Er. PERUMAL MANIMEKALAI COLLEGE OF ENGINEERING

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

Koneripalli, Hosur - 635117.

PMC TECH

INSPIRE TO INNOVATE

ACADEMIC REGULATIONS 2023 (R23)

Curriculum&Syllabi

(Version 1)

B.E. ELECTRONICS AND COMMUNICATION ENGINEERING

Applicable from 2023 -24 onwards

REGULATIONS 2023 - AUTONOMOUS

CHOICE BASED CREDIT SYSTEM

B.E. ELECTRONICS AND COMMUNICATION ENGINEERING
CURRICULUM FOR I TO VIII SEMESTERS

Program Educational Objectives (PEO's)

PEO 1: Graduates will have good technical knowledge, skills, and attributes in Electronics and Communication Engineering for successful careers, higher studies leading to research and innovation.

PEO 2: Graduates will work in multi-disciplinary areas to meet the contemporary requirements of the industry and society.

PEO 3: Graduates will exhibit leadership qualities and ethics with good team spirit, use modern tools, and engage themselves in continuous learning.

Program Outcomes (PO's)

1. **PO1 Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
2. **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.
3. **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.
4. **PO4 Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis, and interpretation of data and synthesis of the information to provide valid conclusions.
5. **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.

6. **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.
7. **PO7 Environment and sustainability:** Understand the impact of the professional engineering solutions in societal, environmental contexts, demonstrate the knowledge and need for sustainable development.
8. **PO8 Ethics:** Apply ethical principles, commit to professional ethics, responsibilities and norms of the engineering practice.
9. **PO9 Individual and team work**: Function effectively as an individual, as a member or leader in diverse teams and in multidisciplinary settings.
10. **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.
11. **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.
12. **PO12 Life-long learning:** Recognize the need, ability to engage in independent and lifelong learning in the broadest context of technological change.

Program Specific Outcomes (PSO's)

PSO1 : The capacity to ascertain the kind of tools and equipment required to carry out challenges associated with implementations of Electronics and Communication Engineering technologies to meet out societal and industrial requirements.

PSO2 : An ability to provide innovative solutions through the knowledge in Electronics and Communication Engineering domains namely Embedded, VLSI, Signal Processing and Networking..

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

B.E(ECE)

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

S. NO.	COURSE CODE	COURSE NAME	CATE-GORY	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 Laboratory	HM	-	-	4	4	2
8.	PUCC1PL02	Physics and Chemistry Laboratory	BS	-	-	4	4	2
9.	PUCC1HM03	Wellness	HM	-	-	1	1	0
TOTAL				14	1	13	28	21

SEMESTER II

S. NO.	COURSE CODE	COURSE NAME	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	PUCC2HM04	Professional English - II	HM	2	-	-	2	2
2.	PUEC2BS04	Transforms and Partial Differential Equations	BS	3	1	-	4	4
3.	PUCC2BS05	Engineering Materials	BS	3	-	-	3	3
4.	PUEC2PC01	Circuit Analysis	PC	3	-	-	3	3
5.	PUEC2BE01	Basic Electrical & Instrumentation 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.	PUEC2PL04	Circuit Analysis Laboratory	PC	-	-	2	2	1
10	PUCC2PL04	Problem solving using Python programming	BE	-	-	4	4	2
11	PUCC2PL05	Civil and Mechanical Engineering Practices	BE	-	-	2	2	1
12	PUCC2PL06	Electrical and Electronics Engineering Practices	BE	-	-	2	2	1
13	PUCC2HM06	Wellness	HM	-	-	1	1	0
TOTAL				17	1	15	33	25

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SEMESTER III

S.NO.	COURSE CODE	COURSE NAME	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	PUEC3BS06	Probability and Random Processes	BS	3	1	-	4	4
2.	PUEC3PC02	Control systems	PC	3	1	-	4	4
3.	PUEC3PC03	Electronic devices and circuits	PC	3	-	-	3	3
4.	PUEC3TL02	Digital system design	TL	3	-	2	5	4
5.	PUCS3BE01	Data Structures using C	BE	3	-	-	3	3
6.	PUCC3MC01	Mandatory Course – I (Non-Credit)	MC	2	-	-	2	0
PRACTICALS								
7.	PUEC3PL02	Electronic devices and circuits laboratory	PC	-	-	4	4	2
8.	PUCS3PL04	Data Structures using C Laboratory	BE	-	-	4	4	2
9.	PUCC3HM07	Extension Activities	HM	-	-	1	1	0
TOTAL				17	2	11	30	22

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SEMESTER IV

S. NO.	COURSE CODE	COURSE NAME	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	PUCC4BS07	Environmental Sciences & Sustainability	BS	3	-	-	3	3
2.	PUEC4PC04	Signals and Systems	PC	3	1	-	4	4
3.	PUEC4PC05	Linear Integrated Circuits	PC	3	-	-	3	3
4.	PUEC4PC06	Communication Systems	PC	3	-	-	3	3
5.	PUEC4PC07	Electromagnetic Fields	PC	3	-	-	3	3
6.	PUCC4MC02	Mandatory Course – II (Non-Credit)	MC	2	-	-	2	0
PRACTICAL								
7.	PUEC4PL03	Linear Integrated Circuits Laboratory	PC	-	-	4	4	2
8.	PUEC4PL04	Communication Systems Laboratory	PC	-	-	4	4	2
9.	PUCC4HM08	Extension Activities	HM	-	-	1	1	0
10	PUEC4IP01	In-plant Training/Internship	SD	-	-	-	-	-
TOTAL				17	1	9	27	20

- In-plant-Training – 2 Weeks of training each during 4th/5th/6th Semester – During college hours or semester vacation. Total 4 weeks of Training – 2 Credits

SEMESTER V

S.NO.	COURSE CODE	COURSE NAME	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	PUCC5HM09	Universal Human Values & Ethics	HM	3	-	-	3	3
2.	PUEC5PC08	VLSI and Chip Design	PC	3	-	-	3	3
3.	PUEC5PC09	Digital signal processing	PC	3	1	-	4	4
4.	PUEC5PC10	Transmission lines and RF systems	PC	3	-	-	3	3
5.	PUEC5PEXX	Professional Elective – I	PE	3	-	-	3	3
6.	PUEC5IL01	Industry Lecture	SD	1	-	-	1	0
PRACTICAL								
7.	PUEC5PL05	VLSI Design Laboratory	PC	-	-	4	4	2
8.	PUEC5PL06	Digital signal processing Laboratory	PC	-	-	4	4	2
9.	PUEC5PD01	Professional Development	SD	-	-	2	2	1
10.	PUEC5IP02	In-plant-Training/Internship	SD	-	-	-	-	1
TOTAL				16	1	10	27	22

- In-plant-Training – 2 Weeks of training each during 4th/5th/6th Semester – During college hours or semester vacation. Total 4 weeks of Training – 2 Credits

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SEMESTER VI

S.NO.	COURSE CODE	COURSE NAME	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	PUEC6PC11	Embedded Systems and IoT	PC	3	-	-	3	3
2.	PUEC6TL03	Networks and security	TL	3	-	2	5	4
3.	PUEC6PEXX	Professional Elective – II	PE	3	-	-	3	3
4.		Open Elective – I	OE	3	-	-	3	3
5.		Open Elective – II	OE	3	-	-	3	3
6.	PUEC6IL02	Industry Lecture	SD	1	-	-	1	0
PRACTICAL								
7.	PUEC6PL07	Embedded Systems and IoT Laboratory	PC	-	-	4	4	2
8.	PUEC6PD02	Professional Development	SD	-	-	2	2	1
9.	PUEC6VA01	Technical Skill Development	SD	-	-	2	2	1
10.	PUEC6IP03	In-plant training/Internship	SD	-	-	-	-	1
TOTAL				16	-	10	26	21

- In-plant Training – 2 Weeks of training each during 4th/5th/6th Semester – During college hours or semester vacation
- Any one Open Elective has to chosen from the Management verticals.

Total 4 weeks of Training – 2 Credits

SEMESTER VII

S.NO.	COURSE CODE	COURSE NAME	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	PUEC7PC12	Optical and Wireless Communication	PC	3	-	-	3	3
2.	PUEC7PEXX	Professional Elective – III	PE	3	-	-	3	3
3.	PUEC7PEXX	Professional Elective – IV	PE	3	-	-	3	3
4.	PUEC7PEXX	Professional Elective – V	PE	3	-	-	3	3
5.		Open Elective – III	OE	3	-	-	3	3
6.		Open Elective – IV	OE	3	-	-	3	3
PRACTICAL								
7.	PUEC7PL08	Advanced Communication Laboratory	PC	-	-	4	4	2
8.	PUEC7VA02	Technical Skill Development	SD	-	-	2	2	1
9.	PUEC7PR01	Project Phase – I	Project	-	-	2	2	1
TOTAL				18	-	8	26	22

SEMESTER VIII

S.NO.	COURSE CODE	COURSE NAME	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	PUEC8PR02	Project Phase – II / Internship	Project	-	-	20	20	10

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

TOTAL CREDITS: 163

SUMMARY

B.E. ELCTRONICS AND COMMUNICATION ENGINEERING										
S.NO	Subject Area	I	II	III	IV	V	VI	VII	VIII	Total Credits
		Credits Per Semester								
1	HM	5	5			3				14
2	BS	12	7	4	3					26
3	BE	4	9	5						11
4	PC		4	13	17	14	9	5		68
5	PE					3	3	9		18
6	OE						6	6		9
7	PR							1	10	11
8	SD					2	3	1		6
Total		21	25	22	20	22	21	22	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

MANDATORY COURSES I
(Semester – III)

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS
				L	T	P	
1.	PUCC3MC01	Women and Gender Studies	MC	3	0	0	3
2.	PUCC3MC02	Elements of Literature	MC	3	0	0	3
3.	PUCC3MC03	Film Appreciation	MC	3	0	0	3
4.	PUCC3MC04	The Constitution of India	MC	3	0	0	3

MANDATORY COURSES II
(Semester – IV)

Sl. No.	COURSECODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS
				L	T	P	
1.	PUCC4MC01	Practices for well being	MC	3	0	0	3
2.	PUCC4MC02	Indian History of Science and Technology	MC	3	0	0	3
3.	PUCC4MC03	Political and Economic Thought for a Humane Society	MC	3	0	0	3
4.	PUCC4MC04	Sociology, Society and Culture	MC	3	0	0	3

SEMESTER – I

(Common to all B.E.,/B.Tech. Courses)

S. NO.	COURSE CODE	COURSE NAME	CATE-GORY	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
							28	21

B.E(ECE)

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

COURSE OBJECTIVES:

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

UNIT – I	INTRODUCTION TO COMMUNICATION	6

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?

FUNDAMENTALSOFCOMMUNICATION

Reading-Reading Brochures (technical context), telephone messages/social media messages relevant to technical contexts and emails. Writing-Writing emails/letters introducing one-self 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: 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 non-verbal (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–Contentvs Function words

TOTAL: 30 PERIODS

B-ECECE)

COURSE OUTCOMES Upon completion of this course, the student will be able to		Cognitive level
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

TEXT BOOKS:	
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.

REFERENCE BOOKS:	
1	Meenakshi Raman & Sangeeta Sharma, Technical Communication – Principles and Practices, Oxford Univ. Press, New Delhi. 2016.
2	M. Ashraf Rizvi, Effective Technical Communication, McGraw 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 / 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)
3	http://www.indiabix.com/group-discussion/topics-with-answers/
4	http://www.dailywriting tips .com/

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	-	3	-	2	3	3	1
CO2	2	-	-	-	-	-	2	-	1	3	3	-
CO3	3	-	-	-	-	-	2	-	2	3	3	-
CO4	4	-	-	-	-	-	2	-	1	3	3	1
CO5	5	-	-	-	-	-	1	-	1	2	2	-

B-E(ECE)

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

COURSE OBJECTIVES:

1	To develop the use of matrix algebra techniques that are needed by engineers for practical applications
2	To familiarize the students with differential calculus.
3	To familiarize the student with functions of several variables. This is needed in many branches of engineering.
4	To make the students understand various techniques of integration
5	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: 60 PERIODS

COURSE OUTCOMES		Cognitive level
CO1	Use the matrix algebra methods for solving practical problems	Apply
CO2	Apply differential calculus tools in solving various application problems	Apply

B.E(ECE)

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

CO-PO MAPPING

COs	PO1	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

PUCC1BS02	ENGINEERING PHYSICS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1	To make the students effectively to achieve an understanding of mechanics.
2	To enable the students to gain knowledge of electromagnetic waves and its applications
3	To introduce the basics of oscillations, optics and lasers
4	Equipping the students to be successfully understand the importance of quantum physics.
5	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 Upon completion of this course, the student will be able to		Cognitive level
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

TEXT BOOKS:

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.

REFERENCE BOOKS:

1	R.Wolfson. Essential University Physics. Volume 1 & 2. Pearson Education (Indian Edition), 2009.
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. Springer- Verlag, 2012.

WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC 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

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	-	-	-	-	-	-	-

PUCC1BS03	ENGINEERING CHEMISTRY	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1	To inculcate sound understanding of water quality parameters and water treatment techniques.
2	To impart knowledge on the basic principles and properties of polymers and composites
3	To introduce the basic concepts of corrosion, alloys and corrosion preventive methods
4	To facilitate the understanding of different type of fuels, their preparation, properties and combustion characteristics.
5	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 CaCO3. 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. CO2 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: H2-O2 fuel cell, microbial fuel cell; Super capacitors: Storage principle, types and examples.	
TOTAL: 45 PERIODS	

COURSE OUTCOMES **Upon completion of this course, the student will be able to**		**Cognitive level**
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

TEXT BOOKS:	
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

REFERENCE BOOKS:	
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 Pvt Ltd. Chennai, 2009.

WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:	
1	NPTEL: Basic courses-Sem 1 and 2 - Engineering Chemistry-I
2	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
3	https://www.chemistryviews.org/debating-the-everyday-impact-of-polymer-materials - Debating the Everyday Impact of Polymer Materials – Chemistry Views
4	https://batteryuniversity.com – Learn about batteries
5	https://wiseinternational.org/nuclear-energy -Nuclear Energy Wise international

CO-PO MAPPING												
COs	**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

PMC TECH

PUCC1BE01	ENGINEERING GRAPHICS	L	T	P	C
		2	4	0	4

COURSE OBJECTIVES:

1	Drawing engineering curves
2	Drawing freehand sketch of simple objects
3	Drawing orthographic projection of solids and section of solids.
4	Drawing development of solids
5	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; T=60) 90 PERIODS

B.E(ECE)

COURSE OUTCOMES Upon completion of this course, the student will be able to		Cognitive level
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

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

WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:	
1	https://nptel.ac.in/courses/112102304 - Engineering Graphics and Design, IIT Delhi
2	https://nptel.ac.in/courses/112103019 - Engineering Drawing, IIT Guwahati
3	https://archive.nptel.ac.in/courses/112/102/112102304/ - Engineering Graphics and Design
4	https://users.encs.concordia.ca/~nrskumar/Index_files/Mech211/Full%20Lecture/Lecture%201.pdf - Mechanical Engineering Drawing

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.

CO-PO MAPPING

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

PMC TECH

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 carmaking—Massive Terracottasculptures, Villagedeities, Thiruvalluvar Statueat 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-REFERENCE BOOK:

1. தமிழக வரலாறு –மக்களும் பண்பாடும் –கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும்
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).

B.E(ECE)

9. Keeladi – 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text book and Educational Services Corporation, Tamil Nadu)

10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author).

11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)

12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Refernece Book.

PMC TECH

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

COURSE OBJECTIVES:

1	To improve the communicative competence of learners
2	To develop various listening strategies to comprehend various types of audio materials like lectures, discussions, videos etc.
3	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 **Upon completion of this course, the student will be able to**		**Cognitive level**
CO1	Create Email and letter of introduction in formal and informal.	Apply
CO2	Communicate effectively about personal experiences and events.	Apply
CO3	Make Presentation on products and technical processes effectively.	Apply
CO4	Transcode visual content appropriately.	Apply
CO5	Participate in group discussion or debates.	Apply

TEXT BOOKS:

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 BOOKS:

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

CO-PO MAPPING

COs	PO1	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

PUCC1PL02	PHYSICS AND CHEMISTRY LABORATORY	L	T	P	C
		0	0	4	2

PHYSICS LABORATORY: (Any seven experiments to be conducted)

COURSE OBJECTIVES:

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

LIST OF EXPERIMENTS — **30**

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		Cognitive level
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

B.E(ECE)

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

LIST OF EXPERIMENTS	**30**

1. Preparation of Na2CO3 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 (TiO2/ZnO/CuO) by Sol-Gel method.
14. Estimation of Nickel in steel
15. Proximate analysis of Coal

TOTAL: 30 PERIODS

COURSE OUTCOMES		Cognitive level
CO1	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
CO4	To learn simple method of synthesis of nanoparticles	Analyze
CO5	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	-	-	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

SEMESTER II

S. NO.	COURSE CODE	COURSE NAME	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	PUCC2HM04	Professional English - II	HM	2	-	-	2	2
2.	PUEC2BS04	Transforms and Partial Differential Equations	BS	3	1	-	4	4
3.	PUCC2BS05	Engineering Materials	BS	3	-	-	3	3
4.	PUEC2PC01	Circuit Analysis	PC	3	-	-	3	3
5.	PUEC2BE01	Basic Electrical & Instrumentation 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.	PUEC2PL04	Circuit Analysis Laboratory	PC	-	-	2	2	1
10	PUCC2PL04	Problem solving using Python programming	BE	-	-	4	4	2
11	PUCC2PL05	Civil and Mechanical Engineering Practices	BE	-	-	2	2	1
12	PUCC2PL06	Electrical and Electronics Engineering Practices	BE	-	-	2	2	1
13	PUCC2HM06	Wellness	HM	-	-	1	1	0
TOTAL				17	1	15	33	25

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

COURSE OBJECTIVES:

1	To engage learners in meaningful language activities to improve their reading and writing skills
2	To help learners understand the purpose, audience, contexts of different types of writing
3	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 of complaint, 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		Cognitive level
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	Analyze
CO4	Presenting oral and written Report of Events and Technical process	Apply
CO5	Prepare job applications and resume	Apply

B.E C E(E)

TEXT BOOKS:	
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
REFERENCE BOOKS:	
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 / NPTEL/ SWAYAM/ MOOC REFERENCE:	
1	IELTS: https://ieltstrainingonline.com/british-council-practice-ielts-reading-actual-tests/
2	http://www.englishdaily626.com/c-errors.php?010 (common errors)
3	https://nptel.ac.in/courses/109105144 (employment communication)
4	https://onlinecourses.nptel.ac.in/noc22_hs05/preview (effective Writing)
5	https://www.slideshare.net/Punitayadav19/cv-writing-nptelpdf (resume Preparation)

CO-PO MAPPING

COs	PO1	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

PUEC2BS04	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES:

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 valueproblems.
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 partialdifferential 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 – III	APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS	9+3

Classification of PDE - Fourier series solutions of one dimensional wave equation - One dimensional equation of heat conduction - Steadystate 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		Cognitive level
CO1	Understand how to solve the given standard partial differential equations.	Understand
CO2	Solve differential equations using Fourier series analysis which plays a vitalrole in engineering applications	Apply

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 differentialequations by using Z-transform techniques for discrete time systems	Apply

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.

WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:

1	Transforms And Partial Differential Equations : https://nptel.ac.in/courses/111/103/111103021/
2	Transforms And Partial Differential Equations: https://archive.nptel.ac.in/courses/111/107/111107111
3	Transforms And Partial Differential Equations https://archive.nptel.ac.in/courses/111/105/111105123/

CO-PO MAPPING

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

PUCC2BS05	ENGINEERING MATERIALS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1	To make the students to understand the basics of crystallography and its importance in studying materials properties.
2	To understand the electrical properties of materials including free electron theory, applications of quantum.
3	To insist knowledge on physics of semiconductors, determination of charge carriers and device applications.
4	To establish a sound of knowledge on different optical properties of materials, optical displays and applications.
5	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		Cognitive level
CO1	Explain the basics of crystallography and its importance in materials properties	Understand
CO2	Illustrate the electrical properties of Conducting materials and their applications	Understand

CO3	Comprehend the concepts of semiconductor physics and functioning of semiconductor devices	Understand
CO4	Illustrate optical properties of materials and working principles of various optical devices	Understand
CO5	Demonstrate preparation, properties and applications of ceramics, composites and nano-materials	Apply

TEXT BOOKS:	
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.
REFERENCE BOOKS:	
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.
WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:	
1	https://onlinecourses.nptel.ac.in/noc19_cy35/preview - Chemical Crystallography 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 Prof. Inderdeep Singh, IIT Roorke.

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

PUEC2PC01	CIRCUIT ANALYSIS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1	To learn the basic concepts and behaviour of DC and AC circuits.
2	To study various methods of circuit/network analysis using network theoremsand concept of duality.
3	To understand the steady state and transient response of the circuits subjected to DC excitations and AC with sinusoidal excitations
4	To learn the concept of two port networks and network topologies.

UNIT – I	FUNDAMENTALS OF DC CIRCUITS	9

Introduction to DC and AC circuits - Active and passive two terminal elements, Ohms law and its limitations, Kirchhoff's laws, Series and Parallel circuits and its applications, Mesh current and Node voltage methods, Analysis using dependent sources

UNIT – II	NETWORK REDUCTION AND NETWORK THEOREM	9

Ideal sources –equivalent resistor, current division, voltage division,Superposition, Thevenin and Norton Equivalent Circuits, Maximum Power Transfer theorem, Delta-Wye Conversion, Duals, Dual circuits.

UNIT – III	ANALYSIS OF AC CIRCUITS	9

Sinusoidal Steady – State analysis ,The Complex Forcing Function, The Phasor, Phasor relationship for R, L, and C, impedance and Admittance, Phasor Diagrams, AC Circuit Power Analysis, Instantaneous Power, Average Power, Apparent Power and Power Factor, Complex Power

UNIT – IV	UNTRANSIENT RESPONSE AND RESONANCE IN RLC CIRCUITS	9

Basic RL and RC Circuits, Transient response of driven RL, RC and RLC circuits using Laplacetransforms for DC input and AC sinusoidal input. The Unit- Step Function,Single tuned circuits-Frequency Response,Parallel Resonance, Series Resonance, Quality Factor and Bandwidth.

UNIT – V	TWO PORT NETWORKS AND NETWORK TOPOLOGY	9

Two Port network Parameters and its applications , An introduction to Network Topology, Trees andGeneral Nodal analysis, Links and Loop analysis

TOTAL: 45 PERIODS

COURSE OUTCOMES		Cognitive level
CO1	Understand the basic elements in circuits and apply the concepts of circuit analysis such as Kirchoff's laws, mesh current and nodevoltage method for analysis of DC and AC circuits.	Understand
CO2	Apply suitable network theorems to analyze AC and DC circuits	Apply
CO3	Analyze steady state response of any R, L and C circuits	Analyze
CO4	Analyze the transient response for any RC, RL and RLC circuits andfrequency response of single tuned circuits	Analyze
CO5	Analyze the two port networks and network topologies	Analyze

TEXT BOOKS:

1	Hayt Jack Kemmerly, Steven Durbin, "Engineering Circuit Analysis",Mc Graw Hill education,10th edition, 2023
2	Joseph Edminister and Mahmood Nahvi, —Electric Circuits, Schaum's Outline Series, Tata McGraw Hill Publishing Company, New Delhi, Fifth Edition Reprint 2016

REFERENCE BOOKS:

1	Robert.L. Boylestead, "Introductory Circuit Analysis", Pearson Education India, 12th Edition,2014.
2	Allan H.Robbins, Wilhelm C.Miller, "Circuit Analysis Theory and Practice", CengageLearning, Fifth Edition, 1st Indian Reprint 2013

WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:

1	https://archive.nptel.ac.in/courses/Basic Electric Circuits
2	https://archive.nptel.ac.in/courses/Network Analysis

CO-PO MAPPING

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

PUEC2BE01	BASIC ELECTRICAL AND INSTRUMENTATIONENGINEERING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1	To impart knowledge in types, construction and working of transformers
2	To impart knowledge in types, construction and working of DC machines
3	To impart knowledge in types, construction and working of AC rotating machines
4	To introduce the functional elements and working of measuring instruments
5	To introduce the basics of power system and protection schemes

UNIT – I	TRANSFORMER	9

Introduction - Ideal and Practical Transformer – Phasor diagram— Per Unit System – Equivalent circuit- Testing- Efficiency and Voltage Regulation– Three Phase Transformers –Applications- Auto Transformers, Advantages- Harmonics.

UNIT – II	DC MACHINES	9

Introduction – Constructional Features– Motor and Generator mode - EMF and Torque equation – Circuit Model – Methods of Excitation- Characteristics – Starting and Speed Control – UniversalMotor- Stepper Motors – Brushless DC Motors- Applications

UNIT – III	AC ROTATING MACHINES	9

Principle of operation of three-phase induction motors – Construction –Types – Equivalent circuit, Speed Control - Single phase Induction motors -Construction– Types–starting methods.Alternator: Working principle–Equation of induced EMF – Voltage regulation, Synchronous motors- working principle-starting methods – Torque equation

UNIT – IV	MEASUREMENTS AND INSTRUMENTATION	9

Functional elements of an instrument , Standards and calibration, Operating Principle , types -Moving Coil and Moving Iron meters, Measurement of three phase power, Energy Meter, Instrument Transformers-CT and PT,DSO- Block diagram- Data acquisition

UNIT – V	BASICS OF POWER SYSTEMS	9

Power system structure -Generation , Transmission and distribution , Various voltage levels, Earthing – methods of earthing, protective devices- switch fuse unit- Miniature circuit breaker moulded case circuit breaker- earth leakage circuit breaker, safety precautions and FirstAid

TOTAL: 45 PERIODS

COURSE OUTCOMES : At the end of the course students can able to		Cognitive level
CO1	Explain the working principles of electrical machines	Understand
CO2	Analyse the output characteristics of electrical machines	Analyze
CO3	Choose the appropriate electrical machines for various applications	Analyze
CO4	Explain the types and operating principles of measuring instruments	Understand
CO5	Explain the basic power system structure and protection scheme	Understand

TEXT BOOKS:	
1	Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition,McGraw Hill Education, 2020
2	.S. K, Bhattacharya, "Basic Electrical and Electronics Engineering", Second Edition, Pearson Education, 2017
1	Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw HillEducation, 2019
2	A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements&Instrumentation', Dhanpat Rai and Co, New Delhi, 2015
3	H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010
WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:	
1	https://nptel.ac.in/courses/Fundamental of Electrical Engineering
2	https://nptel.ac.in/courses/Basic Electrical Technology

CO-PO MAPPING

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

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

COURSE OBJECTIVES:

1	The objective of this course is to familiarize the students with to know the design of algorithm and efficiency.
2	To understand variables, expressions and statements.
3	To explore flow of data and its executions.
4	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.

UNIT – II	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: 45 PERIODS

COURSE OUTCOMES		Cognitive level
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 Python programs.	Apply
CO5	Infer the Object Oriented Concepts.	Remember

B.E(ECE)

TEXT BOOKS:	
1	Allen B. Downey, "Think Python: How to Think like a Computer Scientist", 2nd Edition, O'Reilly Publishers, 2016.
REFERENCE BOOKS:	
1	Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.
2	G Venkatesh and Madhavan Mukund, "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 / NPTEL/ SWAYAM/ MOOC 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
3	The Joy of Computing using Python, IIT Ropar, Prof. Sudarshan Iyengar NPTEL Courses. https://onlinecourses.nptel.ac.in/nc21_cs32/preview

CO-PO MAPPING

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

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

UNIT – I	WEAVINGAND CERAMIC TECHNOLOGY	3

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

UNIT – II	DESIGNANDCONSTRUCTION TECHNOLOGY	3

Designing and Structural construction House & Designs in household materials during Sangam Age –Building materials and Herostones of Sangam age– Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and otherworship 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	AGRICULTUREAND 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-Conchediving-Ancient Knowledge of Ocean-Knowledge Specific Society.

UNIT – V	SCIENTIFICTAMIL & 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. கணினித் தமிழ் –மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும்
2. முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)

கல்வியியல் பணிகள் கழகம்).

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: Department of Archaeology & Tamil Nadu Text book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author).
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Refernece Book.

B.E(ECE)

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

COURSE OBJECTIVES:

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

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 compares 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: 45 PERIODS

COURSE OUTCOMES		Cognitive level
CO1	Write professional emails	Apply
CO2	Prepare complaint and responding letter	Apply
CO3	Discuss and analyse problems from various perspectives to arrive solutions	Analyze
CO4	Write short articles with precision	Apply
CO5	Create company profile	Apply

TEXT BOOKS:

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

REFERENCE BOOKS:

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.

CO-PO MAPPING

COs	PO1	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

PUEC2PL04	CIRCUIT ANALYSIS LABORATORY	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

1	To gain hands- on experience in Thevenin & Norton theorem, KVL & KCL, andSuperposition Theorems
2	To understand the working of RL,RC and RLC circuits.

LIST OF EXPERIMENTS **30**

a) Verifications of KVL & KCL.

b) Verifications of Thevenin & Norton theorem.

c) Verification of Superposition Theorem.

d) Verification of maximum power transfer Theorem

e) Determination of Resonance Frequency of Series & Parallel RLC Circuits.

f) Transient analysis of RL and RC circuits.

TOTAL: 30 PERIODS

COURSE OUTCOMES		Cognitive level
CO1	Verify Thevenin & Norton theorem KVL & KCL and Super Positions Theorems	Apply
CO2	Design RL and RC Circuits	Apply

TEXT BOOKS:

CO-PO MAPPING

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

PMC TECH

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

COURSE OBJECTIVES:

1	The objective of this course is to familiarize the students with to know the design of algorithm and efficiency.
2	To understand variables, expressions and statements.
3	To explore flow of data and its executions.
4	To study the compound data types.
5	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. Net salary
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

PMC TECH

d. insertion sort

e. quicksort

9. Develop matrix manipulations programs using nested lists.

10. Develop simple programs using dictionaries

1. frequency histogram
2. 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 data types and files

TOTAL: 60 PERIODS

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

TEXT BOOKS:

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

REFERENCE BOOKS:

1	Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.
2	G Venkatesh and Madhavan Mukund, "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 / NPTEL/ SWAYAM/ MOOC 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
3	The Joy of Computing using Python, IIT Ropar, Prof. Sudarshan Iyengar NPTEL Courses. https://onlinecourses.nptel.ac.in/nc21_cs32/preview

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

PMC TECH

PUCC2PL05	CIVIL AND MECHANICAL ENGINEERING PRACTICES LABORATORY	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

1	Drawing pipe line plan; laying and connecting various pipe fittings used in common household plumbing work; Sawing; planning; making joints in wood materials used in common house hold wood work.
2	Welding various joints in steel plates using arc welding work; Machining various simple processes like turning, drilling, tapping in parts
3	Assembling simple mechanical assembly of common household equipment's; Making a tray out of metal sheet using sheet metal work

GROUP – A **CIVIL PRACTICE** **12**

PLUMBING WORK:

a) Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in household.

b) Preparing plumbing line sketches.

c) Laying pipe connection to the suction side of a pump

d) Laying pipe connection to the delivery side of a pump.

e) Connecting pipes of different materials: Metal, plastic and flexible pipes used in house hold appliances.

WOOD WORK:

a) Sawing,

b) Planning and

c) Making joints like T-Joint,

d) Mortise joint

e) Tenon joint and Dovetail joint.

Wood Work Study:

a) Studying joints in door panels and wooden furniture

b) Studying common industrial trusses using models.

GROUP - B **MECHANICAL PRACTICES** **18**

WELDING WORK:

a) Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding.

b) Practicing gas welding.

BASIC MACHINING WORK:

a) Simple Turning.

b) Simple Drilling.

c) Simple Tapping.

d) Simple Grinding

ASSEMBLY WORK:

a) Assembling a centrifugal pump.

b) Assembling a household mixer.

c) Assembling an air conditioner.

PMC TECH

SHEET METAL WORK:

a) Making of a square tray and Rectangle tray

FOUNDRY WORK:

a) Demonstrating basic foundry operations.

(b) Smithy operations, upsetting, swaging, setting down and bending. Example –

(c) Exercise – Production of hexagonal headed bolt.

(d) Fitting – Exercises – Preparation of square fitting and V – fitting models.

TOTAL: 30 PERIODS

COURSE OUTCOMES		**Cognitive level**
CO1	Draw pipe line plan; lay and connect various pipe fittings used in common household Plumbing work.	Apply
CO2	Make joints in wood materials used in common household wood work.	Apply
CO3	Perform various machining operation in a lathe, drilling and Milling.	Apply
CO4	Perform the various welding processes and know about its applications.	Apply
CO5	Demonstrate the various foundry and fitting Exercises and know about its applications.	Apply

TEXT BOOKS:

1	Willis H. Wagner, Howard "Bud" Smith, and Mark W. Huth Modern Carpentry, 12th Edition, 2015
2	P.C.Sharma, Production Technology (Manufacturing Process): Manufacturing Process, S.Chand publisher, 2006
3	Robert W. Messler, Reverse Engineering: Mechanisms, Structures, Systems & Materials, McGraw-Hill Education, 2014
4	K.Jeyachandran, S.Natarajan& S, Balasubramanian, "A Primer on Engineering
5	Practices Laboratory", Anuradha Publications, (2007).
6	Steam Generators and Waste Heat Boilers: For Process and Plant Engineers (Mechanical Engineering) by V. Ganapathy

CO-PO MAPPING

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

B.E(ECE)

PUCC2PL06	ELECTRICAL AND ELECTRONICS ENGINEERING PRACTICES LABORATORY	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

1	To enable the students to understand the behaviour of semiconductor device based on experimentation.
2	Be exposed to active and passive circuit elements.
3	Familiarize the operation and characteristics of transistor like BJT and FET.
4	Explore the characteristics of amplifier gain and frequency response.
5	Learn the required functionality of positive and negative feedback systems.

ELECTRICAL ENGINEERING PRACTICES — **15**

g) Introduction to switches, fuses, indicators and lamps - Basic switch board wiring with lamp, fan and three pin socket
h) Staircase wiring
i) Fluorescent Lamp wiring with introduction to CFL and LED types
j) Energy meter wiring and related calculations/ calibration
k) Measurement of electrical quantities – voltage, current, power &power factor in RLC circuit.
l) Measurement of resistance to earth of electrical equipment
m) Study of Iron Box / Fan Regulator / emergency lamp wiring and assembly

ELECTRONICS ENGINEERING PRACTICES — **15**

a) Study of Electronic components and equipments – Resistor, colour coding measurement of AC signal parameter (peak-peak, rms period, frequency) using CRO.
b) Verification truth table of logic gates AND, OR, NOT and NAND,NOR
c) Generation of Clock Signal.
d) Soldering practice – simple electronic circuits and checking continuity & Assembling and testing electronic components on a small PCB
e) Study elements of smart phone/ LED TV/ computer/ laptop

TOTAL: 30 PERIODS

COURSE OUTCOMES		Cognitive level
CO1	Wire various electrical joints in common house hold electrical works	Apply
CO2	Solder and test simple electronic circuits, Assemble and test simple electronic components on PCB	Apply

TEXT BOOKS:

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	1	1	1	1	1	1	1	1
CO2	3	3	3	3	3	3	3	3	3	3	3	3

SEMESTER III

S.NO.	COURSE CODE	COURSE NAME	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	PUEC3BS06	Probability and Random Processes	BS	3	1	-	4	4
2.	PUEC3PC02	Control systems	PC	3	1	-	4	4
3.	PUEC3PC03	Electronic devices and circuits	PC	3	-	-	3	3
4.	PUEC3TL02	Digital system design	TL	3	-	2	5	4
5.	PUCS3BE01	Data Structures using C	BE	3	-	-	3	3
6.	PUCC3MC01	Mandatory Course – I (Non-Credit)	MC	2	-	-	2	0
PRACTICALS								
7.	PUEC3PL02	Electronic devices and circuits laboratory	PC	-	-	4	4	2
8.	PUCS3PL04	Data Structures using C Laboratory	BE	-	-	4	4	2
9.	PUCC3HM07	Extension Activities	HM	-	-	1	1	0
		TOTAL		17	2	11	30	22

INSPIRE TO INNOVATE

PUEC3BS06	PROBABILITY AND RANDOM PROCESSES	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES:

1	Apply the concepts of probability, random variable and their properties to generate the moments
2	Fit the suitable distribution and its properties to the real world problems and interpret the results
3	Apply the concepts of joint probability distribution and its properties to find the covarianceand transformation of random variables
4	Make a probabilistic model for characterizing a random processes.
5	To understand the concept of correlation and spectral densities

UNIT – I	PROBABILITY AND RANDOM VARIABLE	12

Probability - Axioms of probability - Conditional probability - Baye's theorem - Random variables - One dimensional random variable (Discrete and continuous) - Probability mass function, probability density function, moments, moment generating function

UNIT – II	PROBABILITY DISTRIBUTIONS	12

Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions - Function of one dimensional random variable - Applications

UNIT – III	TWO DIMENSIONAL RANDOM VARIABLES	12

Joint distributions - Marginal and conditional distributions - Covariance - Correlation - Transformation of twodimensional random variables - Central limit theorem (Statement only)

UNIT – IV	RANDOM PROCESSES	12

Classification - Stationary process - wide sense Stationary process and ergodic processes- Markov process -Poisson process

UNIT – V	CORRELATION AND SPECTRAL DENSITIES	12

Auto correlation functions - Cross correlation functions - Properties - Power spectral density - Cross spectraldensity - Properties

TOTAL: 60 PERIODS

COURSE OUTCOMES		Cognitive level
CO1	Understand the fundamental knowledge of the concepts ofprobability.	Understand
CO2	Apply the knowledge of standard distributions which can describereal life phenomenon.	Apply
CO3	Understand the basic concepts of one and two dimensional randomvariables and apply in engineering applications.	Understand

CO4	Apply the concept random processes in engineering disciplines	Apply
CO5	Understand and apply the concept of correlation and spectraldensities.	Understand

TEXT BOOKS:

1	Ibe,O.C.," Fundamentals of Applied Probability and Random Processes ", 2nd Edition,Academic press, 2019
2	Peebles, P.Z., "Probability, Random Variables and Random Signal Principles ", 4th Edition,New Delhi, McGraw Hill Education, 2017

REFERENCE BOOKS:

1	Cooper. G.R., McGillem. C.D., "Probabilistic Methods of Signal and System Analysis",Oxford University Press, New Delhi, 3rd Indian Edition, 2012
2	Yates. R.D. and Goodman. D.J., Probability and Stochastic Processes", Wiley India Pvt. Ltd.,Bangalore, 2nd Edition, 2012
3	T. Veerarajan, "Probability, Statistics and Random Processes with Queueing Theory and Queueing Networks", McGraw Hill Publishers, 4th Edition, 7th Reprint, 2018
4	S. C. Gupta and V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand andSons Publishers, 11th Edition, Reprint, 2019
5	R. A. Johnson and C. B. Gupta, "Miller and Freund's, Probability and Statistics for Engineers", Pearson Publishers, 9th Edition, 2018

WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:

1	Random processes : https://swayam.gov.in/nd1_noc19_ma30/preview
2	Probability theory : https://nptel.ac.in/courses/111102111/
E	Probability Distributions: https://nptel.ac.in/courses/111/104/111104032/
4	Probability and Random Processes: https://www.ee.iitb.ac.in/~bsraj/courses/ee325/

CO-PO MAPPING

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

PUEC3PC02	CONTROL SYSTEMS	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES:

1	To introduce the components and their representation of control systems
2	To learn various methods for analyzing the time response, frequency response and stability of the systems
3	To learn the various approach for the state variable analysis

Unit-I	SYSTEMS COMPONENTS AND THEIR REPRESENTATION	12

Control System: Terminology and Basic Structure-Feed forward and Feedback control theory Electrical and Mechanical Transfer Function Models-Block diagram Models-Signal flow graphs models-DC and AC servoSystems-Synchronous - Multivariable control system

Unit-II	TIME RESPONSE ANALYSIS	12

Transient response-steady state response-Measures of performance of the standard first order and second order system-effect on an additional zero and an additional pole-steady error constant and system- type number-PID control-Analytical design for PD, PI,PID control systems

Unit-III	FREQUENCY RESPONSE AND SYSTEM ANALYSIS	12

Closed loop frequency response-Performance specification in frequency domain-Frequency responseof standard second order system- Bode Plot - Polar Plot- Nyquist plots-Design of compensators usingBode plots-Cascade lead compensation-Cascade lag compensation-Cascade lag-lead compensation

UNIT-IV	CONCEPTS OF STABILITY ANALYSIS	12

Concept of stability-Bounded - Input Bounded - Output stability-Routh stability criterion-Relative stability-Root locus concept-Guidelines for sketching root locus-Nyquist stability criterion

UNIT-V	CONTROL SYSTEM ANALYSIS USING STATE VARIABLE METHODS	12

State variable representation-Conversion of state variable models to transfer functions-Conversion of transfer functions to state variable models-Solution of state equations-Concepts of Controllability and Observability-Stability of linear systems-Equivalence between transfer function and state variable representations-State variable analysis of digital control system-Digital control design using state feedback.

TOTAL: 60 PERIODS

COURSE OUTCOMES		Cognitive Level
CO1	Compute the transfer function of different physical systems.	Understand
CO2	Analyze the time domain specification and calculate the steady stateerror	Analyze
CO3	Illustrate the frequency response characteristics of open loop andclosed loop system response	Apply

B.E(ECE)

CO4	Analyze the stability using Routh and root locus techniques	Apply
CO5	Illustrate the state space model of a physical system and discuss the concepts of sampled data control system.	Apply

TEXT BOOKS:

1	J.Nagrath and M.Gopal, "Control System Engineering", New Age InternationalPublishers, 7th Edition, 2022

REFERENCE BOOKS:

1	K.Ogata, "Modern Control Engineering", PHI, 7th Edition, 2020.
2	S.K.Bhattacharya, "Control System Engineering", Pearson,5th Edition, 2018
3	Benjamin.C.Kuo, "Automatic Control Systems", Prentice Hall of India,11th Edition, 2015

WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:

1	NPTEL: Control Systems: https://onlinecourses.nptel.ac.in/noc20_ee90, Prof. C. S. Shankar Ram,IIT Madras

CO-PO MAPPING

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

PUEC3PC03	ELECTRONIC DEVICES AND CIRCUITS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1	To give a comprehensive exposure to all types of devices and circuits constructed with discrete components
2	To develop a strong basis for building linear and digital integrated circuits and to analyze thefrequency response of small signal amplifiers
3	Design and analyze single stage and multistage amplifier circuits
4	To study about feedback amplifiers and oscillators principles as well as to understand the analysisand design of multi vibrators

UNIT – I	SEMICONDUCTOR DEVICES	9

PN junction diode, Zener diode, BJT, JFET, MOSFET, UJT –structure, operation and V-I characteristics,diffusion and transition capacitance - Rectifiers – Half Wave and Full Wave Rectifier, Zener as regulator

UNIT – II	AMPLIFIERS	9

Load line, operating point, biasing methods for BJT and MOSFET, BJT small signal model – Analysis of CE, CB, CC amplifiers- Gain and frequency response –MOSFET small signal model– Analysis of CS, CG andSource follower – Gain and frequency response- High frequency analysis.

UNIT – III	MULTISTAGE AMPLIFIERS AND DIFFERENTIAL AMPLIFIER	9

Cascode amplifier, Differential amplifier – Common mode and Difference mode analysis – MOSFET inputstages – tuned amplifiers – Gain and frequency response – Neutralization methods

UNIT – IV	FEEDBACK AMPLIFIERS AND OSCILLATORS	9

Advantages of negative feedback – Voltage / Current, Series , Shunt feedback Amplifiers – positive feedback–Condition for oscillations, phase shift – Wien bridge, Hartley, Colpitts and Crystal oscillators

UNIT – V	POWER AMPLIFIERS AND DC/DC CONVERTERS	9

Power amplifiers- class A-Class B-Class AB-Class C-Power MOSFET-Temperature Effect- Class AB Poweramplifier using MOSFET –DC/DC convertors – Buck, Boost, Buck-Boost analysis and design

TOTAL: 60 PERIODS

COURSE OUTCOMES		Cognitive Level
CO1	Explain the structure and working operation of basic electronic devices	Understand
CO2	Design and analyze amplifiers	Analyse
CO3	Analyze frequency response of BJT and MOSFET amplifiers	Analyse
CO4	Design and analyze feedback amplifiers and oscillator principles	Analyse

B.E(ECE)

CO5	Design and analyze power amplifiers and supply circuits	Analyse

TEXT BOOKS:

1	S Salivaganan & N Suresh kumar, "Electronic Devices and Circuits", McGraw Hill,5th Edition, 2022

REFERENCE BOOKS:

1	Donald.A. Neamen, "Microelectronics: Circuit Analysis and Design", McGraw Hill, 4th Edition, 2021
2	Dale R. Patrick, Stephen W. Fardo, Electronic Devices and Circuit Fundamentals,River Publishers, 1st edition, 2023
3	Mitchel Schultz, "Grob`s Basic Electronics", McGraw Hill,13th Edition, 2021

WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:

1	NPTEL: Semiconductor Devices and Circuits: https://onlinecourses.nptel.ac.in/noc21_ee80/-Prof. Sanjiv Sambandan, IISc Bangalore

CO-PO MAPPING

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

PUEC3TL02	DIGITAL SYSTEMS DESIGN	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

1	To present the fundamentals of digital circuits and simplification methods
2	To practice the design of various combinational digital circuits using logic gates
3	To bring out the analysis and design procedures for synchronous and asynchronous Sequentialcircuits
4	To learn integrated circuit families
5	To introduce semiconductor memories and related technology

Unit-I	BASIC CONCEPTS	9

Review of number systems-representation-conversions, Review of Boolean algebra- theorems, sum of product and product of sum simplification, canonical forms min term and max term, Simplification of Boolean expressions- Karnaugh map, completely and incompletely specified functions, Implementation of Boolean expressions using universal gates ,Tabulation methods.

Unit-II	COMBINATIONAL LOGIC CIRCUITS	9

Problem formulation and design of combinational circuits - Code-Converters, Half and Full Adders, Binary Parallel Adder – Carry look ahead Adder, BCD Adder, Magnitude Comparator, Decoder, Encoder, Priority Encoder, Mux/Demux, Case study: Digital trans-receiver / 8 bit Arithmetic and logic unit, Parity Generator/Checker, Seven Segment display decoder.

Unit-III	SYNCHRONOUS SEQUENTIAL CIRCUITS	9

Latches, Flip flops – SR, JK, T, D, Master/Slave FF, Triggering of FF, Analysis and design of clocked sequential circuits – Design - Moore/Mealy models, state minimization, state assignment, lock - out condition circuit implementation - Counters, Ripple Counters, Ring Counters, Shift registers, Universal Shift Register. Model Development: Designing of rolling display/real time clock.

UNIT-IV	ASYNCHRONOUS SEQUENTIAL CIRCUITS	9

Stable and Unstable states, output specifications, cycles and races, state reduction, race free assignments, Hazards, Essential Hazards, Fundamental and Pulse mode sequential circuits, Design of Hazard free circuits.

UNIT-V	LOGIC FAMILIES AND PROGRAMMABLE LOGIC DEVICES	9

Logic families- Propagation Delay, Fan - In and Fan - Out - Noise Margin - RTL ,TTL,ECL, CMOS - Comparison of Logic families - Implementation of combinational logic/sequential logic design using standard ICs, PROM, PLA and PAL, basic memory, static ROM,PROM,EPROM,EEPROM,EAPROM.

TOTAL: 45 PERIODS

30 HOURS

PRACTICAL EXERCISES

1. Design of adders and subtractors & Code converters
2. Design of multiplexers & Demultiplexers
3. Design of encoders & Decoders
4. Design of magnitude Comparators
5. Design and implementation of counters using flip-flops
6. Design and implementation of shift registers

	COURSE OUTCOMES	Cognitive Level
CO1	Use Boolean algebra and simplification procedures relevant to digital logic.	Apply
CO2	Design various combinational digital circuits using logic gates.	Analyze
CO3	Analyze and design synchronous sequential circuits.	Analyze
CO4	Analyze and design asynchronous sequential circuits.	Analyze
CO5	Build logic gates and use programmable devices	Analyze

TEXT BOOKS:

1	M. Morris Mano and Michael D. Ciletti, 'Digital Design', Pearson, 6th Edition, 2018.

REFERENCE BOOKS:

1	Charles H. Roth, Jr, 'Fundamentals of Logic Design', Jaico Books, 7th Edition, 2020.
2	William I. Fletcher, "An Engineering Approach to Digital Design", Prentice- Hall of India, 10th Edition 2018
3	Floyd T.L., "Digital Fundamentals", Charles E. Merril publishing company,12th Edition-2018.
4	John. F. Wakerly, "Digital Design Principles and Practices", Pearson Education, 5th Edition, 2021

WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:

1	NPTEL: Digital System Design: https://onlinecourses.nptel.ac.in/noc21_ee39, Prof. Neeraj Goel, IIT Ropar

CO-PO MAPPING

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

PUCS3BE01	DATA STRUCTURES USING C	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1	To introduce the basics of C programming language
2	To learn the concepts of advanced features of C
3	To understand the concepts of ADTs and linear data structures
4	To know the concepts of non-linear data structure and hashing
5	To familiarize the concepts of sorting and searching techniques

Unit-I	C PROGRAMMING FUNDAMENTALS	9

Data Types – Variables – Operations – Expressions and Statements – Conditional Statements – Functions – Recursive Functions – Arrays – Single and Multi-Dimensional Arrays.

Unit-II	C PROGRAMMING - ADVANCED FEATURES	9

Structures – Union – Enumerated Data Types – Pointers: Pointers to Variables, Arrays and Functions – File Handling – Preprocessor Directives.

Unit-III	LINEAR DATA STRUCTURES	9

Abstract Data Types (ADTs) – List ADT – Array-Based Implementation – Linked List – DoublyLinked Lists – Circular Linked List – Stack ADT – Implementation of Stack – Applications – Queue ADT – Priority Queues – Queue Implementation – Applications

Unit-IV	NON-LINEAR DATA STRUCTURES	9

Trees – Binary Trees – Tree Traversals – Expression Trees – Binary Search Tree – Hashing - Hash Functions –Separate Chaining – Open Addressing – Linear Probing– Quadratic Probing – Double Hashing – Rehashing.

Unit-V	SORTING AND SEARCHING TECHNIQUES	9

Insertion Sort – Quick Sort – Heap Sort – Merge Sort –Linear Search – Binary Search.

TOTAL: 45 PERIODS

COURSE OUTCOMES		Cognitive Level
CO1	Develop C Program for any real world/technical application	Apply
CO2	Apply advanced features of C in solving problems	Apply
CO3	Write functions to implement linear and non-linear data structure operations	Remember

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CO4	Suggest and use appropriate linear/non-linear data structure operations for solving a given problem	Apply
CO5	Appropriately use sort and search algorithms for a given application	Apply

TEXT BOOKS:

1	Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition,Pearson Education, 2014
2	Reema Thareja, "Programming in C", Third Edition, Oxford University Press, 2023.

REFERENCE BOOKS:

1	Paul J. Deitel, Harvey Deitel, "C How to Program", Ninth Edition, Pearson Education, 2021
2	Narasimha Karumanchi, "Data Structures and Algorithms Made Easy", Careermonk publishers, 2017
3	Ellis Horowitz, SartajSahni and Susan Anderson, "Fundamentals of Data Structures", Galgotia, 2018

WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:

1	**NPTEL: INTRODUCTION TO DATA STRUCTURES AND ALGORITHMS,** https://nptel.ac.in/courses/106102064, Prof Naveen Garg, IIT Madras

CO-PO MAPPING

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

PUEC3PL02	ELECTRONIC DEVICES AND CIRCUITS LAB	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

1	To learn the characteristics of PN Junction diode and Zener diode
2	To understand the operation of rectifiers and filters
3	To study the characteristics of amplifier

LIST OF EXPERIMENTS

1. Characteristics of PN Junction Diode and Zener diode.
2. Full Wave Rectifier with Filters.
3. Design of Zener diode Regulator.
4. Common Emitter input-output Characteristics.
5. MOSFET Drain current and Transfer Characteristics.
6. Frequency response of CE and CS amplifiers.
7. Frequency response of CB and CC amplifiers.
8. Frequency response of Cascode Amplifier
9. CMRR measurement of Differential Amplifier
10. Class A Transformer Coupled Power Amplifier

TOTAL: 60 PERIODS

COURSE OUTCOMES		Cognitive Level
CO1	Characteristics of PN Junction Diode and Zener diode.	Understand
CO2	Design and Testing of BJT and MOSFET amplifiers.	Apply
CO3	Operation of power amplifiers.	Understand

CO-PO MAPPING

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

PUCS3PL01	DATA STRUCTURES USING C LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

1	To develop applications in C
2	To implement linear and non-linear data structures
3	To understand the different operations of search trees
4	To get familiarized to sorting and searching algorithms

LIST OF EXPERIMENTS

1. Practice of C programming using statements, expressions, decision making and iterative statements
2. Practice of C programming using Functions and Arrays
3. Implement C programs using Pointers and Structures
4. Implement C programs using Files
5. Development of real time C applications
6. Array implementation of List ADT
7. Array implementation of Stack and Queue ADTs
8. Linked list implementation of List, Stack and Queue ADTs
9. Applications of List, Stack and Queue ADTs
10. Implementation of Binary Trees and operations of Binary Trees
11. Implementation of Binary Search Trees
12. Implementation of searching techniques
13. Implementation of Sorting algorithms : Insertion Sort, Quick Sort, Merge Sort
14. Implementation of Hashing – any two collision techniques

TOTAL: 60 PERIODS

COURSE OUTCOMES		**Cognitive Level**
CO1	Use different constructs of C and develop applications	Apply
CO2	Write functions to implement linear and non-linear data structure operations	Apply
CO3	Suggest and use the appropriate linear / non-linear data structure operations for a given problem	Apply
CO4	Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval	Apply
CO5	Implement Sorting and searching algorithms for a given application	Apply

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

PMC TECH

PUCC3MC01	MANDATORY COURSES-1	L	T	P	C
	WOMEN AND GENDER STUDIES	3	0	0	0

COURSE OBJECTIVES:

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, Binarism, 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, Post modernist, 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		Cognitive level
CO1	Define and Evaluate gender as a social construct.	Understand
CO2	Identify the ways gender, power, privilege, and oppression play out across a range of cultures and human experiences.	Understand
CO3	Demonstrate an understanding of gender as it intersects with sexuality, race, ethnicity, religion, class and other critical variables.	Understand
CO4	Analyze human interactions and social/political systems using a "gender lens".	Apply
CO5	Conduct scholarly research on key gender issues and/or debates in the present modern era.	Apply

TEXT BOOKS:	
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
REFERENCE BOOKS:	
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
WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:	
1	https://en.wikipedia.org/wiki/Gender_studies
2	https://www.wellesley.edu/departments-programs/department/womens-and-gender-studies
3	https://nptel.ac.in/courses/109103122
4	https://www.youtube.com/watch?v=lI8pyUSg4ns&list=PL2QYOrBMOd7-Jw6OA78pfp4B0oIDhsqwF
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

PUCC3MC02	MANDATORY COURSES-1	L	T	P	C
	ELEMENTS OF LITERATURE	**3**	**0**	**0**	**0**

COURSE OBJECTIVES:

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: At the end of the course, the students will be able:		**Cognitive level**
CO1	Analyze the various elements of poetry and develop their critical thinking skills.	Apply
CO2	Comprehend Complex academic texts for narrating experience and events.	Understand
CO3	To understand the nature of the dramatic genres including comedy, romance, tragedy, and history.	Understand
CO4	To analyze the texts and understand the modernist techniques in the narratives & to develop critical thinking and close reading of texts.	Apply
CO5	Critically view literary artifacts & apply high seriousness as guiding principles in appreciating literature.	Apply

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71

TEXT BOOKS:	
1	Nozar Niazi & Rama Gautam, How to Study Literature: Stylistic and Pragmatic Approaches, Prentice Hall of India; 1st edition, 2010, ISBN – 10: 8120340612
2	Mahdi Javid shad, Amirhossein Nemati, An Outline of The Norton Anthology of English Literature, Arb Publications, 2024, ISBN-10: 9382527559
REFERENCE BOOKS:	
1	David Green, The Winged World, Macmillan Education, 2016, ISBN-10: 9352521005
2	Patricia Waugh, Literary Theory and Criticism, Oxford University Press, 2006.
3	George. K. M., Modern Indian Literature – An Anthology, Sahitya Akademi, 1994, ISBN: 8172017839
4	X. J. Kennedy, Dana Gioia, Literature: An Introduction to Fiction, Poetry, Drama, and Writing, Pearson; 13th edition, 2015, ISBN – 10: 0321971663
5	About Edgar V. Roberts, Literature: An Introduction to Reading and Writing, Pearson; 6th edition, 2014, ISBN – 10: 032194478X
WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:	
1	https://www.britannica.com/art/literature
2	https://www.worldhistory.org/literature/
3	https://www.ereadingworksheets.com/e-reading-worksheets/all-reading-worksheets-list/
4	https://www.readingandwritinghaven.com/10-of-the-best-literary-analysis-activities-to-elevate-thinking
5	https://onlinecourses.nptel.ac.in/noc22_hs01/preview
6	https://archive.nptel.ac.in/courses/109/106/109106124/
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

PUCC3MC03	MANDATORY COURSES-1	L	T	P	C
	FILM APPRECIATION	3	0	0	0

COURSE OBJECTIVES:

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: At the end of the course, the students will be able		**Cognitive level**
CO1	Analyze the various Components of Films and develop their critical thinking skills.	Apply
CO2	To understand the evolutionary levels of Films and analyze its linguistic nature.	Understand
CO3	To understand the nature of the Film genres including comedy, romance, tragedy, and history and appreciate it as criticism.	Understand
CO4	To analyse the history of films at universal level.	Apply
CO5	To Understand the native film techniques and appreciate it.	Understand

TEXT BOOKS:

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

REFERENCE BOOKS:	
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	Penda Kur, 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.
WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:	
1	https://onlinecourses.nptel.ac.in/noc21_hs17/preview - Introduction to film studies
2	https://onlinecourses.nptel.ac.in/noc24_ge56/preview - Thin Film Technology
3	https://testbook.com/objective-questions/mcq-on-cinema--626bb8c22de86486d8920d08 - Cinema MCQ
4	https://www.videomaker.com/how-to/directing/film-history/an-introduction-to-film-studies/ - An introduction to film studies
5	https://www.youtube.com/watch?v=g3qFVVjzQFA – What is film studies
6	https://www.filmconnection.com/reference-library/how-the-internet-has-changed-movies-and-the-movie-business/ - Film Connection
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

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PUCC3MC04	MANDATORY COURSES-1	L	T	P	C
	THE CONSTITUTION OF INDIA	3	0	0	0

COURSE OBJECTIVES:

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 constitutional institutions.

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 Elected Representative – 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 Service Public Commission – Planning Commission (NITI).

TOTAL: 45 PERIODS

COURSE OUTCOMES At the end of the course, the students will be able		Cognitive level
CO1	Describe historical background of the constitution making and its importance for building a democratic India.	Apply
CO2	Explain the functioning of three wings of the Union government i.e., executive, legislative and judiciary.	Understand
CO3	Explain the functions of State Government and the Union Territories and compare with the Union.	Understand
CO4	Analyse the decentralization of power between central, state and local self-government.	Apply

CO5	Apply the knowledge in strengthening of the constitutional institutions like CAG, NITI Election Commission and USPC for sustaining democracy.	Apply

TEXT BOOKS:	
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
REFERENCE BOOKS:	
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
WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:	
1	https://onlinecourses.nptel.ac.in/noc24_lw05/preview - Constitution Law and Public Administration in India
2	https://archive.nptel.ac.in/courses/129/106/129106003/ - Constitution Studies
3	https://cdnbbsr.s3waas.gov.in/s380537a945c7aaa788ccfcdf1b99b5d8f/uploads/2023/05/2023050195.pdf - National Informatics Centre
4	https://books.google.co.in/books?hl=en&lr=&id=d0knDAAAQBAJ&oi=fnd&pg=PP1&dq=online+material+on+the+constitution+of+india&ots=NCBHUYUqJn&sig=gKBTjU0Wua3EBaYI3GUn9CarZXQ#v=onepage&q=online%20material%20on%20the%20constitution%20of%20india&f=false
5	https://en.bharatpedia.org/wiki/Constitution_of_India
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

SEMESTER IV

S. NO.	COURSE CODE	COURSE NAME	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	PUCC4BS07	Environmental Sciences & Sustainability	BS	3	-	-	3	3
2.	PUEC4PC04	Signals and Systems	PC	3	1	-	4	4
3.	PUEC4PC05	Linear Integrated Circuits	PC	3	-	-	3	3
4.	PUEC4PC06	Communication Systems	PC	3	-	-	3	3
5.	PUEC4PC07	Electromagnetic Fields	PC	3	-	-	3	3
6.	PUCC4MC02	Mandatory Course – II (Non-Credit)	MC	2	-	-	2	0
PRACTICAL								
7.	PUEC4PL03	Linear Integrated Circuits Laboratory	PC	-	-	4	4	2
8.	PUEC4PL04	Communication Systems Laboratory	PC	-	-	4	4	2
9.	PUCC4HM08	Extension Activities	HM	-	-	1	1	0
10	PUEC4IP01	In-plant Training/Internship	SD	-	-	-	-	-
TOTAL				17	1	9	27	20

- In-plant-Training – 2 Weeks of training each during 4th/5th/6th Semester – During college hours or semester vacation. Total 4 weeks of Training – 2 Credits

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

COURSE OBJECTIVES:

1	To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on the biodiversity of India and its conservation
2	To impart knowledge on the causes, effects and control or prevention measures of environmental pollution and natural disasters.
3	To facilitate the understanding of global and Indian scenario of renewable and non-renewable resources, causes of their degradation and measures to preserve them.
4	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.
5	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 AND BIODIVERSITY	9

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

UNIT – II	ENVIRONMENTAL POLLUTION	9

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

UNIT – III	RENEWABLE SOURCES OF ENERGY	9

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

UNIT – IV	SUSTAINABILITY 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 Climate change- Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry-A case study

UNIT – V	SUSTAINABILITY PRACTICES	9

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

TOTAL: 45 PERIODS

COURSE OUTCOMES		Cognitive Level
CO1	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
CO4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.	Understand
CO5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	Understand

TEXT BOOKS:

1	Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6th Edition, New Age International Publishers, 2018.
2	Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016..

REFERENCE BOOKS:

1	Gilbert M. Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.
2	Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.
3	Bradley. A.S; Adebayo, A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning.

WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:

1	Energy Flow in the Ecosystem: Get Details - Embibe – Energy flow in Ecosystem
2	Biodiversity Conservation - Different Methods And Strategies (byjus.com) – Conservation of biodiversity
3	Air Pollution: Types, Causes, Effects and Control Measures - Embibe – Air pollution
4	Complex Ecosystem Dynamics - Course (swayam2.ac.in) - Complex Ecosystem Dynamics

CO-PO MAPPING

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

PUEC4PC04	SIGNALS AND SYSTEMS	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES:

1	To understand the basic properties of signal & systems
2	To know the methods of characterization of LTI systems in time domain
3	To analyze continuous time signals and system in the Fourier and Laplace domain
4	To analyze discrete time signals and system in the Fourier and Z transform domain

Unit-I	CLASSIFICATION OF SIGNALS AND SYSTEMS	12

Standard signals- Step, Ramp, Pulse, Impulse, Real and complex exponentials and Sinusoids Classification of signals – Continuous time (CT) and Discrete Time (DT) signals, Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals - Classification of systems- CT systems and DT systems- – Linear & Nonlinear, Time-variant& Time-invariant, Causal & Non-causal, Stable & Unstable.

Unit-II	ANALYSIS OF CONTINUOUS TIME SIGNALS	12

Fourier series for periodic signals - Fourier Transform – properties- Laplace Transforms and Properties

Unit-III	LINEAR TIME INVARIANT CONTINUOUS TIME SYSTEMS	12

Impulse response - convolution integrals- Differential Equation- Fourier and Laplace transforms in Analysisof CT systems - Systems connected in series / parallel.

UNIT-IV	ANALYSIS OF DISCRETE TIME SIGNALS	12

Baseband signal Sampling–Fourier Transform of discrete time signals (DTFT)– Properties of DTFT - Z Transform & Properties

UNIT-V	LINEAR TIME INVARIANT-DISCRETE TIME SYSTEMS	12

Impulse response–Difference equations-Convolution sum- Discrete Fourier Transform and Z TransformAnalysis of Recursive & Non-Recursive systems-DT systems connected in series and parallel

TOTAL: 60 PERIODS

COURSE OUTCOMES		Cognitive Level
CO1	Determine if a given system is linear/causal/stable	Apply
CO2	Determine the frequency components present in a deterministic signal	Apply
CO3	Characterize continuous LTI systems in the time domain and frequency domain	Analaze
CO4	Characterize discrete LTI systems in the time domain and frequency domain	Apply
CO5	Analyze speial function ICs compute the output of an LTI system in the time and frequency domain	Analaze

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TEXT BOOKS:	
1	Oppenheim, Willsky and Hamid, "Signals and Systems", 2nd Edition, Pearson Education, New Delhi,2015
2	Simon Haykin, Barry Van Veen, "Signals and Systems", 2nd Edition, Wiley, 2021
REFERENCE BOOKS	
1	B. P. Lathi, "Principles of Linear Systems and Signals", 3rd Edition, Oxford, 2017
2	M. J. Roberts, "Signals and Systems Analysis using Transform methods and MATLAB", McGraw-Hill Education, 2018
3	John Alan Stuller, "An Introduction to Signals and Systems", Thomson, 2015
WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:	
1	**NPTEL**: Signals and Systems, https://onlinecourses.nptel.ac.in/noc21_ee28/preview,Prof Kushal K Shah, IISER Bhobal
2	**NPTEL**: Principles of Signals & Systems, https://onlinecourses.nptel.ac.in/noc20_ee15/preview,Prof Aditya K Jagannatham IIT Kanpur

CO-PO MAPPING

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

PUEC4PC05	LINEAR INTEGRATED CIRCUITS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1	To introduce the basic building blocks of linear integrated circuits
2	To learn the linear and non-linear applications of operational amplifiers
3	To introduce the theory and applications of analog multipliers and PLL
4	To learn the theory of ADC and DAC
5	To introduce the concepts of waveform generation and introduce some special function ICs

Unit-I	BASICS OF OPERATIONAL AMPLIFIERS	9

Current mirror and current sources, Current sources as active loads, Voltage sources, Voltage References, BJT Differential amplifier with active loads, Basic information about op-amps – Ideal Operational Amplifier - General operational amplifier stages -and internal circuit diagrams of IC 741, DC and AC performance characteristics, slew rate, Open and closed loop configurations – MOSFET Operational Amplifiers – LF155 and TL082.

Unit-II	APPLICATIONS OF OPERATIONAL AMPLIFIERS	9

Sign Changer, Scale Changer, Phase Shift Circuits, Voltage Follower, V-to-I and I-to-V converters, adder, subtractor, Instrumentation amplifier, Integrator, Differentiator, Logarithmic amplifier, Antilogarithmic amplifier, Comparators, Schmitt trigger, Precision rectifier, peak detector, clipper and clamper, Low-pass, high-pass and band-pass Butterworth filters

Unit-III	ANALOG MULTIPLIER AND PLL	9

Analog Multiplier using Emitter Coupled Transistor Pair - Gilbert Multiplier cell – Variable trans conductance technique, analogmultiplier ICs and their applications, Operation of the basic PLL, Closed loop analysis, Voltage controlled oscillator, MonolithicPLL IC 565, application of PLL for AM detection, FM detection, FSK modulation and demodulation and Frequency synthesizing and clock synchronization

UNIT-IV	ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS	9

Analog and Digital Data Conversions, D/A converter – specifications - weighted resistor type, R-2R Ladder type, Voltage Modeand Current-Mode R - 2R Ladder types - switches for D/A converters, high speed sample-and-hold circuits, A/D Converters – specifications - Flash type - Successive Approximation type - Single Slope type – Dual Slope type - A/D Converter using Voltage-to-Time Conversion - Over-sampling A/D Converters, Sigma – Delta converters

UNIT-V	WAVEFORM GENERATORS AND SPECIAL FUNCTION ICS	9

Sine-wave generators, Multi-vibrators and Triangular wave generator, Saw-tooth wave generator, ICL8038 function generator, Timer IC 555, IC Voltage regulators – Three terminal fixed and adjustable voltage regulators - IC 723 general purpose regulator - Monolithic switching regulator, Low Drop – Out(LDO) Regulators - Switched capacitor filter IC MF10, Frequency to Voltage and Voltage to Frequency converters, Audio Power amplifier, Video Amplifier, Isolation Amplifier, Optocouplers and fibre optic IC

TOTAL: 45 PERIODS

COURSE OUTCOMES		Cognitive Level
CO1	Design linear and nonlinear applications of OP – AMPS	Apply
CO2	Design applications using analog multiplier and PLL	Analyze
CO3	Design ADC and DAC using OP – AMPS	Apply
CO4	Generate waveforms using OP – AMP Circuits	Apply
CO5	Analyze special function ICs	Analyze

TEXT BOOKS:

1	D.Roy Choudhry, Shail Jain, "Linear Integrated Circuits", New Age International Pvt. Ltd., 2018,Fifth Edition
2	Sergio Franco, "Design with Operational Amplifiers and Analog Integrated Circuits",4th Edition, Tata Mc Graw-Hill, 2016

REFERENCE BOOKS:

1	Ramakant A. Gayakwad, "OP-AMP and Linear ICs", 4th Edition, Prentice Hall / Pearson Education, 2015
2	Robert F.Coughlin, Frederick F.Driscoll, "Operational Amplifiers and Linear Integrated Circuits",Sixth Edition, PHI, 2021
3	S.Salivahanan & V.S. Kanchana Bhaskaran, "Linear Integrated Circuits", TMH,2nd Edition,4th Reprint, 2016

WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:

1	NPTEL: Integrated Circuits and Applications, https://onlinecourses.nptel.ac.in/noc24_ee73/preview ,Prof Shaik Rafi Ahamed, IIT Gowahati

CO-PO MAPPING

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

PUEC4PC06	COMMUNICATION SYSTEMS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1	To introduce Analog Modulation Schemes
2	To impart knowledge in random process and importance of sampling & quantization
3	To study various Digital techniques
4	To impart knowledge in digital modulation schemes
5	To impart knowledge in demodulation techniques

Unit-I	ANALOG MODULATION	9

Review of signals and systems, Time and Frequency domain representation of signals, Principles of Amplitude Modulation Systems- DSB, SSB and VSB modulations. Angle Modulation, Representation of FM and PM signals, Spectral characteristics of angle modulated signals. SSB Generation – Filter and Phase Shift Methods,

VSB Generation – Filter Method, Hilbert Transform, Pre-envelope & complex envelope AM techniques, Superheterodyne Receiver

Unit-II	RANDOM PROCESS & SAMPLING	9

Review of probability and random process. Gaussian and white noise characteristics, Noise in amplitude modulation systems, Noise in Frequency modulation systems. Pre-emphasis and De-emphasis, Threshold effectin angle modulation. Low pass sampling – Aliasing- Signal Reconstruction-Quantization - Uniform & non- uniform quantization - quantization noise - Nyquist criterion- Logarithmic Companding –PAM, PPM, PWM, PCM – TDM, FDM

Unit-III	DIGITAL TECHNIQUES	9

Pulse modulation Differential pulse code modulation. Delta modulation, Noise considerations in PCM,, Digital Multiplexers, Channel coding theorem - Linear Block codes - Hamming codes - Cyclic codes - Convolutional codes- Viterbi Decoder

Unit-IV	DIGITAL MODULATION SCHEME	9

Geometric Representation of signals - Generation, detection, IQ representation, PSD & BER of Coherent BPSK,BFSK, & QPSK - QAM - Carrier Synchronization - Structure of Non-coherent Receivers Synchronization and Carrier Recovery for Digital modulation, Spectrum Analysis – Occupied bandwidth – Adjacent channel power,EVM, Principle of DPSK

Unit - V	DEMODULATION TECHNIQUES	9

Elements of Detection Theory, Optimum detection of signals in noise, Coherent communication with waveforms- Probability of Error evaluations. Baseband Pulse Transmission- Eye pattern, Inter symbol Interference, Optimum demodulation of digital signals over band-limited channels.

TOTAL: 45`` PERIODS

COURSE OUTCOMES		Cognitive Level
CO1	Gain knowledge in amplitude modulation techniques	Understand

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84

CO2	Understand the concepts of Random Process to the design of communicationsystems	Understand
CO3	Gain knowledge in digital techniques.	Understand
CO4	Gain knowledge in digital modulation schemes.	Understand
CO5	Understand the importance of demodulation techniques.	Understand

TEXT BOOKS:

1	Simon Haykins," Communication Systems", Wiley, 5th Edition, 2017
2	B.P.Lathi, "Modern Digital and Analog Communication Systems", 4th Edition, Oxford University Press, 2017.

REFERENCE BOOKS:

1	G Kennedy, Electronic Communication System, 6th Edition, Mcgraw Hill Education (India) Pvt. Ltd,2018.
2	D.Roody, J.Coolen, Electronic Communications, 5th edition PHI 2016.
3	A.Papoulis, "Probability, Random variables and Stochastic Processes", McGraw Hill, 4th edition, 2017.
4	B.Sklar, "Digital Communications Fundamentals and Applications", 3rd Edition Pearson Education, 2020
5	H P Hsu, Schaum Outline Series - "Analog and Digital Communications" TMH, 2nd Edition, 2016.

WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:

1	NPTEL: Principles of Communication Systems, https://archive.nptel.ac.in/courses/108/104/10810409,Prof Aditya K Jagannatham, IIT Kanpur

CO-PO MAPPING

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

PUEC4PC07	ELECTROMAGNETIC FIELDS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1	To impart knowledge on the basics of static electric field and the associated laws.
2	To impart knowledge on the basics of static magnetic field and the associated laws.
3	To give insight into coupling between electric and magnetic fields through Faraday's law, displacementcurrent and Maxwell's equations.
4	To gain the behavior of the propagation of EM waves.
5	To study the significance of Time varying fields.

Unit-I	INTRODUCTION	9

Electromagnetic model, Units and constants, Review of vector algebra, Rectangular, cylindrical and spherical coordinate systems, Line, surface and volume integrals, Gradient of a scalar field, Divergence of a vector field, Divergence theorem, Curl of a vector field, Stoke's theorem, Null identities, Helmholtz's theorem, Verify theorems for different path, surface and volume.

Unit-II	ELECTROSTATICS	9

Electric field, Coulomb's law, Gauss's law and applications, Electric potential, Conductors in static electric field, Dielectrics in static electric field, Electric flux density and dielectric constant, Boundary conditions, Electrostatics boundary value problems, Capacitance, Parallel, cylindrical and spherical capacitors, Electrostaticenergy, Poisson's and Laplace's equations, Uniqueness of electrostatic solutions, Current density and Ohm's law,
Electromotive force and Kirchhoff's voltage law, Equation of continuity and Kirchhoff's current law

Unit-III	MAGNETOSTATICS	9

Lorentz force equation, Ampere's law, Vector magnetic potential, Biot-Savart law and applications, Magnetic field intensity and idea of relative permeability, Calculation of magnetic field intensity for various current distributions Magnetic circuits, Behaviour of magnetic materials, Boundary conditions, Inductance and inductors, Magnetic energy, Magnetic forces and torques.

UNIT-IV	TIME-VARYING FIELDS AND MAXWELL's EQUATIONS	9

Faraday's law, Displacement current and Maxwell-Ampere law, Maxwell's equations, Potential functions,Electromagnetic boundary conditions, Wave equations and solutions, Time-harmonic fields, Observing thePhenomenon of wave propagation with the aid of Maxwell's equations

UNIT-V	PLANE ELECTROMAGNETIC WAVES	9

Plane waves in lossless media, Plane waves in lossy media (low-loss dielectrics and good conductors), Group velocity, Electromagnetic power flow and Poynting vector, Normal incidence at a plane conducting boundary, Normal incidence at a plane dielectric boundary

TOTAL: 45 PERIODS

COURSE OUTCOMES		Cognitive Level
CO1	Relate the fundamentals of vector, coordinate system to electromagneticconcepts	Understand
CO2	Analyze the characteristics of Electrostatic field	Analyze

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CO3	Interpret the concepts of Electric field in material space and solve theboundary conditions	Apply
CO4	Explain the concepts and characteristics of Magneto Static field inmaterial space and solve boundary conditions.	Understand
CO5	Determine the significance of time varying fields.	Understand

TEXT BOOKS:

1	D.K. Cheng, Field and wave electromagnetics, 2nd ed., Pearson (India), 2014
2	M.N.O. Sadiku and S.V. Kulkarni, Principles of electromagnetics, 6th ed., Oxford (Asian Edition), 2015

REFERENCE BOOKS:

1	Edward C. Jordan & Keith G. Balmain, Electromagnetic waves and Radiating Systems, SecondEdition, Prentice-Hall Electrical Engineering Series, 2015.
2	W.H. Hayt and J.A. Buck, Engineering electromagnetics, 9th Edition, McGraw-Hill (India), 2016
3	Kraus/Fleisch, Electromagnetics with Applications, Fifth Edition, McGraw-Hill, 2017.

WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:

1	**NPTEL:** Electromagnetic Theory: https://archive.nptel.ac.in/courses/108/104/108104087/,Prof Pradeep Kumar K, IIT Kanpur

CO-PO MAPPING

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

PUEC4PL04	COMMUNICATION SYSTEMS LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

1	To study the AM & FM Modulation and Demodulation
2	To learn and realize the effects of sampling and TDM
3	To understand the PCM & Digital Modulation
4	To Simulate Digital Modulation Schemes
5	To Implement Equalization Algorithms and Error Control Coding Schemes

LIST OF EXPERIMENTS

1. AM- Modulator and Demodulator
2. FM - Modulator and Demodulator
3. Pre-Emphasis and De-Emphasis.
4. Signal sampling and TDM.
5. Pulse Code Modulation and Demodulation.
6. Pulse Amplitude Modulation and Demodulation.
7. Pulse Position Modulation and Demodulation and Pulse Width Modulation and Demodulation.
8. Digital Modulation – BASK, BPSK, BFSK.
9. Delta Modulation and Demodulation.
10. Simulation of BASK, BFSK, and BPSK Generation and Detection Schemes.
11. Simulation of DPSK, QPSK and QAM Generation and Detection Schemes.
12. Simulation of Linear Block and Cyclic Error Control coding Schemes.

TOTAL: 60 PERIODS

COURSE OUTCOMES		Cognitive Level
CO1	Design AM, FM & Digital Modulators for specific applications	Apply
CO2	Compute the sampling frequency for digital modulation.Apply various Evolution of Film Language	Apply
CO3	Simulate & validate the various functional modules ofCommunication system.	Apply
CO4	Demonstrate their knowledge in base band signaling schemesthrough implementation of digital modulation schemes.	Apply
CO5	Apply various channel coding schemes & demonstrate theircapabilities towards the improvement of the noise performance of Communication system.	Apply

CO-PO MAPPING

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

PMC TECH

PUEC4PL03	LINEAR INTEGRATED CIRCUITS LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

1	To gain hands on experience in designing electronic circuits.
2	To learn simulation software used in circuit design.
3	To learn the fundamental principles of amplifier circuits.
4	To differentiate feedback amplifiers and oscillators.
5	To differentiate the operation of various multivibrators

LIST OF EXPERIMENTS

DESIGN AND ANALYSIS OF THE FOLLOWING CIRCUITS

1. Series and Shunt feedback amplifiers - Frequency response, Input and output impedance RC Phase shiftoscillator and Wien Bridge Oscillator
2. Hartley Oscillator and Colpitts Oscillator
3. RC Integrator and Differentiator circuits using Op-Amp
4. Clippers and Clampers
5. Instrumentation amplifier
6. Active low-pass, High pass & Band pass filters
7. PLL Characteristics and its use as frequency multiplier, clock synchronization
8. R-2R ladder type D-A converter using Op-Amp

SIMULATION USING SPICE (Using Transistor):

1. Tuned Collector Oscillator
2. Twin -T Oscillator / Wein Bridge Oscillator
3. Double and Stagger tuned Amplifiers
4. Bistable Multi-vibrator
5. Schmitt Trigger circuit with Predictable hysteresis
6. Analysis of power amplifier

Components and Accessories:

Transistors, Resistors, Capacitors, Inductors, diodes, Zener Diodes, Bread Boards, Transformers.SPICE Circuit Simulation Software: (any public domain or commercial software).

Note: Op-Amps uA741, LM 301, LM311, LM 324, LM317, LM723, 7805, 7812, 2N3524, 2N3525,2N3391, AD 633, LM 555, LM 565 may be used.

TOTAL: 60 PERIODS

COURSE OUTCOMES		Cognitive Level
CO1	Analyze various types of feedback amplifiers	Apply
CO2	Design oscillators, tuned amplifiers, wave-shaping circuitsand multivibrators	Apply
CO3	Design and simulate feedback amplifiers, oscillators, tuned amplifiers, wave- shaping circuits and multi-vibrators, filtersusing SPICE Tool.	Apply
CO4	Design amplifiers, oscillators, D-A converters usingoperational amplifiers	Apply
CO5	Design filters using op-amp and perform an experiment on frequency response.	Apply

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

PMC TECH

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

COURSE OBJECTIVES:

1	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.
2	To produce interdisciplinary/intersectional student research that addresses Health and hygiene, Diseases and disorders, Diet and nuitrician and traditional and modern practices of wellbeing.
3	To engage students in a process of healthy behaviour 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 - Financial health - Emotional health - Spiritual health - Intellectual health - Relationship health - Environmental health - 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 NUITRICIAN	9

Role of diet in maintaining health - energy one needs to keep active throughout the day - nutrientsone 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

B.E(ECE)

COURSE OUTCOMES: At the end of the course, the students will be able:		Cognitive level
CO1	Able to describe Health and its importance at multi-dimensional levels.	Apply
CO2	To be summarize on various diseases and disorders and their symptoms.	Understand
CO3	Able to illustrate habits of food intake and nutritious diet.	Understand
CO4	To explain on traditional methods of Medical Treatments: Ayurveda and Siddha.	Apply
CO5	Able to Implement best practices to manage physical and emotional Quotient	Apply

TEXT BOOKS:	
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

REFERENCE BOOKS:	
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

WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:	
1	https://www.who.int/ - World Health Organization (WHO)
2	https://standard.wellcertified.com/mind/health-and-wellness-awareness - Health and wellness awareness
3	https://www.niehs.nih.gov/health/topics/conditions - Conditions & Diseases
4	https://www.ayurwakeup.com/how-are-ayurveda-and-yoga-related/#:~:text=Yoga%20can%20help%20release%20physical,their%20physical%20health%20as%20well. - Yoga & Ayurveda Integration: A Holistic System
5	https://ayurhealing.net/blog/comparing-homeopathy-allopathy-and-ayurveda/ - Comparing Homeopathy, Allopathy, & Ayurveda
6	https://www.medicalnewstoday.com/articles/286745 - Yoga: Methods, types, philosophy, and risks
7	https://yoga.ayush.gov.in/blog?q=58 - Do's and Don'ts of Yoga Practice - Yoga Ayush Portal
8	https://www.yogabasics.com/practice/ - The Practice of Yoga
9	https://www.tnpesu.org/syllabus/414%20-%20Certificate%20Course%20in%20Yoga%20and%20Naturopathy - Certificate Course in Yoga and Naturopathy
10	https://onlinecourses.swayam2.ac.in/aic23_ge05/preview - Yoga for Concentration - Online Courses Swayam 2
11	https://onlinecourses.nptel.ac.in/noc21_hs29/preview - Psychology of Stress, Health and Well-being - Course

CO-PO MAPPING

B.E(ECE)

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

PMC TECH
INSPIRE TO INNOVATE

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 students 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: At the end of the course, the students will be able:		**Cognitive level**
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

TEXT BOOKS:

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

REFERENCE BOOKS:	
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
WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:	
1	https://en.wikipedia.org/wiki/History_of_science_and_technology_on_the_Indian_subcontinent - History of science and technology on the Indian subcontinent
2	https://en.wikipedia.org/wiki/Science_and_technology_in_India - Science and technology in India
3	https://link.springer.com/journal/43539 - Indian Journal of History of Science - SpringerLink
4	https://www.youtube.com/watch?v=zxDp7OkjlLM - Talk by Prof. Partha P Chakrabarti on "History of Science
5	https://en.wikipedia.org/wiki/List_of_Indian_scientists - List of Indian scientists
6	https://www.indiascience.in/ - India Science | Explore Science Channel in India
7	http://www.indianscience.org/index.html - History of Indian Science And Technology
8	https://www.ias.ac.in/About_IASc/History/ - History | About IASc
9	https://onlinecourses.swayam2.ac.in/arp20_ap35/preview - History of Indian Science and Technology - Course
10	https://onlinecourses.nptel.ac.in/noc20_ae10/preview -Introduction to Ancient Indian Technology - Course
11	https://www.classcentral.com/subject/indian-history - Indian History Courses and Certifications
12	https://iisc.ac.in/courses/ - Courses - Bengaluru
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

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, dialectical materialism, 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: At the end of the course, the students will be able:		**Cognitive level**
CO1	Able to describe human, society and their interrelationships	Understand
CO2	Able to summarize various political theories and their evolutions.	Understand
CO3	To summarize the theory of Gandhi and his uniqueness	Understand
CO4	To be illustrate the formation, role and future of civilization in making of human	Apply

B.E (ECE)

CO5	To be illustrate the trends of Modern Economic Policies	Apply

TEXT BOOKS:	
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
REFERENCE BOOKS:	
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
WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:	
1	https://www.acton.org/node/6298 - The Humane Economy
2	https://thegreatthinkers.org/ - Great Thinkers: A Guide to the History of Political Philosophy
3	https://oll.libertyfund.org/pages/major-political-thinkers - Major Political Thinkers: Plato to Mill | Online Library of Liberty
4	https://www.youtube.com/watch?v=3_lmd4XH-a4 -The History of Economic Thought (Economic Ideas and ...
5	https://en.wikipedia.org/wiki/Political_philosophy - Political philosophy
6	https://onlinecourses.swayam2.ac.in/nou21_hs34/preview - MGPE-009: Gandhi in the 21st Century - Course
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
CO5	-	-	-	-	-	3	-	1	2	1	-	3

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

COURSE OBJECTIVE

1	To Understand the reciprocal relationship between the individual and society
2	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
3	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

Conceptualizing 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: At the end of the course, the students will be able:		**Cognitive level**
CO1	Able to Describe Society in terms of science and find logic behind establishment of society	Understand
CO2	Able to Illustrate Society with Culture to develop the best cultural environment	Apply
CO3	To summarize two major revolutionary concepts of Varna: The Caste and The Class	Understand
CO4	Able to describe the relationship between environment and modern society	Understand

CO5	Able to illustrate various levels of modern issues in the evolution of society	Apply

TEXT BOOKS:	
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
REFERENCE BOOKS:	
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
WEBSITE REFERENCE / NPTEL/ SWAYAM/ MOOC REFERENCE:	
1	https://en.wikipedia.org/wiki/Society - Society
2	https://en.wikipedia.org/wiki/Culture - Culture
3	https://www.sparknotes.com/sociology/society-and-culture/context/ - Society and Culture: Introduction
4	https://en.wikipedia.org/wiki/Sociology_of_culture - Sociology of culture
5	https://ncert.nic.in/textbook/pdf/kesy104.pdf - Culture and Socialisation
6	https://nptel.ac.in/courses/109106180 - Course Details
7	https://archive.nptel.ac.in/courses/109/103/109103023/ - Humanities and Social Sciences - Introduction to Sociology
8	https://onlinecourses.swayam2.ac.in/cec21_hs40/preview - Introduction to Sociology I - Online Courses Swayam 2
9	https://www.my-mooc.com/en/categorie/sociology - Learn with MOOCs about Sociology | Free Online Courses
10	https://egyankosh.ac.in/handle/123456789/66016 - Unit-8 Culture and Society
11	https://onlinecourses.swayam2.ac.in/cec24_hs15/preview - Sociology of India - 1 - Online Courses Swayam 2
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

B.E(ECE)

100