.
6. Create a text file and perform read and write operations.
7. Develop a program to search and update records stored in a file.

MODULE – VI PROBLEM SOLVING AND MODULAR PROGRAMMING 7

Preprocessor Directives – Header Files – Macros – Conditional Compilation – Command Line Arguments – Modular Programming – Standard Library Functions – Program Design and Problem-Solving Techniques – Algorithm Development – Flowcharts – Debugging and Testing – Computational Problem Solving using C.

LIST OF EXPERIMENTS

1. Develop programs using user-defined header files.
2. Implement programs using macros and preprocessor directives.
3. Develop a C program using command line arguments.
4. Create a menu-driven application integrating functions, arrays and structures.
5. Develop a mini application such as Student Record Management System.
6. Implement a problem-solving application involving searching, sorting and file handling.
7. Develop, test and debug a complete C application based on a real-world problem.

TOTAL: 45 PERIODS

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

TEXT BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", Prentice Hall, 2nd Edition.
2. E. Balagurusamy, "Programming in ANSI C", McGraw Hill Education.
3. Yashavant Kanetkar, "Let Us C", BPB Publications.
4. Reema Thareja, "Programming in C", Oxford University Press.

REFERENCES:

1. Herbert Schildt, "C: The Complete Reference", McGraw Hill.
2. Byron S. Gottfried, "Programming with C", McGraw Hill.
3. K. N. King, "C Programming: A Modern Approach", W. W. Norton & Company.
4. Steven Holzner, Java Black Book, New Edition, Dreamtech Press (BPB Publications), 2019.
5. Timothy Budd, "Understanding Object-Oriented Programming with Java", Updated Edition, Pearson Education, 2000.

WEB REFERENCES:

1. GNU C documentation and compiler resources.
2. https://www.programiz.com/c-programming
3. https://www.geekshttps://www.w3schools.com/c/ forgeeks.org/c/c-programming-language/
4. https://www.tutorialspoint.com/cprogramming/index.htm

OUTCOMES:

Upon completion of the course, the student will be able to:

1. Apply basic C programming constructs including data types, operators, expressions, input/output, control structures, arrays, strings, functions, searching and sorting techniques to solve computational problems. (K3)
2. Analyze pointers, dynamic memory allocation, structures, unions, and user-defined data types to evaluate their impact on memory utilization, data organization and program efficiency. (K4)
3. Analyze C programs involving modular programming, preprocessor directives, file handling, data structures, and integrated programming constructs to determine their effectiveness and efficiency in solving real-world computational problems. (K4)

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

CO-PO, MAPPING:

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

SEMESTER - I

COURSE CODE: 24ESID101	IDEA ENGINEERING LAB - I	L	T	P	CP	C
		0	0	2	2	1
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 1-17				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- Understand the principles of Idea Engineering and creative thinking for engineering problem identification.
- Develop critical thinking, computational thinking, information evaluation, and responsible AI skills for informed engineering decision-making.
- Apply empathetic and ethical observation techniques to identify community needs and SDG-aligned challenges.
- Explore rural governance, rural development, appropriate technologies, and government schemes for sustainable community development.
- Analyze real-world problems, user needs, and market opportunities to formulate innovative and actionable problem statements.
- Understand the fundamentals of intellectual property, startup funding, and innovation commercialization to transform ideas into sustainable entrepreneurial ventures.

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

MODULE - I PHILOSOPHY OF IDEA ENGINEERING 3

Traditional Engineering vs Idea Engineering - Human - centred innovation - People, Process and Purpose Framework - Detect physical problems by observation - User needs and environmental constraints - Innovative mindset - Technical concepts with sustainability and social implications - Creative thinking techniques.

MODULE - II ANATOMY OF A KNOWLEDGE CONSTRUCTOR 3

Knowledge Construction - Information vs Knowledge - Critical Thinking and Information Evaluation - Computational Thinking - Information Synthesis - Digital Noise Filtering and Source Credibility - Triangulation method - Algorithmic Literacy and Digital Feed Influence - Responsible Use of AI and Human Judgment - Ethics in Innovation - Wikipedia Model of Collaborative Knowledge Construction

MODULE - III ART OF EMPATHETIC OBSERVATION 3

Empathetic Observation in Idea Engineering - Emotional Impact Assessment - Surface Wants vs Deeper Needs - Community Gatekeepers and Trust-Building - Scouts for SDG Problem Identification - Bottlenecks, Blind Spots, and Hidden Needs - Ethical Observation, Data Privacy, Dignity, and Consent

MODULE - IV LOCALISING GLOBAL CHALLENGES THROUGH SDG's 4

Community Engagement - Localising Global Challenges - Systems Thinking - Sustainable Development Goals (SDGs) - Millennium Development Goals (MDGs) - Localised Sustainable Development Goals (LSDGs) - Engineering Innovation - Participatory Development - Contextual Mapping - Root Cause Analysis - Stakeholder Analysis - Learning Beyond the Classroom - Social & Field Exposure visits - Ethics in Field Research - Technology for Social Good - Barriers to Sustainable Innovation - Engineers as Change Makers

MODULE - V ENGAGEMENT IN RURAL DEVELOPMENT 4

Gram Panchayat – Foundation of Rural Governance - Rural Technology And Appropriate Technology - Government Schemes And Community Development - Social Innovation And Frugal Innovation - AICTE - UBA 2.0

MODULE - VI PROBLEM IDENTIFICATION AND MARKET GAPS 4

Introduction to Problem Identification and Opportunity Recognition - Understanding Problems: Root Causes vs. Symptoms - Identifying User Needs and Pain Points - Observation, Research, and Data Collection Techniques -

Problem Impact Analysis on Individuals, Society, and Industry - Market Gap Analysis and Opportunity Identification - Formulating Clear and Actionable Problem Statements - Prioritising Problems Using Feasibility, Impact, and Innovation Potential - Tools and Techniques for Problem Analysis - Activities, Case Studies, and Practical Exercises

22 + 8 (Immersion Program) TOTAL: 30 PERIODS

REFERENCES:

1. https://www.india.gov.in/services
2. https://sdgs.un.org/2030agenda
3. https://www.local2030.org/library/375/Sustainable-Development-Goals-and-Gram-Panchayats-Handbook-for-Elected-Representatives.pdf
4. https://sdgknowledgehub.undp.org.in/tag/lsdg/
5. https://www.tnrd.tn.gov.in/constitutionalprovision.html#1

WEB REFERENCES:

1. UN Sustainable Development Goals
2. https://srmuniv.digimat.in/nptel/courses/video/109106200/L30.html
3. https://avcce.digimat.in/nptel/courses/video/109106200/L26.html

OUTCOMES:

Upon completion of the course, the student will be able to:

1. Understand the philosophy of Idea Engineering and apply creative thinking techniques to identify engineering problems.(K2)
2. Apply critical thinking, computational thinking, information evaluation, and ethical use of AI to construct reliable knowledge and support engineering decision-making.(K3)
3. Analyze community needs through empathetic and ethical observation to formulate SDG-aligned, human-centered solutions. (K4)
4. Identify rural development challenges and apply ethical field practices to identify SDG-aligned, sustainable engineering solutions.(K3)
5. Evaluate Gram Panchayat governance, rural technologies, and government schemes to develop sustainable community solutions.(K4)
6. Create and analyze real-world problems, user needs, and market opportunities to formulate actionable problem statements.(K4)

CO-PO, PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	1	-	-	-	-	-
CO2	2	-	-	-	2	-	1	-	-	-	2
CO3	1	2	-	-	-	2	2	2	1	-	1
CO4	2	-	-	-	-	2	2	2	-	-	1
CO5	2	1	-	-	-	-	-	2	-	-	1
CO6	2	2	-	-	-	2	1	2	-	-	2

SEMESTER - I

COURSE CODE: 24ENTP101	FUNCTIONAL LIFE SKILLS	L	T	P	CP	C
		1	0	1	2	1
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 4				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- Resolve common communication problems
- Observe the effectiveness of nonverbal messages
- Communicate precisely through the digital media
- Understand the importance of empathetic listening
- Explore reading and speaking processes

MODULE - I LISTENING 5

- Listening and comprehending
- Probing questions
- Barriers to listening
- Reflection from listening

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

MODULE - II SPEECH MECHANICS 5

- Pronunciation
- Enunciation
- Vocabulary
- Fluency
- Common errors

MODULE - III READING SKILLS 5

- Techniques of effective reading
- Kinds of reading
- Gathering ideas and information from the text
- Evaluating the ideas and information
- Interpreting the text from multiple angles

MODULE - IV EMOTIONAL INTELLIGENCE 5

- Intro on Emotional Intelligence
- Goal Setting
- Positive Thinking
- Stress Management
- Time Management

MODULE - V PRESENTATION SKILLS 5

- Types of presentations
- Nonverbal communication
- Understanding the purpose and the audience
- Beginning and closure of presentations
- Presentation tools and strategies

MODULE - VI ARTICULATION ASPECTS 5

- Perform exercises
- Extempore
- Monologues, Dialogues and Conversation
- Feedback necessity

TOTAL : 30 PERIODS

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

REFERENCES:

1. Sen, Madhuchanda.2010, An Introduction to Critical Thinking, Delhi, Pearson.
2. Effective Communication Skills Strategies for Success. Edited by Nitin Bhatnager and Mamta Bhatnager. 2023, Pearson
3. Technical Communication: Principles and Practice, Meenakshi Raman and Sangeeta Sharma. Oxford University Press, 2015

WEB REFERENCES:

1. https://swayam.gov.in/nd1_noc19_hs31/preview
2. https://www.myenglishpages.com/speaking/#google_vignette

OUTCOMES:

Upon completion of the course, the student will be able to:

1. Employ reading, writing, and listening skills to communicate clearly in academic and professional contexts.
2. Demonstrate confident oral communication and presentation skills using appropriate tools and techniques.
3. Interpret ethical, inclusive, and culturally aware communication in team and societal settings

CO-PO, PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	3	-	2	-	-
CO2	-	-	-	-	-	-	-	-	3	-	2	-	-
CO3	-	-	-	-	-	-	-	3	2	-	2	-	-

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

SEMESTER - I

COURSE CODE: 24HSTP101	TAKE CHARGE : COLLEGE READINESS - I	L	T	P	CP	C
		1	0	0	1	0
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 4,7,8,9,11,12,17				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

The objective of this course is to help students make a successful transition to college life by developing self-awareness, personal responsibility, effective time management, healthy lifestyle practices, and positive social relationships.

MODULE - I FOUNDATION & TIME MANAGEMENT

- Foundation
- Take Charge of Your Time
- Activity on Taking Charge of Your Time

MODULE - II HEALTH & WELL-BEING

- Take Charge of Your Health
- Activity on Taking Charge of Your Health

MODULE - III SOCIAL LIFE & RELATIONSHIPS

- Take Charge of Your Social Life
- Activity on Taking Charge of Your Social Life .

REFERENCE

1. Franklin Convey, Take Charge College Readiness, Franklin Convey Education.

This division is well aligned with curriculum design:

- Semester I: Self-management and adjustment to college (Modules I–III).

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

OUTCOMES:

Upon completion of the course, the student will be able to:

1. Apply self-awareness, responsibility, and a growth mindset to adapt effectively to college life. (K3)
2. Apply effective time-management and self-care practices to balance academic responsibilities and personal well-being. (K3)
3. Demonstrate effective communication skills and responsible social behaviour in diverse college environments. (K3)

CO-PO, MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	-	-	-	-	2	-	-	-	-	-
CO2	1	-	-	-	-	2	-	-	-	-	-
CO3	-	-	-	-	-	2	-	-	-	-	-

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

SEMESTER - II

COURSE CODE: 24HSEN202	BUSINESS COMMUNICATION & VALUE SCIENCE – II	L	T	P	CP	C
		3	0	0	2	3
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 4				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- To create awareness about Genders and CS
- To differentiate diversified cultures of India
- To recognize the role of science in nation building and define AI and its impacts
- To understand the need for diversity and inclusion
- Identify the significance of Business Communication and the uses of communicative writing

MODULE - I SOCIAL RESPONSIBILITY 8

Maslow's theory of Needs - Activity: Make a wish list of wants & needs - Gender Sensitization- Activity:Poster making on gender issues - Intro on Corporate Social Responsibility (CSR) - Corporate Etiquettes -Business Idioms

MODULE - II CULTURAL STUDIES 8

Cultures in India - Global, Glocal & Translocational cultures - Cross-cultural communication - culturalsensitivity - Activity: Presentation on different cultures of India - Activity: FauxPas in different cultures -Listening to cross cultural exchanges - Activity: Finding your roots and traditions

MODULE - III SCIENCE AND ARTIFICIAL INTELLIGENCE 8

Role of Science in nation building - AI in everyday life - Activity: Debate - Will machines control us? -Activity: GD - AI in Future - Stress Management - Time Management - Activity: Presentation onScientist/Mathematician who changed the world

MODULE - IV DIVERSITY AND INCLUSION 7

Introduction to Diversity - Inclusion - Need for Diversity in corporate environment - Activity: Global Brands on diversity and inclusion - Activity: watching videos on Diversity and Inclusion (Purl) - Activity: Create a short film on social issues/diversity - Activity: GD on Challenges of Diversity

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

MODULE - V BUSINESS COMMUNICATION 7

Principles of general/technical Writing - Business letters (Placing Order, Complaint, Responding to letters) - Writing Business Proposal for a Startup - Vision, Mission Statements for an NGO - Creating Tagline and Logo - Activity: Develop a Startup Idea - Activity: Speaking - Pitching start- up idea

MODULE - VI EMOTIONAL INTELLIGENCE 7

Introduction to EI – Awareness of multiple intelligence and learning styles in communication –Activity; scenario based quiz – Impact of conflicts – Guideline to manage conflicts - Activity: Each group will draw up a list of tips to manage conflicts at work – Need of public speaking –Activity:Each group should present the list of best practices in public speaking

TOTAL: 45 PERIODS

TEXT BOOKS:

1. There are no prescribed texts– there will be handouts and reference links shared.

REFERENCES:

1. Emotional Intelligence: Why it Can Matter More Than IQ by Daniel Goleman
2. Putting Emotional Intelligence to Work by Ryback David
3. How to Develop Self Confidence and Improve Public Speaking - Time - Tested Methods of Persuasion by Dale Carnegie -author- Y.S. Rajan
4. TED Talks: The official TED guide to public speaking: Tips and tricks for giving unforgettable speeches and presentations

WEB REFERENCES:

1. Train your mind to perform under pressure- Simon sinek
   https://curiosity.com/videos/simon-sinek-on-training-your-mind-to-perform-underpressurecaptureyour-flag/
2. Brilliant way one CEO rallied his team in the middle of layoffs
   https://www.inc.com/video/simon-sinek-explains-why-you-should-put-people-beforenumbers.html
3. Will Smith's Top Ten rules for success
   https://www.youtube.com/watch?v=bBsT9omTeh0

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

ONLINE RESOURCES:

1. https://www.coursera.org/learn/learning-how-to-learn
2. https://www.coursera.org/specializations/effective-business-communication

OUTCOME:

Upon completion of the course, the learners will be able to:

1. Develop the understanding of the difference between wants and needs to demonstrate responsible decision-making in social contexts. (K3)
2. Differentiate cross-cultural communication challenges and examine strategies to address them effectively. (K4)
3. Examine the role of science in nation building and assess the impact of Artificial Intelligence on the future. (K4)
4. Implement inclusive practices to promote diversity and inclusion in workplace scenarios.(K3)
5. Apply the principles of Business Communication in drafting effective letters and professional proposals. (K3)
6. Analyze real-life interpersonal and professional situations and examine how emotional intelligence influences effective decision-making and relationship management. (K4)

CO- PO, PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	3	-	1	-	-
CO2	-	-	-	-	-	-	2	-	3	-	1	-	-
CO3	-	-	-	-	-	-	-	-	3	-	1	-	-
CO4	-	-	-	-	-	-	2	-	3	-	1	-	-
CO5	-	-	-	-	-	-	-	-	3	-	1	-	-
CO6	-	-	-	-	-	-	-	-	3	-	1	-	-

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

SEMESTER - II

COURSE CODE: 24BSMA204	DISCRETE MATHEMATICS FOR COMPUTER SCIENCE	L	T	P	CP	C
		3	1	0	5	4
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 4				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- The aim of this course is to introduce abstraction, logical thinking and reasoning for developing algorithms and mathematical proofs related to Computer Science.

MODULE - I MATHEMATICAL LOGIC 9

Logic: Propositional calculus - propositions and connectives, syntax; Semantics – truth assignments and truth tables, validity and satisfiability, tautology; Adequate set of connectives;Equivalence and normal forms; Compactness and resolution; Formal reducibility - natural deduction system and axiom system; Soundness and completeness.

MODULE - II COMBINATORICS 9

Basic counting, balls and bins problems, generating functions, recurrence relations, Solution of recurrence relations by the method of characteristic roots and method of generating function principle of mathematical induction, pigeonhole principle.

MODULE - III ABSTRACT ALGEBRA 12

Set, Relation, Group, Subgroups, Normal subgroups and Quotient groups, Homomorphism, Cosets, Lagrange's theorem, Rings and Fields (Definition and examples only).

MODULE - IV BOOLEAN ALGEBRA 9

Introduction of Boolean algebra, truth table, basic logic gate, basic postulates of Boolean algebra,principle of duality, canonical form, Karnaugh map.

MODULE - V GRAPHS & DIGRAPHS 12

Graphs and digraphs, complement, isomorphism, connectedness and reachability, adjacency matrix, Eulerian paths and circuits in graphs and digraphs, Hamiltonian paths and circuits in graphs .

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

MODULE - VI TREES AND PLANAR GRAPHS 9

Trees, Planar graphs, Euler's formula, dual of a planar graph, independence number and clique number, chromatic number, statement of Four-color theorem.

TOTAL: 60 PERIODS

TEXTBOOKS:

1. Mathematical Logic for Computer Science, L. Zhongwan, 2nd edition, World Scientific, Singapore, 1998.
2. Elements of Discrete Mathematics, C. L. Liu, 2nd edition, McGraw Hill, New Delhi, 1985.
3. Topics in Algebra, I. N. Herstein, 2nd edition, John Wiley and Sons,1975.
4. Digital Logic & Computer Design, M. Morris Mano, 1st edition, Pearson,2004.
5. Graph Theory with Applications, J. A. Bondy and U. S. R. Murty, 1st edition, Macmillan Press, London, 1976.

REFERENCES:

1. Introduction to Mathematical Logic, E. Mendelsohn, 2nd edition, Van-Nostrand, London,1979.
2. Introductory Combinatorics, R. A. Brualdi, 5th edition, North-Holland, New York, 2010.
3. Graph Theory with Applications to Engineering and Computer Science, N. Deo, 1st edition, Prentice Hall, Englewood Cliffs, 1974.

WEB REFERENCES:

1. https://www.youtube.com/watch?v=rjV4AO0iIVY
2. https://www.britannica.com/science/combinatorics/The-Ferrer-diagram
3. https://www.youtube.com/watch?v=zK8hxSwRar0
4. https://www.youtube.com/watch?v=eQA-m22wjTQ
5. https://discrete.openmathbooks.org/dmoi3/sec_planar.html

ONLINE RESOURCES:

1. www.ucl.ac.uk/~ucahmto/0007/_book/4-2-examples-of-groups.html
2. https://archive.nptel.ac.in/courses/106/108/106108051/
3. https://archive.nptel.ac.in/courses/108/105/108105132/

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

COURSE OUTCOMES:

Upon completion of the course, the student should be able to:

1. Apply mathematical logic to understand logical arguments, construct logical proofs, solve problems and validate them. (K3)
2. Solve combinatorial problems using basic principles of counting. (K3)
3. Explain the concepts of algebraic structures such as groups, rings and fields. (K3)
4. Apply the principles of Boolean Algebra to design and simplify the circuits. (K3)
5. Solve real world problems using graphs and use it to develop algorithms in Computer Science. (K3)
6. Apply the concepts of coloring and planarity in computer science. (K3)

CO- PO, PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	2
CO2	3	-	-	-	-	-	-	-	-	-	-	-	2
CO3	3	-	-	-	-	-	-	-	-	-	-	-	2
CO4	3	-	-	-	-	-	-	-	-	-	-	-	2
CO5	3	-	-	-	-	-	-	-	-	-	-	-	3
CO6	3	-	-	-	-	-	-	-	-	-	-	-	3

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

SEMESTER - II

COURSE CODE: 24BSMA205	STATISTICAL METHODS WITH LABORATORY	L	T	P	CP	C
		3	1	0	4	4
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 4				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- The objective of the course is to introduce the necessary statistical background for analyzing engineering problems.
- To introduce the R programming language

MODULE - I TESTING OF HYPOTHESIS 7

Test of hypothesis – concept and formulation, Type I and Type II errors, Neyman Pearson lemma, Procedures of testing.

MODULE - II LINEAR STATISTICAL MODELS AND DESIGN OF EXPERIMENTS 7

Simple linear regression and correlation, multiple regression and multiple correlation. Analysis of Variance (one-way, two-way with as well as without interaction).

MODULE - III ESTIMATION AND SUFFICIENT STATISTIC 10

Point estimation, criteria for good estimates (unbiasedness, consistency), Methods of estimation including maximum likelihood estimation. Sufficient statistics – concept and examples, complete sufficiency, their application in estimation.

MODULE - IV NON-PARAMETRIC INFERENCE 12

Comparison with parametric inference, use of order statistics, Sign test, Wilcoxon signed rank test, Mann-Whitney test, Run test, Kolmogorov-Smirnov test, Spearman's and Kendall's test. Tolerance region.

MODULE - V BASICS OF TIME SERIES AND FORECASTING 10

Stationary, ARIMA Models: Identification, Estimation and Forecasting.

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

MODULE - VI R STATISTICAL PROGRAMMING LANGUAGE 14

Introduction to R, Functions, Control flow and Loops, Working with Vectors and Matrices, Reading in Data, Writing Data, Working with Data, Manipulating Data, Simulation, Linear model, Data Frame, Graphics in R.

TOTAL: 60 PERIODS

TEXT BOOKS:

1. Probability and Statistics for EngineersMiller and Freund's, R.A. Johnson, 9th edition, Pearson Publications, January 2020.
2. Fundamentals of Statistics (Vol. I), A. Goon, M. Gupta and B. Dasgupta, World press, 2013.
3. Fundamentals of Statistics (Vol. II), A. Goon, M. Gupta and B. Dasgupta, World press, 2016.
4. The Analysis of Time Series: An Introduction, Chris Chatfield, 6th edition, CRC press, 2017.

REFERENCES:

1. Introduction to Linear Regression Analysis, D. C. Montgomery and E. Peck, G.Geofferry , WILEY student's edition, Third edition, Dec 2006.
2. Introduction to the Theory of Statistics, A. M. Mood, F. A. Graybill and D.C. Boes, Mc Graw Hill, India edition, 2017.
3. Applied Regression Analysis, N. Draper and H. Smith, Wiley Publications, 1998.
4. Hands on Programming With R: Write Your Own Functions and Simulations , Garrett Grolemund , Grayscale edition, O'REILLY, 2014.
5. R for Everyone: Advanced Analytics and Graphics, Jared P. Lander, 2nd edition, 2018.

WEB RESOURCES:

1. https://onlinecourses.swayam2.ac.in/cec24_ma03
2. https://onlinecourses.nptel.ac.in/noc24_ma46
3. https://online.stat.psu.edu/stat415/lesson/26/26.1.pdf
4. https://learningstatisticswithr.com/book/hypothesistesting.html
5. https://www.machinelearningplus.com/time-series/arima-model-time-series-forecasting-python/
6. https://onlinecourses.swayam2.ac.in/ini24_ge09

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

ONLINE RESOURCES

1. https://www.youtube.com/watch?v=VPZD_aij8H0
2. https://www.youtube.com/watch?v=yZ0g-DIfVpc

OUTCOMES:

Upon completion of the course, the student should be able to

1. Use testing of hypotheses to infer the given data. (K3)
2. Analyze linear regression, correlation, and ANOVA models to interpret relationships among variables and evaluate differences between groups. (K4)
3. Utilize the criteria for good estimators and methods of estimation to evaluate statistical properties. (K3)
4. Analyze and interpret non-parametric statistical tests for comparing samples, testing distributions, and measuring associations between variables(K4)
5. Identify the various models of time series and forecasting. (K3)
6. Apply the features of R language to carry out statistical tests for the given data. (K3)

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	2	-
CO2	3	3	-	-	2	-	-	-	-	-	-	3	-
CO3	3	-	-	-	-	-	-	-	-	-	-	2	-
CO4	3	3	-	-	2	-	-	-	-	-	-	2	-
CO5	3	-	-	-	-	-	-	-	-	-	-	3	-
CO6	3	-	-	-	2	-	-	-	-	-	-	3	-

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

SEMESTER - II

COURSE CODE: 24BSPH205	PRINCIPLES OF ELECTRONICS ENGINEERING	L	T	P	CP	C
		3	0	0	3	3
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 4,7,9,11				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- To understand the basics of semiconductors.
- To understand the working of diodes and diode circuits.
- To learn the principles of various types of transistors.
- To understand the working of feedback amplifiers and oscillators.
- To learn linear integrated circuits.
- To understand the digital electronic principles of Logic gates.

MODULE - I INTRODUCTORY IDEA OF SEMICONDUCTORS 8

Introduction – Solid state materials – Classification – Energy band theory – Fermi Levels - Electrical properties –Semiconductors – Effect of Temperature – Hole current - Intrinsic Semiconductor – Doping - Extrinsic Semiconductors – Fermi energy level variation with Temperature - Drift & Diffusion Carriers.

MODULE - II DIODES AND DIODE CIRCUITS 7

Formation of P-N Junction - Energy Band Diagram - Built-in-Potential - Forward and Reverse Biased P-N Junction - Formation of Depletion Zone – Operating conditions - V-I Characteristics - Zener Breakdown - Avalanche Breakdown and its Reverse Characteristics- Varactor Diode - Simple Diode Circuits - Load Line - Linear Piecewise Model – Rectifier circuits –HalfWave – Full Wave - PIV, DC Voltage and Current - Ripple Factor – Efficiency – Idea of regulation.

MODULE - III TRANSISTORS AND TRANSISTOR CIRCUITS 8

Introduction - PNP and NPN Transistors - Transistors CE, CB, CC mode of configuration- Transistor Characteristics - Concept of Field Effect Transistors (Channel Width Modulation) - Gate Isolation Types - JFET Structure and Characteristics - MOSFET Structure and Characteristics - Depletion and Enhancement -Type - CS, CG, CD Configurations- CMOS: Basic Principles.

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

MODULE - IV FEEDBACK AMPLIFIER AND OSCILLATORS 7

Concept (Block Diagram) - Properties - Positive and Negative Feedback - Loop Gain - Open Loop Gain - Feedback Factors - Topologies of Feedback Amplifier- Effect of Feedback on Gain - Output Impedance - Input Impedance - Sensitivities (qualitative) - Bandwidth Stability- Feedback Effect of Positive - Instability - Oscillation - Condition of Oscillation - Barkhausen Criteria – Hartley – Colpitt's – Crystal Oscillators.

MODULE - V OPERATIONAL AMPLIFIER BASICS 8

Introduction to integrated circuits - operational amplifier and its terminal properties - Application of operational amplifier - inverting and non-inverting mode of operation – Voltage follower – Adder – subtractor– comparator Integrator - Differentiator - Proportional, Integral, Derivative circuits.

MODULE - VI BASIC IDEAS OF DIGITAL ELECTRONICS 7

Introduction - Number systems - Boolean Algebra - Realization of Logic gates - DeMorgan's theorem - Half and Full Adder - Subtractor - Multiplexers – De-Multiplexers – Flip flops – Registers and Counters.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. D.K. Bhattacharya &T.Poonam, "Engineering Physics". Oxford University Press, 2015.
2. R.K. Gaur & S.L. Gupta, "Engineering Physics". Dhanpat Rai Publishers, 2012.
3. B.K. Pandey &S.Chaturvedi, "Engineering Physics", Cengage Learning India, 2017.
4. V. Rajendran, "Engineering Physics", Mc Graw Hill Publications Ltd. New Delhi, 2014.
5. M.N. AvadhanuluAnd P.G. Kshirsagar, "A textbook of Engineering Physics", S. Chand & Co Ltd. 2016.

REFERENCES:

1. D. Halliday, Resnick & J. Walker, "Principles of Physics", Wiley, 2015.
2. R.A. Serway, & J.W. Jewett, "Physics for Scientists and Engineers", Cengage Learning, 2010.
3. N.K. Verma," Physics for Engineers", PHI Learning Private Limited, 2014.
4. P.A. Tipler & G. Mosca "Physics for Scientists and Engineers", W.H.Freeman, 2020.

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

5. Brijlal and Subramanyam, "Properties of Matter", S. Chand Publishing, 2018.
6. Shatendra Sharma & Jyotsna Sharma, "Engineering Physics", Pearson, 2018.
7. Arthur Beiser. "Concepts of Modern Physics", McGraw-Hill, 6th Edition. 2003.
8. Charles Kittel, "Introduction to Solid State Physics". John Wiely& Sons. 8th Edition, 2005.

OUTCOMES:

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

1. Analyze the band structures and carrier concentrations of semiconductors, study their variations with temperature, and examine carrier transport mechanisms (K4)
2. Apply the principles of P-N junctions and diodes to analyze V-I characteristics, breakdown mechanisms, and design basic rectifier circuits (K3)
3. Examine the structures, characteristics, and configurations of BJTs and FETs, including MOSFETs and CMOS, and their operating principles (K4)
4. Apply the working principles of electronic devices in circuits such as feedback amplifiers, operational amplifiers, and oscillators (K3)
5. Acquire the knowledge of the operational amplifier concept and its application (K3)
6. Analyze the digital logic and design of basic combinational and sequential circuits (K4)

CO – PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	3	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-
CO6	-	3	-	-	-	-	-	-	-	-	-

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

SEMESTER - II

COURSE CODE: 24CBPC201	DATA STRUCTURES AND ALGORITHMS	L	T	P	CP	C
		3	0	0	3	3
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 4,9				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- To understand the basic terminologies of algorithm and data organization.
- To recognize and distinguish the applications of various linear data structures
- To analyse the concepts of non linear data structures.
- To be able to incorporate various searching and sorting techniques in real time scenarios.
- To understand the concept of files and its operations.

MODULE - I BASIC TERMINOLOGIES AND INTRODUCTION TO ALGORITHM 7

Algorithm Specification - Recursion - Performance Analysis – Asymptotic Notation - The Big-O - Omega and Theta Notation - Programming Style –Refinement of Coding-Time-Space TradeOff-Testing-Data Abstraction.

MODULE - II LINEAR DATA STRUCTURES 9

Array-Stack–Operations-Evaluating Arithmetic Expressions-Conversion of Infix to Postfix Expression-Queue–Circular Queue–DeQueue-Operations-Linked_List and its Types - Various Representations - Applications of Linear Data Structures.

MODULE - III NON-LINEAR DATA STRUCTURE–TREES 7

Trees–Tree Traversals-Binary Tree- Threaded Binary Tree-Binary Search Tree- B & B+ Tree – AVL Tree-Splay Tree-Graph-Directed-Undirected

MODULE - IV NON-LINEAR DATA STRUCTURE–GRAPHS 7

Basic Terminologies and Representations – Graph Search and Traversal Algorithms –Operations & Applications of Non-Linear Data Structures.

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

MODULE - V EARCHING AND SORTING ON VARIOUS DATA STRUCTURES 9

Sequential Search-Binary Search-Breadth First Search-Depth First Search Insertion Sort - Selection Sort - Shell Sort - Divide and Conquer Sort – Merge Sort-Quick Sort-Heap Sort-Introduction to Hashing.

MODULE - VI FILES 6

File Organisation - Sequential - Direct - Indexed Sequential - Hashed and Various Types of Accessing Schemes.

TOTAL: 45 PERIODS

TEXTBOOKS:

1. E.Horowitz,S.Sahni,S.A-"Fundamentals of Data Structures", Universities Press, Second Edition,2008.
2. A.V.Aho, J.E.Hopperoft, J.D.Ullman, "Data Structures and Algorithms", Pearson Education, 1983.

REFERENCES:

1. The Art of Computer Programming: Volume1: Fundamental Algorithms, Donald E.Knuth.
2. Introduction to Algorithms, Thomas, H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, The MIT Press.
3. Open Data Structures: An Introduction (Open Paths to Enriched Learning), 31stEdition, Pat Morin, UBCPress.

WEB REFERENCES:

1. https://swayam.gov.in/nd2_cec19_cs04/preview
2. https://nptel.ac.in/courses/106102064/

ONLINE RESOURCES:

1. https://www.codechef.com/certification/data-structures-and-algorithms/prepare
2. https://www.coursera.org/specializations/data-structures-algorithms

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

OUTCOMES:

Upon completion of the course, the student should be able to

1. Understand the various data structure concepts.(K2)
2. Apply the different linear data structures to problem solutions. (K3)
3. Apply the trees non-linear data structures to problem solutions. (K3)
4. Apply the graphs non-linear data structures to problem solutions. (K3)
5. Analyse the various searching and sorting algorithms. (K3)
6. Understand the concept of files and its operations. (K2)

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	2	-	1	1	1	-	2	1	3	1
CO2	3	3	3	3	2	-	-	1	1	-	1	1	3	1
CO3	3	3	3	3	2	-	-	1	1	-	1	1	3	1
CO4	3	3	3	3	1	-	-	1	1	-	1	1	3	1
CO5	3	3	3	3	1	-	-	1	1	-	1	1	3	1
CO6	3	3	3	3	2	-	-	1	1	-	1	1	3	1

SEMESTER - II

COURSE CODE: 24CYMC201	ENVIRONMENTAL STUDIES	L	T	P	CP	C
		2	0	0	2	0
NPTEL CODE: 106105225	SYLLABUS VERSION 1.1	SDG NO. 1-17				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- To introduce the basic concepts of the environment, ecosystems, and biodiversity, and emphasize the biodiversity of India and its conservation.
- To impart knowledge on the causes, effects, and control or prevention measures of environmental pollution and natural disasters.
- To promote awareness of sustainable energy practices to encourage adoption and contribute to a greener and more sustainable future.

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

- To introduce the basic structure and components of the atmosphere, including an overview of the photochemical reactions involved.
- To familiarize with the concept of Sustainable Development Goals (SDGs) and analyze climate change, the concept of carbon credits, and the challenges of environmental management.
- To inculcate and embrace sustainability practices, develop a broader understanding of green materials and energy cycles, and analyze the role of sustainable urbanization.

MODULE - I ENVIRONMENT AND BIODIVERSITY 5

Definition, scope and importance of environment - need for public awareness. Ecosystem and Energy flow-ecological succession. Types of biodiversity: genetic, species and ecosystem diversity- values of biodiversity, India as a mega-diversity nation hot-spots of biodiversity threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts - endangered and endemic species of India - conservation of biodiversity: In-situ and ex-situ.

MODULE - II ENVIRONMENTAL POLLUTION 5

Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollution. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts

MODULE - III RENEWABLE SOURCES OF ENERGY 5

Energy management and conservation, New Energy Sources: Need of new sources. Different types, new energy sources. Applications of Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy

MODULE - IV ATMOSPHERIC CHEMISTRY 5

Atmospheric Chemistry - Composition and structure of atmosphere. Climate change - greenhouse effect- role of greenhouse gasses on global warming. Chemical and photochemical reactions in the atmosphere - Formation of smog, PAN, acid rain (causes, effect and control measures). Oxygen and ozone chemistry - Ozone layer depletion (causes, effect and control measures).

MODULE - V SUSTAINABILITY AND MANAGEMENT 5

Development, GDP, Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols - Sustainable Development Goals-targets, indicators and intervention areas Climate change- Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry-A case study.

MODULE - VI SUSTAINABILITY PRACTICES 5

Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles- carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization-Socio- economical and technological change.

TOTAL: 30 PERIODS

TEXT BOOKS:

1. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2006.
2. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.
3. Ravikrishnan A, 'Environmental Science and Engineering', Sri Krishna Hitech Publishing Company Pvt. Ltd, Revised Edition 2024.

REFERENCES:

1. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT LTD, New Delhi, 2007.
2. Erach Bharucha, "Textbook of Environmental Studies'', Universities Press(I) PVT, LTD, Hyderabad, 2015.
3. G. Tyler Miller and Scott E. Spoolman, "Environmental Science", Cengage Learning India PVT, LTD, Delhi, 2014.
4. Chemistry for Environmental Engineering, Clair N. Sawyer, Perry L. Mc Carty, Gene F. Parkin, 4th Edition, McGraw-Hill.

OUTCOMES:

Upon completion of the course, the student should be able to

1. Explore the fundamental concepts of the environment, ecosystems, biodiversity, and the conservation practices within complex ecological systems. (K3)
2. Analyze the causes and effects of environmental pollution and natural disasters to contribute to preventive measures in society. (K4)
3. Recognize the renewable and non-renewable resources and have a insight into various methods for harnessing energy from different sources and explain their applications in various contexts. (K3)
4. Evaluate the primary components of the atmosphere, and analyses the causes of atmospheric pollution and propose strategies to promote a sustainable and clean atmosphere. (K4)
5. Assess the diverse goals of sustainable development to promote appropriate technological advancement and societal progress. (K4)
6. Demonstrate various sustainability practices, identify examples of green materials, describe their life cycle impacts, and assess their suitability for sustainable development. (K3)

CO - PO MAPPING :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	-	-	-	-	-	2	-	-	-	-
CO2	-	2	-	-	-	2	-	-	-	-	-
CO3	-	3	-	-	-	2	-	-	-	-	-
CO4	-	2	-	-	-	2	-	-	-	-	-
CO5	-	2	-	-	-	2	-	-	-	-	-
CO6	-	-	2	-	-	-	-	-	-	-	3

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

SEMESTER - II

COURSE CODE: 24HSTA201	TAMILS AND TECHNOLOGY	L	T	P	CP	C
		1	0	0	1	1
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 4				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- To understand the methods of biasing BJT and FET
- To design and analyze single stage and multistage amplifier circuits

அலகு-I நெசவு மற்றும் பானைத் தொழில்நுட்பம்

சங்க காலத்தில் நெசவுத் தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.

UNIT-I WEAVING AND POTTERY (CERAMIC) TECHNOLOGY 5

Weaving Industry during Sangam Age - Ceramic technology - Black and Red-ware Potteries (BRW) - Graffiti on Potteries.

அலகு -II சங்ககாலவடிவமைப்புகள்

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள்ரூசங்க காலத்தில் வீட்டுப்பொருட்களில் வடிவமைப்பு -சங்க காலத்தில் கட்டுமான பொருட்களும்நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள்.

UNIT-II SANGAM AGE DESIGNS 5

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

அலகு -III பழங்காலகட்டிடத் தொழில்நுட்பம்

மாமல்லபுரச்சிற்பங்களும், கோவில்களும் - சோழர்காலத்துப்பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத்தலங்கள் - நாயக்கர்காலக்கோயில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாட்டுவீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ-சாரோசெனிக்கட்டிடக் கலை.

UNIT-III ANCIENT CONSTRUCTION TECHNOLOGY 5

Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses> Indo - Saracenic architecture at Madras during British Period.

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அலகு- IV உற்பத்தித் தொழில்நுட்பம்

கப்பல் கட்டும் கலை -உலோகவியல் -இரும்புத் தொழிற்சாலை இரும்பை உருக்குதல், எஃகு - வரலாற்றுச்சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் சங்கு மணிகள் -எலும்புத்துண்டுகள் - தொல்லியல்சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

UNIT-IV MANUFACTURING TECHNOLOGY 5

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 - Archaeological evidences - Gem stone types described in Silappathikaram.

அலகு - V வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்நுட்பம்

அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக்குமுழித்தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காகவடிவமைக்கப்பட்டகிணறுகள்- வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள்- கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்.

UNIT-V AGRICULTURE AND IRRIGATION TECHNOLOGY 5

Dam, Tank, Ponds, Sluice, Significance of KumizhiThoompu of Chola Period> Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries - Pearl - Conch diving -Ancient Knowledge of Ocean - Knowledge Specific Society.

அலகு-VI அறிவியல்தமிழ்மற்றும்கணித்தமிழ்

அறிவியல் தமிழின் வளர்ச்சி - கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக்கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்.

UNIT-VI SCIENTIFIC TAMIL & TAMIL COMPUTING 5

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.

TOTAL: 30 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு ___ மக்களும் பண்பாடும் ___ கே.கே. பிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்)
2. கணினித் தமிழ் ___ முனைவர் இல.சுந்தரம் (விகடன் பிரசுரம்)
3. கீழடி ___ வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

4. பொருநை — ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian> Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. 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)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation> Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

OUTCOMES:

Upon completion of the course, the learners will be able to:

1. சங்ககால நெசவு மற்றும் பானைத்தொழில்நுட்பங்களைப் பற்றி அறிந்து கொள்ளுதல்
   To learn about the weaving and pottery (ceramic) technologies during the Sangam Age.(K2)
2. சங்ககாலவடிவமைப்புகள் மற்றும் கட்டுமானக்கலையைப் புரிந்து கொள்ளுதல்
   To understand the designs and structural constructions during the Sangam period.(K2)
3. பண்டைய கால கட்டிடக்கலையின்நுட்பங்கள் மற்றும் கட்டிடவடிவமைப்புகளை ஆராய்தல்.
   To explore the techniques and architectural patterns of ancient Tamil structures.(K2)
4. உற்பத்தி மற்றும் உலோகவியல்தொழில்நுட்பங்களைப் பற்றி அறிதல்.
   To gain knowledge on manufacturing and metallurgical technologies of ancient Tamils.(K3)
5. வேளாண்மை, நீர்ப்பாசனம் மற்றும் கடல்சார்தொழில்நுட்பங்களைப் பற்றி அறிந்து கொள்ளுதல்.
   To understand agricultural> irrigation> and marine technologies of ancient Tamil society.(K3)
6. அறிவியல்தமிழ் மற்றும் கணித்தமிழின்வளர்ச்சியையும் அதன் கணினி பயன்பாடுகளையும் புரிந்து கொள்ளுதல்.
   To understand the development of Scientific Tamil and its applications in Tamil computing.(K3)

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

CO- PO, PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	2	-	-	-	-	-	-	1	2	2
CO2	3	3	3	2	-	-	-	-	-	-	1	2	1
CO3	3	3	3	3	-	-	-	-	-	-	1	2	1
CO4	3	2	3	3	-	-	-	-	-	-	1	2	2
CO5	3	3	3	3	-	-	-	-	-	-	1	2	1
CO6	3	3	3	3	-	-	-	-	-	-	1	2	2

SEMESTER - II

COURSE CODE: 24HSNC201	NCC COURSE LEVEL 1	L	T	P	CP	C
		2	0	0	2	0
NPTEL CODE: -	SYLLABUS VERSION 1.0	SDG NO. 4				
PRE-REQUISITE COURSES	-					

ARMY WING

NCC GENERAL **6**

NCC 1	Aims, Objectives & Organization of NCC	1
NCC 2	Incentives	2
NCC 3	Duties of NCC Cadet	1
NCC 4	NCC Camps: Types & Conduct	2

NATIONAL INTEGRATION AND AWARENESS **4**

NI 1	National Integration: Importance & Necessity	1
NI 2	Factors Affecting National Integration	1
NI 3	Unity in Diversity & Role of NCC in Nation Building	1
NI 4	Threats to National Security	1

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

PERSONALITY DEVELOPMENT		**7**
PD 1	Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving	2
PD 2	Communication Skills	3
PD 3	Group Discussion: Stress & Emotions	2
LEADERSHIP		**5**
L 1	Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code	3
L 2	Case Studies: Shivaji, Jhasi Ki Rani	2
SOCIAL SERVICE AND COMMUNITY DEVELOPMENT		**8**
SS 1	Basics, Rural Development Programmes, NGOs, Contribution of Youth	3
SS 4	Protection of Children and Women Safety	1
SS 5	Road / Rail Travel Safety	1
SS 6	New Initiatives	2
SS 7	Cyber and Mobile Security Awareness	1
		TOTAL: 30 PERIODS

NAVAL WING

NCC GENERAL		**6**
NCC 1	Aims, Objectives & Organization of NCC	1
NCC 2	Incentives	2
NCC 3	Duties of NCC Cadet	1
NCC 4	NCC Camps: Types & Conduct	2
NATIONAL INTEGRATION AND AWARENESS		**4**
NI 1	National Integration: Importance & Necessity	1
NI 2	Factors Affecting National Integration	1
NI 3	Unity in Diversity & Role of NCC in Nation Building	1
NI 4	Threats to National Security	1
PERSONALITY DEVELOPMENT		**7**
PD 1	Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving	2

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

PD 2	Communication Skills	3
PD 3	Group Discussion: Stress & Emotions	2
LEADERSHIP		**5**
L 1	Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code	3
L 2	Case Studies: Shivaji, Jhasi Ki Rani	2
SOCIAL SERVICE AND COMMUNITY DEVELOPMENT		**8**
SS 1	Basics, Rural Development Programmes, NGOs, Contribution of Youth	3
SS 4	Protection of Children and Women Safety	1
SS 5	Road / Rail Travel Safety	1
SS 6	New Initiatives	2
SS 7	Cyber and Mobile Security Awareness	1
		TOTAL: 30 PERIODS

ARMY WING

NCC GENERAL		**6**
NCC 1	Aims, Objectives & Organization of NCC	1
NCC 2	Incentives	2
NCC 3	Duties of NCC Cadet	1
NCC 4	NCC Camps: Types & Conduct	2
NATIONAL INTEGRATION AND AWARENESS		**4**
NI 1	National Integration: Importance & Necessity	1
NI 2	Factors Affecting National Integration	1
NI 3	Unity in Diversity & Role of NCC in Nation Building	1
NI 4	Threats to National Security	1
PERSONALITY DEVELOPMENT		**7**
PD 1	Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving	2
PD 2	Communication Skills	3
PD 3	Group Discussion: Stress & Emotions	2

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

LEADERSHIP		**5**
L 1	Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code	3
L 2	Case Studies: Shivaji, Jhasi Ki Rani	2
SOCIAL SERVICE AND COMMUNITY DEVELOPMENT		**8**
SS 1	Basics, Rural Development Programmes, NGOs, Contribution of Youth	3
SS 4	Protection of Children and Women Safety	1
SS 5	Road / Rail Travel Safety	1
SS 6	New Initiatives	2
SS 7	Cyber and Mobile Security Awareness	1

TOTAL: 30 PERIODS

SEMESTER - II

COURSE CODE: 24ITPL301	DATA STRUCTURES AND ALGORITHMS LABORATOR	L	T	P	CP	C
		0	0	4	4	2
NPTEL CODE: -	SYLLABUS VERSION 1.0	SDG NO. 4				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- To implement and demonstrate basic data structures
- To understand and apply algorithmic paradigms
- To apply graph algorithms and optimization techniques
- To develop and analyze efficient searching and sorting techniques
- To implement advanced data structures and algorithms

List of Experiments:

1. Implement the basic operations of a stack using arrays (push, pop, peek, and isEmpty).
2. Implement the basic operations of a queue using arrays (enqueue, dequeue, front, rear, and isEmpty).

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3. Implement the conversion of an infix expression to a postfix expression using a stack.
4. Implement a singly linked list with basic operations such as insertion, deletion, and traversal.
5. Implement a doubly linked list with basic operations such as insertion, deletion, and traversal.
6. Implement a binary tree and perform basic operations like insertion, deletion, and traversal (inorder, preorder, postorder).
7. Implementation of AVL tree(all operation).
8. Implementation of Priority queue using Heap.
9. Graph representation and Traversal algorithms a) Depth first Search b) Breadth First Search.
10. Implement Dijkstra's algorithm to find the shortest path from a source vertex to all other vertices in a graph.
11. Implement linear search and Binary search.
12. Implement merge sort and quick sort for Divide and Conquer.
13. Implement the 0/1 Knapsack Problem using the Greedy technique
14. Analyze and implement a recursive algorithm (like factorial or Fibonacci)

TOTAL: 30 PERIODS

LAB REQUIREMENTS : Turbo C/Dev C++, Borland C or GCC equivalent

OUTCOMES:

Upon completion of the course, the student should be able to:

1. Apply basic linear and non linear data structures (K3)
2. Analyze and compare various trees, searching and sorting algorithms (K4)
3. Apply algorithmic strategies such as greedy and graph-based techniques (K3)

CO, PO, PSO MAPPING:

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

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

SEMESTER - II

COURSE CODE: 24BSPL201	PRINCIPLES OF ELECTRONICS ENGINEERING LABORATORY	L	T	P	CP	C
		0	0	2	2	1
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 4				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- To learn about the working of semiconductor diodes and its applications.
- To learn about the working of transistor circuits.
- To learn about the working of JFET, Oscillators and Amplifiers.

LIST OF EXPERIMENTS:

1. Characteristics of PN junction Diode.
2. Characteristics of Zener Diode.
3. Diode-wave shaping circuit
4. Half wave and full wave Rectifier.
5. Characteristics of BJT in (NPN/PNP Transistor) C-E configuration.
6. Characteristics of BJT in common base (NPN/PNP Transistor) C-B configuration.
7. Characteristics of BJT in common collector (NPN/PNP Transistor) C-C configuration.
8. Characteristics of Junction Field Effect Transistor.
9. Determination of frequency using Hartley Oscillator.
10. Integrators and Differentiator circuit using IC 741 operational amplifier.
11. Operational amplifiers applications using IC 741.

TOTAL:30 PERIODS

LAB REQUIREMENT FOR A BATCH OF 30 STUDENTS / 2 - STUDENTS PER EXPERIMENT:

LAB REQUIREMENTS

1.	Semiconductor Diodes 3. 4. 5. 6. 7. 8., Etc	15 Sets
2.	Semiconductor Diode Circuit Set	15 Sets
3.	Transistor Circuit Set	15 Sets
4.	Transistors (npn, Pnp)	15 Sets
5.	Jfet Circuit Set	15 Sets

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6. Oscillator Circuit Set 15 Sets
7. Amplifier Circuit Set 15 Nos
8. Electronic Wires, Accessories 15 Nos

OUTCOMES:

Upon completion of the course, the student should be able to

1. Understand the diode circuits and its application. (K2)
2. Apply how to construct the transistor circuit and its working and its applications. (K2)
3. Design the Junction field effect transistor and its working. (K2)
4. Design the oscillators circuit and its output waveform and their application. (K2)
5. Gain knowledge of operational amplifier circuit and its application. (K2)

CO - PO MAPPING :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2	2	2	-	-	-	-	-	2
CO2	3	2	2	2	3	-	-	-	-	-	2
CO3	3	3	2	2	2	-	-	-	-	-	1
CO4	3	2	2	2	2	-	-	-	-	-	2
CO5	3	3	2	2	2	-	-	-	-	-	1
CO6	3	3	2	2	2	-	-	-	-	-	1

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

SEMESTER - II

COURSE CODE: 24ESID201	IDEA ENGINEERING LAB - II	L	T	P	CP	C
		0	0	2	2	1
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 1-17				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- Apply rapid ideation, creative thinking, and collaborative problem-solving to generate innovative engineering solutions.
- Create engineering sketches, technical drawings, and CAD models to visualize, communicate, and refine product concepts.
- Utilize design thinking to analyze user needs, build value propositions, and achieve product–market fit.
- Explore innovation management through case studies, technology commercialization, and entrepreneurial ecosystems.
- Navigate Intellectual Property Rights (IPR), patent protection, startup funding, incubation, and government schemes.
- Design sustainable, future-ready solutions using human–AI collaboration, regenerative innovation, and systems thinking aligned with UN SDGs.

MODULE - I TECHNIQUES FOR RAPID IDEATION 5

Introduction to Rapid Ideation and Creative Thinking - Principles and Techniques of Rapid Ideation - The Ideathon Workflow: From Problem to Solution - Brainstorming Methods for Idea Generation - Collaborative and Multidisciplinary Teamwork - Creativity Enhancement Techniques and Innovation Tools - Idea Evaluation and Refinement Through Expert Feedback - Institutional Support for Innovation and Ideation - Developing Feasible Products and Solution Concepts - Hands-on Ideation Activities, Case Studies, and Practical Exercises

MODULE - II TECHNICAL DRAWING AND VISUALISATION 5

Introduction to Technical Drawing for Ideation - Role of Technical Drawing in Communicating Innovative Ideas - Fundamentals of Freehand Sketching and 2D Concept Development - Visual Representation of Ideas Using Engineering Sketches - Orthographic Projection Techniques - Isometric and Pictorial Views for Product Visualisation - Spatial Visualisation and Multi-Dimensional

Thinking - Introduction to Computer-Aided Design (CAD) for Ideation - Creating and Refining Digital Product Models Using CAD Tools - Transforming Creative Ideas into Practical Engineering Designs - Hands-on Sketching, CAD Exercises, and Mini Design Projects

MODULE - III VALUE PROPOSITION FIT 4

Introduction to the Value Proposition - Understanding Customer Needs, Wants, and Pain Points - Customer Segmentation and User Profiling - Identifying Customer Problems and Opportunities - Designing Value Through Quality, Affordability, and Customisation - Defining the Scope of Products and Services - Creating Unique and Personalised Value Propositions - Value Proposition Canvas and Customer–Solution Fit - Evaluating Product–Market Fit and Customer Validation - Refining Value Propositions Through Feedback and Iteration - Case Studies, Activities, and Practical Exercises

MODULE - IV CASE STUDIES IN SUCCESSFUL IDEA GENERATION 4

Introduction to Innovation Through Case Studies - Framework for Analysing Innovation Case Studies - Observation and Opportunity Recognition - Creativity and Problem-Solving in Innovation - Technical, Social, Economic, and Environmental Impact Assessment - Innovation and the United Nations Sustainable Development Goals (SDGs) - Lessons Learned from Successful Innovations - Applying Case Study Insights to Real-World Challenges - Building an Innovative and Entrepreneurial Mindset - Reflection, Discussion, and Practical Exercises

MODULE - V PROTECTING AND FUNDING THE IDEA 4

Introduction to Protecting and Funding Innovative Ideas - Importance of Protecting Startup Ideas and Innovations - Fundamentals of Intellectual Property Rights (IPR) - Patents: Concepts, Types, and Patent Filing Process - Trademarks, Copyrights, Trade Secrets, and Non-Disclosure Agreements (NDAs) - Technology Transfer and Intellectual Property Commercialisation - Startup Funding Sources and Stages of Funding - Institutional, State, National, and International Funding Opportunities - Role of Incubators, Accelerators, Angel Investors, and Venture Capital - Government Grants and Innovation Support Programmes - Commercialisation Strategies for Innovative Products and Services - Case Studies, Best Practices, and Practical Exercises

MODULE - VI FUTURE OF IDEA ENGINEERING 4

Future of Idea Engineering - Human–AI Co-Creation and Responsible Innovation - Resilience Engineering - Linear, Circular, and Regenerative Innovation - Collective Action, Collaboration, and Global Partnerships -

Customer Identification, Buyers vs Users, and Customer Personas - Innovation Case Studies and Sustainable Impact

26 + 4 (village visit) TOTAL: 30 PERIODS

REFERENCES:

1. https://www.india.gov.in/services
2. https://sdgs.un.org/2030agenda
3. https://www.local2030.org/library/375/Sustainable-Development-Goals-and-Gram-Panchayats-Handbook-for-Elected-Representatives.pdf
4. https://sdgknowledgehub.undp.org.in/tag/lsdg/
5. https://www.tnrd.tn.gov.in/constitutionalprovision.html#1

WEB REFERENCES

1. UN Sustainable Development Goals
2. https://srmuniv.digimat.in/nptel/courses/video/109106200/L30.html
3. https://avcce.digimat.in/nptel/courses/video/109106200/L26.html

OUTCOMES:

Upon completion of the course, the student will be able to:

1. Apply rapid ideation techniques, creative thinking methods, and collaborative approaches to generate innovative engineering solutions for real-world problems.(K2)
2. Develop engineering sketches, technical drawings, and CAD-based models to effectively visualize, communicate, and refine innovative product concepts.(K3)
3. Analyze customer needs, value propositions, and product–market fit using structured design thinking tools to develop user-centric engineering solutions.(K4)
4. Evaluate innovation case studies, intellectual property rights (IPR), commercialization strategies, and funding opportunities to support technology-based entrepreneurship.(K3)
5. Evaluate IPR protection and funding mechanisms for startup ideas.(K3)
6. Design sustainable and future-ready innovation solutions by integrating human–AI collaboration, regenerative innovation, resilience engineering, and global partnership principles.(K6)

CO-PO, PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	-	-	-	2	-	-	-	-	-	-	3	3
CO2	3	-	-	-	3	-	-	-	-	-	-	2	-
CO3	2	-	-	-	3	-	-	-	-	-	-	3	2
CO4	2	-	-	-	3	-	-	-	-	-	-	3	3
CO5	3	-	-	-	2	-	-	3	-	-	-	3	2
CO6	2	-	-	-	-	-	3	3	-	-	-	3	3

SEMESTER - II

COURSE CODE: 24ENTP201	DIGITAL DYNAMICS	L	T	P	CP	C
		1	0	1	2	0
NPTEL CODE: -	SYLLABUS VERSION 1.1	SDG NO. 4				
PRE-REQUISITE COURSES	-					

OBJECTIVES:

- Explore online communication
- Master computer skills
- Use virtual platforms
- Understand digital ethics and cyber security
- Observe and follow do's and don'ts

MODULE - I DIGITAL CULTURE AND SOCIETY 6

Adapting to changes
Importance in today's digital landscape
Digital identity and self- presentation
Online communities and forums
Digital divide and consequences
Online collaboration and collective action

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

MODULE - II DIGITAL LITERACY AND ACCESS TO TECHNOLOGY 5

Computer skills
Social and cultural understanding
Social media campaign and Activism
Netiquettes
Trending Technologies
Digital tools and softwares

MODULE - III DIGITAL ETHICS 3

Digital ethics and moral panics
The art of protecting secrets
Overview of digital tools

MODULE - IV CYBER SECURITY 3

Threats, vulnerability and consequences
Data making and usage practice
Importance of security

MODULE - V DIGITAL NETWORKING 7

Remote work and virtual teams
Authenticity in digital interactions
Engaging content creation
Tools and and techniques for insightful usage
Balancing online and offline interactions
Collaboration for research and innovation

MODULE - VI BUREAU OF INDIAN STANDARDS (BIS): BASIC CONCEPTS,STANDARDS FORMATION PROCESS AND CHALLENGES 6

Standardization –Basic Concepts:

Basic concepts of standardization

Purpose of standardization, marking and certification of articles and processes

Importance of standards to industry, policy makers, trade, sustainability and innovation

Standards Formulation Process and Challenges:

Objectives, roles and functions of BIS, Bureau of Indian Standards Act, ISO/ IEC Directives

WTO Good Practices for Standardization

World of Standards:

Important Indian and International Standards

TOTAL: 30 PERIODS

REFERENCES:

1. Communication Skills and Soft Skills – an Integrated Approach. Edited by E. Sureshkumar, P. Sreehari and J. Savithri, Pearson.
2. Silvia. P.J.2007. How to Read a Lot. Washington DC, American Psychological Association.

WEB REFERENCES:

1. https://swayam.gov.in/nd1_noc19_hs31/preview
2. https://www.sscnasscom.com/ssc-projects/capacity-building-and-development/training/gbfs/

OUTCOMES:

Upon completion of the course, the student will be able to:

1. Apply online communication techniques and collaboration skills (K3)
2. Enumerate the principles of digital ethics in online interactions (K2)
3. Understand the importance of Bureau of Indian Standards (BIS). (K2)

CO-PO, PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	3	-	2	-	-
CO2	-	-	-	-	-	-	-	-	3	-	2	-	-
CO3	-	-	-	-	-	-	-	3	2	-	2	-	-

Recommended in Board of Studies (BoS) Meeting No. _____ held on _____

SEMESTER - II

COURSE CODE: 24AMPC201	TAKE CHARGE : COLLEGE READINESS - II	L	T	P	CP	C
		3	0	0	3	3
NPTEL CODE: 106106182	SYLLABUS VERSION 1.1	SDG NO. 4 , 9				
PRE-REQUISITE COURSES	24ESCS101					

OBJECTIVES:

- The To formulate computational solutions to real-world problems and express them as algorithms, pseudocode and flowcharts.
- To write, execute and debug Python programs using appropriate data types, operators and expressions.
- To Control program flow using branching, looping and user-defined, recursive and anonymous functions.
- To manipulate the right built-in collection for a given data-handling task.
- To build reliable, modular programs using file handling, exception handling, user-defined modules and simple classes.
- To process and visualise real datasets using NumPy, Pandas and Matplotlib.

MODULE - IV CONTRIBUTION & LEARNING SKILLS

- Take Charge of Your Contribution
- Take Charge of Your Learning
- Activity on Taking Charge of Your Contribution
- Activity on Taking Charge of Your Learning

MODULE - V GETTING IN – CAREER & HIGHER EDUCATION READINESS

- Take Charge of Getting In
- Activity on Taking Charge of Getting In

MODULE - VI FINANCIAL LITERACY & REFLECTION

- Take Charge of Your Finances
- Activity on Taking Charge of Your Finances
- Reflections on Take Charge – College Readiness

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REFERENCE :

1. Franklin Convey, Take Charge College Readiness, Franklin Convey Education.

This division is well aligned with curriculum design:

- Semester II: Personal growth, academic success, career planning, and financial responsibility (Modules IV–VI).

COURSE OUTCOMES

After successful completion of the course, the student will be able to:

4. Participate effectively in leadership, teamwork, and community-oriented activities. (K3)
5. Use self-directed learning strategies to enhance academic performance and lifelong learning skills. (K3)
6. Analyse and plan college, career, and basic financial decisions to achieve personal and professional goals. (K4)

CO – PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	2	-	-	-	-	-
CO2	1	-	-	-	1	-	-	-	-	-	-
Co3	-	2	-	-	-	2	-	-	-	-	-

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Imagine the Future and

Make it happen!

Together let's build a better world where there is NO POVERTY and ZERO HUNGER.

We have GOOD HEALTH AND WELL BEING QUALITY EDUCATION and full GENDER EQUALITY everywhere.

There is CLEAN WATER AND SANITATION for everyone. AFFORDABLE AND CLEAN ENERGY

which will help to create DECENT WORK AND ECONOMIC GROWTH. Our prosperity shall be fuelled

by investments in INDUSTRY, INNOVATION AND INFRASTRUCTURE that will help us to

REDUCE INEQUALITIES by all means. We will live in SUSTAINABLE CITIES AND COMMUNITIES.

RESPONSIBLE CONSUMPTION AND PRODUCTION will help in healing our planet.

CLIMATE ACTION will reduce global warming and we will have abundant,

flourishing LIFE BELOW WATER, rich and diverse LIFE ON LAND.

We will enjoy PEACE AND JUSTICE through STRONG INSTITUTIONS

and will build long term PARTNERSHIPS FOR THE GOALS.

For the goals to be reached, everyone needs to do their part: governments, the private sector, civil society and **People like you.**

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1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
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12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS

Sairam RAISE — *Inspiring* PEOPLE

Sairam EOMS — *Improving* PROCESS

Sairam SDG ACTION PROGRAM — *Instilling* PURPOSE

Together we can...