Er. PERUMAL MANIMEKALAI COLLEGE OF ENGINEERING

(An Autonomous Institution – Affiliated to Anna University, Chennai)

Koneripalli, Hosur - 635117.

ACADEMIC REGULATIONS 2023 (R23)

Curriculum

(Version 1)

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Applicable from 2023 -24 onwards

REGULATIONS 2023 - AUTONOMOUS
CHOICE BASED CREDIT SYSTEM
B.E. ELECTRICAL AND ELECTRONICS ENGINEERING
CURRICULUM FOR I TO VIII SEMESTERS

Program Educational Objectives (PEO's)

PEO1: Students with strong basic knowledge in science and engineering to formulate, solve and analyze electrical and electronics engineering problems.

PEO2: Students with ability to provide innovative solutions pertaining to Electrical and Electronics engineering to emerging industrial and societal problems.

PEO3: Students able to communicate and indulge in life-long learning and practice professionalism with ethics.

Program Outcomes (PO's)

PO1 Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

PO2 Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3 Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health, safety, cultural, societal and environmental considerations.

PO4 Conduct investigations of complex problems: Use research-based knowledge and researchmethods including design of experiments, analysis, and interpretation of data and synthesis of the information to provide valid conclusions.

PO5 Modern tool usage: Create, select, apply appropriate techniques, resources, modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6 The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7 Environment and sustainability: Understand the impact of the professional engineering solutionsin societal, environmental contexts, demonstrate the knowledge and need for sustainable development.

PO8 Ethics: Apply ethical principles, commit to professional ethics, responsibilities and norms of the engineering practice**.**

PO9 Individual and team work: Function effectively as an individual, as a member or leader in diverse teams and in multidisciplinary settings.

PO10 Communication: Communicate effectively on complex engineering activities with the engineering community with society at large being able to comprehend, write effective reports, design documentation, make effective presentations and receive clear instructions.

PO11 Project management and finance: Demonstrate knowledge, understanding of the engineering and management and leader in a team, to manage projects and in multidisciplinary environments.

PO12 Life-long learning: Recognize the need, ability to engage in independent and lifelong learning inthe broadest context of technological change.

Program Specific Outcomes (PSO's)

PSO1: Able to identify, formulate and investigate various real time problems of Electrical Machines, Control System, Instrumentation System and Power Electronics & drives.

PSO2: Able to develop innovative solutions through conventional and renewable energy systems to minimize the environmental impact to the society

PEO/PO MAPPING

PEOs	PROGRAM OUTCOMES													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
PEO1	3	3	3	3	2	2	1	1	1	2	1	1	3	3
PEO2	3	3	3	3	3	3	3	3	3	2	2	2	3	3
PEO3	2	2	2	2	2	3	2	3	2	3	2	3	3	3

AUTONOMOUS COLLEGE
REGULATIONS 2023
CHOICE BASED CREDIT SYSTEM
B. E. [ELECTRICAL AND ELECTRONICS ENGINEERING]
CURRICULUM FOR I TO VIII SEMESTERS
SEMESTER I

S.NO.	COURSE CODE	COURSE NAME	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
0		Induction Programme – 2 Weeks	-	-	-	-	-	0
THEORY								
1.	PUCC1HM01	Professional English-I	HM	2	-	-	2	2
2.	PUCC1BS01	Matrices and Calculus	BS	3	1	-	4	4
3.	PUCC1BS02	Engineering Physics	BS	3	-	-	3	3
4.	PUCC1BS03	Engineering Chemistry	BS	3	-	-	3	3
5.	PUCC1BE01	Engineering Graphics	BE	2	-	4	6	4
6.	PUCC1HM02	Heritage of Tamils தமிழர்மரபு	HM	1	-	-	1	1
PRACTICALS								
7.	PUCC1PL01	Professional English - I	HM	-	-	4	4	2
8.	PUCC1PL02	Physics and Chemistry Laboratory	BS	-	-	4	4	2
9.	PUCC1HM03	Wellness	HM	-	-	1	1	0
			TOTAL	14	01	13	28	21

SEMESTER II

S.NO.	COURSE CODE	COURSE NAME	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	PUCC2HM04	Professional English-II	HM	2	-	-	2	2
2.	PUCC2BS04	Statistics and Numerical Methods	BS	3	1	-	4	4
3.	PUCC2BS05	Engineering Materials	BS	3	-	-	3	3
4.	PUEE2PC01	Electronic Devices and Circuits	PC	3	-	-	3	3
5.	PUCC2BE05	Basics of Civil and Mechanical Engineering	BE	3	-	-	3	3
6.	PUCC2BE04	Problem Solving Using Python Programming	BE	2	-	-	2	2
7.	PUCC2HM05	Tamils and Technology தமிழரும்தொழில்நுட்பமும்	HM	1	-	-	1	1
PRACTICALS								
8.	PUCC2PL03	Professional English - II	HM	-	-	4	4	2
9.	PUCC2PL04	Problem Solving Using Python Programming	BE	-	-	4	4	2
10.	PUEE2PL01	Electronic Devices and Circuits Lab	PC	-	-	4	4	2
11.	PUCC2HM06	Wellness	HM	-	-	1	1	0
			TOTAL	17	1	13	31	24

SEMESTER III

S.NO.	COURSE CODE	COURSE NAME	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	PUCC3BS06	Transforms and partial differential equations	BS	3	1	-	4	4
2.	PUEE3PC02	Electro-magnetic Fields	PC	3	-	-	3	3
3.	PUEE3PC03	Electric Circuit Analysis	PC	3	1	-	4	4
4.	PUEE3PC04	Electrical Machines - I	PC	3	1	-	4	4
5.	PUEE3PC05	Measurements and Instrumentation	PC	3		-	3	3
6.	PUCC3MC01	Mandatory Course – I (Non-Credit)	MC	2	-	-	2	0
PRACTICALS								
7.	PUEE3PL02	Electrical Circuit Laboratory	PC	-	-	4	4	2
8.	PUEE3PL03	Electrical Machines – I Lab	PC	-	-	4	4	2
9.	PUCC3HM07	Extension Activities	HM	-	-	-	-	-
			TOTAL	17	3	8	28	22

SEMESTER IV

S.NO.	COURSE CODE	COURSE NAME	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	PUCC4BS07	Environmental Sciences & Sustainability	BS	3	-	-	3	3
2.	PUEE4PC04	Linear & Digital Integrated Circuits	PC	3	-	-	3	3
3.	PUEE4PC05	Transmission and Distribution	PC	3	-	-	3	3
4.	PUEE4PC06	Electrical Machines -II	PC	3	1	-	4	4
5.	PUEE4PC07	Control systems	PC	3	1	-	4	4
6.	PUEE4MC02	Mandatory Course – II (Non-Credit)	MC	2	-	-	2	0
PRACTICAL								
7.	PUEE4PL04	Linear & Digital Integrated Circuits	PC	-	-	4	4	2
8.	PUEE4PL05	Electrical Machines –II Lab	PC	-	-	4	4	2
9.	PUCC4HM08	Extension Activities	HM	-	-	-	-	1
10	PUEE4IP01	In-plant Training/Internship	SD	-	-	-	-	-
			TOTAL	17	2	8	27	22

SEMESTER V

S.NO.	COURSE CODE	COURSE NAME	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	PUCC5HM09	Universal Human Values & Ethics	HM	3	-	-	3	3
2.	PUEE5PC07	Power Electronics	PC	3	-	-	3	3
3.	PUEE5PC08	Power system Analysis	PC	3	1	-	4	4
4.	PUEE5PEXX	Professional Elective – I	PE	3	-	-	3	3
5.	PUEE5PEXX	Professional Elective – II	PE	3	-	-	3	3
6.	PUEE5IL01	Industry Lecture	IL	1	-	-	1	0
PRACTICAL								
7.	PUEE5PL06	Power Electronics Lab	PC	-	-	4	4	2
8.	PUEE5PL07	Control system lab	PC	-	-	4	4	2
9.	PUCC5PD01	Professional Development I	SD	-	-	2	2	1
10.	PUEE5IP02	In-plant Training/Internship	SD	-	-	-	-	-
			TOTAL	16	01	10	27	21

- In-plant-Training – 2 Weeks of training each during $4^{th}/5^{th}/6^{th}$ Semester – During college hours or semester vacation

Total 4 weeks of Training – 2 Credits

SEMESTER VI

S.NO.	COURSE CODE	COURSE NAME	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	PUEE6PC09	Digital Signal Processing	PC	3	-	-	3	3
2.	PUEE6PC10	Microprocessor and Microcontroller	PC	3	-	-	3	3
3.	PUEE5PEXX	Professional Elective – III	PE	3	-	-	3	3
4.	PUEE5PEXX	Professional Elective – IV	PE	3	-	-	3	3
5.		Open Elective – I (Management)	OE	3	-	-	3	3
6.	PUEE5IL02	Industry Lecture	IL	1	-	-	1	0
PRACTICAL								
7.	PUEE3PL08	Microprocessor and Microcontroller lab	PC	-	-	4	4	2
8.	PUEE3PL09	Mini Project	PC	-	-	4	4	2
9.	PUEE6VA01	Technical Skill Development	SD	-	-	2	2	1
10.	PUEE6PD02	Professional development II	SD	-	-	2	2	1
11.	PUEE6IP03	In-plant Training/Internship	SD	-	-	-	-	-
			TOTAL	16		12	28	21

- In-plant-Training – 2 Weeks of training each during $4^{th}/5^{th}/6^{th}$ Semester – During college hours or semester vacation
- Any one Open Elective has to choose from the Management verticals.
  Total 4 weeks of Training – 2 Credits

SEMESTER VII

S.NO.	COURSE CODE	COURSE NAME	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	PUEE7PC11	Protection and switchgear	PC	3	1	-	4	4
2	PUEE5PEXX	Professional Elective – V	PE	3	-	-	3	3
3	PUEE5PEXX	Professional Elective – VI	PE	3	-	-	3	3
4		Open Elective – II	OE	3	-	-	3	3
5		Open Elective – III	OE	3	-	-	3	3
PRACTICAL								
6	PUEE7PL10	Power system simulation Lab	PC	-	-	4	4	2
7	PUEE7VA02	Technical Skill Development	SD	-	-	2	2	1
8	PUEE7PR01	Project Phase –I	PR			2	2	1
			TOTAL	15	1	8	24	20

SEMESTER VIII

S.NO.	COURSE CODE	COURSE NAME	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	PUEE7PR02	Project Phase –II / Internship	PR	-	-	20	20	10
			TOTAL			20	20	10

TOTAL CREDITS: 163

- Project – Phase II - Mandatory
- Internship - Optional – 3 Months to 6 Months

SUMMARY

B.E. ELCTRICAL AND ELECTRONICS ENGINEERING										
S.NO	Subject Area	I	II	III	IV	V	VI	VII	VIII	Total Credits
		Credits Per Semester								
1	HM	5	5		1	3				14
2	BS	12	7	4	3					26
3	BE	4	7							11
4	PC		5	18	18	11	10	6		68
5	PE					6	6	6		18
6	OE						3	6		9
7	PR							1	10	11
8	SD					1	3	2		6
Total		21	24	22	22	21	22	21	10	163

TOTAL NUMBER OF CREDITS TO BE EARNED FOR AWARD OF THE DEGREE = 163

HM	Humanities, Management, Wellness & Extension
BS	Basic Science
BE	Basic Engineering
PC	Professional Core
PE	Professional Elective
OE	Open Elective
MC	Mandatory Non-Credit
PR	Project
SD	Professional Development, In-plant Training / Internship, Industry Lecture, Value added courses

AUTONOMOUS COLLEGE
REGULATIONS 2023
CHOICE BASED CREDIT SYSTEM
B. E. [ELECTRICAL AND ELECTRONICS ENGINEERING]
CURRICULUM FOR I TO VIII SEMESTERS
SEMESTER I

S.NO.	COURSE CODE	COURSE NAME	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
0		Induction Programme – 2 Weeks	-	-	-	-	-	0
THEORY								
1.	PUCC1HM01	Professional English-I	HM	2	-	-	2	2
2.	PUCC1BS01	Matrices and Calculus	BS	3	1	-	4	4
3.	PUCC1BS02	Engineering Physics	BS	3	-	-	3	3
4.	PUCC1BS03	Engineering Chemistry	BS	3	-	-	3	3
5.	PUCC2TL04	Engineering Graphics	BE	2	-	4	6	4
6.	PUCC1HM02	Heritage of Tamils □□□□□□□□□□	HM	1	-	-	1	1
PRACTICALS								
7.	PUCC1PL01	Professional English - I	HM	-	-	4	4	2
8.	PUCC1PL02	Physics and Chemistry Laboratory	BS	-	-	4	4	2
9.	PUCC1HM03	Wellness	HM	-	-	1	1	0
			TOTAL	14	01	13	28	21

PUCC1HM01	PROFESSIONAL ENGLISH I	L T P C
		2 0 0 2

COURSE OBJECTIVE

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Listening, Speaking, Reading and Writing skills.
- Equip students to study academic subjects more effectively by using the theoretical and practical components of English syllabus
- Develop communication skills in formal and informal situations.

UNIT I: INTRODUCTION TO COMMUNICATION **6**

EFFECTIVE COMMUNICATION:

What is effective communication? (Explain using activities) What are the seven C's of effective communication? What are key language skills? What is LSRW? How does one develop language and communication skills?

FUNDAMENTALS OF COMMUNICATION:

Reading - Reading brochures (technical context), telephone messages / social media messages relevant to technical contexts and emails. Writing - Writing emails / letters introducing oneself. Grammar - Present Tense (simple and progressive); Question types: Wh/ Yes or No/ and Tags. Vocabulary - Synonyms and Antonyms, Abbreviations & Acronyms (as used in technical contexts).

UNIT II: NARRATION AND SUMMATION **6**

Reading - Reading biographies, travelogues, newspaper reports, Excerpts from literature, and travel & technical blogs. Writing - Guided writing-- Paragraph writing Short Report on an event (field trip etc.) Grammar –Past tense (simple); Subject-Verb Agreement; and Prepositions. Vocabulary - Word forms (prefixes& suffixes);. Phrasal verbs

UNIT III: DESCRIPTION OF A PROCESS / PRODUCT **6**

Reading — Reading advertisements, gadget reviews; user manuals. Writing - Writing definitions; instructions; and Product /Process description. Grammar - Imperatives; Adjectives; Degrees of comparison; Present & Past Perfect Tenses. Vocabulary - Compound Nouns, Homonyms; and Homophones, discourse markers (connectives & sequence words).

UNIT IV: CLASSIFICATION AND RECOMMENDATIONS **6**

Reading — Newspaper articles; Journal reports –and Non Verbal Communication (tables, pie charts etc,.). Writing — Note-making / Note-taking (*Study skills to be taught, not tested); Writing recommendations; Transferring information from nonverbal (chart, graph etc, to verbal mode) Grammar — Articles; Pronouns - Possessive & Relative pronouns. Vocabulary - Collocations; Fixed /Semi fixed expressions.

UNIT V: EXPRESSION **6**

Reading – Reading editorials; and Opinion Blogs; Writing – Essay Writing (Descriptive or narrative).Grammar – Future Tenses, Punctuation; Negation (Statements & Questions); and Simple, Compound & Complex Sentences. Vocabulary - Cause & Effect Expressions – Content vs Function words.

TOTAL: 30 PERIODS

COURSE OUTCOMES: At the end of the course, the students will be able:

COs	Course Outcome (CO)	Blooms Taxonomy
CO1	Apply Elements of communication to LSRW on self-introduction and introduction of others	Apply
CO2	Comprehend Complex academic texts for narrating experience and events	Understand
CO3	Describe nonverbal process and products transferring into verbal texts	Understand
CO4	Prepare Journal reports and newspaper article	Apply
CO5	Write descriptive and narrative essay	Apply

CO – PO Mapping

COs	PO-1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	3	-	2	3	3	1	3
CO2	-	-	-	-	-	2	-	1	3	3	-	3
CO3	-	-	-	-	-	2	-	2	3	3	-	3
CO4	-	-	-	-	-	2	-	1	3	3	1	3
CO5	-	-	-	-	-	1	-	1	2	2	-	1

*For Entire Course, PO /PSO Mapping; 1 (Low); 2(Medium); 3(High) Contribution to PO/PSO

TEXT BOOK:

1. Faculty, Department of English, Anna University, English for Engineers & Technologists, Orient Blackswan Private Ltd. 2020
2. Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN. Shoba, and Dr. Lourdes Joevani Department of English, Anna University.**,**English for Science & Technology, Cambridge University Press, 2021.

REFERENCES:

1. Meenakshi Raman & Sangeeta Sharma, Technical Communication – Principles And Practices, Oxford Univ. Press, New Delhi. 2016,
2. M. Ashraf Rizvi, Effective Technical Communication,Mc Graw Hill, 2017
3. Michael Swan, Practical English Usage, Oxford, 2016
4. N P Sudharshana , C Savitha),English for Engineers, Cambridge University Press,2018
5. Sajitha Jai Prakash, Sowmya JAyaprakash, Technical Communication English – I, Himalaya Publishing House, 2018

WEBSITE REFERENCE:

1. http://www.indiabix.com/group-discussion/topics-with-answers/
2. http://www.dailywriting **tips .com/**

NPTEL/ SWAYAM/ MOOC REFERENCE:

1. https://digimat.in/nptel/courses/video/109106067/L04.html (better Spoken English)
2. https://onlinecourses.nptel.ac.in/noc20_hs14/preview **(speak effectively)**

PUCC1BS01	MATRICES AND CALCULUS	L T P C
		3 1 0 4

COURSE OBJECTIVE

- To develop the use of matrix algebra techniques that are needed by engineers for practical applications.
- To familiarize the students with differential calculus.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To make the students understand various techniques of integration.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.

UNIT I: MATRICES **9+3**

Types of matrices- Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors - Cayley - Hamilton theorem- Reduction of a quadratic form to canonical form by orthogonal transformation-Nature of quadratic-Application: Stretching of an elastic membrane.

UNIT II DIFFERENTIAL CALCULUS **9+3**

Representation of functions - Limit of a function-L-Hospital rule - Continuity - Derivatives - Differentiation rules (sum, product, quotient, chain rules) - Implicit differentiation - Logarithmic differentiation- Applications: Maxima and Minima of functions of one variable-production quantity for optimization technique-volume optimization of cone circumscribed around the sphere-rectangular fencing problems (Not for Examination).

UNIT III - FUNCTIONS OF SEVERAL VARIABLES **9+3**

Partial differentiation – Homogeneous functions and Euler's theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Applications: Maxima and minima of functions of two variables and Lagrange's method of undetermined multipliers. Applications: Find the size of the rectangular prism which gives minimum surface area for fixed volume. Find the breadth and depth of the rectangular beam cut from a cylindrical rod for maximum strength.

UNIT IV - INTEGRAL CALCULUS **9+3**

Definite and Indefinite integrals - Substitution rule - Techniques of Integration: Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction - Improper integrals - Applications: Hydrostatic force and pressure, moments and centers of mass.

UNIT - V: MULTIPLE INTEGRALS **9+3**

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Applications: Moments and centres of mass, moment of inertia.

TOTAL: 45 PERIODS

Course Outcomes

COs	Course Outcome (CO)	Blooms Taxonomy
CO1	Use the matrix algebra methods for solving practical problems	Apply
CO2	Apply differential calculus tools in solving various application problems	Apply
CO3	Able to analyze differential calculus ideas on several variable functions.	Analyze
CO4	Apply different methods of integration in solving practical problems.	Apply
CO5	Apply multiple integral ideas in solving areas, volumes and other practical problem	Apply

CO-PO Mapping

COs	PO-1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	-	-	-	-	-	-	-	1
CO2	3	3	3	2	-	-	-	-	-	-	-	1
CO3	3	3	-	3	-	-	-	-	-	-	-	1
CO4	3	3	2	2	-	-	-	-	-	-	-	1
CO5	3	3	2	-	-	-	-	-	-	-	-	1

TEXT BOOK:

1. Kreyszig.E, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.

REFERENCES:

1. Anton. H, Bivens. I and Davis. S, "Calculus", Wiley, 10th Edition, 2016
2. Jain . R.K. and Iyengar. S.R.K., “Advanced Engineering Mathematics”, Narosa Publications, New Delhi, 5th Edition, 2016.
3. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2016.
4. Thomas. G. B., Hass. J, and Weir. M.D, "Thomas Calculus", 14th Edition, Pearson India, 2018.

WEBSITE REFERENCE:

1. https://3lihandam69.files.wordpress.com/2018/10/calculus-10th-edition-anton.pdf - Calculus 10th Edition anton.pdf
2. https://www.hzu.edu.in/engineering/Higher%20Engineering%20Mathematics.pdf - Higher Engineering Mathematics, Sixth Edition
3. https://dl.konkur.in/post/Book/Paye/Thomas-Calculus-14th-Edition-%5Bkonkur.in%5D.pdf
   https://archive.org/details/advanced-engneering-maths - High advanced Engineering Mathematics

NPTEL/ SWAYAM/ MOOC REFERENCE:

1. NPTEL: Matrix theory, Prof.Chandra, R. Murthy Indian institute of Science -Bangalore.

2.NPTEL: Basic Calculus, Prof. Arindama Singh Department of Mathematics -IIT Madras

3.SWAYAM: Online course – Integral and Vector Calculus, Prof.Hari Shankar Mahato, IIT -Kharagpur.

PUCC1BS02	ENGINEERING PHYSICS	L T P C
		3 0 0 3

COURSE OBJECTIVE

- To make the students effectively to achieve an understanding of mechanics.
- To enable the students to gain knowledge of electromagnetic waves and its applications.
- To introduce the basics of oscillations, optics and lasers.
- Equipping the students to be successfully understand the importance of quantum physics.
- To motivate the students towards the applications of quantum mechanics.

UNIT I MECHANICS **9**

Multi-particle dynamics: Center of mass (CM) – CM of continuous bodies – motion of the CM – kinetic energy of system of particles. Rotation of rigid bodies: Rotational kinematics – rotational kinetic energy and moment of inertia - theorems of M .I – moment of inertia of continuous bodies – Radius of gyration – M.I of a diatomic molecule - rotational energy state of a rigid diatomic molecule - torque – conservation of angular momentum – gyroscope - torsional pendulum.

UNIT II ELECTROMAGNETIC WAVES **9**

The Maxwell's equations - wave equation; Plane electromagnetic waves in vacuum, Conditions on the wave field - properties of electromagnetic waves: speed, amplitude, phase, orientation and waves in matter - Producing electromagnetic waves - Energy and momentum in EM waves: Intensity, momentum and radiation pressure - Cell-phone reception - Reflection and transmission of electromagnetic waves from a non-conducting medium-vacuum interface for normal incidence.

UNIT III OSCILLATIONS, OPTICS AND LASERS **9**

Simple harmonic motion - resonance - waves on a string - standing waves - traveling waves – Energy transfer of a wave - sound waves - Doppler effect - reflection and refraction of light waves – total internal reflection - interference - interferometers - air wedge experiment. Theory of laser - characteristics - Spontaneous and stimulated emission - Einstein's coefficients – population inversion - Nd-YAG laser, CO2 laser, semiconductor laser - Basic applications of lasers in industry.

UNIT IV BASIC QUANTUM MECHANICS **9**

Photons and light waves - Electrons and matter waves –Compton effect - The Schrodinger equation (Time dependent and time independent forms) - meaning of wave function - Normalization –Free particle - particle in a infinite potential well: 1D,2D and 3D Boxes- Normalization, probabilities and the correspondence principle

UNIT V APPLIED QUANTUM MECHANICS **9**

The harmonic oscillator(qualitative)- Barrier penetration and quantum tunneling(qualitative)- Tunneling microscope - Resonant diode - Finite potential wells (qualitative)- Bloch's theorem for particles in a periodic potential –Kronig-Penney model and origin of energy bands.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

COs	Course outcomes	Blooms Taxonomy
CO1	Comprehend the basics and importance of mechanics	Understand
CO2	Illustrate the properties of electromagnetic waves and its propagation in vacuum and medium.	Understand
CO3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers	Understand
CO4	Explain the concepts of quantum physics	Understand
CO5	Comprehend and apply quantum mechanical principles towards the formation of energy bands	Understand

CO – PO Mapping

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

TEXT BOOK

1. D.Kleppner and R.Kolenkow. An Introduction to Mechanics. McGraw Hill Education (Indian Edition), 2017
2. Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, Concepts of Modern Physics, McGraw-Hill (Indian Edition), 2017.

REFERENCES:

1. R.Wolfson. Essential University Physics. Volume 1 & 2. Pearson Education (Indian Edition), 2019.
2. K.Thyagarajan and A.Ghatak. Lasers: Fundamentals and Applications, Laxmi Publications, (Indian Edition), 2019.
3. D.Halliday, R.Resnick and J.Walker. Principles of Physics, Wiley (Indian Edition), 2015.
4. N.Garcia, A.Damask and S.Schwarz. Physics for Computer Science Students. SpringerVerlag,2012.

NPTEL/ SWAYAM/ WEBSITE REFERENCE:

1. https://nptel.ac.in/courses/112104114 - Dynamics of Machines, IIT Kanpur, Prof. Amitabha Ghosh
2. https://onlinecourses.nptel.ac.in/noc19_ph08/preview - Introduction to Electromagnetic Theory by Dr. Manoj Kumar Harbola, IIT Kanpur
3. https://nptel.ac.in/courses/115105104, Modern Optics, IIT Kharagpur, Prof. Partha Roy Choudhury
4. https://archive.nptel.ac.in/courses/115/106/115106119/ - Waves & Oscillations, Coordinated by IIT Madras

PUCC1BS03	ENGINEERING CHEMISTRY	L T P C
		3 0 0 3

COURSE OBJECTIVE

- To inculcate sound understanding of water quality parameters and water treatment techniques.
- To impart knowledge on the basic principles and properties of polymers and composites
- To introduce the basic concepts of corrosion, alloys and corrosion preventive methods
- To facilitate the understanding of different type of fuels, their preparation, properties and combustion characteristics.
- To familiarize the students with the operating principles, working processes, applications of energy conversion and storage devices.

UNIT I: WATER AND ITS TREATMENT 9

Water: Sources and impurities, Water quality parameters: Definition and significance of - colour, odour, turbidity, pH, hardness, alkalinity, TDS, COD and BOD, fluoride and arsenic. Hardness – types: temporary and permanent – expression of hardness in terms of $CaCO_3$. Municipal water treatment: primary treatment and disinfection (UV, Ozonation, break-point chlorination). Boiler troubles: Scale and sludge, Boiler corrosion, Caustic embrittlement, Priming & foaming. Treatment of boiler feed water: Internal treatment (phosphate, colloidal, sodium aluminate and Calgon conditioning) and External treatment – Ion exchange demineralization and zeolite process. Desalination of brackish water: Reverse Osmosis.

UNIT II: POLYMER CHEMISTRY AND COMPOSITES 9

Polymers-definition-types: thermoplastics and thermosetting plastics, polymerization-types-addition and condensation polymerization-free radical polymerization mechanism-Plastics, classification-preparation, properties and uses of PVC, Teflon, polycarbonate, nylon 6,6, PET-Rubber- types- synthetic rubber-butyl rubber- vulcanization of rubber, Composites-definition, types polymer matrix composites-FRP only

UNIT III: CORROSION AND ALLOYS 9

CORROSION: causes- factors- types- chemical, electrochemical corrosion (galvanic, differential aeration), corrosion control - material selection and design aspects – electrochemical protection – sacrificial anode method and impressed current cathodic method.

ALLOYS: Introduction- Definition- Properties of alloys- Significance of alloying, Functions and effect of alloying elements- Ferrous alloys- Nichrome and Stainless steel – heat treatment of steel; Non-ferrous alloys – brass and bronze.

UNIT IV: FUELS AND COMBUSTION 9

FUELS: Introduction: Classification of fuels; Coal and coke: Analysis of coal (proximate and ultimate), Carbonization, Manufacture of metallurgical coke (Otto Hoffmann method). Petroleum and Diesel: Manufacture of synthetic petrol (Bergius process), Knocking - octane number, diesel oil – cetane number; Power alcohol and biodiesel.

COMBUSTION OF FUELS: Introduction: Calorific value - higher and lower calorific values, Ignition temperature: spontaneous ignition temperature, Explosive range; Flue gas analysis-ORSAT Method. CO_2 emission and carbon foot print.

UNIT V: ENERGY SOURCES AND STORAGE DEVICES 9

NUCLEAR ENERGY: light water nuclear power plant, breeder reactor. Solar energy conversion: Principle, working and applications of solar cells; Recent developments in solar cell materials. Wind energy; Geothermal energy.

BATTERIES: Types of batteries, Primary battery- dry cell, Secondary battery-lead acid battery and lithium-ion-battery; Electric vehicles – working principles; Fuel cells: H_2-O_2 fuel cell, microbial fuel cell; Super capacitors: Storage principle, types and examples.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able:

COs	Course outcomes	Blooms Taxonomy
CO1	Explain the types of water and water treatment techniques	Understand
CO2	Demonstrate the knowledge of polymers and composites	Understand
CO3	Apply the knowledge of corrosion and alloys	Understand
CO4	Explain the types of fuels and the manufacturing of secondary fuels	Understand
CO5	Illustrate the types of energy sources	Understand

CO – PO Mapping

S. No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	1	1	1	1	-	1	-	2
CO2	3	2	1	1	1	1	1	1	-	1	-	2
CO3	3	2	1	1	1	1	1	1	-	1	-	2
CO4	3	2	2	1	1	1	2	1	-	1	-	2
CO5	3	2	2	1	1	1	2	1	-	1	-	2

*For Entire Course, PO /PSO Mapping; 1 (Low); 2(Medium); 3(High) Contribution to PO/PSO

TEXT BOOK:

1. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018.
2. S.S. Dara, "A Text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.

REFERENCES:

1. O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
2. Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014.
3. Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.
4. O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013.
5. Gowariker V.R., Viswanathan N.V. and Jayadev Sreedhar, "Polymer Science", New Age International P (Ltd.,),
6. Chennai, 2009.

WEBSITE REFERENCE:

1. https://vlab.amrita.edu/?sub=2&brch=193&sim=1548&cnt=1 - Water analysis-Determination of Chemical parameters (Theory): Inorganic Chemistry Virtual Lab: Chemical Sciences: Amrita Vishwa Vidyapeetham Virtual Lab
2. https://www.chemistryviews.org/debating-the-everyday-impact-of-polymer-materials - Debating the Everyday Impact of Polymer Materials – Chemistry Views
3. https://batteryuniversity.com – Learn about batteries
4. https://wiseinternational.org/nuclear-energy -Nuclear Energy Wise international

NPTEL/ SWAYAM/ MOOC REFERENCE:

1. NPTEL: Basic courses-Sem 1 and 2 - Engineering Chemistry-I

PUCC1BE01	ENGINEERING GRAPHICS	L T P C
		2 0 4 4

COURSE OBJECTIVE

- Drawing engineering curves
- Drawing freehand sketch of simple objects
- Drawing orthographic projection of solids and section of solids.
- Drawing development of solids
- Drawing isometric and perspective projections of simple solids.

CONCEPTS AND CONVENTIONS (Not for Examination)

Importance of graphics in engineering applications - Use of drafting instruments - BIS conventions and specifications — Size, layout and folding of drawing sheets — Lettering and dimensioning.

UNIT - I PLANE CURVES AND FREEHAND SKETCHING 6+12

Basic Geometrical constructions, Curves used in engineering practices: Conics — Construction of ellipse, parabola and hyperbola by eccentricity method — Construction of cycloid — construction of involutes of square and circle — Drawing of tangents and normal to the above curves. Visualization concepts and Free Hand sketching: Visualization principles Representation of Three-Dimensional objects – Layout of views- Freehand sketching of multiple views from pictorial views of objects

UNIT - II PROJECTION OF POINTS, LINES AND PLANE SURFACES 6+12

Orthographic projection- principles-Principal planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes -Determination of true lengths and true inclinations by rotating line method and traces. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method. Introduction to Basic Commands in auto CAD (Not for examination).

UNIT - III PROJECTION OF SOLIDS 6+12

Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes and parallel to the other by rotating object method. Practicing three-dimensional modelling of simple objects by CAD Software (Not for examination).

UNIT- IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES 6+12

Section of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes and parallel to the other by rotating object method. Development of lateral surfaces of solids with cut-outs and holes. Practicing three-dimensional modelling of simple objects by CAD Software (Not for examination).

UNIT - V ISOMETRIC AND PERSPECTIVE PROJECTIONS 6+12

Principles of isometric projection — isometric scale - isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions - Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method. Practicing three-dimensional modelling of isometric projection of simple objects by CAD Software (Not for

examination).

TOTAL: (L=30; P=60) 90 PERIODS

COURSE OUTCOMES

On successful completion of this course, the student will be able to.

COs	Course outcomes	Blooms Taxonomy
CO1	Use BIS conventions and specifications for engineering drawing and construct the conic curves, involutes and cycloid.	Apply
CO2	Solve practical problems involving projection of lines and plane surfaces.	Apply
CO3	Draw the projections of 3D primitive objects like prisms, pyramids, cylinders and cones	Apply
CO4	Develop the lateral surfaces of simple and truncated solids.	Analyze
CO5	Draw the orthographic, isometric and perspective projections of simple solids.	Analyze

CO-PO MAPPING

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

TEXT BOOKS:

1	Venugopal K. and Prabhu Raja V., "Engineering Graphics", 15th Edition, New Age International Pvt. Ltd., New Delhi, 2018.
2	Natrajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.

REFERENCE BOOKS:

1	Parthasarathy, N. S. and Vela Murali, "Engineering Drawing", Oxford University Press, 2015
2	Parthasarathy N. S. and Vela Murali, "Engineering Graphics", Oxford University, Press, New Delhi, 2015.
3	Basant Agrawal, Agrawal C.M., "Engineering Drawing", 2nd Edition, McGraw Hill Education, 2019.
4	Gopalakrishnana K.R. "Engineering Drawing", Volume. I & II, Subhas Publications, Bengaluru, 2014.
5	Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2019.

PUBLICATION OF BUREAU OF INDIAN STANDARDS:	
1	IS10711 — 2001: Technical products Documentation — Size and layout of drawing sheets.
2	IS 9609 (Parts 0 & 1) — 2001: Technical products Documentation —Lettering.
3	IS 10714 (Part 20) — 2001 & SP 46 — 2003: Lines for technical drawings.
4	IS 11669 — 1986 & SP 46 —2003: Dimensioning of Technical Drawings.
5	IS 15021 (Parts 1 to 4) — 2001: Technical drawings — Projection Methods
SPECIAL POINTS APPLICABLE TO UNIVERSITY EXAMINATIONS ON ENGINEERING GRAPHICS:	
1	There will be five questions, each of either-or type covering all units of the syllabus.
2	All questions will carry equal marks of 20 each making a total of 100.
3	The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4	The examination will be conducted in appropriate sessions on the same day
WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:	
1	https://nptel.ac.in/courses/112102304
2	https://nptel.ac.in/courses/112103019
3	https://archive.nptel.ac.in/courses/112/102/112102304/
4	https://users.encs.concordia.ca/~nrskumar/Index_files/Mech211/Full%20Lecture/Lecture%201.pdf

PUCC1HM02	HERITAGE OF TAMILS	L T P C
		1 0 0 1

UNIT I: LANGUAGE AND LITERATURE 3

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 - 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.

UNIT II: HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE 3

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNIT III: FOLK AND MARTIAL ARTS 3

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

UNIT IV: THINAI CONCEPT OF TAMILS 3

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

UNIT V: CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE 3

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self- Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

TOTAL: 15 PERIODS

TEXT-CUM-REFEREN CE BOOK:

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் 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\ statute 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:
10. Department of Archaeology & Tamil Nadu Text book and Educational Services Corporation,Tamil Nadu)
11. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author).
12. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
13. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Refernece Book

PUCC1PL01		L T P C
PROFESSIONAL ENGLISH - I LABORATORY		0 0 4 2

COURSE OBJECTIVE

- To improve the communicative competence of learners
- To develop various listening strategies to comprehend various types of audio materials like lectures, discussions, videos etc.
- To use language efficiently in expressing their opinions via various media

LIST OF ACTIVITIES

UNIT-I **12**

Activity 1	Listening for general information-specific details - Audio / video : Gap Filling Activity
Activity 2	Creating a Brochure (technical context), Preparing Emails and letter of introduction
Activity 3	Telephone etiquette , making telephone calls, Self Introduction; Introducing a friend;
Activity 4	Role play : Politeness strategies- making polite requests, making polite offers, replying to polite requests and offers- understanding basic instructions(filling out a bank application for example)

UNIT-II **12**

Activity 1	Listening to anecdotes / stories /Short films
Activity 2	Hints development
Activity 3	Listening to biographies/ News/ documentaries and interviews with celebrities: Narrating personal experiences / events
Activity 4	Listening the audio of field trips : Engaging in small talk- Describing experiences and feelings

UNIT – III **12**

Activity 1	Listen to advertisements, gadget reviews and user manuals
Activity 2	Role play – Advertisement and reviews
Activity 3	Listening to product and process descriptions
Activity 4	Presenting a product :Giving instruction to use the product- explaining uses and purposes

UNIT – IV **12**

Activity 1	Listen to data Interpretation (Graphs & chart) :
Activity 2	Prepare and describe the chart (pie chart,Bar chart, Flow chart & Tabular Chart)
Activity 3	listen to technical / general passage and Take Note
Activity 4	prepare a journal / an article

UNIT – V **12**

Activity 1	Listening to TED Talks / debates /group discussion
Activity 2	Participate in debate
Activity 3	Participate in Group discussion
Activity 4	Presenting Technical / General Topic.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

COs	Course Outcome (co)	Blooms Taxonomy
CO-1	Create Email and letter of introduction in formal and informal.	Apply
CO-2	Communicate effectively about personal experiences and events .	Apply
CO-3	Make Presentation on products and technical processes effectively .	Apply
CO-4	Transcode visual content appropriately.	Apply
CO-5	Participate in group discussion or debates.	Apply

CO – PO Mapping

COs	PO-1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	3	-	1	2	3	-	3
CO2	-	-	-	-	-	2	-	2	2	3	-	3
CO3	-	-	-	-	-	2	-	2	3	3	-	2
CO4	-	-	-	-	-	2	-	1	3	3	-	2
CO5	-	-	-	-	-	2	-	2	3	3	-	3

TEXT BOOK:

1. Faculty ,Anna university , Orient Blackswan ,“English for Engineers and Technologists” Volume I ,2022.
2. Cambridge University Press ,“English for Science & Technology - II” , 2023.

REFERENCE:

1. Adrian Wallwork , Springer , “English for Academic Correspondence and Socializing” 2011.
2. Stella Cortrell , Red Globe Press, “The Study Skills Handbook” , 2019
3. Mathew Richardson , Charlie Creative Lab ,“Advanced Communication Skills” , 2020.
4. Jack C.Richards , “Interchange”, Cambridge University Press , Fifth Edition, 2017
5. Mathew Richardson, Charlie Creative Lab ,“Advanced Communication Skills” , 2020

PUCC1PL02	PHYSICS AND CHEMISTRY LABORATORY	L T P C
PHYSICS LABORATORY: (Any seven experiments to be conducted)		**2 0 0 4**

COURSE OBJECTIVE

- To learn the proper use of various kinds of physics laboratory equipment.
- To learn how data can be collected, presented and interpreted in a clear and concise manner.
- To learn problem solving skills related to physics principles and interpretation of experimental data.
- To determine error in experimental measurements and techniques used to minimize such error.
- To make the student as an active participant in each part of all lab exercises.

LIST OF EXPERIMENTS

1. Torsional pendulum - Determination of rigidity modulus of wire and moment of inertia of regular and irregular objects.
2. Simple harmonic oscillations of cantilever.
3. Non-uniform bending - Determination of Young's modulus
4. Uniform bending – Determination of Young's modulus
5. Laser- Determination of the wave length of the laser using grating
6. Air wedge - Determination of thickness of a thin sheet/wire
7. a) Optical fibre -Determination of Numerical Aperture and acceptance angle
   b) Compact disc- Determination of width of the groove using laser.
8. Acoustic grating- Determination of velocity of ultrasonic waves in liquids.
9. Ultrasonic interferometer – determination of the velocity of sound and compressibility of liquids
10. Post office box -Determination of Band gap of a semiconductor.
11. Photoelectric effect
12. Michelson Interferometer.
13. Melde's string experiment
14. Experiment with lattice dynamics kit.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

COS	Course outcomes	Blooms Taxonomy
CO1	Demonstrate the functioning of various physics laboratory equipment.	Apply
CO2	Use graphical models to analyze laboratory data.	Analyze
CO3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.	Analyze
CO4	Access, process and analyze scientific information.	Analyze
CO5	Solve problems individually and collaboratively.	Apply

CO – PO Mapping

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

CHEMISTRY LABORATORY: (Any seven experiments to be conducted)

COURSE OBJECTIVE

- To inculcate experimental skills to test basic understanding of water quality parameters, such as, acidity, alkalinity, hardness, DO, chloride and copper.
- To induce the students to familiarize with electroanalytical techniques such as, pH metry, potentiometry and conductometry in the determination of impurities in aqueous solutions.
- To demonstrate the analysis of metals and alloys.
- To demonstrate the synthesis of nanoparticles

LIST OF EXPERIMENTS

1. Preparation of Na_2CO_3 as a primary standard and estimation of acidity of a water sample using the primary standard.
2. Determination of types and amount of alkalinity in water sample. - Split the first experiment into two.
3. Determination of total, temporary & permanent hardness of water by EDTA method.
4. Determination of DO content of water sample by Winkler's method.
5. Determination of chloride content of water sample by Argentometric method.
6. Estimation of copper content of the given solution by Iodometry.
7. Estimation of TDS of a water sample by gravimetry.
8. Determination of strength of given hydrochloric acid using pH meter.
9. Determination of strength of acids in a mixture of acids using conductivity meter.
10. Conductometric titration of barium chloride against sodium sulphate (precipitation titration)
11. Estimation of iron content of the given solution using potentiometer.
12. Estimation of sodium /potassium present in water using flame photometer.
13. Preparation of nanoparticles (TiO_2/ZnO/CuO) by Sol-Gel method.
14. Estimation of Nickel in steel
15. Proximate analysis of Coal

TOTAL: 30 PERIODS

COURSE OUTCOMES:

On successful completion of this course, the student will be able to.

COs	Course outcomes	Blooms Level
CO 1	To analyze the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	Analyze
CO2	To determine the amount of metal ions through volumetric and spectroscopic techniques	Analyze
CO3	To analyze and determine the composition of alloys	Analyze
CO 4	To learn simple method of synthesis of nanoparticles	Analyze
CO 5	To quantitatively analyze the impurities in solution by electroanalytical techniques	Analyze

CO – PO Mapping

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

SEMESTER II

S.NO.	COURSE CODE	COURSE NAME	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	PUCC2HM04	Professional English-II	HM	2	-	-	2	2
2.	PUCC2BS04	Statistics and Numerical Methods	BS	3	1	-	4	4
3.	PUCC2BS05	Engineering Materials	BS	3	-	-	3	3
4.	PUEE2PC01	Electronic Devices and Circuits	PC	3	-	-	3	3
5.	PUCC2BE05	Basics of Civil and Mechanical Engineering	BE	3	-	-	3	3
6.	PUCC2BE04	Problem Solving Using Python Programming	BE	2	-	-	2	2
7.	PUCC2HM05	Tamils and Technology தமிழரும்தொழில்நுட்பமும்	HM	1	-	-	1	1
PRACTICALS								
8.	PUCC2PL03	Professional English - II	HM	-	-	4	4	2
9.	PUCC2PL04	Problem Solving Using Python Programming Laboratory	BE	-	-	4	4	2
10.	PUEE2PL01	Electronic Devices and Circuits Laboratory	PC	-	-	4	4	2
11.	PUCC2HM06	Wellness	HM	-	-	1	1	0
			TOTAL	17	1	13	31	24

PUCC2HM04	PROFESSIONAL ENGLISH - II	L T P C
		2 0 0 2

COURSE OBJECTIVE

- To engage learners in meaningful language activities to improve their reading and writing skills
- To help learners understand the purpose, audience, contexts of different types of writing
- To demonstrate an understanding of job applications and interviews for internship and placements

UNIT I: MAKING COMPARISONS **6**

Reading - Reading advertisements, user manuals, brochures; Writing – Professional emails, Email etiquette - Compare and Contrast Essay; Grammar – Mixed Tenses, Prepositional phrases

UNIT II: EXPRESSING CAUSAL RELATIONS IN SPEAKING AND WRITING **6**

Reading - Reading longer technical texts– Cause and Effect Essays, and Letters / emails ofcomplaint, Writing - Writing responses to complaints. Grammar - Active Passive Voice transformations, Infinitive and Gerunds

UNIT III: PROBLEM SOLVING **6**

Reading - Case Studies, excerpts from literary texts, news reports etc. Writing – Letter to the Editor, Checklists, Problem solution essay / Argumentative Essay. Grammar – Error correction; If conditional sentences

UNIT IV: REPORTING OF EVENTS AND RESEARCH **6**

Reading –Newspaper articles; Writing – Recommendations, Transcoding, Accident Report, Survey Report Grammar – Reported Speech, Modals

UNIT V: THE ABILITY TO PUT IDEAS OR INFORMATION COGENTLY **6**

Reading – Company profiles, Statement of Purpose, (SOP), an excerpt of interview with professionals; Writing – Job / Internship application – Cover letter & Resume; Grammar – Numerical adjectives, Relative Clauses.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able to:

COs	Course Outcome (CO)	Blooms Taxonomy
CO1	Compare and Contrast products and ideas in technical texts.	Apply
CO2	Identify cause and effect in longer text for technical communication	Apply
CO3	Analyze problems in order to ensure solutions in oral and written professional communication	Analyse
CO4	Presenting oral and written Report of Events and Technical process	Apply
CO5	Prepare job applications and resume	Apply

CO – PO Mapping

Course Outcomes	Programme Outcomes (POs)											
	PO-1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	1	-	1	2	3	-	2
CO2	-	-	-	-	-	1	-	1	2	3	-	1
CO3	-	-	-	-	-	1	-	1	3	3	-	1
CO4	-	-	-	-	-	2	-	1	3	3	-	2
CO5	-	-	-	-	-	2	-	1	3	3	-	3

*For Entire Course, PO /PSO Mapping; 1 (Low); 2(Medium); 3(High) Contribution to PO/PSO

TEXTBOOKS:

1. Elizabeth Tebeaux, Sam Dragga, The Essentials of Technical Communication, Oxford University Press, 2017
2. Raman. Meenakshi, Sharma. Sangeeta . Professional English. Oxford university press. New Delhi.2019.

REFERENCES:

1. Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN. Shoba, and Dr. Lourdes Joevani, Department of English, Anna University., English for Science & Technology Cambridge University Press 2021.
2. Kieran Morgan & Sanja Spajic, Technical Writing Process, Better On Paper Publications,2015.
3. Krishna Mohan, Meera Banerji, "Developing Communication Skills", Trinity Press, 2017.
4. Phillip, A. Laplante,Technical Writing: A Practical Guide for Engineers and Scientists , CRC Press; 2 edition,2018
5. Gerald J. Alred, Walter E. Oliu, Charles T. Brusaw, Handbook of Technical Writing, Bedford/St. Martin's; 12th edition,2018

WEBSITE REFERENCE:

1. IELTS : https://ieltstrainingonline.com/british-council-practice-ielts-reading-actual-tests/
2. http://www.englishdaily626.com/c-errors.php?010 (common errors)

NPTEL/ SWAYAM/ MOOC REFERENCE:

1. https://nptel.ac.in/courses/109105144 (employment communication)
2. https://onlinecourses.nptel.ac.in/noc22_hs05/preview (effective Writing)
3 .https://www.slideshare.net/Punitayadav19/cv-writing-nptelpdf (resume Preparation)

PUCC2BS04	STATISTICS AND NUMERICAL METHODS	L T P C
		3 1 0 4

COURSE OBJECTIVE

- This course aims at providing the necessary basic concepts of a few statistical and numerical methods and give procedures for solving numerically different kinds of problems occurring in engineering and technology.
- To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems.
- To introduce the basic concepts of solving algebraic and transcendental equations.
- To introduce the numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines.
- To acquaint the knowledge of various techniques and methods of solving ordinary differential equations.

UNIT I TESTING OF HYPOTHESIS 9+3

Sampling distributions - Tests for single mean, proportion and difference of means (Large and small samples) – Tests for single variance and equality of variances – Chi square test for goodness of fit – Independence of attributes -Application: Real life problems in varies field.

UNIT II DESIGN OF EXPERIMENTS 9+3

One way and two-way classifications - Completely randomized design – Randomized block design – Latin square design – 2 Square factorial designs.

UNIT III SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9+3

Solution of algebraic and transcendental equations – Newton Raphson method- Solution of linear system of equations - Gauss elimination method – Pivoting – Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel - Eigenvalues of a matrix by Power method.

UNIT IV INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION 9+3

Lagrange's and Newton's divided difference interpolations – Newton's forward and backward difference interpolation – Approximation of derivates using interpolation polynomials – Numerical single and double integrations using Trapezoidal and Simpson's 1/3 rules- Applications: Application of numerical differentiation and integration.

UNIT V NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS 9+3

Single step methods: Taylor's series method – Euler's method - Modified Euler's method – Fourth order Runge- Kutta method for solving first order differential equations - Multi step methods: Milne's predictor corrector methods for solving first order differential equations- Application of numerical solution of ordinary differential equations.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

	Course outcomes	Blooms Level
CO 1	Apply the concept of testing of hypothesis for small and large samples in real life problems**.**	Apply
CO2	Apply the basic concepts of classifications of design of experiments in the field of agriculture	Apply
CO 3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems	Evaluate
CO 4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations	Understand
CO 5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications	Apply

CO – PO Mapping

S. No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	3	-	-	-	-	-	-	-	1
CO2	3	3	2	2	-	-	-	-	-	-	-	1
CO3	3	3	2	3	-	-	-	-	-	-	-	1
CO4	3	3	2	2	-	-	-	-	-	-	-	1
CO5	3	3	2	-	-	-	-	-	-	-	-	1

TEXTBOOKS:

1. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015.
2. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.46

REFERENCES:

1. Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016.
2. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.
3. Spiegel. M.R., Schiller. J. and Srinivasan. R.A., "Schaum's Outlines on Probability and Statistics ", Tata McGraw Hill Edition, 4th Edition, 2012.
4. Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", 9th Edition, Pearson Education, Asia, 2010.

WEBSITE REFERENCE:

1. https://learnengineering.in/ma3251-statistics-and-numerical-methods/ - Learn Engineering
2. https://lms.su.edu.pk/download?filename=1588490822-walpole-probability-statistics-for-engineers-scientists-9th-edition.pdf&lesson=15012 – Probability & Statistics for Engineers and Scientist

NPTEL/ SWAYAM/ MOOC REFERENCE:

1. NPTEL: Introduction to testing Hypothesis, Prof.Arun, K Tangirala,IIT Madras
2. NPTEL: Numerical Methods , Prof. Ameeya kumar Nayak, Sanjeev Kumar -IIT Roorkee.
3. SWAYAM: Numerical Analysis, Prof. S. Baskar , IIT Bombay.

PUCC2BS05	ENGINEERING MATERIALS	L T P C
		3 0 0 3

COURSE OBJECTIVE

- To make the students to understand the basics of crystallography and its importance in studying materials properties.
- To understand the electrical properties of materials including free electron theory, applications of quantum
- To insit knowledge on physics of semiconductors, determination of charge carriers and device applications
- To establish a sound of knowledge on different optical properties of materials, optical displays and applications
- To introduce the preparation, properties and applications of ceramics, composites and Nanomaterials

UNIT I CRYSTAL PHYSICS **9**

Single Crystals: Unit Cell-Crystal System-Bravais Lattices-Crystal structures: BCC, FCC and HCP – Directions and planes: Miller indices-inter-planar distances - linear and planar densities – Crystal imperfections: Point defects - edge and screw dislocations – grain and twin boundaries - Burgers vector –nucleation and growth – homogeneous and heterogeneous nucleation.

UNIT II CONDUCTING MATERIALS **9**

Classical free electron theory: Expression for electrical conductivity – Thermal conductivity, expression - Quantum free electron theory: Tunneling – degenerate states – Fermi- Dirac statistics – Density of energy states – Electron in periodic potential – Energy bands in solids: Tight binding approximation - Electron effective mass – concept of hole.

UNIT III SEMICONDUCTING MATERIALS **9**

Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – extrinsic semiconductors – Carrier concentration in N-type & P-type semiconductors – Variation of carrier concentration with temperature – Carrier transport in Semiconductors: Drift, mobility and diffusion – Hall effect and devices – Ohmic contacts – Schottky diode

UNIT IV OPTICAL PROPERTIES OF MATERIALS **9**

Classification of optical materials – Optical absorption and emission, charge injection and recombination. Absorption and emission in Metals, Insulators and Semiconductors – Optoelectronic devices: light detectors and solar cells – light emitting diode – laser diode - OLED – Electro-optics and nonlinear optics: Modulators and switching devices.

UNIT V NEW ENGINEERING MATERIALS **9**

Ceramics: Types and applications- refractories, abrasives and cements – Composites: classification, role of matrix and reinforcement - Fiber reinforced composites – carbon-carbon composites – Nanomaterials: types, physical, chemical and mechanical properties –- synthesis of nano-materials: physical vapor deposition (PVD) and chemical vapor deposition (CVD). Carbon nanotubes: properties and applications

TOTAL: 45 PERIODS

COURSE OUTCOMES:

	Course outcomes	**Blooms Level**
CO 1	Explain the basics of crystallography and its importance in materials properties	K2- Understand
CO2	Illustrate the electrical properties of Conducting materials and their applications	K2- Understand
CO 3	Comprehend the concepts of semiconductor physics and functioning of semiconductor devices	K2- Understand
CO 4	Illustrate optical properties of materials and working principles of various optical devices	K2- Understand
CO 5	Demonstrate preparation, properties and applications of ceramics, composites and nano-materials	K3- Apply

CO – PO Mapping

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

TEXTBOOKS:

1. V.Raghavan. Materials Science and Engineering: A First Course, Prentice Hall India Learning Private Limited, 2015.
2. Safa Kasap, Principles of Electronic Materials and Devices, Mc-Graw Hill, 2018.

REFERENCES:

1. R.Balasubramaniam, Callister's Materials Science and Engineering. Wiley (Indian Edition), 2014.
2. Wendelin Wright and Donald Askeland, Essentials of Materials Science and Engineering, CL Engineering, 2013.
3. Pallab Bhattacharya, Semiconductor Optoelectronic Devices, Pearson, 2017.
4. Wahab, M.A. "Solid State Physics: Structure and Properties of Materials", Narosa Publishing House, 2009.

NPTEL/ SWAYAM/ WEBSITE REFERENCE:

1. https://onlinecourses.nptel.ac.in/noc19_cy35/preview - Chemical Crystallography by By Prof. Angshuman Roy Choudhury, IISER Mohali
2. https://archive.nptel.ac.in/courses/113/102/113102080/ -Introduction to Materials science and Engineering by Prof. Rajesh Prasad, IIT Delhi.
3. https://onlinecourses.nptel.ac.in/noc20_ph10/preview - Electronic Theory of Solids, by Prof. Arghya Taraphder, IIT Kharagpur
4. https://nptel.ac.in/courses/112107086 - Engineering Materials and Processing Techniques by Inderdeep Singh, IIT Roorke
5. https://onlinecourses.nptel.ac.in/noc19_mm13/preview - Advanced Materials and Processes by Prof. Jayanta Das, IIT Kharagpur

PUEE2PC01	ELECTRONIC DEVICES AND CIRCUITS	L T P C
		3 0 0 3

COURSE OBJECTIVE

- To understand the structure of basic electronic devices.
- To be exposed to active and passive circuit elements.
- To familiarize the operation and applications of transistor like BJT and FET.
- To explore the characteristics of amplifier gain and frequency response.
- To learn the required functionality of positive and negative feedback systems.

UNIT I: PN JUNCTION DEVICES **9**

PN junction diode –structure, operation and V-I characteristics, diffusion and transient capacitance - Rectifiers – Half Wave and Full Wave Rectifier,– Zener diode- characteristics-Zener Reverse characteristics – Zener as regulator

UNIT II BJT AND ITS APPLICATION **9**

Junction Transistor- Transistor construction & operation – Input & output characteristics' –CE,CB and CC Configuration Application, Operation and V-I characteristics-SCR ,TRIAC and DIAC

UNIT III -FET AND ITS APPLUICATION **9**

JFET- Types –Drain & transfer Characteristics, MOSFET-Types-characteristics enhancement & Depletion mode UJT-Characteristics & application, equivalent circuit of UJT-Intrinsic Stand off ratio.

UNIT IV - AMPLIFIERS AND OSCILLATORS **9**

Differential Amplifier-CM & DM - CMRR Derivation, Advantages of negative feedback – voltage / current, series , Shunt feedback –positive feedback – Condition for oscillations,-RC,Wien bridge, and Crystal oscillators.

UNIT - V: PULSE CIRCUITS **9**

RC Wave shaping circuits- High pass, low pass RC circuits, Diode Clampers & Clippers-Multivibrator and its Application–UJT based saw tooth oscillator,

TOTAL: 45 PERIODS

COURSE OUTCOMES:		**Blooms Taxonomy**
CO1	Explain the basic concepts of various PN junction diodes and its applications	Understanding
CO2	Explain the structure, operation and characteristics of various types of transistors	Understanding
CO3	Analyze of various types of FET, MOSFET, UJT	Analyzing
CO4	Imparting the operation of multistage and differential amplifiers, various feedback amplifiers and oscillators	Understanding
CO5	Design clipper and clamper circuits	Applying

CO – PO Mapping

Course code & Name:					**PUEE2PC01 - Electronic Devices and Circuits**									
CO Vs PO MAPPING														
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	-	-	-	-	-	-	-	-	-	1	1	3	1
CO2	3	2	-	-	-	-	-	-	-	-	1	1	3	2
CO3	3	2	-	-	-	-	-	-	-	-	1	1	3	2
CO4	3	-	-	-	-	-	-	-	-	-	1	1	3	2
CO5	3	2	3	-	-	-	-	-	-	-	1	1	3	2

TEXT BOOKS:

1. David A. Bell , "Electronic devices and circuits", Oxford University higher education, 5th edition 2016.
2. Sedra and smith, "Microelectronic circuits",7th Edition, Oxford University Press, 2017

REFERENCES:

1. Balbir Kumar, Shail.B.Jain, "Electronic devices and circuits" PHI learning private limited, 2nd edition 2014.
2. Thomas L.Floyd, "Electronic devices" Conventional current version, Pearson prentice hall,10th Edition, 2017.

WEBSITE REFERENCE:

1. https://www.electricaleasy.com/
2. https://www.vssut.ac.in/lecture_notes/lecture1423726156.pdf

NPTEL/ SWAYAM/ MOOC REFERENCE:

1. NPTEL: https://nptel.ac.in/courses/108101091 - Basic Electronics

PUME2BE01	BASIC CIVL AND MECHANICAL ENGINEERING	L T P C
		3 0 0 3

COURSE OBJECTIVE

To familiarize with the basic Mechanical Elements, Cycles and Power plants
To learn the concepts of safety and industrial Principles
To provide knowledge about different types of building materials
To teach the different building materails use for construction
To acquire concepts of various infrastrucute and its services

MECHANICAL ENGINEERING

UNIT I – BASIC MECHANICAL ELEMENTS **9**

Basic concepts and demonstration - Bearing – Gears – Belt drives – Chain drives – Cable drives – Chain block – Convweyors – Shafts – Keys – Spline shafts – Springs – Fasteners – Screws – Bolts – Nuts and Their Specifications fundamental hydraulics and Pneumatics – Valves and Cylinders.

UNIT II – MECHANICAL CYCLES, POWER PLANTS AND IC ENGINES **9**

Rankines cycle – Refrigeration and Air Conditioning – VARC and VCRC Systems – Power plants – Steam – Gas – Diesel – Hydroelectirc and Nucler power plants – Turbines and Pumps – Classification and Functions – IC Engines – SI and CI Engines – Two stroke and Four Stroke Engines.

UNIT III - INDUSTRIAL ENGINEERING **9**

Introduction to safety Engineering – Evolution of safety - Improveemnts required – Safety organiosations – Safety functions – Workplace operations requiring safety – Safety benefits – Software in Mechanical Industry – Introduction to Modelling and Analysis software – Basic concepts and application of IoT to industrial process.

CIVIL ENGINEERING

UNIT IV – BUILDING MATERIALS AND COMPONENETS **9**

Building Materilas: Introduction – Bricks – Stones – Sand – Cement – Mortar – Concrete – Steel – Wood – Smart materials. **Surveying:** Objects – Clasisfication – **Sub structure**: Soil – Classifiction – Bearing Capacity – Foundation – Function – Requiremnts – Types of foundation – **Superstrucute:** Brick Masonry – Stone Masonry – Beams – Columns – Lintel – Roofing – Flooring – Plastering – Damp proof – Weathering Course.

UNIT V – BASIC INFRASTRUCTURE AND SERVICES **9**

Introduction to Highways – Railways – Airways and Waterways – Building Information Modelling(BIM) – Solid waste management system – Concept og Green Building – Benefits of Green building – Green Buildning Materials – Smart cities.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

COs	Course outcomes	Blooms Taxonomy
CO1	Recognize various mechanical elements and list out the applications an functions	Apply
CO2	Understand the working of power plants, machinery and IC Engines	Understand
CO3	Recall various safety requirements and software required for Mechanical Engineering	Remembering
CO4	Understand the importance of building materials and structures	Understand
CO5	Recognize and relate the various infrastructures and its services	Apply

CO – PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2	-	-	-	1	-	-	-	-	-	1	-	-
2	3	2	-	-	-	1	-	-	-	-	-	1	-	-
3	3	2	-	-	-	1	-	-	-	-	-	1	-	-
4	3	2	-	-	-	1	-	-	-	-	-	1	-	-
5	3	2	-	-	-	1	-	-	-	-	-	1	-	-

1-low, 2-medium, 3-high, '-' - no correlation

TEXTBOOK:

3. G Shanmugam, M S Palanichamy, Basic Civil and Mechanical Engineering, McGraw Hill Education; First edition, 2018
4. Basat Agarwal and CM Agarwal, "Basics of Mecahnical Engineering" Third Edition Wiley India Pvt. Ltd. New Delhi, 2018.

REFERENCES:

1. Palanikumar K, "Basic Mecahnical Engineering", ARS Publications, 2010.
2. Seetharaman S., "Basic Civil Engineering", Anuradha Agencies, 2015.
3. Venugopal K and Prabhu Raja V, "Basic Mecahnical Engineering", Anuradha Publisher, 2010.
4. Subramanian K.P. "Highways, Railways, Airport and Harbour Engineering", Scitech Publications, 2010.

NPTEL/ SWAYAM/ MOOC REFERENCE:

1.NPTEL, Introduction to Civil Engineering, https://archive.nptel.ac.in/courses/105/106/105106201/, Prof. Ravindra Gettu and Prof. Subhadeep Banerjee

2.https://archive.nptel.ac.in/courses/112/107/112107292/ - Princples of industrial Engineering.

PUCC2BE04	PROBLEM SOLVING USING PYTHON PROGRAMMING	L T P C
		2 0 0 2

COURSE OBJECTIVE

- The objective of this course is to familiarize the students with to know the design of algorithm and efficiency, to understand variables, expressions and statements, to explore flow of dataand its executions, to study the compound data types, to know about class and objects in python.

UNIT I:- COMPUTER-PROBLEM-SOLVING **6**

Introduction: Top Down Design, Implementation of Algorithms, Program verification, Efficiency of algorithms.

UNITII:-DATA-TYPES, EXPRESSIONS, STATEMENTS **6**

Python interpreter and interactive mode, debugging; values and types: int, float, Boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments, Errors.

UNIT III - CONTROL FLOW, FUNCTIONS, STRINGS **6**

Conditionals: Boolean values and operators, conditional, chained conditional; Iteration: while, for, break, continue, pass, Random Number Generation; Functions: return values, parameters, local and global scope, function composition, recursion; Strings: slices, immutability, functions and methods, module.

UNIT IV - LISTS, TUPLES, DICTIONARIES **6**

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing – list comprehension; Illustrative programs: Word histogram, Most Common Words, Word Frequency analysis.

UNIT - V: FILES, MODULES, PACKAGES **6**

Files and Exceptions : text files, reading and writing files, errors and exceptions, handling exceptions, Pickling; Modules & Packages- Writing a Module- Library Files-Numpy-Pandas

TOTAL: 30 PERIODS

COs	Course outcomes	Blooms Taxonomy
CO1	Identify Computer problems with its algorithmic design and solutions.	Remember
CO2	Illustrate simple Python data types, Expressions and Operators.	Remember
CO3	Execute simple Python programs using conditionals, looping statement and Functions for solving problems	Apply
CO4	Identify Compound Data Types using List, Tuple and Dictionaries Pythonprograms.	Apply
CO5	Infer the Object Oriented Concepts	Remember

CO – PO Mapping

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

TEXT BOOK:

1. Allen B. Downey, "Think Python: How to Think like a Computer Scientist", 2nd Edition, O'Reilly Publishers, 2016.

REFERENCES:

1. Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.
2. G Venkatesh and MadhavanMukund, "Computational Thinking: A Primer for Programmers and Data Scientists", 1st Edition,Notion-Press,2021.
3. John V Guttag,"Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data'', Third Edition, MIT Press.
4. Eric Matthes, "Python Crash Course, A Hands – on Project Based Introduction to Programming", 2nd Edition, No Starch-Press,2019.
5. R.G.Dromey,"How to solve it by Computer",Pearson India 2007

WEBSITE REFERENCE:

1. https://www.vlab.co.in/broad-area-computer-science-and-engineering
2. "Python for Everybody" at Coursera Online Courses. https://www.coursera.org/courses?query=python%20for%20beginners

NPTEL/ SWAYAM/ MOOC REFERENCE:

1. The Joy of Computing using Python, IIT Ropar ,Prof. SudarshanIyengar

   NPTEL Courses.https://onlinecourses.nptel.ac.in/noc21_cs32/preview

PUCC2HM05	TAMILS AND TECHNOLOGY	L T P C
		1 0 0 1

UNIT I: WEAVING AND CERAMIC TECHNOLOGY 3

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

UNIT II: DESIGN AND CONSTRUCTION TECHNOLOGY 3

Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - 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.

UNIT III: MANUFACTURING TECHNOLOGY 3

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.

UNIT IV: AGRICULTURE AND IRRIGATION TECHNOLOGY 3

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.

UNIT V: SCIENTIFIC TAMIL & TAMIL COMPUTING 3

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.

TOTAL: 15 PERIODS

TEXT-CUM-REFERENCE BOOK:

1. தமிழக வரலாறு –மக்களும் பண்பாடும் –கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் 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\ statute 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:InternationalInstitute of Tamil Studies).
9. Keeladi – 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Departmentof 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) – Refernece Book.

PUCC2PL03		L T P C
PROFESSIONAL ENGLISH – II LABORATORY		0 0 4 2

COURSE OBJECTIVE

- To identify varied group discussion skills and apply them to take part in effective discussions in a professional context.
- To analyse concepts and problems and make effective presentations explaining them clearly and precisely.
- To be able to use appropriate language structures to write emails, reports and essays

LIST OF ACTIVITIES

UNIT-I **12**

Activity 1	Reading Advertisement and Group activity
Activity 2	Writing Professional Emails
Activity 3	Group activity : create simple user manuals
Activity 4	writing compare and contrast essay

UNIT-II **12**

Activity 1	Reading longer text and identify the main ideas
Activity 2	Writing cause and effect essay
Activity 3	Reading complaint letter
Activity 4	Writing Responding letter

UNIT – III **12**

Activity 1	Reading Case Studies
Activity 2	Discussion and presentation on Case studies
Activity 3	Excerpts from literary texts or news reports
Activity 4	Group Activity : Create simple News report

UNIT – IV **12**

Activity 1	Reading Article from newspaper
Activity 2	Group Activity :Writing article
Activity 3	Reading types of reports
Activity 4	pair activity : writing Survey / Accident Report

UNIT – V **12**

Activity 1	Reading company profile
Activity 2	Role play activity – Create company profile
Activity 3	Reading Types of Resume
Activity 4	Create Cover letter and resume

TOTAL: 60 PERIODS

COs	Course Outcome (CO)	Blooms Taxonomy
CO1	Write professional emails	Apply
CO2	Prepare complaint and responding letter	Apply
CO3	Discuss and analyse problems from various perspectives to arrive solutions	Analyse
CO4	Write short articles with precision	Apply
CO5	Create company profile	Apply

CO – PO Mapping

Course Outcomes	Programme Outcomes (Pos)											
	PO-1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	1	-	1	3	3	-	3
CO2	-	-	-	-	-	2	-	2	3	3	-	3
CO3	-	-	-	-	-	2	-	2	3	3	-	3
CO4	-	-	-	-	-	2	-	1	3	3	-	2
CO5	-	-	-	-	-	3	-	1	3	3	-	3

TEXT BOOK:

1. Department of English, Anna University,English for Engineers & Technologists ,Orient Blackswan ,2021.
2. Cambridge University Press ,English for Science & Technology ,2021.

REFERENCE:

1. Raman. Meenakshi, Sharma. Sangeeta , Professional English, Oxford university press.New Delhi.2019
2. Stella Cortrell , Red Globe Press, “The Study Skills Handbook” , 2019
3. Mathew Richardson , Charlie Creative Lab ,“Advanced Communication Skills” , 2020.
4. Jack C.Richards , “Interchange”, Cambridge University Press , Fifth Edition, 2017
5. Mathew Richardson, Charlie Creative Lab ,“Advanced Communication Skills” , 2020

PUCC2PL04 PROBLEM SOLVING USING PYTHON PROGRAMMING LABORATORY	L T P C
	0 0 4 2

COURSE OBJECTIVE

- The objective of this course is to familiarize the students with to know the design of algorithm and efficiency, to understand variables, expressions and statements, to explore flow of data and its executions, to study the compound data types, to know about class and objects in python.

LIST OF EXERCISES

1. Use Linux shell commands, use Python in interactive mode, and an editor
    a. os.system()
    b. subprocess.run()
    c. subprocess.Popen()
    d. os.utime()
2. Write simple python programs for
    a. Area of a geometric shape
    b. Simple interest
    c. Solve quadratic equation
    d. Netsalary
3. Write programs using conditional statements for
    a. Leap year
    b. Simple calculator
    c. Grade of the total mark
4. Develop programs using loops and nested loops for
    a. Multiplication table
    b. Sum of a series
    c. Print patterns
5. Develop programs using functions for
    a. Sine and cosine series
    b. Pythagorean triplets
6. Develop programs using recursion for
    a. Efficient power of a number
    b. Factorial
    c. Fibonacci number
7. Develop programs using strings for
    a. Palindrome
    b. Finding substring
8. Develop programs using lists and tuples
    a. linear search
    b. binary search
    c. selection sort
    d. insertion sort
    e. quicksort

09. Develop matrix manipulations programs using nested lists.
10. Develop simple programs using dictionaries

    a. frequency histogram
    b. nested dictionary

11. Develop programs using Files.

    a. read files
    b. write files

12. Develop programs to perform any task by reading arguments from command line.
13. Implement a simple application using appropriate datatypes and files

Total Periods: 60

COURSE OUTCOMES:

COs	**Course outcomes**	**Blooms Taxonomy**
CO1	Execute simple Python data types, Expressions and Operators.	Applying
CO2	Write simple Python programs using conditionals, looping statement and Functions for solving problems.	Applying
CO3	Represent Compound Data Types using List, Tuple and Dictionaries Python programs.	Applying
CO4	Read and write data from/to files in Python programs and Object Oriented Concepts.	Applying
CO5	Implement a simple application using appropriate datatypes and files	Applying

CO – PO Mapping

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

TEXT BOOK:

1. Allen B. Downey, “Think Python: How to Think like a Computer Scientist”, 2nd Edition, O’Reilly Publishers, 2016.

REFERENCES:

2. Paul Deitel and Harvey Deitel, “Python for Programmers”, Pearson Education, 1st Edition, 2021.
3. G Venkatesh and MadhavanMukund, “Computational Thinking: A Primer for Programmers and Data Scientists”, 1st Edition,Notion-Press,2021.
4. John V Guttag,”Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data‘‘, Third Edition, MIT Press.
5. Eric Matthes, “Python Crash Course, A Hands – on Project Based Introduction to Programming”, 2nd Edition, No Starch-Press,2019.
6. R.G.Dromey,”How to solve it by Computer”, Pearson India 2007

WEBSITE REFERENCE:

1. https://www.vlab.co.in/broad-area-computer-science-and-engineering

2. “Python for Everybody” at Coursera Online Courses.

https://www.coursera.org/courses?query=python%20for%20beginners

NPTEL/ SWAYAM/ MOOC REFERENCE:

1. The Joy of Computing using Python, IIT Ropar ,Prof. SudarshanIyengar

NPTEL Courses.https://onlinecourses.nptel.ac.in/noc21_cs32/preview

.

PUEE2PL01	ELECTRONIC DEVICES AND CIRCUITS LABORATORY	L T P C
		0 0 4 2

COURSE OBJECTIVE

- To enable the students to understand the behavior of semiconductor device based onexperimentation.
- Be exposed to active and passive circuit elements.
- Familiarize the operation and characteristics of transistor like BJT and FET.
- Explore the characteristics of amplifier gain and frequency response.
- Learn the required functionality of positive and negative feedback systems.

LIST OF EXPERIMENTS

1.Staircase wiring
2.Energy meter wiring and related calculations/ calibration
3. Measurement of electrical quantities – voltage, current, power &power factor in RLC circuit.
4. Characteristics of PN Junction diode & Zener diode .
5.Characteristics of NPN Transistor under common Emitter'
6. Characteristics of NPN Transistor under common Base'
7. VI - Characteristics of SCR
8. VI – Characteristics DIAC and TRIAC.
9. Characteristics of JFET.
10. Characteristics of UJT and generation of saw tooth waveforms.
11. Characteristics of Single Phase half-wave with inductive and capacitive
12. Characteristics of Centre tapped Single Phase full wave rectifiers with inductive and capacitive filters.
13. Characteristics of Single Phase full wave Bridge rectifiers with inductive and capacitive filters.
14. Measurement of frequency and phase angle using CRO.
15. Realization of Low Pass & High Pass filters.

.

TOTAL: 60 PERIODS

COURSE OUTCOMES: **Blooms level**

CO1: Understanding and implementing House wiring of bulb and energy meter	Understanding
CO2: Distinguish the performance of PN junction diode and zener diode	Understanding
CO3: Locate the various operating regions of BJT using the input and output characteristics	Applying
CO4: Draw the characteristics of electron devices and analyze their performance	Analyzing
CO5: Demonstrate the working of rectifier circuits in both hardware and software	Applying

CO – PO Mapping

Course code & Name:					**PUEE2PL01 - Electron Devices and Circuits Laboratory**									
CO Vs PO MAPPING														
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	-	-	-	-	-	-	-	2	-	1	1	3	2
CO2	3	2	-	-	-	-	-	-	2	-	1	1	3	2
CO3	3	2	-	-	-	-	-	-	2	-	1	1	3	2
CO4	3	-	3	-	-	-	-	-	2	-	1	1	3	2
CO5	3	2	-	-	-	-	-	-	2	-	1	1	3	2

SEMESTER III

S.NO.	COURSE CODE	COURSE NAME	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	PUCC3BS06	Transforms and partial differential equations	BS	3	1	-	4	4
2.	PUEE3PC02	Electro-magnetic Fields	PC	3	-	-	3	3
3.	PUEE3PC03	Electric Circuit Analysis	PC	3	1	-	4	4
4.	PUEE3PC04	Electrical Machines - I	PC	3	1	-	4	4
5.	PUEE3PC05	Measurements and Instrumentation	PC	3		-	3	3
6.	PUCC3MC01	Mandatory Course – I (Non-Credit)	MC	2	-	-	2	0
PRACTICALS								
7.	PUEE3PL02	Electrical Circuit Laboratory	PC	-	-	4	4	2
8.	PUEE3PL03	Electrical Machines – I Laboratory	PC	-	-	4	4	2
9.	PUCC3HM07	Extension Activities	HM	-	-	-	-	-
			TOTAL	17	3	8	28	22

PUCC3BS06	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	L T P C
		3 1 0 4

COURSE OBJECTIVE

1. To introduce the basic concepts of PDE for solving standard partial differential equations.
2. To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems.
3. To acquaint the student with Fourier series techniques in solving heat flow problems used in various situations.
4. To acquaint the student with Fourier transform techniques used in wide variety of situations.
5. To introduce the effective mathematical tools for the solutions of partial differential equations that model several physical processes and to develop Z transform techniques for discrete time systems.

UNIT I PARTIAL DIFFERENTIAL EQUATIONS 9+3

Formation of partial differential equations - Solutions of standard types of first order partial differential equations - First order partial differential equations reducible to standard types- Lagrange's linear equation (multiplier method only)

UNIT II FOURIER SERIES 9+3

Dirichlet's conditions - General Fourier series - Odd and even functions - Half range sine series and cosine series - Parseval's identity - Harmonic analysis

UNIT IIII APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS 9+3

Classification of PDE - Fourier series solutions of one dimensional wave equation - One dimensional equation of heat conduction - Steady state solution of two dimensional equation of heat conduction (Cartesian coordinates only).

UNIT IV FOURIER TRANSFORMS 9+3

Fourier transform pair -Fourier sine and cosine transforms -Properties - Transforms of simple functions - Parseval's identity.

UNIT-V Z – TRANSFORMS 9+3

Z-transforms - Elementary properties - Initial and final value theorems - Inverse Z-transform using partial fraction, residues and convolution theorem.

TOTAL: 60 PERIODS

COURSE OUTCOMES:		**Blooms Taxonomy**
CO1	Understand how to solve the given standard partial differential equations.	Understand
CO2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.	Analyze
CO3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.	Understand
CO4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.	Understand
CO5	Use the effective mathematical tools for the solutions of partial differential equations by using Z-transform techniques for discrete time systems.	Apply

CO – PO Mapping:

Course code & Name:				PUCC3BS06 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8				PO12	PSO1	PSO2
CO1	3	3	1	2	1	-	-	-	2	2	-	2	1	1
CO2	3	3	1	2	1	-	-	-	2	2	-	2	1	1
CO3	3	3	1	2	1	-	-	-	2	2	-	2	1	1
CO4	3	3	1	2	1	-	-	-	2	2	-	2	1	1
CO5	3	3	1	2	1	-	-	-	2	2	-	2	1	1

TEXT BOOKS

1. Grewal B.S., “Higher Engineering Mathematics", 44thEdition, Khanna Publishers, New Delhi, 2018.
2. Kreyszig E, "Advanced Engineering Mathematics ", 10th Edition, John Wiley, New Delhi, India, 2016.

REFERENCE BOOKS

1. Bali. N.P and Manish Goyal, "A Textbook of Engineering Mathematics", 10th Edition, Laxmi Publications Pvt. Ltd, 2015.
2. James. G., "Advanced Modern Engineering Mathematics", 4thEdition, Pearson Education, New Delhi, 2016.
3. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2018.

NPTEL/ SWAYAM/ MOOC REFERENCE:

1.https://nptel.ac.in/courses/111/103/111103021/

2.https://archive.nptel.ac.in/courses/111/107/111107111/

3.https://archive.nptel.ac.in/courses/111/105/111105123/

PUEE3PC02	ELECTROMAGNETIC FIELDS	L T P C
		3 1 0 4

COURSE OBJECTIVE

- To introduce the basic mathematical concepts related to electromagnetic vector fields
- To impart knowledge on the concepts of
  - ✓ Electrostatic fields, electric potential, energy density and their applications.
  - ✓ Magneto static fields, magnetic flux density, vector potential and its applications.
  - ✓ Different methods of emf generation and Maxwell's equations
  - ✓ Electromagnetic waves and characterizing parameters

UNIT I - ELECTROSTATICS – I **12**

Sources and effects of electromagnetic fields – Coordinate Systems – Vector fields – Vector fields Curl – theorems and applications - Coulomb's Law – Electric field intensity – Field due to discrete and continuous charges – Gauss's law and applications.

UNIT II - ELECTROSTATICS – II **12**

Electric potential — Electric field and equipotential plots, Uniform and Non-Uniform field, Utilization factor – Electric field in free space, conductors, dielectrics - Dielectric polarization – Dielectric strength - Electric field in multiple dielectrics — Boundary conditions, Poisson's and Laplace's equations, Capacitance, Energy density, Applications.

UNIT III - MAGNETOSTATICS **12**

Lorentz force, magnetic field intensity (H) — Biot–Savart's Law - Ampere's Circuit Law — H due to straight conductors, circular loop, infinite sheet of current, Magnetic flux density (B) – B in free space, conductor, magnetic materials — Magnetization, Magnetic field in multiple media – Boundary conditions, scalar and vector potential, Poisson's Equation, Magnetic force, Torque, Inductance, Energy density, Applications.

UNIT IV - ELECTRODYNAMIC FIELDS **12**

Magnetic Circuits - Faraday's law – Transformer and motional EMF – Displacement current - Maxwell's equations (differential and integral form) – Relation between field theory and circuit theory – Applications.

UNIT V - ELECTROMAGNETIC WAVES **12**

Electromagnetic wave generation and equations – Wave parameters; velocity, intrinsic impedance,propagation constant – Waves in free space, lossy and lossless dielectrics, conductors-skin depth -Poynting vector — Plane wave reflection and refraction.

TOTAL: 60 PERIODS

	COURSE OUTCOMES:	**Blooms Taxonomy**
CO1	Visualize and explain Gradient, Divergence, and Curl operations on electromagnetic vector fields and identify the electromagnetic sources and their effects.	Understanding
CO2	Compute and analyze electrostatic fields, electric potential, energy density along withtheir applications.	Analyzing
CO3	Compute and analyze magneto static fields, magnetic flux density, vector potential alongwith their applications.	Analyzing
CO4	Explain different methods of emf generation and Maxwell's equations.	Understanding
CO5	Explain the concept of electromagnetic waves and characterizing parameters.	Understanding

CO – PO Mapping:

Course code & Name:				PUEE3PC02 – Electro Magnetic Fields										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	-	-	3	1	-	1	-	1	3	2
CO2	3	2	1	2	1	-	1	1	-	1	-	1	3	2
CO3	3	2	1	2	1	-	1	1	-	-	-	1	3	2
CO4	3	2	1	2	2	-	1	1	-	1	-	1	3	2
CO5	3	2	1	2	2	-	1	1	-	-	-	1	3	2

TEXT BOOKS:

1. Mathew N. O. Sadiku, S.V. Kulkarni 'Principles of Electromagnetics', 6th Edition, OxfordUniversity Press Inc. Asian edition, 2015.
2. William H. Hayt and John A. Buck, 'Engineering Electromagnetics', McGraw Hill SpecialIndian edition, 2014.

REFERENCES:

1. V.V.Sarwate, 'Electromagnetic fields and waves', Second Edition, Newage Publishers,2018.
2. Joseph. A.Edminister, 'Schaum's Outline of Electromagnetics, Fifth Edition (Schaum'sOutline Series), McGraw Hill, 2018.
3. S.P.Ghosh, Lipika Datta, 'Electromagnetic Field Theory', First Edition, McGraw HillEducation(India) Private Limited, 2017.

NPTEL/ SWAYAM/ MOOC REFERENCE:

1. NPTEL: https://archive.nptel.ac.in/courses/108/106/108106073/ - Electro Magnetic Fields

PUEE3PC03	ELECTRIC CIRCUIT ANALYSIS	L T P C
		3 1 0 4

COURSE OBJECTIVE

- To familiarize basic components in electric circuits and its analysis
- To deliver key concepts to analyze and recognize electrical circuits
- To convey knowledge on solving circuit equations using network theorems
- To instruct on obtaining the transient response of circuits.
- To announce the phenomenon of resonance in coupled circuits.
- To introduce Phasor diagrams and analysis of single &three phase circuits

UNIT I - BASIC CIRCUITS ANALYSIS **9+3**

Fundamentals concepts of R, L and C elements-Energy Sources- Ohm's Law -Kirchhoff 's Laws – DC Circuits — Resistors in series and parallel circuits - A.C Circuits — Average and RMS Value — Complex Impedance – Phasor diagram Real and Reactive Power, Power Factor, Energy -Mesh current and node voltage methods of analysis D.C.

UNIT II - NETWORK REDUCTION AND THEOREMS FOR DC AND AC CIRCUITS **9+3**

Network reduction: voltage and current division, source transformation – star delta conversion. Theorems – Superposition, Thevenin's and Norton's Theorem – Maximum power transfer theorem –Reciprocity Theorem –application to DC and AC Circuits.

UNIT III - TRANSIENT RESPONSE ANALYSIS **9+3**

Introduction – Laplace transforms and inverse Laplace transforms- standard test signals - Transient response of RL, RC and RLC circuits using Laplace transform for Source free, Step input and Sinusoidal input.

UNIT IV - RESONANCE AND COUPLED CIRCUITS **9+3**

Series and parallel resonance –frequency response – Quality factor and Bandwidth – Self and mutual inductance – Coefficient of coupling – Dot rule-Analysis of coupled circuits– Single Tuned circuits.

UNIT V - THREE PHASE CIRCUITS **9+3**

Analysis of three phase 3-wire and 4-wire circuits with star and delta connected loads, balanced and unbalanced – phasor diagram of voltages and currents – power measurement in three phase circuits.

TOTAL: 45 PERIODS

COURSE OUTCOMES:		**Blooms Taxonomy**
CO1	Explain circuit's behavior using circuit laws.	Understanding
CO2	Apply mesh analysis/ nodal analysis / network theorems to determine behavior of the given DC and AC circuit.	Analyzing
CO3	Calculate the transient response of first order and second order systems to step and sinusoidal input.	Analyzing
CO4	Compute power, line/ phase voltage and currents of the given three phase circuit CO5: Describe the frequency response of series and parallel RLC circuits.	Applying
CO5	Explicate the behavior of magnetically coupled circuits.	Applying

CO – PO Mapping:

Course code & Name:	PUEE3PC03 – Electric Circuit Analysis													
COs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	-	2	1	-	1	-	3	3	3
CO2	3	3	2	3	2	-	2	1	-	1	-	3	3	3
CO3	3	3	3	3	2	-	2	1	-	1	-	3	3	3
CO4	3	3	3	2	2	-	2	1	-	-	-	3	3	3
CO5	3	3	3	3	2	-	2	1	-	1	-	3	3	3

TEXT BOOKS:

1. William H. HaytJr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis",McGraw Hill publishers, 9th edition, New Delhi, 2020.

REFERENCES:

1. Chakrabarti A, "Circuits Theory (Analysis and synthesis), Dhanpat Rai& Sons, New Delhi,2020.
2. Joseph A. Edminister, Mahmood Nahvi, "Electric circuits", Schaum's series, McGraw-Hill,First Edition, 2019.
3. M E Van Valkenburg, "Network Analysis",Prentice-Hall of India Pvt Ltd, New Delhi, 2015.
4. Richard C. Dorf and James A. Svoboda, "Introduction to Electric Circuits", 7th Edition, JohnWiley Sons, Inc. 2018.

NPTEL/ SWAYAM/ MOOC REFERENCE:

1. https://archive.nptel.ac.in/courses/108/104/108104139/

PUEE3PC04	ELECTRICAL MACHINES - I	L T P C
		3 1 0 4

COURSE OBJECTIVE

- To understand the concept of electromechanical energy conversion system.
- To identify the appropriate machine for a given application based on its characteristics.
- To identify the appropriate test to determine the performance parameters of a given machine.
- To familiarize with the procedure for parallel operation of generators and transformers.

To deliberate the working of auto transformer and three phase transformers.

UNIT I - ELECTROMECHANICAL ENERGY CONVERSION **9+3**

Fundamentals of Magnetic circuits- Statically and dynamically induced EMF - Principle of electromechanical energy conversion forces and torque in magnetic field systems- energy balance in magnetic circuits- magnetic force- co-energy in singly excited and multi excited magnetic field system mmf of distributed windings – Winding Inductances-, magnetic fields in rotating machines- magnetic saturation and leakage fluxes.

UNIT II - DC GENERATORS **9+3**

Principle of operation, constructional details, armature windings and its types, EMF equation, wave shape of induced emf, armature reaction, demagnetizing and cross magnetizing Ampere turns, compensating winding, commutation, methods of improving commutation, interpoles, OCC and load characteristics of different types of DC Generators. Parallel operation of DC Generators, equalizing connections- applications of DC Generators.

UNIT III - DC MOTORS **9+3**

Principle of operation, significance of back emf, torque equations and power developed by armature, speed control of DC motors, starting methods of DC motors, load characteristics of DC motors, losses and efficiency in DC machine, condition for maximum efficiency. Testing of DC Machines: Brake test, Swinburne's test, Hopkinson's test, Field test, Retardation test, Separation of core losses- applications of DC motors.

UNIT IV - SINGLE PHASE TRANSFORMER **9+3**

Construction and principle of operation, equivalent circuit, phasor diagrams, testing - polarity test, open circuit and short circuit tests, voltage regulation, losses and efficiency, all day efficiency, back-toback test, separation of core losses, parallel operation of single-phase transformers, applications of single-phase transformer.

UNIT V - AUTOTRANSFORMER AND THREE PHASE TRANSFORMER **9+3**

Construction and working of auto transformer, comparison with two winding transformers, applications of autotransformer. Three Phase Transformer- Construction, types of connections and their comparative features, Scott connection, applications of Scott connection

TOTAL: 45 PERIODS

COURSE OUTCOMES:		**Blooms Taxonomy**
CO1	Apply the laws governing the electromechanical energy conversion for singly and multiple excited systems.	Understanding
CO2	Explain the construction and working principle of DC machines	Understanding
CO3	Interpret various characteristics of DC machines	Understanding
CO4	Compute various performance parameters of the machine, by conducting suitable tests.	Understanding
CO5	Describe the working principle of auto transformer, three phase transformer with different types of connections	Understanding

CO – PO Mapping:

Course code & Name:				PUEE3PC04 – ELECTRICAL MACHINES - I										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	1	-	-	-	-	1	1	1	3	1
CO2	3	3	2	2	1	-	-	-	-	1	1	1	3	2
CO3	3	3	2	2	-	-	-	-	-	1	1	1	3	2
CO4	3	3	2	-	-	-	-	-	-	-	1	1	3	2
CO5	3	3	1	2	1	-	-	-	-	1	1	1	3	2

TEXT BOOKS:

1. A.E. Fitzgerald, Charles Kingsley, Stephen. D. Umans, 'Electric Machinery', Mc Graw Hill publishing Company Ltd, 6th Education 2017.I.J. Nagrath & M. Gopal, "Control Systems Engineering", 5th Edition, New Age International Publishers, New Delhi, 2007.
2. D.P. Kothari and I.J. Nagrath, 'Electric Machines', McGraw Hill Publishing Company Ltd, 5th Edition 2017.

REFERENCES:

1. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 6th Edition 2017.
2. Sahdev S. K. "Electrical Machines", Cambridge University Press, 2018.

NPTEL/ SWAYAM/ MOOC REFERENCE:

1.https://archive.nptel.ac.in/courses:

PUEE3PC05	MEASUREMENT AND INSTRUMENTATION	L T P C
		3 0 0 3

COURSE OBJECTIVE

- To introduce the basic functional elements of instrumentation & characteristics of measurement and errors
- To impart the knowledge on the functional aspects of measuring instruments
- To educate on the importance of various measurements techniques
- To introduce various transducers and sensors with their applications
- To introduce the data acquisition systems and knowledge on digital instrumentation principles.

UNIT I - INTRODUCTION **9**

Instruments: classification .Functional elements of an instrument – Static and dynamic characteristics – Errors in measurement – Statistical evaluation of measurement data – Standards and calibration.

UNIT II - MEASUREMENT OF PARAMETERS IN ELECTRICAL SYSTEMS **9**

Classification of instruments – moving coil and moving iron meters – Induction type, dynamometer type watt meters – Energy meter – Megger- Multimeters– Instrument transformers (CT & PT).

UNIT III - AC/DC BRIDGES AND INSTRUMENTATION AMPLIFIERS **9**

D.C potentiometers, D.C (Wheat stone, Kelvin and Kelvin Double bridge) & A.C bridges (Maxwell, Anderson and Schering bridges), Electrostatic and electromagnetic Interference - Grounding techniques. Instrumentation Amplifiers.

UNIT IV - TRANSDUCERS FOR MEASUREMENT OF NON- ELECTRICAL PARAMETERS **9**

Classification of transducers – Measurement of pressure, temperature, displacement, flow, angular velocity – Digital transducers – Smart Sensors.

UNIT V - DIGITAL INSTRUMENTATION **9**

A/D converters: types and characteristics – Sampling, Errors- Measurement of voltage, Current, frequency and phase - D/A converters: types and characteristics- DSO- Data Loggers – Basics of PLC programming and Introduction to Virtual Instrumentation - Instrument standards.

TOTAL: 45 PERIODS

COURSE OUTCOMES:		**Blooms Taxonomy**
CO1	Ability to understand the fundamental art of measurement in engineering	Understanding
CO2	Ability to understand the structural elements of various instruments.	Understanding
CO3	Ability to understand the importance of bridge circuits.	Understanding
CO4	Ability to understand about various transducers and their characteristics by experiments.	Understanding
CO5	Ability to understand the concept of digital instrumentation and virtual instrumentation by experiments	Understanding

CO – PO Mapping:

Course code & Name:				PUEE3PC05 – Measurement and Instrumentation										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	-	3	2	-	2	-	-	-	3	3	3
CO2	3	2	3	2	-	-	-		-	3	-	3	3	3
CO3	3	2	3	-	3	2	-		-	-	-	3	3	3
CO4	3	2	3	-	-	-	-	2	-	-	-	-	3	3
CO5	3	2	3	2	3	-	-		-	3	-	3	3	3

TEXT BOOKS:

1. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, New Delhi, Edition 2011.

REFERENCES:

1. M.M.S. Anand, 'Electronics Instruments and Instrumentation Technology', Prentice Hall India, New Delhi, 2009
2. J.J. Carr, 'Elements of Electronic Instrumentation and Measurement', Pearson Education India, New Delhi, 2011
1. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010

NPTEL/ SWAYAM/ MOOC REFERENCE:

1. https://archive.nptel.ac.in/courses/108/105/108105153/

PUEE3PL01	ELECTRICAL CIRCUIT LABORATORY	L T P C
		0 0 4 2

COURSE OBJECTIVE

- To simulate various electric circuits using Pspice/ Matlab/e-Sim / Scilab
- To gain practical experience on electric circuits and verification of theorems

LIST OF EXPERIMENTS

1. Simulation and experimental verification of series and parallel electrical circuit usingfundamental laws.
2. Simulation and experimental verification of electrical circuit problems using Thevenin'stheorem.
3. Simulation and experimental verification of electrical circuit problems using Norton'stheorem.
4. Simulation and experimental verification of electrical circuit problems using Superpositiontheorem.
5. Simulation and experimental verification of Maximum Power transfer theorem.
6. Simulation and Experimental validation of R-C,R-L and RLC electric circuit transients
7. Simulation and Experimental validation of frequency response of RLC electric circuit.
8. Design and implementation of series and parallel resonance circuit.
9. Simulation and experimental verification of three phase balanced and unbalanced star,delta networks circuit (Power and Power factor calculations).

TOTAL: 45 PERIODS

COURSE OUTCOMES:		**Blooms Taxonomy**
CO1	Use simulation and experimental methods to verify the fundamental electrical laws for the given DC/AC circuit (Ex 1)	Understanding
CO2	Use simulation and experimental methods to verify the various electrical theorems (Superposition, Thevenin, Norton and maximum power transfer) for the given DC/AC circuit (Ex 2-5)	Understanding
CO3	Analyze transient behavior of the given RL/RC/RLC circuit using simulation and experimental methods (Ex 6)	Understanding
CO4	Analyze frequency response of the given series and parallel RLC circuit usingsimulation and experimentation methods (Ex 7-8)	Understanding
CO5	Analyze the performance of the given three phase circuit using simulation andexperimental methods (Ex 9)	Understanding

CO – PO Mapping:

Course code & Name:					**PUEE3PL01 ELECTRICAL CIRCUIT LABORATORY**									
CO Vs PO MAPPING														
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	1	1	-	-	-	-	2	-	1	1	3	2
CO2	3	3	1	1	-	-	-	-	2	-	1	1	3	2
CO3	3	3	1	1	-	-	-	-	2	-	1	1	3	2
CO4	3	3	1	1	-	-	-	-	2	-	1	1	3	2
CO5	3	3	1	1	-	-	-	-	2	-	1	1	3	2

PUEE3PL02	ELECTRICAL MACHINES LABORATORY - I	L T P C
		0 0 3 1.5

COURSE OBJECTIVE

- To provide hands on experience to evaluate the performance parameters of DC machines and transformer by conducting suitable tests.

LIST OF EXPERIMENTS

1. Open circuit and load characteristics of DC shunt generator- calculation of critical resistance and critical speed.
2. Load characteristics of DC compound generator with differential and cumulative connections.
3. Load test on DC shunt motor
4. Load test on DC compound motor.
5. Load test on DC series motor.
6. Load test on single-phase transformer and three phase transformers.
7. Open circuit and short circuit tests on single phase transformer.
8. Separation of no-load losses in single phase transformer..
9. Swinburne's test and speed control of DC shunt motor.
10. Study of starters and 3-phase transformers connections

TOTAL: 45 PERIODS

COURSE OUTCOMES:		**Blooms Taxonomy**
CO1	Construct the circuit with appropriate connections for the given DC machine/transformer.	Understanding
CO2	Experimentally determine the characteristics of different types of DC machines.	Understanding
CO3	Demonstrate the speed control techniques for a DC motor for industrial applications.	Understanding
CO4	Identify suitable methods for testing of transformer and DC machines.	Understanding
CO5	Predetermine the performance parameters of transformers and DC motor.	Understanding

CO – PO Mapping:

Course code & Name:					**PUEE3PL02 ELECTRICAL MACHINES LABORATORY - I**									
CO Vs PO MAPPING														
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	1	1	-	-	-	-	2	-	1	1	3	2
CO2	3	3	1	1	-	-	-	-	2	-	1	1	3	2
CO3	3	3	1	1	-	-	-	-	2	-	1	1	3	2
CO4	3	3	1	1	-	-	-	-	2	-	1	1	3	2
CO5	3	3	1	1	-	-	-	-	2	-	1	1	3	2

PUCC3MC01	MANDATORY COURSES – I	L T P C
	WOMEN AND GENDER STUDIES	3 0 0 3

COURSE OBJECTIVE

1. To provide an effective educational program that will equip students to utilize the frameworks of various disciplines in order to analyze women, gender and sexuality in meaningful ways.
2. To produce interdisciplinary/intersectional student research that addresses political and practical issues of gender in relation to race, ethnicity, class, sexuality, privilege and power.
3. To prepare students to meet the needs of an increasingly ethnically and gender-diverse workplace.

UNIT I: CONCEPTS **9**

Sex Vs. Gender, Masculinity, Femininity, Socialization, Matriarchy, Patriarchy, Public/ Private, Essentialism, Binaryism, Power, Hegemony, Hierarchy, Stereotype, Gender Roles, Female, Feminine, Feminist, Gender Relation, Deconstruction, Resistance, Sexual Division Of Labour.

UNIT II: FEMINIST THEORY **9**

Feminist thinkers and theories: Liberal, Marxist, Socialist, Radical, Psychoanalytic, Postmodernist, Indian Feminism, Eco-feminism.

UNIT III: WOMEN'S MOVEMENTS: GLOBAL, NATIONAL AND LOCAL **9**

Rise of Feminism in Europe and America. Women's Movement in India.

UNIT IV: GENDER AND LANGUAGE **9**

Linguistic Forms and Gender. Gender and narratives.

UNIT V: GENDER AND REPRESENTATION **9**

Advertising and popular visual media. - Gender and Representation in Alternative Media. - Gender and social media.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able:

COs	Course Outcome (CO)	Blooms Taxonomy
CO-1	Define and Evaluate gender as a social construct.	Understand
CO-2	Identify the ways gender, power, privilege, and oppression play out across a range of cultures and human experiences.	Understand
CO-3	Demonstrate an understanding of gender as it intersects with sexuality, race, ethnicity, religion, class and other critical variables.	Understand
CO-4	Analyze human interactions and social/political systems using a "gender lens".	Apply
CO-5	Conduct scholarly research on key gender issues and/or debates in the present modern era.	Apply

CO – PO Mapping

Course Outcomes	Programme Outcomes (Pos)											
	PO-1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	2	2	1	3	3	-	3
CO2	-	-	-	-	-	2	2	1	3	3	-	3
CO3	-	-	-	-	-	2	2	1	3	3	-	3
CO4	-	-	-	-	-	2	2	1	3	3	-	3
CO5	-	-	-	-	-	3	2	1	3	3	-	3

TEXT BOOK:

1. Junaid Dani & Harpreet Haur, Women, Gender and Modern Society, Peridot Literary Books, 2023, ISBN: 9789390393893
2. Melissa J. Gillis and Andrew T. Jacobs, Introduction to Women's and Gender Studies, Oxford University Press, 2019, ISBN: 9780190064235

REFERENCES:

1. Afshar, Haleh. (1991) (Ed), Women, Development and Survival in the Third World, Longman, New York
2. John, Mary (2008) Women's Studies in India: A Reader, Pengiun Books India
3. Sarkar, Tankia and Sumit Sarkar ed., 2007, Women and Social Reform in Modern India (Vol. 1 and Vol. 2), Permanent Black
4. Jain, Jasbir ed., 2014, Women's Writing: Text & Context, Rawat Publication
5. Radha Kumar, The History Of Doing; An illustrated account of women's movement and feminism in india-1800-1900, Zubaan Publications, 2015
6. Flavia Agnes. (1999). Law and Gender Inequality. The Politics of Women's Rights in India. (Oxford University Press: India

NPTEL/ SWAYAM/ MOOC REFERENCE:

https://nptel.ac.in/courses/109103122
https://www.youtube.com/watch?v=lI8pyUSg4ns&list=PL2QYOrBMOd7-Jw6OA78pfp4B0oIDhsqwF

PUCC3MC02	MANDATORY COURSES – I	L T P C
	ELEMENTS OF LITERATURE	3 0 0 3

COURSE OBJECTIVE

1. Students will be able to understand the relevance of literature in human life and appreciate its aspects in developing finer sensibilities.
2. Stimulate the interest of the students and sharpen their critical sensibility so that they may appreciate the beauty and richness of the texts they study.

UNIT I: POETRY **9**

Poet – Persona/Speaker – Lines – Stanzas – Themes – Types of Poetry

Figurative Language: Simile – Metaphor – Irony – Personification – other Literary devices

UNIT II: PROSE **9**

Author – Character – Plot – Setting – Themes – Types of Prose

Narrative Techniques: Flashback – Foreshadowing – Irony – Figurative Devices

UNIT III: DRAMA **9**

Playwright – Plot – Dialogue – Characters – Setting –Audience – Themes; Types of Drama: Comedy – Tragedy – Modern Drama – Indian Drama; Dramatic Techniques: Dramatic Irony – Situational Irony

UNIT IV: FICTION & NOVEL **9**

Bildungsroman, Picaresque, Epistolary, Stream-of-Consciousness, Novel of Social Reality, Psychological Novel , Historical Novel, Science Fiction, Gothic Novel and Graphic Novel

UNIT V: LITERARY CRITICISM **9**

Definition - Classical and medieval criticism - Renaissance criticism - Baroque criticism - Enlightenment criticism - 19th-century Romantic criticism - The New Criticisms – Eco Criticism

TOTAL: 45 PERIODS

COURSE OUTCOMES: (Each unit – one outcome, total 5 outcomes)
At the end of the course, the students will be able:

COs	Course Outcome (CO)	Blooms Taxonomy
CO-1	Analyze the various elements of poetry and develop their critical thinking skills.	Apply
CO-2	Comprehend Complex academic texts for narrating experience and events.	Understand
CO-3	To understand the nature of the dramatic genres including comedy, romance, tragedy, and history.	Understand
CO-4	To analyze the texts and understand the modernist techniques in the narratives & to develop critical thinking and close reading of texts.	Apply
CO-5	Critically view literary artifacts & apply high seriousness as guiding principles in appreciating literature.	Apply

Mapping; 1 (Low); 2(Medium); 3(High) Contribution to PO/PSO

CO – PO Mapping

Course Outcomes	Programme Outcomes (Pos)											
	PO-1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	2	2	1	3	3	-	3
CO2	-	-	-	-	-	2	2	1	3	3	-	3
CO3	-	-	-	-	-	2	2	1	3	3	-	3
CO4	-	-	-	-	-	2	2	1	3	3	-	3
CO5	-	-	-	-	-	3	2	1	3	3	-	3

TEXT BOOK:

3. Nozar Niazi & Rama Gautam, How To Study Literature : Stylistic And Pragmatic Approaches, Prentice Hall of India; 1st edition, 2010, ISBN – 10: 8120340612
4. Mahdi Javidshad, Amirhossein Nemati, An Outline Of The Norton Anthology Of English Literature, Arb Publications, 2024, ISBN-10: 9382527559

REFERENCES:

7. David Green, The Winged World, Macmillan Education, 2016, ISBN-10: 9352521005
8. Patricia Waugh, Literary Theory and Criticism, Oxford University Press, 2006.
9. George. K. M., Modern Indian Literature – An Anthology, Sahitya Akademi, 1994, ISBN: 8172017839
10. X. J. Kennedy, Dana Gioia, Literature: An Introduction to Fiction, Poetry, Drama, and Writing, Pearson; 13th edition, 2015, ISBN – 10: 0321971663
11. About Edgar V. Roberts, Literature: An Introduction to Reading and Writing, Pearson; 6th edition, 2014, ISBN – 10: 032194478X

NPTEL/ SWAYAM/ MOOC REFERENCE:

1. https://onlinecourses.nptel.ac.in/noc22_hs01/preview
2. https://archive.nptel.ac.in/courses/109/106/109106124/

PUCC3MC03	MANDATORY COURSES – I	L T P C
	FILM APPRECIATION	**3 0 0 3**

COURSE OBJECTIVE

1. To understand the relevance of Films and Movies in human life and appreciate its aspects in developing analytical sense.
2. To stimulate the interest of the students and sharpen their critical sensibility so that they can appreciate the aesthetics of films practically.

UNIT I: The Component Of Films **9**

The material and equipment - The story, screenplay and script -The actors, crew members, and the director - The process of film making & structure of a film

UNIT II: Evolution of Film Language **9**

Film language, form, movement etc. - Early cinema… silent film (Particularly French) - The emergence of feature films: Birth of a Nation - Talkies

UNIT III: Film Theories and Criticism/Appreciation **9**

Realist theory; Auteurists - Psychoanalytic, Ideological, Feminists - How to read films? - Film Criticism / Appreciation

UNIT IV: Development of Films **9**

Representative Soviet films - Representative Japanese films - Representative Italian films - Representative Hollywood film and the studio system

UNIT V: Indian Films **9**

The early era - The important films made by the directors - The regional films - The documentaries in India

TOTAL: 45 PERIODS

COURSE OUTCOMES: (Each unit – one outcome, total 5 outcomes)
At the end of the course, the students will be able:

COs	Course Outcome (CO)	Blooms Taxonomy
CO-1	Analyze the various Components of Films and develop their critical thinking skills.	Apply
CO-2	To understand the evolutionary levels of Films and analyze its linguistic nature.	Understand
CO-3	To understand the nature of the Film genres including comedy, romance, tragedy, and history and appreciate it as criticism.	Understand
CO-4	To analyze the history of films at universal level.	Apply
CO-5	To Understand the native film techniques and appreciate it.	Understand

CO – PO Mapping

Course Outcomes	Programme Outcomes (Pos)											
	PO-1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	2	2	1	3	3	-	3
CO2	-	-	-	-	-	2	2	1	3	3	-	3
CO3	-	-	-	-	-	2	2	1	3	3	-	3
CO4	-	-	-	-	-	2	2	1	3	3	-	3
CO5	-	-	-	-	-	3	2	1	3	3	-	3

TEXT BOOK:

1. Jill Nelmes, An Introduction to Film Studies, Routledge, 2012, ISBNL: 9780415582599
2. Barnouw, E. and Krishnaswamy, S. , Indian Film (2nd edn), Oxford University Press, New York, 1980

REFERENCES:

1. Chatterji, Gayatri , Mother India , BFI Classics, BFI, London, 2002.
2. Chopra, Anupama , Sholay: The Making of a Classic, Penguin Books India, New Delhi, 2000.
3. Desai, Jigna , Beyond Bollywood: The Cultural Politics of South Asian Diasporic Film, Routledge, New York and London, 2004.
4. Ganti, Tejaswini , Bollywood: A Guidebook to Popular Hindi Cinema, Routledge, New York and London, 2004.
5. Pendakur, Manjunath , Indian Popular Cinema: Industry, Ideology, and Consciousness , Hampton Press, Cresshill, NJ, 2003.
6. Rai, Amit S. , Untimely Hollywood: Globalization and India's New Media Assemblage , Duke University Press, Durham, NC and London, 2009.
7. Rajadhyaksha, Ashish and Willeman, Paul (eds), Encylopaedia of Indian Cinema (2nd edn), British Film Institute, London, 1999.

NPTEL/ SWAYAM/ MOOC REFERENCE:

1. https://onlinecourses.nptel.ac.in/noc21_hs17/preview
2. https://onlinecourses.swayam2.ac.in/cec23_ge0
3. https://www.ftii.ac.in/p/courses8/preview

PUCC3MC04	MANDATORY COURSES – I	L T P C
	THE CONSTITUTION OF INDIA	3 0 0 3

COURSE OBJECTIVE

1. To create an awareness in students on the Constitution of India.
2. To understand the function wings of the Government, fundamental rights and duties of citizens.
3. To analyse the powers of central, state, and local government, and strengthen constitutionalinstitutions.

UNIT I: INTRODUCTION TO INDIAN CONSTITUTION **9**

Constitution meaning of the term - The making of the Indian Constitution – Sources and constitutional history – Salient features of Indian Constitution - Philosophy of Constituent Assembly - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

UNIT II: THE UNION: EXECUTIVE, LEGISLATIVE AND JUDICIARY **9**

Union Government and its Administration Structure: Role, power and position of President and Vice President; PM and Council of ministers, Cabinet and Central Secretariat: Powers and Functions of Lok Sabha, Rajya Sabha, The Supreme Court and High Court

UNIT III: THE STATES AND THE UNION TERRITORIES **9**

State Government and its Administration: Governor -Role and Position – CM and Council of ministers,State Secretariat: Organisation, Structure and Functions – Relation between the Union and the States.

UNIT IV: LOCAL ADMINISTRATION **9**

District's Administration Head - Role and Importance, Municipalities - Mayor and role of ElectedRepresentative – Panchayati Raj: Functions PRI: Zilla Panchayat, 73rd and 74th amendments; Elected officials and their roles - Block level Organizational Hierarchy, Village level - Role of Elected and Appointed officials - Importance of grass-root democracy

UNIT V: EMERGENCY PROVISIONS AND THE MAJOR FUNCTIONARIES **9**

Emergency: Proclamation of Emergency, types of emergency – Election Commission – Union ServicePublic Commission – Planning Commission (NITI).

TOTAL: 45 PERIODS

COURSE OUTCOMES: (Each unit – one outcome, total 5 outcomes)
At the end of the course, the students will be able:

COs	Course Outcome (CO)	Blooms Taxonomy
CO-1	Describe historical background of the constitution making and its importance for building ademocratic India.	Apply
CO-2	Explain the functioning of three wings of the Union government i.e., executive, legislative andjudiciary.	Understand
CO-3	Explain the functions of State Government and the Union Territories and compare with the Union.	Understand
CO-4	Analyse the decentralization of power between central, state and local self-government.	Apply
CO-5	Apply the knowledge in strengthening of the constitutional institutions like CAG, NITI ElectionCommission and USPC for sustaining democracy.	Apply

CO – PO Mapping

Course Outcomes	Programme Outcomes (Pos)											
	PO-1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	2	2	1	3	3	-	3
CO2	-	-	-	-	-	2	2	1	3	3	-	3
CO3	-	-	-	-	-	2	2	1	3	3	-	3
CO4	-	-	-	-	-	2	2	1	3	3	-	3
CO5	-	-	-	-	-	3	2	1	3	3	-	3

TEXT BOOK:

1. **Sujit Choudhry, Madhav Khosla**, The Oxford Handbook of the Indian Constitution, Oxford University Press Indian Ltd. **2016, ISBN: 9780198787334**
2. **Mahendra P Singh**, Constitution of India, **Eastern Book Company**, 2024, **ISBN: 9789351453512**

REFERENCES:

1. Fali S. Nariman, You Must Know Your Constitution, Hay House Publishers India, 2023, ISBN-10 : 8195991726
2. P M Bakshi, Constitution of India, Lexis Nexis**,** 19th edition 2023

NPTEL/ SWAYAM/ MOOC REFERENCE:

1.https://onlinecourses.nptel.ac.in/noc24_lw05/preview

2.https://archive.nptel.ac.in/courses/129/106/129106003/

3.https://legalaffairs.nalsar.ac.in/students/student/course-details/1/courses

SEMESTER IV

S.NO.	COURSE CODE	COURSE NAME	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	PUCC4BS07	Environmental Sciences & Sustainability	BS	3	-	-	3	3
2.	PUEE4PC04	Linear & Digital Integrated Circuits	PC	3	-	-	3	3
3.	PUEE4PC05	Transmission and Distribution	PC	3	-	-	3	3
4.	PUEE4PC06	Electrical Machines -II	PC	3	1	-	4	4
5.	PUEE4PC07	Control systems	PC	3	1	-	4	4
6.	PUEE4MC02	Mandatory Course – II (Non-Credit)	MC	2	-	-	2	0
PRACTICAL								
7.	PUEE4PL04	Linear & Digital Integrated Circuits Laboratory	PC	-	-	4	4	2
8.	PUEE4PL05	Electrical Machines –II Laboratory	PC	-	-	4	4	2
9.	PUCC4HM08	Extension Activities	HM	-	-	-	-	1
10.	PUEE4IP01	In-plant Training/Internship	SD	-	-	-	-	-
			TOTAL	17	2	8	27	22

- In-plant-Training – 2 Weeks of training each during $4^{th}/5^{th}/6^{th}$ Semester – During college hours or semester vacation
  Total 4 weeks of Training – 2 Credits
- In-plant-Training – 2 Weeks of training each during $4^{th}/5^{th}/6^{th}$ Semester – During college hours or semester vacation
- Any one Open Elective has to choose from the Management verticals.
  Total 4 weeks of Training – 2 Credits

PUCC4BS07	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY	L T P C
		3 0 0 3

COURSE OBJECTIVE

- To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on 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 facilitate the understanding of global and Indian scenario of renewable and non-renewable resources, causes of their degradation and measures to preserve them.
- To familiarize the concept of sustainable development goals and appreciate the interdependence of economic and social aspects of sustainability, recognize and analyze climate changes, concept of carbon credit and the challenges of environmental management.
- To inculcate and embrace sustainability practices and develop a broader understanding on green materials, energy cycles and analyze the role of sustainable urbanization

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 9

Definition, Scope and Importance of Environment – Need for Public Awareness - Concept of an Ecosystem – Structure and Function of an Ecosystem – Energy Flow in the Ecosystem – Ecological Succession – Food Chains, Food Webs and Ecological Pyramids – Introduction, Types, Characteristic Features, Structure and Function of the various types of ecosystems – Introduction to Biodiversity Definition: Genetic, Species and Ecosystem Diversity – Value of Biodiversity– India as a Mega-Diversity Nation – Hot-Spots of Biodiversity – Threats to Biodiversity – Endangered and Endemic Species of India – Conservation of Biodiversity.

UNIT II ENVIRONMENTAL POLLUTION 9

Definition – Causes, Effects and Control Measures of Air, Water, Soil, Noise Pollutions- Pollution Case Studies Solid waste, Hazardous waste and E-waste Management — Disaster Management: Floods, Earthquake, Cyclone and Landslides, Climate change, Global Warming. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts.

UNITIII RENEWABLE AND NON-RENEWABLE SOURCES OF ENERGY 9

Energy management and conservation, Concept, process, applications of Renewable energy Sources (solar, wind geothermal, ocean, hydrogen, tidal, biomass) and non – renewable energy sources (coal, petroleum, LPG, natural gas, nuclear) New Energy Sources: Need of new sources. Different types new energy sources.

UNIT IV SUSTAINABILITY PRACTICES AND MANAGEMENT 9

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 – Environmental management inindustry-A case study. Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Sustainable habitat: Energy efficiency, Sustainable transports .Sustainable energy, Sustainable urbanization-Socio-economic and technological change.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT 9

Population Growth, Variation Among Nations – Population Explosion – Family Welfare Programme – Human Rights – Value Education – Women and Child Welfare – Role of Information Technology in Environment and Human Health. Environmental Impact Assessment. Green Engineering: Green buildings, Green materials, Green chemistry – 12 principles.

TOTAL: 45 PERIODS

COURSEOUTCOMES:		Blooms Taxonomy
CO 1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.	Understand
CO2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	Understand
CO3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	Understand
CO 4	To recognize the different goals of sustainable development, practices and apply them for suitable technological advancement and societal development.	Understand
CO 5	To demonstrate the knowledge of identify green materials, public awareness of environmental at infant stage.	Understand

CO – PO Mapping:

Course code & Name:	PUCC4BS07 ENVIRONMENTAL SCIENCES AND SUSTAINABILITY												
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	-	-	-	2	3	-	-	-	-	2	1	-
CO2	3	2	-	-	-	3	3	-	-	-	-	2	1	-
CO3	3	-	1	-	-	2	2	-	-	-	-	2	1	-
CO4	3	2	1	1	-	2	2	-	-	-	-	2	1	-
CO5	3	2	1	-	-	2	2	-	-	-	-	1	1	-

For Entire Course, PO /PSO Mapping; 1 (Low); 2(Medium); 3(High) Contribution to PO/PSO

TEXT BOOK:

5. Gilbert M. Masters, ―Introduction to Environmental Engineering and Science ‖, Second Edition, Pearson Education 2004.
6. Benny Joseph, 'Environmental Science and Engineering',Tata McGraw-Hill, New Delhi, 2016.
7. Allen, D.T. and Shonnard, D.R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.
8. Bradley.A.S; Adebayo,A.O., Maria,P. Engineering applications in sustainable designand development, Cengage learning.

9. Environment Impact Assessment Guidelines, Notification of Government of India, 2006.
10. Mackenthun,K.M., Basic Concepts in Environmental Management, Lewis Publication, London, 1998.
11. Anubha Kaushik and C.P.Kaushik's" Perspectives in Environmental Studies", 6th Edition, New Age International Publishers, 2018.

REFERENCES:

7. R.K. Trivedi, ―Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards‖, Vol. I and II, Enviro Media.
8. Cunningham, W.P.Cooper, T.H.Gorhani,' Environmental Encyclopedia', JaicoPubl., House, Mumbai, 2001.
9. Dharmendra S.Sengar, 'Environmental law', Prentice Hall of India PVT.LTD, NewDelhi, 2007.
10. Rajagopalan,R,' Environmental Studies-From Crisis to Cure', Oxford University Press, 2005.
11. ErachBharucha"Text book of Environmental Studies for Undergraduate Courses"Orient Blackswan Pvt.Ltd. 2013.

NPTEL/ SWAYAM/ MOOC REFERENCE:

NPTEL: Complex Ecosystem Dynamics - Course (swayam2.ac.in) - Complex Ecosystem Dynamics

PUEE4PC04	LINEAR & DIGITAL INTEGRATED CIRCUITS	L T P C
		3 0 0 3

COURSE OBJECTIVE

- To make the students to familiarize with various op amp Configurations
- To make the students to analyze Filter and Timer Circuits
- To make the students to analyze working Analog ,digital Converters
- To make the students to analyze the various types of Digital Integrated Circuits
- To design counters based on flip flops and to understand memory configurations

UNIT I – OPERATIONAL AMPLIFIER **9**

Ideal and Practical opamp- AC and DC characteristics- Features of 741 IC—Different modes-Inverting, Non inverting, Differential Configurations-Differentiators, Integrators, Comparators Schmitt trigger, Zero crossing Detector , Voltage Regulators-723 IC Features-

UNIT II – FILTERS,TIMERS **9**

Active Filters-Low pass, High pass, Band pass ,Band reject filters-Butterworth Filters-Triangular, Sawtooth ,Square wave generators-IC 555 Timer –Functional diagram-Monstable and Astable operations-

UNIT III ANALOG MULTIPLIER AND PLL **9**

Analog multiplier using emitter-coupled transistor-Variable trans conductance technique-multiplier IC Applictions-PLL operation of basic PLL, Closed loop analysis, VCO-Monolithic PLL-IC565-Applications-AM detection, FM detection, FSK modulation-Frequency synthesizer.

UNIT IV – DIGITAL INTEGRATED CIRCUITS **9**

Classification-Different logic families-TTL, CMOS-TTL driving CMOS, CMOS driving TTL-74XX,40XX IC series-Code Converters, Decoders, Demultiplexers-Priority Encoders, Multiplexers ,Demultiplexers, Binary Adders

UNIT V –SEQUENTIAL CIRCUITS MEMORIES **9**

Flip flops –SR,D,JK,T Flip flops-Synchronous Counters-Shift registers-Decade Counter-ROM Architecture-Types of ROM and Applications-RAM Architecture-Static and Dynamic RAMS

TOTAL: 45 PERIODS

COURSE OUTCOMES:		**Blooms Taxonomy**
CO1	Get thorough understanding of opamp circuits	Understanding
CO2	Design various filter circuits and timer circuits	Analyzing
CO3	Construct Different ADC and DAC Circuits	Analyzing
CO4	Understand various logic families and design Combinational circuits	Applying
CO5	Analyze various flip flops and Design counters ,registers	Understanding

CO – PO Mapping:

Course code & Name:				P23UEE4PC07 – Control Systems										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	2	-	-	-	-	-	1	-	-	1	-
CO2	3	2	-	2	2	-	-	-	-	1	-	-	1	2
CO3	3	2	1	-	2	-	-	-	-	1	-	-	1	2
CO4	3	2	1	2	-	-	-	-	-	1	-	-	3	2
CO5	2	2	-	-	1	-	-	-	3	1	-	2	2	-

TEXT BOOKS:

3. Ramakanth A.Gayakward,"opamps &Linear ICs, 3rd edition,PHI,2003
4. D.Roy Choudhary,"Linear Integrated Circuits",New Age International,2nd edition,2003
5. Floyd & Jain,""Digital Fundamentals",Pearson Education,8th edition,2005

REFERENCES:

3. K.Lal Kishore,"operational Amplifiers with Linear Integrated Circuits"Pearson,2009
4. William D Stanley,"Operational amplifiers with linear integrated circuits",4th edition ,pearson 2009.
5. John F.Wakerly,"Digital Design Principles and practices",3rd edition 2005

NPTEL/ SWAYAM/ MOOC REFERENCE:

1. NPTEL: https://onlinecourses.nptel.ac.in/noc24_ee73/preview - Integrated Circuits &Applications

PUEE4PC05	TRANSMISSION AND DISTRIBUTION	L T P C
		2 1 0 3

COURSE OBJECTIVE

- To impart knowledge about the configuration of the electrical power transmission lines.
- To study the line parameters and interference with neighboring circuits.
- To understand the mechanical design and performance analysis of transmission lines.
- To learn about underground cables.
- To understand and analyze the distribution system.

UNITI TRANSMISSION LINE PARAMETERS **9**

Structure of Power System – Parameters of single and three phase transmission lines with single and double circuits – Resistance, inductance and capacitance of solid, stranded and bundled conductors – Symmetrical and unsymmetrical spacing and transposition – Application of self and mutual GMD – Skin and proximity effects – Typical configurations – Conductor types(AAAC,ACSR,ACAR)- and electrical parameters of EHV lines.

UNIT II - MODELLING AND PERFORMANCE OF TRANSMISSION LINES **9**

Performance of Transmission lines – Short line, medium line and long line – Equivalent circuits, phasor diagram, attenuation constant, phase constant, surge impedance – Transmission efficiency and voltage regulation– –Ferranti effect– Formation of Corona – Critical Voltages – Effect on Line Performance.

UNIT III - MECHANICAL DESIGN OF LINES **9**

Mechanical design of OH lines – Line Supports – Types of towers – Stress and Sag Calculation – Effects of Wind and Ice loading. – Insulators: Types – Voltage distribution in insulator string – Improvement of string efficiency – Testing of insulators

UNIT IV - UNDER GROUND CABLES **9**

Underground cables – Types of cables – Construction of single core and 3 core cables – Insulation Resistance – Potential Gradient – Capacitance of Single-core and 3 core cables – Grading of cables – Power factor and heating of cables – DC cables and fault

UNIT V – DISTRIBUTION SYSTEMS **9**

Distribution Systems – General Aspects – Kelvin's Law – AC and DC distributions – Techniques of Voltage Control and Power factor improvement – Distribution Loss –Types of Substations – Methods of Grounding- Resistance grounding- Reactance grounding -Peterson-coil grounding .

TOTAL: 45PERIODS

COURSE OUTCOMES:		**Blooms level**
CO1	Explain the Structure of Electrical Power System and Line Parameters	Understanding
CO2	Summarize the Modeling and Performance of transmission line.	Understanding
CO3	Apply the Mechanical design and Line Supports	Applying
CO4	Illustrate the different types of Underground Cables	Understanding
CO5	Explain the Various types of distribution systems and substations	Understanding

CO – PO Mapping:

Course code & Name:				TRANSMISSION AND DISTRIBUTION											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-	1	-	-	1	-	1	-	-	3	1	1
CO2	3	2	1	1	1	1	-	2	-	1	-	-	3	2	1
CO3	3	2	1	1	1	1	-	2	-	1	-	-	3	3	1
CO4	3	2	1	1	1	1	-	2	-	1	-	-	3	3	1
CO5	3	2	1	1	1	1	-	2	-	1	-	-	3	3	1

TEXT BOOKS:

1. D.P.Kothari,I.J. Nagarath,'Power System Engineering',McGraw- Hill Publishing Company limited, New Delhi,ThirdEdition,2019.
2. C.L.Wadhwa,'Electrical Power Systems',NewAgeInternationalLtd,seventhedition2022.
3. S.N.Singh,'Electric Power Generation, Transmission and Distribution',Prentice Hall ofIndia Pvt.Ltd, New Delhi, Second Edition,2008.

REFERENCES:

4. B.R.Gupta,'Power System Analysis andDesign'S.Chand,NewDelhi,SixthEdition,2011.
5. G.Ramamurthy,"Handbookof Electrical power Distribution,"UniversitiesPress,2013.
6. V.K.Mehta,RohitMehta,'Principlesofpowersystem',S.Chand&CompanyLtd,NewDelhi,2013
7. Hadi Saadat, 'Power System Analysis',Mc Graw Hill EducationPvt.Ltd.,NewDelhi,3rd Edition,23rd reprint,2015.
8. Kamaraju , Electrical Power Distribution Systems, Tata McGraw Hill Ltd, New Delhi, 2017.

NPTEL/ SWAYAM/ MOOC REFERENCE:

2. NPTEL: https://archive.nptel.ac.in/courses/108/102/108102047/ - Transmission and distribution
3. https://www.youtube.com/watch?v=gGN6HPo9TnA

PUEE4PC06	ELECTRICAL MACHINES - II	L T P C
		3 0 0 3

COURSE OBJECTIVE

- Construction and performance of salient and non – salient type synchronous generators.
- Principle of operation and performance of synchronous motor.
- Construction, principle of operation and performance of induction machines.
- Starting and speed control of three-phase induction motors.
- Construction, principle of operation and performance of single phase induction motors and special machines.

UNIT I SYNCHRONOUS GENERATOR **9**

Constructional details – Types of rotors –winding factors- EMF equation – Synchronous reactance – Armature reaction – Phasor diagrams of non-salient pole synchronous generator connected to infinite bus-- Synchronizing and parallel operation – Synchronizing torque -Change of excitation and mechanical input- Voltage regulation – EMF, MMF, ZPF and A.S.A method

UNIT II SYNCHRONOUS MOTOR **9**

Principle of operation – Torque equation – Operation on infinite bus bars - V and Inverted V curves – Power input and power developed equations – Starting methods – Current loci for constant power input, constant excitation and constant power Developed-Hunting – natural frequency of oscillations – damper windings- synchronous condenser

UNIT III THREE PHASE INDUCTION MOTOR **9**

Constructional details – Types of rotors –- Principle of operation – Slip –cogging and crawling Equivalent circuit – Torque-Slip characteristics - Condition for maximum torque – Losses and efficiency – Load test - No load and blocked rotor tests - Circle diagram – Separation of losses – Double cage induction motors – Induction generators – Synchronous induction motor

UNIT IV STARTING AND SPEED CONTROL OF THREE PHASE INDUCTION MOTOR **9**

Need for starting – Types of starters – DOL, Rotor resistance, Autotransformer and Star delta starters – Speed control – Voltage control, Frequency control and pole changing – Cascaded Connection-V/f control – Slip power recovery Scheme-Braking of three phase induction motor: Plugging, dynamic braking and regenerative braking.

UNIT V SINGLE PHASE INDUCTION MOTORS AND SPECIAL MACHINES **9**

Constructional details of single phase induction motor – Double field revolving theory and operation – Equivalent circuit – No load and blocked rotor test – Performance analysis – Starting methods of single-phase induction motors – Capacitor-start capacitor run Induction motor- Shaded pole induction motor - Linear induction motor – Repulsion motor - Hysteresis motor - AC series motor- Servo motors

TOTAL: 45 PERIODS

COURSE OUTCOMES:	**Blooms level**
CO1: Ability to understand the construction and working principle of SG	Understanding
CO2: Ability to understand the construction and working principle of SM	Understanding
CO3: Ability to understand the construction and working principle of Three Phase Induction Motor	Understanding
CO4: Acquire knowledge about the starting and speed control of induction motors.	Understanding
CO5: To gain knowledge about the basic principles and working of Single phase induction motors and Special Electrical Machines	Understanding

CO – PO Mapping:

Course code & Name:					**PUEE4PC06 -** ELECTRICAL MACHINES - II									
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	2	2	-	-	-	-	-	1	1	1	3	1
CO2	3	3	2	2	-	-	-	-	-	1	1	1	3	2
CO3	3	3	2	2	-	-	-	-	-	1	1	1	3	2
CO4	3	3	2	-	-	-	-	-	-	1	1	1	3	2
CO5	3	3	1	2	-	-	-	-	-	1	1	1	3	2

TEXT BOOKS:

1. A.E. Fitzgerald, Charles Kingsley, Stephen. D. Umans, 'Electric Machinery', Mc Graw Hill publishing Company Ltd, 6th Education 2017.

2. D.P. Kothari and I.J. Nagrath, 'Electric Machines', McGraw Hill Publishing Company Ltd, 5th Edition 2017

REFERENCES:

3. B.R.Gupta, 'Fundamental of Electric Machines' New age International Publishers,3rd Edition, Reprint 2015.
4. M.N. Bandyo padhyay, Electrical Machines Theory and Practice, PHI Learning PVT LTD., New Delhi, 2011

NPTEL/ SWAYAM/ MOOC REFERENCE:

1. NPTEL: https://archive.nptel.ac.in/courses/108/105/108105131/

PUEE4PC07	CONTROL SYSTEMS	L T P C
		3 0 0 3

COURSE OBJECTIVE

- To make the students to familiarize with various representations of systems.
- To make the students to analyze the stability of linear systems in the time domain and frequency domain.
- To make the students to analyze the stability of linear systems in the frequency domain.
- To make the students to design compensator based on the time and frequency domain specifications.
- To develop linear models: mainly state variable model and Transfer function model

UNIT I - MODELING OF LINEAR TIME INVARIANT SYSTEM (LTIV) **9**

Control system: Open loop and Closed loop — Feedback control system characteristics — First principle modeling: Mechanical, Electrical and Electromechanical systems — Transfer function representations: Block diagram and Signal flow graph.

UNIT II - TIME DOMAIN ANALYSIS **9**

Standard test inputs – Time response – Time domain specifications – Stability analysis: Concept of stability – Routh Hurwitz stability criterion – Root locus: Construction and Interpretation. Effect of adding poles and zeros.

UNIT III - FREQUENCY DOMAIN ANALYSIS **9**

Bode plot, Polar plot and Nyquist plot: — Frequency domain specifications Introduction to closed loop Frequency Response. Effect of adding lag and lead compensators.

UNIT IV - STATE VARIABLE ANALYSIS **9**

State variable formulation – Non uniqueness of state space model – State transition matrix –Eigen values – Eigen vectors - Free and forced responses for Time Invariant and Time Varying Systems – Controllability – Observability.

UNIT V - DESIGN OF FEED BACK CONTROL SYSTEM **9**

Design specifications — Lead, Lag and Lag-lead compensators using Root locus and Bode plot techniques –PID controller - PID control in State Feedback form.

TOTAL: 45 PERIODS

COURSE OUTCOMES:		**Blooms level**
CO1	Represent simple systems in transfer function and state variable forms.	Understanding
CO2	Analyze simple systems in time domain.	Analyzing
CO3	Analyze simple systems in frequency domain.	Analyzing
CO4	Infer the stability of systems in time and frequency domain.	Applying
CO5	Interpret characteristics of the system and find out solution for simple control problems.	Applying

CO – PO Mapping:

Course code & Name:				P23UEE4PC07 – Control Systems										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	1	-	-	1	1	1	-	3	3	3
CO2	3	3	3	3	1	-	-	1	1	1	-	3	3	3
CO3	3	3	3	3	1	-	-	1	1	1	-	3	3	3
CO4	3	3	3	3	-	-	-	1	1	1	-	3	3	3
CO5	3	3	3	3	1	-	-	1	1	1	-	3	3	3

TEXT BOOKS:

6. A. Nagoor Kani, " Control Systems", CBS Publishers & Distributors, 2017.
7. I.J. Nagrath & M. Gopal, "Control Systems Engineering", 5th Edition, New Age International Publishers, New Delhi, 2007.

REFERENCES:

6. K. Ogata, "Modern Control Engineering", 5th Edition, Pearson Education, New Delhi, 2010.
7. R. Anandha Natarajan and B. Ramesh Babu, "Control System Engineering", 3rd Edition, Scitech Publication, 2009.
8. Norman S. Nise, "Control Systems Engineering", 4th Edition, John Wiley & Sons, Inc., 2007.

NPTEL/ SWAYAM/ MOOC REFERENCE:

1. NPTEL: https://onlinecourses.nptel.ac.in/noc22_ee31/preview - Control Engineering
2. NPTEL Video Lecture Notes on "Control Engineering" by Prof.S.D.Agashe, IIT Bombay.

PUEE4PL03	LINEAR AND DIGITAL CIRCUITS LABORATORY	L T P C
		0 0 3 2

COURSE OBJECTIVE

- To learn design, testing and characterizing of circuit behavior with combinational logic gate ICs.
- To learn design, testing and characterizing of circuit behavior with register/ counter andsequential logic ICs.
- To learn design, testing and characterizing of circuit behavior with OPAMP ICs.
- To learn design, testing and characterizing of circuit behavior with analog Ics like 555 timerVCO and regulators.
- To learn design, testing and characterizing of circuit behavior with digital Ics like decoders,multiplexers.

LIST OF EXPERIMENTS

1. Implementation of Boolean Functions, Adder and Subtractor circuits.
2. Code converters: Excess-3 to BCD and Binary to Gray code converter and vice-versa.
3. Parity generator and parity checking.
4. Encoders and Decoders.
5. Counters: Design and implementation of 3-bit modulo counters as synchronous andAsynchronous types using FF IC's and specific counter IC.
6. Shift Registers: Design and implementation of 4-bit shift registers in SISO, SIPO, PISO,PIPO modes using suitability IC's.
7. Study of multiplexer and de multiplexer
8. Timer IC application: Study of NE/SE 555 timer in Astability, Monostability operation.
9. Application of Op-Amp: inverting and non-inverting amplifier, Adder, comparator, Integrator andDifferentiator.

TOTAL: 45 PERIODS

COURSE OUTCOMES:	**Blooms level**
CO1: Ability to understand and implement Boolean Functions.	Understanding
CO2: Ability to understand the importance of code conversion	Understanding
CO3: Ability to Design and implement circuits with digital ICs like decoders, multiplexers,register.	Understanding
CO4: Ability to acquire knowledge on Application of Op-Amp	Understanding
CO5: Ability to Design and implement counters using analog ICs like timers, VCOs and digitalICs like Flip-flops and counters.	Understanding

CO – PO Mapping:

Course code & Name:					**PUEE4PL04 - Electrical Machines Laboratory - II**									
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	-	-	3	-	-	-	1.5	-	-	3	3	2	1
CO2	2	-	3	3	-	-	-	1.5	-	-	3	3	2	1
CO3	2	3	2	3	3	-	-	1.5	-	-	3	3	2	1
CO4	2	3	3	3	3	-	-	1.5	-	-	3	3	2	1
CO5	2	-	-	-	-	-	-	1.5	-	-	-	3	2	1

PUEE4PL04	ELECTRICAL MACHINES LABORATORY - II	L T P C
		0 0 3 2

COURSE OBJECTIVE

- To expose the students to the operation of synchronous machines and induction motors and give them experimental skill

LIST OF EXPERIMENTS

1. Regulation of three phase alternator by EMF and MMF methods.
2. Regulation of three phase alternator by ZPF.
3. Regulation of three phase salient pole alternator by slip test.
4. V and Inverted V curves of Three Phase Synchronous Motor.
5. Load test on three-phase induction motor.
6. No load and blocked rotor tests on three-phase induction motor (Determination of equivalent circuit parameters).
7. Separation of No-load losses of three-phase induction motor.
8. Load test on single-phase induction motor.
9. No load and blocked rotor test on single-phase induction motor.
10. Study of Induction Motor Starters

TOTAL: 45 PERIODS

COURSE OUTCOMES:	**Blooms level**
CO1:Ability to understand and analyze EMF and MMF methods	Understanding
CO2: Ability to analyse the characteristics of V and Inverted V curves	Understanding
CO3: Acquire hands on experience of conducting various tests on alternators and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of Synchronous machines	Understanding
CO4: Acquire hands on experience of conducting various tests on induction motors and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of single and three phase Induction motors	Understanding
CO5: Ability to acquire knowledge on separation of losses	Understanding

CO – PO Mapping:

Course code & Name:					**PUEE4PL04 - Electrical Machines Laboratory - II**									
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO 1	3	3	1	1	1	-	-	-	2	-	1	1	3	2
CO 2	3	3	1	1	1	-	-	-	2	-	1	1	3	2
CO3	3	3	1	1	1	-	-	-	2	-	1	1	3	2
CO4	3	3	1	1	1	-	-	-	2	-	1	1	3	2
CO5	3	3	1	1	1	-	-	-	2	-	1	1	3	2

PMC23UMC2001	MANDATORY COURSES – II	L T P C
	PRACTICES FOR WELL BEING	**3 0 0 3**

COURSE OBJECTIVE

4. To provide an effective educational program that will equip students to gain an in-depth understanding of the various ways to improve Physical & Mental Health and Wellbeing.
5. To produce interdisciplinary/intersectional student research that addresses Health and hygiene, Diseases and disorders, Diet and nuitrician and traditional and modern practices of wellbeing.
6. To Engage students in a process of healthy behavior change or health promotion.

UNIT I: HEALTH AND ITS IMPORTANCE **9**

Health: WHO definition - Ten types of health one has to maintain - Physical health - Mental health - Social health - Financialhealth - Emotional health - Spiritual health - Intellectual health - Relationship health - Environmentalhealth - Occupational/Professional heath – Prevention is better than Cure.

UNIT II: DISEASES AND DISORDERS **9**

Life expectancy rate - mortality rate

Types of diseases and disorders - dreadful diseases - Non-communicable diseases (NCDs) - heart disease – cancer – chronic pulmonary diseases - Lifestyle disorders – Obesity – Diabetes - Cardiovascular diseases – Strokes – hypertension – PCOD – infertility – ADHD – sleeplessness - Mental health issues.

Causes & Risk factors – tobacco – alcohol - unhealthy diet - lack of physical activities.

UNIT III: DIET AND NUITRICION **9**

Role of diet in maintaining health - energy one needs to keep active throughout the day - nutrients one needs for growth and repair.

Balanced Diet and its 7 Components - Carbohydrates – Proteins – Fats – Vitamins – Minerals - Fibre and Water.

Food additives and their merits & demerits - Effects of food additives - Types of food additives -Food additives and processed foods - Food additives and their reactions

Simple lifestyle modifications to maintain health - Healthy Eating habits (Balanced diet according to age) Physical Activities (Stretching exercise, aerobics, resisting exercise) - MaintainingBMI-Importance and actions to be taken

UNIT IV: AYURVEDA & SIDDHA SYSTEMS **9**

AYUSH systems and their role in maintaining health

Traditional Diet and Nutrition - Regimen of Personal and Social Hygiene - Daily routine (Dinacharya) - Seasonal regimens (Ritucharya) - basic sanitation andhealthy living environment - Sadvritta (good conduct) - for conducive social life.

Principles of Siddha & Ayurveda systems - Macrocosm and Microcosm theory - Pancheekarana Theory / **(**Five Element Theory) 96 fundamental Principles - Uyir Thathukkal **(**Tri-Dosha Theory) - Udal Thathukkal

UNIT V: PHYSICAL & EMOTIONAL WELLNESS **9**

Definition and importance of yoga - Types of yoga - The Eight Limbs of Yoga - Simple Yogasanas for cure and prevention of health disorders - What yoga can bring to our life.

Emotional health - 3 key elements: the subjective experience - the physiological response - the behavioral response - Role of emotions in daily life -Short term and long term effects of emotional disturbances - Practices for emotional health - Recognize how thoughts influence emotions - Cultivate positive thoughts - Practice self-compassion - Expressing a full range of emotions.

Stress management - Stress definition - How stress affects one's life - causes of stress - Symptoms of stress - Managing stress (habits, tools, training, professional help) - Complications of stress mismanagement.

Sleep - Sleep and its importance for mental wellness - Sleep and digestion.
Immunity - Types and importance - Ways to develop immunity

TOTAL: 45 PERIODS

COURSE OUTCOMES: (Each unit – one outcome, total 5 outcomes)
At the end of the course, the students will be able:

COs	Course Outcome (CO)	Blooms Taxonomy
CO-1	Able to describe Health and its importance at multi-dimensional levels.	Understand
CO-2	To be summarize on various diseases and disorders and their symptoms.	Understand
CO-3	Able to illustrate habits of food intake and nutritious diet.	Apply
CO-4	To explain on traditional methods of Medical Treatments: Ayurvedha and Siddha.	Understand
CO-5	Able to Implement best practices to manage physical and emotional Quotient.	Apply

CO – PO Mapping

Course Outcomes	Programme Outcomes (Pos)											
	PO-1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	1	1	-	2	1	-	3
CO2	-	-	-	-	-	1	1	-	2	1	-	3
CO3	-	-	-	-	-	1	2	-	2	1	-	3
CO4	-	-	-	-	-	1	1	-	2	1	-	3
CO5	-	-	-	-	-	1	1	-	3	1	-	3

TEXT BOOK:

1. Ashley Martin: Nutrition and Dietetics, Published by White Word Publications, New York, NY 10001,
2. Cory Martin: Yoga for Beginners_35 Simple Yoga Poses to Calm Your Mind and Strengthen Your Body, Althea Press, Berkeley, California, 2015

REFERENCES:

1. Moshe Zeidner, Gerald Matthews, and Richard D.Roberts, : WHAT WE KNOW ABOUT EMOTIONAL INTELLIGENCE How It Affects Learning, Work, Relationships, and Our Mental Health, The MIT Press, Cambridge, Massachusetts, London, England
2. Kristin Neff, Ph.D Christopher Germer, Ph.D,: The Mindful Self-Compassion Workbook The Guilford Press A Division of Guilford Publications, 2011

NPTEL/ SWAYAM/ MOOC REFERENCE:

1. https://www.tnpesu.org/syllabus/414%20-%20Certificate%20Course%20in%20Yoga%20and%20Naturopathy
2. https://onlinecourses.swayam2.ac.in/aic23_ge05/preview
3. https://onlinecourses.nptel.ac.in/noc21_hs29/preview

PMC23UMC2H02	MANDATORY COURSES – II	L T P C
	HISTORY OF SCIENCE AND TECHNOLOGY IN INDIA	3 0 0 3

COURSE OBJECTIVE

1.To provide an understanding of the socio-cultural and philosophical context in which the various scientific and technological ideas got developed in India

2. Stimulate student's interest in knowing various evolutions and thereby help in repositioning India's contributions in science and technology.

UNIT I: CONCEPTS AND PERSPECTIVES **9**

Science and Technology-Meaning, Scope and Importance, Interaction of science, technology & society, Sources of history on science and technology in India.

Introduction to the works of D.D. Kosambi, Dharmpal, Debiprasad Chattopadhyay, Rehman, S. IrfanHabib, Deepak Kumar, Dhruv Raina, and others

UNIT II: SCIENCE AND TECHNOLOGY IN ANCIENT INDIA **9**

Technology in pre-historic period - Beginning of agriculture and its impact on technology - Science and Technology during Vedic and Later Vedic times-Science and technology from 1st century AD to C-1200.

UNIT III: SCIENCE AND TECHNOLOGY IN MEDIEVAL INDIA **9**

Legacy of technology in Medieval India, Interactions with Arabs-Development in medical knowledge, interaction between Unani and Ayurveda and alchemy-Astronomy and Mathematics: interaction with Arabic Sciences-Science and Technology on the eve of British conquest

UNIT IV: SCIENCE AND TECHNOLOGY IN COLONIAL INDIA **9**

Science and the Empire - Indian response to Western Science Growth of techno-scientific institutions

UNIT V: SCIENCE AND TECHNOLOGY IN A POST-INDEPENDENT INDIA **9**

Science, Technology and Development discourse - Shaping of the Science and Technology - Policy Developments in the field of Science and Technology-Science and technology in globalizing India-Social implications of new technologies like the Information Technology and Biotechnology.

TOTAL: 45 PERIODS

COURSE OUTCOMES: (Each unit – one outcome, total 5 outcomes)
At the end of the course, the students will be able:

COs	Course Outcome (CO)	Blooms Taxonomy
CO1	Able to explain the origin and development of Science & Technology in India.	Understand
CO2	Able to Summarize the evolution of Science and Technology in Ancient India.	Understand
CO3	Comprehend the evolution of Science and Technology in Medieval India.	Understand
CO4	Comprehend the evolution of Science and Technology during Colonialism.	Understand
CO5	Comprehend the evolution of Science and Technology during Modern period in India.	Understand

CO – PO Mapping

Course Outcomes	Programme Outcomes (Pos)											
	PO-1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	3	-	-	1	1	-	3
CO2	-	-	-	-	-	3	-	-	1	1	-	3
CO3	-	-	-	-	-	3	-	-	1	1	-	3
CO4	-	-	-	-	-	3	-	-	1	1	-	3
CO5	-	-	-	-	-	3	-	-	1	1	-	3

TEXT BOOK:

1. Kuppuram. G.: History of Science and Technology in India, South Asia Books, 1990, ISBN-13: 978-8185067315.
2. Dr. P Lathwal,: A Brief History of Science & Technology In India, Indu Book Services Pvt Ltd, 2022, ISBN: 9789391377205

REFERENCES:

1. Suvobrata Sarkar, : History of Science, Technology, Environment, and Medicine in India, Taylor & Francis, 2021, ISBN: 1000485005
2. Rattan Lal Hangloo,: HISTORY OF SCIENCE AND TECHNOLOGY: Exploring New Themes, Rawat Publications, 2011, ISBN 9788131604267
3. Dilip K. Chakrabarti,: History of Ancient India: Volume IX: Science and Technology, Medicine, Aryan Books International, 2023, ISBN: 9788173054884
4. The Great Indian Scientists,: Cengage India Private Limited, 2017, ISBN-13 : 978-8131533321
5. D M Bose, S N Sen, B V Subbarayappa,: A Concise History of Science in India, Orient Blackswan, 2009, ISBN: 9788173716195

NPTEL/ SWAYAM/ MOOC REFERENCE:

https://onlinecourses.swayam2.ac.in/arp20_ap35/preview
https://onlinecourses.nptel.ac.in/noc20_ae10/preview
https://www.classcentral.com/subject/indian-history
https://iisc.ac.in/courses/

PMC23UMC2H03	MANDATORY COURSES – II	L T P C
	POLITICAL AND ECONOMIC THOUGHT FOR A HUMANE SOCIETY	3 0 0 3

COURSE OBJECTIVE

1. To Understand the political history of a diversity of development paradigms.
2. To Develop a comparative research paper that seeks to understand why development politics and outcomes have varied across time and/or across geographic space.
3. To read theoretical and policy literature and be able to identify key concepts, arguments, assumptions, and adequacy of logic as well as evidence.

UNIT I: SOCIETY & HUMANE **9**

Society – Human – Six Senses - Responsibilities - holistic thought – Desires - harmony in self, Relationship, society, nature, societal systems.

UNIT II: EVOLUTION OF POLITICAL THOUGHTS **9**

Capitalism – Free markets, demand-supply, perfect competition, laissez-faire, monopolies,imperialism, Liberal democracy - Fascism and totalitarianism. World war I and II. Cold war - Communism – Mode of production, theory of labour, surplus value, class struggle, dialecticalmaterialism, historical materialism, Russian and Chinese models.

UNIT III: GANDHIAN THOUGHTS **9**

Gandhian thought. Swaraj, Decentralized economy & polity, Community. Control over one's lives. Relationship with nature - Welfare state. Relation with human desires. Empowered human beings, satisfaction.

UNIT IV: CIVILIZATIONS **9**

History of Civilization – Indian Civilization - Essential elements of Indian civilization - Technology as driver of society, Role of education in shaping of society. Future directions.

UNIT V: MODERN ECONOMY **9**

Concept of modernity - Tradition Vs Modernity – Globalization – Industrial Revolutions – Modernism and Post – Modernism.

TOTAL: 45 PERIODS

COURSE OUTCOMES: (Each unit – one outcome, total 5 outcomes)
At the end of the course, the students will be able:

COs	KL	Course Outcome (CO)	Blooms Taxonomy
CO-1	K2	Able to describe human, society and their interrelationships	Understand
CO-2	K2	Able to summarize various political theories and their evolutions.	Understand
CO-3	K2	To summarize the theory of Gandhi and his uniqueness.	Understand
CO-4	K3	To be illustrate the formation, role and future of civilization in making of human	Apply
CO-5	K3	To be illustrate the trends of Modern Economic Policies.	Apply

CO – PO Mapping

Course Outcomes	Programme Outcomes (Pos)											
	PO-1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	3	-	1	2	1	-	3
CO2	-	-	-	-	-	3	-	1	2	1	-	3
CO3	-	-	-	-	-	3	-	1	2	1	-	3
CO4	-	-	-	-	-	3	-	1	2	1	-	3

TEXT BOOK:

1. Jogdand P G, Globalization and social movements : Struggle for a humane society, Jaipur Rawat Publications, 2003, ISBN: 9788170338154
2. Adam Smith, The Wealth of Nations, Fingerprint Publishing, 2018, ISBN-13: 978-9387779464

REFERENCES:

1. Maharajan. M, Economic Thoughts of Mahatma Gandhi, Discovery Publishing Pvt.Ltd; First Edition, 2008, ISBN-13 : 978-8171414154
2. James Mill, The Elements of Political Economy, Cosimo Classics, 2007, ISBN-13 : 978-1602069800
3. Lokanathan. V., A History Of Economic Thought, S Chand & Co Ltd, 2018, ISBN-13 : 978-9352533374

NPTEL/ SWAYAM/ MOOC REFERENCE:

https://onlinecourses.swayam2.ac.in/nou21_hs34/preview

PMC23UMC2H04	MANDATORY COURSES – II	L T P C
	SOCIOLOGY, SOCIETY AND CULTURE	3 0 0 3

COURSE OBJECTIVE

- To understand the reciprocal relationship between the individual and society.
- To develop an understanding of societal and cultural dimensions of the nature of society and the environment in which they will live and work as scientists, engineers and entrepreneurs.
- To analyse problems and frame research questions relating to humans and their experience.

UNIT I: Sociology as a Science **9**

Sociology and common Sense - Sociology and current affairs - Sociology as a science - Logic in sociological inquiry - Sociology of action - The field and relevance of sociology - Positivism

UNIT II: Society and Culture **9**

Culture and society - The structure of culture - Cultural Traits and complexes - Subcultures and counter cultures - Cultural integration - Cultural relativism - Real and Ideal culture – Ethnocentrism - Xenocentrism - Cultural lag.

UNIT III: Social Institutions **9**

The concept of varna - The Caste system: Origin and characteristics (of caste) as a system - Hierarchy based on birth - Religious sanctions on social participation - Caste and subcaste - Caste conflicts - Caste councils - An appraisal of caste system - Prospects of caste in modern India.

The Class system: What is social class? - Development of class - Self-identification and class consciousness - Class in itself and class for itself - Class having blue collar status and white collar status - Industrial class - Significance of social class.

The future of social classes: From Proletariat to status seekers

UNIT IV: Environment and Ecology **9**

Conceptualising environment - Forest, ecology and society - Common Property Resources and its management - Significance of forest and environment in modern life - Environmental movement with reference to forest and water management

UNIT V: Issues of modernity **9**

Concept of modernity - Tradition Vs Modernity – Globalization: Is globalization new and real? - Has globalization weakened the state? - Has globalization led to cultural homogenisation? - Does globalization lead to a clash of cultures?

TOTAL: 45 PERIODS

COURSE OUTCOMES: (Each unit – one outcome, total 5 outcomes)
At the end of the course, the students will be able:

COs	KL	Course Outcome (CO)	Blooms Taxonomy
CO-1	K3	Able to Describe Society in terms of science and find logic behind establishment of society.	Understand
CO-2	K3	Able to Illustrate Society with Culture to develop the best cultural environment.	Apply
CO-3	K2	To summarize two major revolutionary concepts of Varna: The Caste and The Class.	Understand
CO-4	K2	Able to describe the relationship between environment and modern society.	Understand
CO-5	K3	Able to illustrate various levels of modern issues in the evolution of society.	Apply

CO – PO Mapping

Course Outcomes	Programme Outcomes (Pos)											
	PO-1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	3	-	1	3	1	-	3
CO2	-	-	-	-	-	3	-	1	3	1	-	3
CO3	-	-	-	-	-	3	-	1	3	1	-	3
CO4	-	-	-	-	-	3	3	1	3	1	-	3
CO5	-	-	-	-	-	3	-	2	3	1	-	3

TEXT BOOK:

1. ROSAMUND BILLINGTON, SHEELAGH STRAWBRIDGE, Culture and Society: A Sociology of Culture, Palgrave Macmillan, 1991, ISBN-13 : 978-0333460399
2. Subas Mohapatra, Society and Culture in India: A Reader, Orient Blackswan, 2017, ISBN: 9789383166145

REFERENCES:

1. Satish Chandra, State, Society, and Culture in Indian History, Oxford University Press, 2012, ISBN: 9780198077398
2. Byran S. Turner, Chris Rojek, Society & Culture, Sage Knowledge, 2001, ISBN: 9780761970491

NPTEL/ SWAYAM/ MOOC REFERENCE:

https://nptel.ac.in/courses/109106180
https://archive.nptel.ac.in/courses/109/103/109103023/
https://onlinecourses.swayam2.ac.in/cec21_hs40/preview
https://www.my-mooc.com/en/categorie/sociology
https://egyankosh.ac.in/handle/123456789/66016
https://onlinecourses.swayam2.ac.in/cec24_hs15/preview