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JAI SHRIRAM ENGINEERING COLLEGE, TIRUPPUR – 638 660
(An Autonomous Institution)

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REGULATIONS 2024

B. E. ELECTRONICS AND COMMUNICATION ENGINEERING

CHOICE BASED CREDIT SYSTEM

CURRICULUM FOR SEMESTERS I TO VIII

&

SYLLABUS FOR SEMESTERS I TO IV

HEAD OF THE DEPARTMENT
Department of ECE
Jai Shriram Engineering College
Avinashipalayam, Tirupur-638660.



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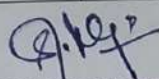
REGULATIONS 2024
B.E. ELECTRONICS AND COMMUNICATION ENGINEERING
CHOICE BASED CREDIT SYSTEM
CURRICULUM FOR SEMESTERS I TO VIII

SEMESTER – I

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
1.	24UIP001	Induction Program	-	-	-	-	0
THEORY							
2.	24UHS101	Professional English-I	HSM	3	0	0	3
3.	24UMA101	Matrices and Calculus	BS	3	1	0	4
4.	24UPH101	Engineering Physics	BS	3	0	0	3
5.	24UCY101	Engineering Chemistry	BS	3	0	0	3
6.	24UGE101	Problem Solving and Python Programming	ES	3	0	0	3
7.	24UHS102	தமிழர்மரபு / Heritage of Tamil	HSM	1	0	0	1
PRACTICAL							
8.	24UGE111	Problem Solving and Python Programming Laboratory	ES	0	0	4	2
9.	24UBS111	Physics and Chemistry Laboratory	BS	0	0	4	2
10.	24UHS111	English Laboratory	EE	0	0	2	1
Total Credits				16	1	10	22

SEMESTER - II

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
THEORY							
1.	24UHS201	Professional English-II	HSM	2	0	0	2
2.	24UMA201	Statistical and Numerical Methods	BS	3	1	0	4
3.	24UPH202	Physics for Electronics Engineering	BS	3	0	0	3
4.	24UEC201	Basic Electrical and Electronic Devices	PC	3	0	0	3
5.	24UEC202	Circuit Analysis	PC	3	1	0	4
6.	24UHS202	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	HSM	1	0	0	1
THEORY CUM PRACTICAL							
7.	24UGEI201	Engineering Graphics and Drafting	ES	3	0	2	4
PRACTICAL							
8.	24UGE211	Engineering Fundamentals Laboratory	ES	0	0	4	2
9.	24UEC211	Circuits & Devices Laboratory	PC	0	0	4	2
10.	24UHS211	Communication Laboratory	EE	0	0	4	2
Total Credits				18	2	14	27

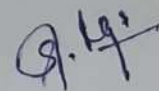

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SEMESTER - III

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
THEORY							
1.	24UMA303	Probability and Random Process	BS	3	1	0	4
2.	24UEC301	Signals and Systems	PC	3	1	0	4
3.	24UEC302	Analog Electronics	PC	3	0	0	3
4.	24UEC303	Control Systems Engineering	PC	3	0	0	3
5.	24UCS321	C Programming & Data Structures	ES	3	0	0	3
THEORY CUM PRACTICAL							
6.	24UECI301	Digital System Design	PC	3	0	2	4
7.	24UEC312	Skill Development Course I	EE	1	0	3	2
PRACTICAL							
8.	24UEC311	Analog Electronics Laboratory	PC	0	0	3	1.5
9.	24UCS322	C Programming & Data Structures Laboratory	ES	0	0	3	1.5
Total Credits				19	2	11	26

SEMESTER - IV

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
THEORY							
1.	24UEC401	Electromagnetic Fields	PC	3	0	0	3
2.	24UEC402	Linear Integrated Circuits	PC	3	0	0	3
3.	24UEC403	Communication Systems	PC	3	0	0	3
4.	24UGE401	Environmental Science and Sustainability	BS	2	0	0	2
THEORY CUM PRACTICAL							
5.	24UECI401	Networks & Security	PC	3	0	2	4
6.	24UECI402	Digital Signal Processing	PC	3	0	2	4
PRACTICAL							
7.	24UEC411	Linear Integrated Circuits Laboratory	PC	0	0	3	1.5
8.	24UEC412	Communication Systems Laboratory	PC	0	0	3	1.5
Total Credits				17	0	10	22

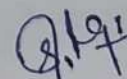

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SEMESTER - V

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
THEORY							
1.	24UEC501	VLSI and Chip Design	PC	3	0	0	3
2.	24UGE501	Human Values and Ethics	HSM	3	0	0	3
3.	24UEC502	Microprocessor Microcontroller & Its Applications	PC	3	0	0	3
4.		Open Elective - I	OE	3	1	0	3
5.		Professional Elective - I	PE	3	0	0	3
6.		Professional Elective II	PE	3	0	0	3
7.	24UECM501	Mandatory Course - I	MC	2	0	0	0
PRACTICAL							
8.	24UEC511	VLSI and Chip Design Lab	PC	0	0	4	2
9.	24UEC512	Microprocessor & Microcontroller Laboratory	PC	0	0	3	1.5
Total Credits				20	1	7	21.5

SEMESTER - VI

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
THEORY							
1.	24UEC601	Embedded Systems and IoT Design	PC	3	0	2	3
2.	24UEC602	Transmission lines and Antennas	PC	3	0	0	3
3.	24UEC603	Artificial Intelligence and Machine Learning	PC	3	0	0	3
4.		Open Elective - II	OE	3	0	0	3
5.		Professional Elective III	PE	3	0	0	3
6.		Professional Elective IV	PE	3	0	0	3
7.	24UECM601	Mandatory Course - II	MC	2	0	0	0
PRACTICAL							
8.	24UEC611	Mini project	EE	3	0	0	3
9.	24UEC612	Embedded Systems and IoT Laboratory	PC	0	0	3	1.5
Total Credits				23	0	5	22.5


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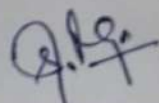
SEMESTER - VII

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
THEORY							
1.	24UMG701	Principles of Management	HSM	3	0	0	3
2.		Open Elective – III	OE	3	0	0	3
3.		Professional Elective – V	PE	3	0	0	3
4.		Professional Elective - VI	PE	3	0	0	3
5.	24UEC711	Internship	EE	0	0	0	2
Total Credits				12	0	0	14

SEMESTER - VIII

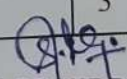
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
PRACTICAL							
1.	24UEC811	Project Work	EE	0	0	20	10
Total Credits				0	0	20	10

Total Credits:165


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PROFESSIONAL ELECTIVES

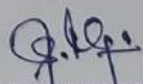
S.NO	COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
PROFESSIONAL ELECTIVE I							
1.	24UECP501	Wireless Communication	PE	3	0	0	3
2.	24UECP502	Optical Communication & Networks	PE	3	0	0	3
3.	24UECP503	Wireless Broad Band Networks	PE	3	0	0	3
4.	24UECP504	4G/5G Communication Networks	PE	2	0	2	3
5.	24UECP505	Software Defined Networks	PE	2	0	2	3
6.	24UECP506	Massive MIMO Networks	PE	2	0	2	3
PROFESSIONAL ELECTIVE II							
1.	24UECP507	Advanced Digital Signal Processing	PE	2	0	2	3
2.	24UECP508	Image Processing	PE	3	0	0	3
3.	24UECP509	Speech Processing	PE	2	0	2	3
4.	24UECP510	Software Defined Radio	PE	2	0	2	3
5.	24UECP511	DSP Architecture and Programming	PE	2	0	2	3
6.	24UECP512	Computer Vision	PE	2	0	2	3
PROFESSIONAL ELECTIVE III							
1.	24UECP601	Wearable Devices	PE	3	0	0	3
2.	24UECP602	Human Assist Devices	PE	3	0	0	3
3.	24UECP603	Therapeutic Equipment	PE	3	0	0	3
4.	24UECP604	Medical Imaging Systems	PE	3	0	0	3
5.	24UECP605	Brain Computer Interface and Applications	PE	3	0	0	3
6.	24UECP606	Body Area Networks	PE	3	0	0	3
PROFESSIONAL ELECTIVE IV							
1.	24UECP607	Radar Technologies	PE	3	0	0	3
2.	24UECP608	Avionics Systems	PE	2	0	2	3
3.	24UECP609	Positioning and Navigation Systems	PE	3	0	0	3
4.	24UECP610	Satellite Communication	PE	3	0	0	3
5.	24UECP611	Remote Sensing	PE	3	0	0	3


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6.	24UECP612	Rocketry and Space Mechanics	PE	3	0	0	3
PROFESSIONAL ELECTIVE V							
1.	24UECP701	RF Transceivers	PE	2	0	2	3
2.	24UECP702	Signal Integrity	PE	2	0	2	3
3.	24UECP703	Antenna Microwave Engineering	PE	2	0	2	3
4.	24UECP704	MICs and RF System Design	PE	2	0	2	3
5.	24UECP705	EMI/EMC Pre Compliance Testing	PE	2	0	2	3
6.	24UECP706	RFID System Design and Testing	PE	2	0	2	3
PROFESSIONAL ELECTIVE VI							
1.	24UECP707	IoT Processors	PE	2	0	2	3
2.	24UECP708	IoT Based Systems Design	PE	3	0	0	3
3.	24UECP709	Wireless Sensor Network Design	PE	3	0	0	3
4.	24UECP710	Industrial IoT and Industry 4.0	PE	2	0	2	3
5.	24UECP711	MEMS Design	PE	2	0	2	3
6.	24UECP712	Fundamentals of Nano electronics	PE	2	0	2	3

SKILL DEVELOPMENT COURSE

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
SKILL DEVELOPMENT COURSE I							
1.	24UECC01	PCB Design	EE	1	0	3	2
2.	24UECC02	Aptitude and Verbal Skill	EE	1	0	3	2


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MANDATORY COURSES I

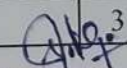
1.	24UMC801	Introduction to Women and Gender Studies	MC	3	0	0	0
2.	24UMC802	Automotive Safety	MC	3	0	0	0
3.	24UMC803	State, Nation Building and Politics in India	MC	3	0	0	0
4.	24UMC804	Disaster Risk Reduction and Management	MC	3	0	0	0
5.	24UMC805	Film Appreciation	MC	3	0	0	0
6.	24UMC806	Elements of Literature	MC	3	0	0	0
7.	24UMC807	Inclusive Work Culture	MC	3	0	0	0
8.	24UMC808	Quality Systems	MC	3	0	0	0
9.	24UMC809	Industrial Practices and Requirements	MC	3	0	0	0

MANDATORY COURSES II

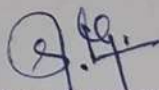
1.	24UMC901	Well Being with Traditional Practices - Yoga, Ayurveda and Siddha	MC	3	0	0	0
2.	24UMC902	History of Science and Technology in India	MC	3	0	0	0
3.	24UMC903	Political and Economic Thought for a Humane Society	MC	3	0	0	0
4.	24UMC904	Industrial Safety	MC	3	0	0	0
5.	24UMC905	Quantitative and verbal proficiency	MC	3	0	0	0
6.	24UMC906	Industrial Hydraulic Circuits	MC	3	0	0	0
7.	24UMC907	Electrical Safety	MC	3	0	0	0

OPEN ELECTIVE

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
1.	24UCEO01	Augmented Reality /Virtual Reality	OE	3	0	0	3
2.	24UCEO02	Remote Sensing Concepts	OE	3	0	0	3
3.	24UCEO03	Geographical Information System	OE	3	0	0	3
4.	24UCEO04	Fire Safety Engineering	OE	3	0	0	3
5.	24UCSO01	Java Programming	OE	3	0	0	3
6.	24UCSO02	UI & UX Design	OE	3	0	0	3
7.	24UCSO03	Cloud Computing	OE	3	0	0	3
8.	24UCSO04	Data Science	OE	3	0	0	3
9.	24UEEO01	Renewable Energy Technologies	OE	3	0	0	3
10.	24UEEO02	Hybrid Electric Vehicles	OE	3	0	0	3
11.	24UEEO03	Introduction to PLC Programming	OE	3	0	0	3
12.	24UEEO04	Energy Conservation & Management	OE	3	0	0	3
13.	24UEEO05	Fundamentals of Electronic Devices	OE	3	0	0	3


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14.	24UEEO06	Batteries and Management System	OE	3	0	0	3
15.	24UEEO07	Sensors and Actuators	OE	3	0	0	3
16.	24UEEO08	Electrical, Electronic & Magnetic Materials	OE	3	0	0	3
17.	24UECO01	Basics of Communication Technologies	OE	3	0	0	3
18.	24UECO02	Image Processing	OE	3	0	0	3
19.	24UECO03	Basics of IoT	OE	3	0	0	3
20.	24UECO04	Introduction to PLC Programming	OE	3	0	0	3
21.	24UECO05	Sensors for Engineering Applications	OE	3	0	0	3
22.	24UECO06	Industry 4.0 and Industrial IoT	OE	3	0	0	3
23.	24UFTO01	Basics of Textile Technology	OE	3	0	0	3
24.	24UFTO02	Fundamentals of Fashion Design	OE	3	0	0	3
25.	24UFTO03	Garment Manufacturing Technology	OE	3	0	0	3
26.	24UFTO04	Retail Management	OE	3	0	0	3
27.	24UFTO05	Industrial Engineering for Garment Industry	OE	3	0	0	3
28.	24UFTO06	Fashion Branding and Advertisement	OE	3	0	0	3
29.	24UMEO01	Fundamentals of Robotics	OE	3	0	0	3
30.	24UMEO02	Nano Technology	OE	3	0	0	3
31.	24UMEO03	Reverse Engineering	OE	3	0	0	3
32.	24UMEO04	Industrial Engineering	OE	3	0	0	3
33.	24UMEO05	Introduction to Additive Manufacturing	OE	3	0	0	3
34.	24UMEO06	Energy Conservation in Industries	OE	3	0	0	3
35.	24UITO01	Digital Image Processing and Its Applications	OE	3	0	0	3
36.	24UITO02	Fundamentals of Databases	OE	3	0	0	3
37.	24UITO03	Internet Programming	OE	3	0	0	3
38.	24UITO04	Fundamentals of Internet of Things	OE	3	0	0	3
39.	24UITO05	Fundamentals of Blockchain	OE	3	0	0	3


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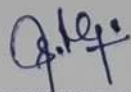
CREDITS SUMMARY

S. NO.	Course Components	Credits per Semester								Total Credits
		I	II	III	IV	V	VI	VII	VIII	
1.	HSM	4	3			3		3		13
2.	BS	12	7	4	2					25
3.	ES	5	6	4.5						15.5
4.	PC		9	15.5	20	9.5	10.5			64.5
5.	PE					6	6	6		18
6.	OE					3	3	3		9
7.	EE	1	2	2			3	2	10	20
8.	MC					√	√			
Total Credits		22	27	26	22	21.5	22.5	14	10	165

Total Credits for The Entire Programme: 165

COMPARISON OF CREDIT SUMMARY

S. NO.	Course Components	AICTE Recommendation		Anna University Curriculum R2021		JSREC Autonomous Curriculum R2024	
		Credits	% Credits	Credits	% Credits	Credits	% Credits
1.	Humanities, Social Science and Management (HSM)	15	9%	12	7%	13	8%
2.	Basic Sciences (BS)	23	14%	25	15%	25	15%
3.	Engineering Sciences (ES)	17	11%	21	13%	15.5	9%
4.	Professional Core (PC)	61	38%	58	36%	64.5	39%
5.	Professional Electives (PE)	12	7%	18	11%	18	11%
6.	Open Electives (OE)	12	7%	12	7%	9	5%
7.	Employment Enhancement Course (EE)	20	12%	16	10%	20	12%
8.	Mandatory (Non-Credit Course (MC)	-	-	-	-	√	√
TOTAL CREDITS		160	100%	162	100%	165	100%


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SYLLABUS FOR I SEMESTER

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24UHS101	PROFESSIONAL ENGLISH I (Common to all Branches)	L	T	P	C
		3	0	0	3

Prerequisites:

- Basic Knowledge in Language usage

COURSE OBJECTIVES:

- To improve the communicative competence of learners
- To learn to use basic grammatical structures in suitable contexts
- To acquire lexical competence and use them appropriately in a sentence and understand their meaning in a text
- To help learners use language effectively in professional contexts
- To develop learners' ability to read and write complex texts, summaries, articles, blogs, definitions, essays and user manuals

UNIT-I	INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION	9
Reading - Reading brochures (technical context), telephone messages / social media messages relevant to technical contexts and emails. Writing - Writing emails / letters introducing oneself. Grammar - Present Tense (simple and progressive); Question types: Wh/ Yes or No/ and Tags. Vocabulary - Synonyms; One word substitution; Abbreviations & Acronyms (as used in technical contexts).		

UNIT-II	NARRATION AND SUMMATION	9
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); Synonyms and Antonyms. Phrasal verbs.		

UNIT-III	DESCRIPTION OF A PROCESS / PRODUCT	9
Reading - Reading advertisements, gadget reviews; user manuals. Writing - Writing definitions; instructions; and Product /Process description. Grammar - Imperatives; Adjectives; Degrees of comparison; Present & Past Perfect Tenses. Vocabulary - Compound Nouns, Homonyms; and Homophones, discourse markers (connectives & sequence words).		

UNIT-IV	CLASSIFICATION AND RECOMMENDATIONS	9
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	9
Reading - Reading editorials; and Opinion Blogs; Writing - Essay Writing (Descriptive or narrative). Grammar - Future Tenses, Punctuation; Negation (Statements & Questions); and		


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Simple, 27 Compound & Complex Sentences. Vocabulary - Cause & Effect Expressions - Content vs Function words.

L: 45 | T: 00 | P: 00 | Total : 45 Periods

TEXT BOOKS

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

REFERENCES

1. Technical Communication – Principles And Practices By Meenakshi Raman & Sangeeta Sharma. Oxford Univ. Press, 2016, New Delhi.
2. A Course Book On Technical English By Lakshminarayanan, Scitech Publications (India) Pvt. Ltd.
3. English For Technical Communication (With CD) By Aysha Viswamohan, Mcgraw Hill Education, ISBN : 0070264244.
4. Effective Communication Skill, Kulbhusan Kumar, RS Salaria, Khanna Publishing House.
5. Learning to Communicate – Dr. V. Chellammal, Allied Publishing House, New Delhi, 2003.

WEB RESOURCES

- https://www.lisedunetwork.com/the-fundamentals-of-communication/#google_vignette
- <http://hdl.handle.net/10603/58170>
- <https://www.vedantu.com/english/narration>
- <https://asana.com/resources/product-development-process>
- <https://onlinelibrary.wiley.com/doi/10.1155/2019/8043905>

COURSE OUTCOMES

At the end of the course students should be able to

- CO1: To use appropriate words in a professional context
CO2: To gain understanding of basic grammatical structures and use them in right context
CO3: To read and infer the denotative and connotative meanings of technical texts
CO4: To read and interpret information presented in tables, charts and other graphic forms
CO5: To write definitions, descriptions, narrations and essays on various topics


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TIRUPUR -638 660, Tamilnadu.

MUMAT101	MATRICES AND CALCULUS (Common to All Branches)	L	T	P	C
		3	1	0	4

Prerequisites:

- Knowledge in Basic Calculus

COURSE OBJECTIVES:

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

UNIT-I	MATRICES	9 + 3
Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – Cayley - Hamilton theorem – Diagonalization of matrices by orthogonal transformation – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms – Applications: Stretching of an elastic membrane.		


UNIT-II	DIFFERENTIAL CALCULUS	9 + 3
Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules (sum, product, quotient, chain rules) - Implicit differentiation - Logarithmic differentiation - Applications - Maxima and Minima of functions of one variable.		

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.		

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, Integration of irrational functions - Improper integrals - Applications: Hydrostatic force and pressure, moments and centres 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 – Change of variables in double and triple integrals – Applications: Moments and centres of mass, moment of inertia.		

L:45	T: 15	P: 00	Total : 60 Periods
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HEAD OF THE DEPARTMENT
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 TIRUPUR -638 660, Tamilnadu.

TEXT BOOKS

1. Kreyszig E, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.
2. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 4th Edition, 2018
3. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 8th Edition, New Delhi, 2015. [For Units II & IV - Sections 1.1, 2.2, 2.3, 2.5, 2.7 (Tangents problems only), 2.8, 3.1 to 3.6, 3.11, 4.1, 4.3, 5.1 (Area problems only), 5.2, 5.3, 5.4 (excluding net change theorem), 5.5, 7.1 - 7.4 and 7.8]

REFERENCES

1. Anton H, Bivens L and Davis S, "Calculus", Wiley, 10th Edition, 2016
2. Bali N., Goyal M and Watkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt. Ltd.), New Delhi, 7th Edition, 2009.
3. Jain R.K and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition, 2016.
4. Narayanan S, and Manicavachagom Pillai T. K., "Calculus" Volume I and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, 2009.
5. Ramana B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2016.
6. Srimantha Pal and Bhunia S.C, "Engineering Mathematics "Oxford University Press, 2015.
7. Thomas G. B., Hass J, and Weir M.D, "Thomas Calculus", 14th Edition, Pearson India, 2018.


WEB RESOURCES

- <http://explained.ai/matrix-calculus/index.html>
- <https://www.comp.nus.edu.sg/~cs5240/lecture/matrix-differentiation.pdf>
- <https://github.com/Lynml/Matrix-Calculus>
- <https://nptel.ac.in/>

COURSE OUTCOMES

At the end of the course students should be able to

- CO1: Use the matrix algebra methods for solving practical problems.
CO2: Apply differential calculus tools in solving various application problems.
CO3: Able to use differential calculus ideas on several variable functions.
CO4: Apply different methods of integration in solving practical problems.
CO5: Apply multiple integral ideas in solving areas, volumes and other practical problems.


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24UPH101	ENGINEERING PHYSICS (Common to All Branches)	L	T	P	C
		3	0	0	3

Prerequisites:

Nil

COURSE OBJECTIVES:

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

UNIT-I	MECHANICS	9
<p>Multiparticle 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 – M.I of a diatomic molecule - torque – rotational dynamics of rigid bodies – conservation of angular momentum – rotational energy state of a rigid diatomic molecule - gyroscope - torsional pendulum – double pendulum –Introduction to nonlinear oscillations.</p>		


UNIT-II	ELECTROMAGNETIC WAVES	9
<p>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 - polarization - Producing electromagnetic waves - Energy and momentum in EM waves: Intensity, waves from localized sources, momentum and radiation pressure - Cell-phone reception. Reflection and transmission of electromagnetic waves from a non-conducting medium-vacuum interface for normal incidence.</p>		

UNIT-III	OSCILLATIONS, OPTICS AND LASERS	9
<p>Simple harmonic motion - resonance –analogy between electrical and mechanical oscillating systems - 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 –Michelson interferometer –Theory of air wedge and 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.</p>		


UNIT-IV	BASIC QUANTUM MECHANICS	9
<p>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.</p>		

UNIT-V	APPLIED QUANTUM MECHANICS	9
<p>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 –Basics of Kronig-Penney model and origin of energy bands.</p>		

L:45	T: 00	P: 00	Total : 45 Periods
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 TIRUPUR -638 660, Tamilnadu.

TEXT BOOKS
<ol style="list-style-type: none"> 1. D.Kleppner and R.Kolenkow. An Introduction to Mechanics. McGraw Hill Education (Indian Edition), 2017. 2. E.M.Purcell and D.J.Morin, Electricity and Magnetism, Cambridge Univ.Press, 2013. 3. Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, Concepts of Modern Physics, McGraw- Hill (Indian Edition), 2017.
REFERENCES
<ol style="list-style-type: none"> 1. R.Wolfson. Essential University Physics. Volume 1 & 2. Pearson Education (Indian Edition), 2009. 2. Paul A. Tipler, Physic – Volume 1 & 2, CBS, (Indian Edition), 2004. 3. K.Thyagarajan and A.Ghatak. Lasers: Fundamentals and Applications, Laxmi Publications, (Indian Edition), 2019. 4. D.Halliday, R.Resnick and J.Walker. Principles of Physics, Wiley (Indian Edition), 2015. 5. N.Garcia, A.Damask and S.Schwarz. Physics for Computer Science Students. Springer-Verlag, 2012.
WEB RESOURCES
<ul style="list-style-type: none"> • https://www.youtube.com/watch?v=caitynfev64 • https://youtu.be/SqhWxOjBb74 • https://youtu.be/F11MHPDd5D8 • https://youtu.be/NGGSROr3Tlc • https://youtu.be/b-w4TSkhlhE
COURSE OUTCOMES
<p>At the end of the course, students should be able to</p> <p>CO1: Understand the importance of mechanics.</p> <p>CO2: Express their knowledge in electromagnetic waves.</p> <p>CO3: Demonstrate a strong foundational knowledge in oscillations, optics and lasers.</p> <p>CO4: Understand the importance of quantum physics.</p> <p>CO5: Compare and apply quantum mechanical principles towards the formation of energy bands.</p>


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24UCY101	ENGINEERING CHEMISTRY (Common to all Branches)	L	T	P	C
		3	0	0	3

Prerequisites:
Nil

COURSE OBJECTIVES:
<ul style="list-style-type: none"> To inculcate sound understanding of water quality parameters and water treatment techniques. To impart knowledge on the basic principles and preparatory methods of nanomaterials. To introduce the basic concepts and applications of phase rule and composites To facilitate the understanding of different types of fuels, their preparation, properties and combustion characteristics. To familiarize the students with the operating principles, working processes and applications of energy conversion and storage devices.

UNIT-I	WATER AND ITS TREATMENT	9
<p>Water: Sources and impurities, Water quality parameters: Definition and significance of- color, odour, turbidity, pH, hardness, alkalinity, TDS, COD and BOD, fluoride and arsenic. Municipal water treatment: primary treatment and disinfection (UV, Ozonation, break-point chlorination). Desalination of brackish water: Reverse Osmosis. 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.</p>		

UNIT-II	NANO CHEMISTRY	9
<p>Basics: Distinction between molecules, nano materials and bulk materials; Size-dependent properties (optical, electrical, mechanical and magnetic); Types of nano materials: Definition, properties and uses of - nano particle, nano cluster, nano rod, nano wire and nano tube. Preparation of nano materials: sol-gel, solvo thermal, laser ablation, chemical vapour deposition, electrochemical deposition and electro spinning. Applications of nano materials in medicine, agriculture, energy, electronics and catalysis.</p>		

UNIT-III	PHASE RULE AND COMPOSITES	9
<p>Phase rule: Introduction, definition of terms with examples. One component system - water system; Reduced phase rule; Construction of a simple eutectic phase diagram - Thermal analysis; Two component system: lead-silver system - Pattinson process. Composites: Introduction: Definition & Need for composites; Constitution: Matrix materials (Polymer matrix, metal matrix and ceramic matrix) and Reinforcement (fiber, particulates, flakes and whiskers). Properties and applications of: Metal matrix composites (MMC), Ceramic matrix composites and Polymer matrix composites. Hybrid composites - definition and examples.</p>		

UNIT-IV	FUELS AND COMBUSTION	9
<p>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, Theoretical calculation of calorific value; Ignition temperature: spontaneous ignition temperature, Explosive range; Flue gas analysis - ORSAT Method. CO₂ emission and carbon footprint.</p>		

UNIT-V	ENERGY SOURCES AND STORAGE DEVICES	9
<p>Stability of nucleus: mass defect (problems), binding energy; Nuclear energy: light water</p>		


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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.

L:45	T: 00	P: 00	Total : 45 Periods
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TEXT BOOKS

1. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018.
2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008.
3. S.S. Dara, "A text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.

REFERENCES

1. B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, "Text book of nanoscience and nanotechnology", Universities Press-IIM Series in Metallurgy and Materials Science, 2018.
2. O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
3. Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014.
4. Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.
5. 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.


WEB RESOURCES

- <https://testbook.com/ias-preparation/water-treatment>
- <https://onlinelibrary.wiley.com/doi/full/10.1002/nano.202300038>
- https://www.pratapsir.com/2023/01/notes-on-phase-rule_21.html
- <https://en.wikipedia.org/wiki/Fuel>

COURSE OUTCOMES

At the end of the course students should be able

- CO1: To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.
- CO2: To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.
- CO3: To apply the knowledge of phase rule and composites for material selection requirements.
- CO4: To recommend suitable fuels for engineering processes and applications.
- CO5: To recognize different forms of energy resources and apply them for suitable applications in energy sectors.


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24UGE101	PROBLEM SOLVING AND PYTHON PROGRAMMING (Common to All Branches)	L	T	P	C
		3	0	0	3

Prerequisites:
Nil

COURSE OBJECTIVES:
<ul style="list-style-type: none"> • To understand the basics of algorithmic problem solving. • To learn to solve problems using Python conditionals and loops. • To define Python functions and use function calls to solve problems. • To use Python data structures - lists, tuples, dictionaries to represent complex data. • To do input/output with files in Python.

UNIT-I	COMPUTATIONAL THINKING AND PROBLEM SOLVING	9
Fundamentals of Computing – Identification of Computational Problems -Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.		


UNIT-II	DATA TYPES, EXPRESSIONS, STATEMENTS	9
Python interpreter and interactive mode, debugging; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.		

UNIT-III	CONTROL FLOW, FUNCTIONS, STRINGS	9
Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.		


UNIT-IV	LISTS, TUPLES, DICTIONARIES	9
Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: simple sorting, histogram, Students marks statement, Retail bill preparation.		

UNIT-V	FILES, MODULES, PACKAGES	9
Files and exceptions: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file, Voter's age validation, Marks range validation (0-100).		

L:45	T:0	P:0	Total: 45 PERIODS
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TEXT BOOKS
<ol style="list-style-type: none"> 1. Allen B. Downey, "Think Python: How to Think like a Computer Scientist", 2nd Edition, O'Reilly Publishers, 2016. 2. Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and Programming", 1st Edition, BCS Learning & Development Limited, 2017.
REFERENCES
<ol style="list-style-type: none"> 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, 2021 4. Eric Matthes, "Python Crash Course, A Hands - on Project Based Introduction to Programming", 2nd Edition, No Starch Press, 2019. 5. Martin C. Brown, "Python: The Complete Reference", 4th Edition, Mc-Graw Hill, 2018.
WEB RESOURCES
<ul style="list-style-type: none"> • https://www.python.org/ • https://nptel.ac.in/courses/106106145/
COURSE OUTCOMES
Upon completion of the course, the students will be able to
<p>CO1: Develop algorithmic solutions to simple computational problems and and execute simple Python programs.</p> <p>CO2: Write simple Python programs using conditionals and loops for solving problems.</p> <p>CO3: Decompose a Python program into functions.</p> <p>CO4: Represent compound data using Python lists, tuples, dictionaries etc.</p> <p>CO5: Read and write data from/to files in Python programs.</p>


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24UHS102	HERITAGE OF TAMILS (Common to All Branches)	L	T	P	C
		1	0	0	1

Prerequisites:
Nil

COURSE OBJECTIVES:
<ul style="list-style-type: none"> • Appreciate Tamil art, culture and literature. • Learn the history and culture of Tamil language. • Relate to various art forms and their relevance to development . • Acknowledge the rich heritage and significant achievements of the Tamilians. • Appreciate the contribution of Tamilians to nation building.

UNIT I	LANGUAGE AND LITERATURE	3
Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.		


UNIT II	HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE	3
Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.		

UNIT III	FOLK AND MARTIAL ARTS	3
Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.		

UNIT IV	TIINAI 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 NATIONALEMENT 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.		

L:15	T: 00	P: 00	Total : 15 Periods
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HEAD OF THE DEPARTMENT
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 Jay Shriram Engineering College
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 TIRUPUR -638 660, Tamilnadu

TEXT-CUM-REFERENCE BOOKS

- 1) தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே.பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
- 2) கணினித் தமிழ் - முனைவர் ஜில்.சுந்தரம்.(விகடன் பிரசுரம்).
- 3) கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
- 4) பொருநை - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
- 5) Social Life of Tamils (Dr.K.K.Pillay) A Joint publication of TNTB & ESC and RMRL – (in print)
- 6) Social Life of the Tamils – The classical Period (Dr.S.Singaravelu) (Published by: International institute of Tamil Studies).
- 7) Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.k.D.Thirunavukkarasu) (Published by: Institute of Tamil Studies).
- 8) The Contribution of the Tamils to Indian Culture (Dr.M.Valarnathi) (Published by: Institute of Tamil Studies).
- 9) Keeladi – Sangam City Civilization on the banks of banks of river Vaigai (Jointly Published by: Department of archaeology & Tamil Nadu Text book and Educational Services Corporation, Tamil Nadu)
- 10) Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (published by: The Author).
- 11) Porunai Civilization (jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
- 12) Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

COURSE OUTCOMES

At the end of the course students should be able

- CO1: Understand the significance of Tamil as a classical language.
CO2: Relate the art and culture in Tamil language.
CO3: Explain the importance of music, dance and martial arts that were derived from Tamil Culture.
CO4: Understand the poetic mode or theme of classical language.
CO5: Relate the contribution of Tamils to Nation building.


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24UHS102	தமிழர் மரபு (Common to All Branches)	L	T	P	C
		1	0	0	1

அலகு I	மொழி மற்றும் இலக்கியம்	3
<p>இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை -சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ்க் காப்பியங்கள் ,தமிழகத்தில் சமண, பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம் , ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு</p>		

அலகு II	மரபு- பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக் கலை	3
<p>நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள் , பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக் கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.</p>		

அலகு III	நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்	3
<p>தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள் .</p>		

அலகு IV	தமிழர்களின் திணைக் கோட்பாடுகள்	3
<p>தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்ககால நகரங்களும் துறை முகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி</p>		

அலகு V	இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு	3
<p>இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு -இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்ச வரலாறு .</p>		

L:15	T: 00	P: 00	Total : 15 Periods
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TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே கே பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முனைவர் ஜில் சுந்தரம் (விகடன் பிரசுரம்)
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருளை - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A Joint publication of TNTB & ESC and RMRL - (in print)
6. Social Life of the Tamils - The classical Period (Dr.S.Singaravelu) (Published by: International institute of Tamil Studies).
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.k.D.Thirunavukkarasu) (Published by: Institute of Tamil Studies).
8. The Contribution of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: Institute of Tamil Studies).
9. Keeladi - Sangam City Civilization on the banks of banks of river Vaigai' (Jointly Published by: Department of archaeology & Tamil Nadu Text book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (published by: The Author).
11. Porunai Civilization (jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) - Reference Book.


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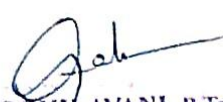
24UGE111	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY (Common to All Branches)	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- To understand the basics of algorithmic problem solving.
- To learn to solve problems using Python conditionals and loops.
- To define Python functions and use function calls to solve problems.
- To use Python data structures - lists, tuples, and dictionaries to represent complex data.
- To do input/output with files in Python.

S.No.	LIST OF EXERCISES:
1	Identification and solving of simple real life or scientific or technical problems, and developing flow charts for the same. (Electricity Billing, Retail shop billing, Sin series, weight of a motorbike, Weight of a steel bar, compute Electrical Current in Three Phase AC Circuited.)
2	Python programming using simple statements and expressions (exchange the values of two variables, circulate the values of n variables, distance between two points).
3	Scientific problems using Conditionals and Iterative loops.(Number series, Number Patterns, pyramid pattern)
4	Implementing real-time/technical applications using Lists, Tuples. (Items present in a library/Components of a car/Materials required for construction of a building –operations of list & tuples).
5	Implementing real-time/technical applications using Sets, Dictionaries. (Language, components of an automobile, Elements of a civil structure, etc.- operations of Sets & Dictionaries).
6	Implementing programs using Functions.(Factorial, largest number in a list, area of shape)
7	Implementing programs using Strings.(reverse,palindrome,charactercount,replacing characters).
8	Implementing programs using written modules and Python Standard Libraries (pandas, numpy, Matplotlib, scipy).
9	Implementing real-time / technical applications using File handling.(copy from one file to another, word count, longest word).
10	Implementing real-time / technical applications using Exception handling.(divide by zero error, voter's age validity, student mark range validation).
11	Exploring Pygame tool.
12	Developing a game activity using Pygame like bouncing ball, carrace etc.

L:00	P:60	T:00	Total: 60 PERIODS
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LIST OF EQUIPMENTS REQUIRED**HARDWARE REQUIREMENTS**

Standard PC

SOFTWARE REQUIREMENTS

1. Windows 7 or higher
2. Python latest version

COURSE OUTCOMES

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

CO1: Develop algorithmic solutions to simple computational problems


CO2: Develop and execute simple Python programs.

CO3: Implement programs in Python using conditionals and loops for solving problems.

CO4: Deploy functions to decompose a Python program.

CO5: Process compound data using Python data structures.

CO6: Utilize Python packages in developing software applications.



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24UBS111	PHYSICS AND CHEMISTRY LABORATORY (Common to All Branches)	L	T	P	C
		0	0	4	2

PHYSICS EXPERIMENTS (Any Seven Experiments)

Prerequisites:
Nil

COURSE OBJECTIVES:
<ul style="list-style-type: none"> • To learn the proper use of various kinds of physics laboratory equipment. • To learn how data can be collected, presented and interpreted in a clear and concise manner. • To learn problem solving skills related to physics principles and interpretation of experimental data. • To determine error in experimental measurements and techniques used to minimize such error. • To make the student an active participant in each part of all lab exercises.

<ol style="list-style-type: none"> 1. Torsion 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.

TEXT BOOKS
<ol style="list-style-type: none"> 1. Marko Pinteric, Building Physics, Springer 2017. 2. D.S.Mathur. Elements of Properties of Matter. S Chand & Company, 2010. 3. Hugo Hens, Building Physics: Heat, Air and Moisture, Wiley, 2017.

REFERENCES
<ol style="list-style-type: none"> 1. W.R.Stevens. Building Physics: Lighting. Pergamon Press, 2013. 2. Hugo Hens, Applied Building Physics, Wiley, 2016. 3. K.G.Budinski and M.K.Budinski. Engineering Materials: Properties and Selection. Pearson Education, 2016. 4. Peter A. Claisse, Civil Engineering Materials, Elsevier, 2016.

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


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CO1: Understand the functioning of various physics laboratory equipment.
CO2: Use graphical models to analyze laboratory data.
CO3: Use mathematical models as a medium for quantitative reasoning and describing physical reality.
CO4: Access, process and analyze scientific information.
CO5: Solve problems individually and collaboratively.

TOTAL: 30 PERIODS

CHEMISTRY EXPERIMENTS (Any Seven Experiments to be conducted)

Prerequisites:


Nil

COURSE OBJECTIVES:

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

1. Preparation of Na_2CO_3 as a primary standard and estimation of acidity of a water sample using the primary standard
2. Determination of types and amount of alkalinity in a 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 a flame photometer.
13. Preparation of nanoparticles ($\text{TiO}_2/\text{ZnO}/\text{CuO}$) by Sol-Gel method.
14. Estimation of Nickel in steel
15. Proximate analysis of Coal

L: 00	T: 00	P: 60	Total : 60 Periods
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TEXT BOOKS

1. J. Mendham, R. C. Denney, J.D. Barnes, M. Thomas and B. Sivasankar, Vogel's Textbook of Quantitative Chemical Analysis (2009).

WEB RESOURCES

- <https://en.wikipedia.org/wiki/Titration>
- [https://en.wikipedia.org/wiki/Conductivity_\(electrolytic\)](https://en.wikipedia.org/wiki/Conductivity_(electrolytic)).

COURSE OUTCOMES

At the end of the course students should be able

- CO1: To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.
- CO2: To determine the amount of metal ions through volumetric and spectroscopic techniques
- CO3: To analyse and determine the composition of alloys.
- CO4: To learn simple method of synthesis of nanoparticles.
- CO5: To quantitatively analyse the impurities in solution by electroanalytical Techniques.

TOTAL: 30 PERIODS


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24UHS111	ENGLISH LABORATORY (Common to all Branches)	L	T	P	C
		0	0	2	1

Prerequisites:

- Basic Knowledge in Language usage

COURSE OBJECTIVES:

- To improve the communicative competence of learners
- To help learners use language effectively in academic /work contexts
- To develop various listening strategies to comprehend various types of audio materials like lectures, discussions, videos etc
- To build on students' English language skills by engaging them in listening, speaking and grammar learning activities that are relevant to authentic contexts
- To use language efficiently in expressing their opinions via various media

UNIT-I	INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION	6
Listening for general information-specific details- conversation: Introduction to classmates - Audio / video (formal & informal); Telephone conversation; Listening to voicemail & messages; Listening and filling a form. Speaking - making telephone calls-Self Introduction; Introducing a friend; - 42 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	NARRATION AND SUMMATION	6
Listening - Listening to podcasts, anecdotes / stories / event narration; documentaries and interviews with celebrities. Speaking - Narrating personal experiences / events-Talking about current and temporary situations & permanent and regular situations* - describing experiences and feelings engaging in small talk- describing requirements and abilities.		

UNIT-III	DESCRIPTION OF A PROCESS / PRODUCT	6
Listening - Listen to product and process descriptions; a classroom lecture; and advertisements about products. Speaking – Picture description- describing locations in workplaces- Giving instruction to use the product- explaining uses and purposes- Presenting a product- describing shapes and sizes and weights- talking about quantities(large & small)-talking about precautions.		

UNIT-IV	CLASSIFICATION AND RECOMMENDATIONS	6
Listening – Listening to TED Talks; Listening to lectures - and educational videos. Speaking – Small Talk; discussing and making plans-talking about tasks-talking about progress- talking about positions and directions of movement-talking about travel preparations- talking about transportation.		

UNIT-V	EXPRESSION	6
Listening – Listening to debates/ discussions; different viewpoints on an issue; and panel		


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discussions. Speaking -making predictions- talking about a given topic-giving opinions- understanding a website-describing processes

L: 00	T: 00	P: 30	Total : 30 Periods
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WEB RESOURCES

- https://www.lisedunetwork.com/the-fundamentals-of-communication/#google_vignette
- <http://hdl.handle.net/10603/58170>
- <https://www.vedantu.com/english/narration>
- <https://asana.com/resources/product-development-process>
- <https://onlinelibrary.wiley.com/doi/10.1155/2019/8043905>

COURSE OUTCOMES

At the end of the course students should be able to

- CO1: To listen to and comprehend general as well as complex academic information
CO2: To listen to and understand different points of view in a discussion
CO3: To speak fluently and accurately in formal and informal communicative contexts
CO4: To describe products and processes and explain their uses and purposes clearly and accurately
CO5: To express their opinions effectively in both formal and informal discussions


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REGULATIONS 2024

B. E. ELECTRICAL AND ELECTRONICS ENGINEERING

CHOICE BASED CREDIT SYSTEM

SYLLABUS FOR II SEMESTER

24UHS201	PROFESSIONAL ENGLISH II (Common to all Branches)	L	T	P	C
		2	0	0	2

Prerequisites:

- Basic Knowledge in Language usage

COURSE OBJECTIVES:

- To engage learners in meaningful language activities to improve their reading and writing skills
- To learn various reading strategies and apply in comprehending documents in professional context
- To help learners understand the purpose, audience, contexts of different types of writing
- To develop analytical thinking skills for problem solving in communicative contexts
- To demonstrate an understanding of job applications and interviews for internship and placements


UNIT-I	MAKING COMPARISONS	6
Reading – Reading comprehension task :Reading strategies, Methods - skimming, scanning, paraphrasing vs summarizing, Reading advertisements, user manuals, brochures; Proforma invoices Writing – Professional emails, Email etiquette, Creative Writing-Content writing, blog writing , Grammar –Preposition & Prepositional phrases Vocabulary – Words on Engineering materials		

UNIT-II	EXPRESSING CAUSAL RELATIONS IN SPEAKING AND WRITING	6
Reading - Reading longer technical texts, Reading short articles& Journals Writing -Writing responses to complaints, Letters / emails of complaint, writing a travelogue, Agenda with Minutes of meeting(MoM), Cause and Effect Essays, Grammar - If conditional sentences, Active & Passive Voice transformations,		

UNIT-III	PROBLEM SOLVING	6
Reading - Case Studies, excerpts from literary texts, etc. Writing – Letter to the Editor, Sequence of Jumbled paragraph, Checklists, Hints Development - Problem solution essay / Argumentative Essay. Grammar – Error correction; Modals Vocabulary – Idioms and phrases.		

UNIT-IV	REPORTING OF EVENTS AND RESEARCH	6
Reading –Newspaper articles; Writing – Recommendations, Transcoding, Structure of Reports-Accident Report, Survey Report, Project Report Grammar – Reported Speech, Vocabulary – Conjunctions.		

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; Business communication letters, Grammar – Numerical adjectives, Relative Clauses, Vocabulary – Infinitive and Gerunds.		


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TEXT BOOKS

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

REFERENCES

1. Raman. Meenakshi, Sharma. Sangeeta (2019). Professional English. Oxford university press. New Delhi.
2. Improve Your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, 2001, New Delhi.
3. Learning to Communicate – Dr. V. Chellamma. Allied Publishers, New Delhi, 2003.
4. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata Mc Graw Hill & Co. Ltd., 2001, New Delhi.
5. Developing Communication Skills by Krishna Mohan, Meera Bannerji- Macmillan India Ltd. 1990, Delhi.

WEB RESOURCES

- <https://academicguides.waldenu.edu/writingcenter/grammar/comparisons#:~:text=Adjectives%20and%20adverbs%20can%20be,to%20hedge%20or%20boost%20language.>
- <https://www.linkedin.com/pulse/causality-expressed-natural-language-text-vivek-khetan>
- <https://www.sessionlab.com/blog/problem-solving-techniques/>

COURSE OUTCOMES

At the end of the course students should be able to

- CO1: Compare and contrast products and ideas in technical texts
- CO2: Identify cause and effects in events, industrial processes through technical texts
- CO3: Analyse problems in order to arrive at feasible solutions and communicate them orally and in the written format
- CO4: Report events and the processes of technical and industrial nature
- CO5: Present their opinions in a planned and logical manner, and draft effective resumes in context of job search


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24UMA201	STATISTICS AND NUMERICAL METHODS (Common to All Branches)	L	T	P	C
		3	1	0	4

Prerequisites:

- Basic Knowledge in Scientific Calculator usage

COURSE OBJECTIVES:

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


UNIT-I	TESTING OF HYPOTHESIS	9 + 3
Sampling distributions - Tests for single mean, proportion and difference of means (Large and small samples) – Tests for single variance and equality of variances – Chi square test for goodness of fit – Independence of attributes. Application of chi square test.		

UNIT-II	DESIGN OF EXPERIMENTS	9 + 3
One way and two way classifications - Completely randomized design – Randomized block design – Latin square design - 22 factorial design. Application of Design of experiment SPSS software (Practical oriented).		


UNIT-III	SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS	9 + 3
Solution of algebraic and transcendental equations - Fixed point iteration method – Newton Raphson method- Solution of linear system of equations - Gauss elimination method – Pivoting - Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel - Eigenvalues of a matrix by Power method and Jacobi's method for symmetric matrices.		

UNIT-IV	INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION	9 + 3
Lagrange's and Newton's divided difference interpolations – Newton's forward and backward difference interpolation – Approximation of derivatives using interpolation polynomials – Numerical single and double integrations using Trapezoidal and Simpson's 1/3 rules.		

UNIT-V	NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS	9 + 3
Single step methods: Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge-Kutta method for solving first order differential equations - Multi step methods: Milne's and Adams - Bash forth predictor corrector methods for solving first order differential equations.		


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 Dharapuram Road, Avinashipalayam,
 TIRUPUR -638 660, Tamilnadu.

TEXT BOOKS
<ol style="list-style-type: none"> 1. Grewal, B.S. and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015. 2. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.
REFERENCES
<ol style="list-style-type: none"> 1. Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016. 2. Devore, J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014. 3. Gerald, C.F and Wheatley, P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 7th Edition, 2007. 4. Gupta S.C. and Kapoor V. K., "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 12th Edition, 2020. 5. Spiegel, M.R., Schiller, J. and Srinivasan, R.A., "Schaum's Outlines on Probability and Statistics", Tata McGraw Hill Edition, 4th Edition, 2012. 6. Walpole, R.E., Myers, R.H., Myers, S.L. and Ye, K., "Probability and Statistics for Engineers and Scientists", 9th Edition, Pearson Education, Asia, 2010.
WEB RESOURCES
<ul style="list-style-type: none"> • http://www.davidmlane.com/hyperstat/index.html • http://www.robertniles.com/stats/ • http://webserv.jcu.edu/math/ISEP/ISEP.htm • http://rt.utsi.u.edu/visualization/analytics/stats/spss-getting-started-windows.php • http://www.ats.ucla.edu/stat/
COURSE OUTCOMES
At the end of the course students should be able to
CO1: Apply the concept of testing of hypothesis for small and large samples in real life problems.
CO2: Apply the basic concepts of classifications of design of experiments in the field of agriculture.
CO3: Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
CO4: Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
CO5: Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.


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24UPH202	PHYSICS FOR ELECTRONICS ENGINEERING	L	T	P	C
		3	0	0	3

Prerequisites:

Nil

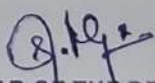
COURSE OBJECTIVES:

- To make the students to understand the basics of crystallography and its importance in studying materials properties.
- To understand the electrical properties of materials including free electron theory, applications of quantum mechanics and magnetic materials.
- To instil knowledge on physics of semiconductors, determination of charge carriers and device applications
- To establish a sound grasp of knowledge on different optical properties of materials, optical displays and applications
- To inculcate an idea of significance of nano structures, quantum confinement and ensuing nano device applications.

UNIT-I	CRYSTALLOGRAPHY	9
Crystal structures: Crystal lattice – basis - unit cell and lattice parameters – crystal systems and Bravais lattices – Structure and packing fractions of SC, BCC, FCC, diamond cubic, NaCl, ZnS structures – crystal planes, directions and Miller indices – distance between successive planes – linear and planar densities – crystalline and noncrystalline materials –Example use of Miller indices: wafer surface orientation – wafer flats and notches – pattern alignment - imperfections in crystals.		

UNIT-II	ELECTRICAL AND MAGNETIC PROPERTIES OF 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. Magnetic materials: Dia, para and ferromagnetic effects – quantum interference devices – GMR devices.		

UNIT-III	SEMICONDUCTORS AND TRANSPORT PHYSICS	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.		


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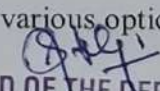
UNIT-IV	OPTICAL PROPERTIES OF MATERIALS	9
Classification of optical materials – Optical processes in semiconductors: optical absorption and emission, charge injection and recombination, optical absorption, loss and gain. Optical processes in quantum wells – Optoelectronic devices: light detectors and solar cells – light emitting diode – laser diode - optical processes in organic semiconductor devices –excitonic state – Electro-optics and nonlinear optics: Modulators and switching devices – plasmonics.		

UNIT-V	NANO DEVICES	9
Density of states for solids - Significance between Fermi energy and volume of the material – Quantum confinement – Quantum structures – Density of states for quantum wells, wires and dots – Band gap of nanomaterials –Tunnelling – Single electron phenomena – Single electron Transistor. Conductivity of metallic nanowires – Ballistic transport – Quantum resistance and conductance – Carbon nanotubes: Properties and applications - Spintronic devices and applications – Optics in quantum structures – quantum well laser.		

L:45	T: 00	P: 00	Total : 45 Periods
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TEXT BOOKS
<ol style="list-style-type: none"> 1. S.O. Kasap. Principles of Electronic Materials and Devices, McGraw Hill Education (Indian Edition), 2020. 2. R.F.Pierret. Semiconductor Device Fundamentals. Pearson (Indian Edition), 2006. 3. G.W.Hanson. Fundamentals of Nanoelectronics. Pearson Education (Indian Edition), 2009.
REFERENCES
<ol style="list-style-type: none"> 1. Laszlo Solymar, Walsh, Donald, Syms and Richard R.A., Electrical Properties of Materials, Oxford Univ. Press (Indian Edition) 2015. 2. Jasprit Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Education (Indian Edition), 2019. 3. Charles Kittel, Introduction to Solid State Physics, Wiley India Edition, 2019.

WEB RESOURCES
<ul style="list-style-type: none"> • https://www.youtube.com/watch?v=9DyfU4eSrZI • https://www.youtube.com/watch?v=Rv5ngMMK84o • https://www.youtube.com/watch?v=HJoaYEOgbe4 • https://www.youtube.com/watch?v=L1c5uZRCyUE • https://www.youtube.com/watch?v=kfhnENxGB6U
COURSE OUTCOMES
At the end of the course students should be able to
CO1: Know basics of crystallography and its importance for varied materials properties.
CO2: Gain knowledge on the electrical and magnetic properties of materials and their applications.
CO3: Understand clearly of semiconductor physics and functioning of semiconductor devices.
CO4: Understand the optical properties of materials and working principles of various optical devices.
CO5: Appreciate the importance of nanotechnology and nano devices.


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24UEC201	BASIC ELECTRICAL AND ELECTRONIC DEVICES	L	T	P	C
		3	0	0	3

Prerequisites:
Nil

COURSE OBJECTIVES:
<ul style="list-style-type: none"> To impart knowledge in basic electrical and power system To impart knowledge in construction and working of electrical machines To learn the fundamentals of semiconductor devices. To analyze the function and characteristics of BJT and FET To learn the structure and working operation of power and display devices

UNIT-I	BASIC ELECTRICAL AND POWER SYSTEM CONCEPTS	9
Sinusoidal waveforms, phase relationships, reactance and impedance in AC circuits, series and parallel resonance. Basic magnetic circuit principles, inductance, mutual inductance, and energy storage. Generation, transmission, and distribution of electric power, single-line diagrams, per-unit system, and introduction to power factor.		

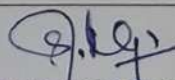
UNIT-II	ELECTRICAL MACHINES	9
DC machines - Construction, principle of operation, Basic Equations and applications – AC machines - Induction motors, synchronous motors, and alternators; basic operation, characteristics, and applications. Transformers: Types, construction, equivalent circuits, efficiency, regulation, and auto-transformers.		

UNIT-III	SEMICONDUCTOR DEVICES	9
Basic Concepts of semiconductor devices – PN Junction Diode Characteristics and its Application – Half Wave Rectifier, Full Wave Rectifier – Zener Diode –Regulators, Construction and working - LED, photo diode and Laser diode		

UNIT-IV	BJT AND FET	9
BJT – NPN and PNP (CB, CE, CC) configuration and its characteristics – Early effect – JFET & MOSFET – construction, operation and its characteristics, Types of MOSFET – NMOS, PMOS and CMOS		

UNIT-V	POWER DEVICES AND DISPLAY DEVICES	9
UJT, SCR, Diac, Triac, Power BJT- Power MOSFET- DMOS-VMOS, LCD, Photo transistor, Plasma, HDTV, Opto Coupler, Solar cell, CCD.		

L:45	T:0	P:0	T: 45 PERIODS
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TEXT BOOKS

1. Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition, McGraw Hill Education, 2020
2. Donald A Neaman, "Semiconductor Physics and Devices", Fourth Edition, Tata Mc Graw Hill Inc. 2012.
3. Salivahanan. S, Suresh Kumar. N, Vallavaraj.A, "Electronic Devices and circuits", Third Edition, Tata McGraw- Hill, 2008.

REFERENCES

1. Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw Hill Education, 2019
2. Robert Boylestad and Louis Nashelsky, "Electron Devices and Circuit Theory" Pearson Prentice Hall, 10th edition, July 2008.
3. R.S.Sedha, " A Text Book of Applied Electronics" S.Chand Publications, 2006.
Yang, "Fundamentals of Semiconductor devices", McGraw Hill International Edition, 1978.

WEB RESOURCES

- <https://archive.nptel.ac.in/courses/108/106/108106181/>
- https://onlinecourses.nptel.ac.in/noc22_mm11/preview

COURSE OUTCOMES

At the end of the course students should be able to

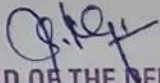
CO1: Explain the basic electrical and power concepts.

CO2: Analyze the characterizes of electrical machines

CO3: Understand the fundamentals of semiconductor devices.

CO4: Understand the basic operations of BJT & FET characteristics.

CO5 : Explain the structure and working operation of power and display devices


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24UEC202	CIRCUIT ANALYSIS	L	T	P	C
		3	1	0	4

Prerequisites:
Nil

COURSE OBJECTIVES:
<ul style="list-style-type: none"> To learn the basic concepts and methods of circuit analysis for DC and AC circuits To understand various methods of circuit/ network analysis using network theorems. To understand the transient and steady state response of the circuits subjected to DC excitations and AC with sinusoidal excitations To learn the concept of coupling in circuits and topologies

UNIT-I	BASIC CIRCUIT ANALYSIS	9 + 3
Basic Components of electric Circuits, Charge, current, Voltage and Power, Voltage and Current Sources, Ohms Law, Kirchoff's Current Law, Kirchoff's voltage law, The single Node – Pair Circuit, series and Parallel Connected Independent Sources, Resistors in Series and Parallel, voltage and current division, Nodal analysis, Mesh analysis.		

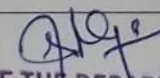
UNIT-II	NETWORK THEOREM AND PARAMETERS	9 + 3
Useful Circuit Analysis techniques - Linearity and superposition, Thevenin and Norton Equivalent Circuits, Reciprocity Theorem, Milliman's Theorem, Maximum Power Transfer, Delta-Wye Conversion. Introduction to Network Parameters, Z-Parameters, Y-Parameters, Transition (ABCD) Parameters, Hybrid Parameters		

UNIT-III	SINUSOIDAL STEADY STATE ANALYSIS	9 + 3
Sinusoidal Steady – State Analysis, Characteristics of Sinusoids, The Complex Forcing Function, The Phasor, Phasor relationship for R, L, and C, impedance and admittance, Nodal and Mesh analysis, Phasor Diagrams, AC Circuit Power Analysis, Instantaneous Power, Average Power, apparent Power and Power Factor, Complex Power		

UNIT-IV	TRANSIENTS AND RESONANCE IN RLC CIRCUITS	9 + 3
Basic RL and RC Circuits, The Source- Free RL Circuit, The Source-Free RC Circuit, The Unit-Step Function, Driven RL Circuits, Driven RC Circuits, RLC Circuits, Frequency Response, Parallel Resonance, Series Resonance, Quality Factor.		

UNIT-V	COUPLED CIRCUITS AND TOPOLOGY	9 + 3
Magnetically Coupled Circuits, mutual Inductance, the Linear Transformer, the Ideal Transformer, An introduction to Network Topology, Interconnection of two port networks, Interrelationship between two port networks Two port networks and its parameter analysis.		

L:45	T:15	P:0	T: 60 PERIODS
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TEXT BOOKS

1. Hayt Jack Kemmerly, Steven Durbin, "Engineering Circuit Analysis", Mc Graw Hill education, 9th Edition, 2018.
2. Charles K. Alexander & Mathew N.O.Sadiku, "Fundamentals of Electric Circuits", Mc GrawHill, 2nd Edition, 2003.
3. Joseph Edminister and Mahmood Nahvi, —Electric Circuits, Schaum's Outline Series, Tata McGraw Hill Publishing Company, New Delhi, Fifth Edition Reprint 2016.

REFERENCES

1. Robert.L. Boylestead, "Introductory Circuit Analysis", Pearson Education India, 12th Edition, 2014. David Bell, "Fundamentals of Electric Circuits", Oxford University press, 7th Edition, 2009.
2. John O Mallay, Schaum's Outlines "Basic Circuit Analysis", The Mc Graw Hill companies, 2nd Edition, 2011.
3. Allan H.Robbins, Wilhelm C.Miller, "Circuit Analysis Theory and Practice", Cengage Learning, Fifth Edition, 1st Indian Reprint 2013.
4. Ben G Streetman, "Solid State Electronic Devices", Pearson, 7th Edition, 2015.

WEB RESOURCES

- https://onlinecourses.nptel.ac.in/noc21_ee99/preview
- <https://archive.nptel.ac.in/courses/108/105/108105159>
- <https://archive.nptel.ac.in/courses/108/105/108105159>

COURSE OUTCOMES

At the end of the course students should be able to

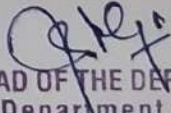
CO1: Apply the basic concepts of circuit analysis such as Kirchoff's laws, mesh current and node voltage method for analysis of DC and AC circuits.

CO2: Apply suitable network theorems and analyze AC and DC circuits.

CO3: Analyze steady state response of any R, L and C circuits.

CO4: Analyze the transient response for any RC, RL and RLC circuits and frequency response.

CO5: Analyze the coupled circuits and network topologies.


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24UHS202	TAMILS AND TECHNOLOGY (Common to All Branches)	L	T	P	C
		1	0	0	1

Prerequisites:

Nil

COURSE OBJECTIVES:

- Appreciate weaving and ceramic technology.
- Learn the design and construction technology of ancient times.
- Understand the engineering principles of manufacturing technology.
- Introduce the methods of irrigation and agricultural technology.
- Learn the scientific tamil and tamil computing.

UNIT I	WEAVING AND CERAMIC TECHNOLOGY	3
Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.		


UNIT II	DESIGN AND CONSTRUCTION TECHNOLOGY	3
Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period		

UNIT III	MANUFACTURING TECHNOLOGY	3
Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel - Copper and gold Coins as source of history - Minting of Coins – Beads making - industries Stone beads - Glass beads - Terracotta beads - Shell beads/ bone beads - Archeological evidences - Gem stone types described in Silappathikaram.		

UNIT IV	AGRICULTURE AND IRRIGATION TECHNOLOGY	3
Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.		

UNIT V	SCIENTIFIC TAMIL & TAMIL COMPUTING	3
Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.		

L:15	T: 00	P: 00	Total : 15 Periods
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 TIRUPUR -638 660, Tamilnadu.


TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே .கே .பிள்ளை (வெளியீடு)
2. தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
3. கணினித் தமிழ் -முனைவர் இல .சுந்தரம்.(விகடன் பிரசுரம்).
4. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5. பொருறை - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
6. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
7. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
8. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
9. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.) 55
10. 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)
11. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
12. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
13. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

COURSE OUTCOMES

At the end of the course students should be able

- CO1: Explain the principles behind weaving and ceramic technology of ancient tamils.
CO2: Correlate the present and ancient design and construction technology.
CO3: Apply engineering principles to ancient manufacturing technology.
CO4: Apply engineering principles to irrigation and agricultural technology.
CO5: Develop scientific tamil and new techniques in tamil computing.


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24UHS202	தமிழரும் தொழில்நுட்பமும் (Common to All Branches)	L	T	P	C
		1	0	0	1

அலகு I	தெசவு மற்றும் பாணைத்தொழில்நுட்பம்	3
சங்க காலத்தில் நெசவுத்தொழில் - பாணைத்தொழில் நுட்பம் கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.		

அலகு II	வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்	3
சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம் சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் கோவில்களும் மாமல்லபுரச் சிற்பங்களும், சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் நாயக்கர் காலக் கோயில்கள் மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் செட்டிநாட்டு வீடுகள் பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ - சாரோசெனிக் கட்டிடக் கலை.		

அலகு III	உற்பத்தி தொழில்நுட்பம்	3
கப்பல் கட்டும் கலை உலோகவியல் - இரும்பு தொழிற்சாலை - இரும்பை உருக்குதல், எ.:கு வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் மணி உருவாக்கும் தொழிற்சாலைகள் மணிகள் துண்டுகள் - கல்மணிகள், கண்ணாடி சுடுமண் மணிகள் சங்கு மணிகள் எலும்புத் தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்		

அலகு IV	வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்நுட்பம்	3
அணை, ஏரி, குளங்கள், மதகு - சோழர் காலக் குழுவித் தூம்பின் முக்கியத்துவம் கால்நடை பராமரிப்பு காலநடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் முத்து மற்றும் முத்துக்குளித்தல் -பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்.		

அலகு V	அறிவியல் தமிழ் மற்றும் கணித்தமிழ்	3
அறிவியல் தமிழின் வளர்ச்சி - கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்கள் மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் சொற்குவைத்திட்டம்		

L:15	T: 00	P: 00	Total : 15 Periods
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TEXT-CUM-REFERENCE BOOKS

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


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24UGE1201	ENGINEERING GRAPHICS AND DRAFTING (Common to B.E. Civil, ECE, EEE, Mechanical & B. Tech. FT & IT)	L	T	P	C
		3	0	2	4

Prerequisites:

Nil

COURSE OBJECTIVES:

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

UNIT-I	PLANE CURVES AND FREEHAND SKETCHING	6+12
<p>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.</p> <p>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.</p>		

UNIT-II	PROJECTION OF POINTS, LINES AND PLANE SURFACES	6+12
<p>Orthographic projection- principles-Principal planes-First angle projection-projection of points (All Quadrants).</p> <p>Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.</p>		

UNIT-III	PROJECTION OF SOLIDS AND SECTION OF SOLIDS	6+12
<p>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. Solids suspended from corner and real time application of projection of solids.</p> <p>Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other — obtaining true shape of section.</p> <p>Practicing three-dimensional modeling of simple objects by CAD Software.</p>		

UNIT-IV	DEVELOPMENT OF SURFACES	6+12
<p>Development of lateral surfaces of simple and sectioned solids — Prisms, pyramids cylinders and cones. Development of lateral surfaces of simple solids with square and cylindrical cut-outs — Prisms, pyramids cylinders and cones. Practicing three-dimensional modeling of simple objects by CAD Software.</p>		

UNIT-V	ISOMETRIC AND PERSPECTIVE PROJECTIONS	6+12
<p>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</p>		

Aradhana

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vertical positions - Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method. Practicing three-dimensional modeling of isometric projection of simple objects by CAD Software. Engineering Applications of isometric, orthographic and perspective projections

L:30 T:0 P:60 Total :90 Periods

TEXT BOOKS

1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2019.
2. Natrajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.
3. Parthasarathy, N. S. and Vela Murali, "Engineering Drawing", Oxford University Press, 2015

REFERENCES

1. Basant Agarwal and Agarwal C.M., "Engineering Drawing", McGraw Hill, 2nd Edition, 2019.
2. Gopalakrishna K.R., "Engineering Drawing" (Vol. I & II combined), Subhas Publications, Bangalore, 27th Edition, 2017.
3. Luzzader, Warren. J. and Duff, John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
4. Parthasarathy N. S. and Vela Murali, "Engineering Graphics", Oxford University, Press, New Delhi, 2015.
5. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson Education India, 2nd Edition
6. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited 2008, 2nd Edition, 2009.

COURSE OUTCOMES:

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

- CO1 Use BIS conventions and specifications for engineering drawing.
- CO2 Construct the conic curves, involutes and cycloid.
- CO3 Solve practical problems involving projection of lines.
- CO4 Draw the orthographic, isometric and perspective projections of simple solids.
- CO5 Draw the development of simple solids.



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24UGE211	Engineering Fundamentals Lab (Common to All branches)	L	T	P	C
		0	0	4	2

Prerequisites:

Nil

COURSE OBJECTIVES:

- Drawing pipe line plan; laying and connecting various pipe fittings used in common household plumbing work; Sawing; planing; making joints in wood materials used in common household wood work.
- Wiring various electrical joints in common household electrical wire work.
- Welding various joints in steel plates using arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipments; Making a tray out of metal sheet using sheet metal work.
- Soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB.
- Understand the component parts of computer systems.
- Understand the master programming constructs, and develop, test, and debug programs.
- Identify and analyze problems, and design and implement solutions.


Part – A (Civil and Mechanical)
(Students will be offered any 10 experiments)

1.	Land documents reading and understanding
2.	Material identification and testing as per BIS & NBC
3.	Basic surveying and land area measurement
4.	Water analysis
5.	Basic vastu
6.	Make a Butt/Lap/Tee joint of MS plate using Arc welding and also make Lap joint using riveting
7.	Prepare T/L/Lap joint from the given wooden workpiece and make a Box /Tray out of plywood using modern power tools
8.	Perform the simple turning, drilling, tapping using lathe
9.	Demonstration of basic foundry operations
10.	Making a square tray using sheet metal
11.	Study of various metals and alloys
12.	Hands on training to use measuring instruments
13.	Study of 3-D printer / Robotics architecture / Mechatronics system

Part – B (Electrical and Electronics)

Students will be offered any 07 experiments

1.	Study of electrical switches, fuses, indicators, circuit breakers, contactors and relays
2.	Wiring circuit for fluorescent lamp and Stair case wiring
3.	Wiring Circuit of ceiling fan
4.	Measurement of Earth Resistance
5.	House wiring with energy meter, RCCB and ELCB


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6.	Study of electronic components resistor, diode, transistors, measuring devices
7.	Soldering and Assembly of Simple Circuits and trouble shooting
8.	Assembly and dismantle of smartphone
Part- C (Computer Technologies)	
1.	Office automation tools - Word processing
2.	Office automation tools -Spread sheets
3.	Office automation tools - Presentation preparation
4.	Network topology configuration
5.	Network crimping & I/O outlet termination
6.	Types of operating systems and installation

L:0	T:0	P:60	Total :60 Periods
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COURSE OUTCOMES:
<p>Upon completion of this course, the students will be able to:</p> <p>CO1: Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.</p> <p>CO2: Wire various electrical joints in common household electrical wire work.</p> <p>CO3: Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.</p> <p>CO4: Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.</p> <p>CO5: Evaluate the performance of different types of CPU scheduling algorithm.</p> <p>CO6: Use different systems calls for writing application programs.</p>



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24UEC211	CIRCUITS AND DEVICES LABORATORY	L	T	P	C
		0	0	4	2

Prerequisites:

Nil

COURSE OBJECTIVES:

- To learn the characteristics of PN Junction diode and Zener diode.
- To understand the operation of BJT configurations
- To gain hands- on experience in Thevenin & Norton theorem, KVL & KCL, and Superposition Theorems
- To understand the working of RL, RC and RLC circuits
- To simulate rectifier and transistor circuits

LIST OF EXPERIMENTS

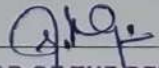
1. Characteristics of PN Junction Diode
2. Zener diode Characteristics & Regulator using Zener diode
3. Common Emitter input-output Characteristics
4. Common Base input-output Characteristics
5. Verifications of Ohms Law, KVL and KCL
6. Verifications of Thevenin and Norton theorem
7. Verifications of Super Position Theorem
8. Verifications of maximum power transfer
9. Determination of Resonance Frequency of Series & Parallel RLC Circuits
10. Transient analysis of RL and RC circuits

Simulation Experiments

1. Simulation of Half wave & Full wave Rectifier
2. Simulation of FET & SCR Characteristics

LIST OF EQUIPMENTS REQUIRED

1. Resistors, Capacitors, Inductors – sufficient quantities. Bread Boards
2. CRO (30MHz)
3. Regulated Power Supplies (0 – 30V)
4. Decade Resistance Box
5. Voltmeter(0-30v)
6. Ammeter(0-30mA)
7. Signal Generators / Function Generators (3 MHz)
8. Breadboards
9. Standalone desktops PC
10. Open-source simulator – circuit design (e-sim, Multisim)


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L:0	T: 0	P: 30	Total: 30 Periods
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TEXT BOOKS

1. Hayt Jack Kemmerly, Steven Durbin, "Engineering Circuit Analysis", McGraw Hill education, 9 th Edition, 2018.
2. Charles K. Alexander & Mathew N.O.Sadiku, "Fundamentals of Electric Circuits", McGraw- Hill, 2nd Edition, 2003.
3. Joseph Edminister and Mahmood Nahvi, "Electric Circuits, Schaum's Outline Series", Tata McGraw Hill Publishing Company, New Delhi, Fifth Edition Reprint 2016.

REFERENCES

1. David Bell, "Fundamentals of Electric Circuits", Oxford University press, 7th Edition, 2009.
2. John O Mally, Schaum's Outlines "Basic Circuit Analysis", The Mc Graw Hill companies, 2nd Edition, 2011.
3. A.Bruce Carlson, "Circuits: Engineering Concepts and Analysis of Linear Electric Circuits, Cengage Learning, India Edition 2nd Indian Reprint 2009.
4. Allan H.Robbins, Wilhelm C.Miller, "Circuit Analysis Theory and Practice", Cengage Learning, Fifth Edition, 1st Indian Reprint 2013

COURSE OUTCOMES

At the end of the course students should be able to

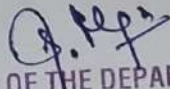
CO1: Analyse the characteristics of PN and Zener diode

CO2: Design and testing of BJT configuration

CO3: Analyse the Ohms Law, KVL and KCL

CO4: Design RL and RC circuits

CO5: Simulate and validate the design of Rectifiers and transistor


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24UHS211	COMMUNICATION LABORATORY (Common to all Branches)	L	T	P	C
		0	0	4	2

Prerequisites:

- Basic Knowledge in Language usage

COURSE OBJECTIVES:

- To identify varied group discussion skills and apply them to take part in effective discussions in a professional context.
- To analyse concepts and problems and make effective presentations explaining them clearly and precisely.
- To be able to communicate effectively through formal and informal writing.
- To be able to use appropriate language structures to write emails, reports and essays
- To give instructions and recommendations that are clear and relevant to the context

UNIT-I	MAKING COMPARISONS	12
Speaking-Role Play Exercises Based on Workplace Contexts, - talking about competition discussing progress toward goals-talking about experiences- talking about events in life-discussing past events-Writing: writing emails (formal & semi-formal).		

UNIT-II	EXPRESSING CAUSAL RELATIONS IN SPEAKING AND WRITING	12
Speaking: discussing news stories-talking about frequency-talking about travel problems discussing travel procedures- talking about travel problems- making arrangements-describing arrangements-discussing plans and decisions- discussing purposes and reasons- understanding common technology terms-Writing: - writing different types of emails.		

UNIT-III	PROBLEM SOLVING	12
Speaking: discussing predictions-describing the climate-discussing forecasts and scenarios-talking about purchasing-discussing advantages and disadvantages- making comparisons-discussing likes and dislikes- discussing feelings about experiences-discussing imaginary scenarios Writing: short essays and reports-formal/semi-formal letters.		

UNIT-IV	REPORTING OF EVENTS AND RESEARCH	12
Speaking: discussing the natural environment-describing systems-describing position and movement- explaining rules - (example- discussing rental arrangements) - understanding technical instructions-Writing: writing instructions-writing a short article.		

UNIT-V	THE ABILITY TO PUT IDEAS OR INFORMATION COGENTLY	12
Speaking: describing things relatively-describing clothing-discussing safety issues (making recommendations) talking about electrical devices-describing controlling actions- Writing: job application (Cover letter + Curriculum vitae)-writing recommendations.		

L: 00	T: 00	P: 60	Total : 60 Periods
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Recognized by UGC & Accredited by NAAC and NBA (CSE and ECE)

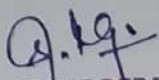


REGULATIONS 2024

B.E. ELECTRONICS AND COMMUNICATION ENGINEERING

CHOICE BASED CREDIT SYSTEM

SYLLABUS FOR SEMESTER III


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24UMA303	PROBABILITY AND RANDOM PROCESS II Year / III Sem (B.E ECE)	L	T	P	C
		3	1	0	4

COURSE OBJECTIVE :

- To provide necessary basic concepts in probability and random processes for applications such as random signals, linear systems in communication engineering.
- To understand the basic concepts of some standard distributions applicable to engineering this can describe real life phenomenon.
- To understand two dimensional random variables applicable to engineering this can describe real life phenomenon.
- To understand the basic concepts of random processes which are widely used in communication fields also the concept of correlation and spectral densities.
- To understand the significance of linear systems with random inputs.

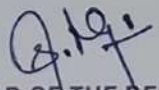
UNIT-I	PROBABILITY AND RANDOM VARIABLES	9+3
Probability – Axioms of probability – Conditional probability – Baye’s theorem - Discrete and continuous random variables – Moments – Moment generating functions –		

UNIT-II	DISCRETE AND CONTINUOS DISTRIBUTIONS	9+3
Discrete -Binomial, Poisson, Geometric distributions Continuous-Uniform, Exponential and Normal distributions.		

UNIT-III	TWO - DIMENSIONAL RANDOM VARIABLES	9+3
Joint distributions – Marginal and conditional distributions – Covariance – Correlation and linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).		

UNIT-IV	RANDOM PROCESSES ,CORRELATION AND SPECTRAL DENSITIES	9+3
Classification – Stationary process – Markov process - Markov chain - Poisson process – Random telegraph process. Auto correlation functions – Cross correlation functions – Properties – Power spectral density – Cross spectral density – Properties.		

UNIT-V	LINEAR SYSTEMS WITH RANDOM INPUTS	9+3
Linear time invariant system – System transfer function – Linear systems with random inputs – Auto correlation and cross correlation functions of input and output. Gaussian process & filter.		


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L:45	T:15	T: 60 PERIODS
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TEXT BOOKS

1. Ibe, O.C., "Fundamentals of Applied Probability and Random Processes ", 1st Indian Reprint, Elsevier, 2007.
2. Peebles, P.Z., "Probability, Random Variables and Random Signal Principles ", Tata McGraw Hill, 4th Edition, New Delhi, 2002.

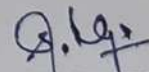
REFERENCES

1. Cooper. G.R., McGillem. C.D., "Probabilistic Methods of Signal and System Analysis", Oxford University Press, New Delhi, 3rd Indian Edition, 2012.
2. Hwei Hsu, "Schaum's Outline of Theory and Problems of Probability, Random Variables and Random Processes ", Tata McGraw Hill Edition, New Delhi, 2004.
3. Miller. S.L. and Childers. D.G., "Probability and Random Processes with Applications to Signal Processing and Communications ", Academic Press, 2004.
4. Stark. H. and Woods. J.W., "Probability and Random Processes with Applications to Signal Processing ", Pearson Education, Asia, 3rd Edition, 2002.
5. Yates. R.D. and Goodman. D.J., "Probability and Stochastic Processes", Wiley India Pvt. Ltd., Bangalore, 2nd Edition, 2012.

COURSE OUTCOMES

At the end of the course students should be able to

- CO1: Understand the fundamental knowledge of the concepts of probability random signals, linear systems in communication engineering.
- CO2: Have knowledge of standard distributions which can describe real life phenomenon.
- CO3: Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
- CO4: Apply the concept random processes ,correlation and spectral densities in engineering disciplines
- CO5: Able to analyze the response of random inputs to linear time invariant systems.



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24UEC301	SIGNALS AND SYSTEMS	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES:

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

UNIT-I	CLASSIFICATION OF SIGNALS AND SYSTEMS	6 + 6
Definition of signals - Standard signals - Classification of signals – Continuous time (CT) and Discrete Time (DT) signals, Periodic & Aperiodic signals, Deterministic & Random signals, odd & even signals, Energy & Power signals – Operation on signals - Classification of systems- CT systems and DT systems- – Linear & Nonlinear, Time-variant & Time-invariant, Causal & Non-causal, Stable & Unstable.		

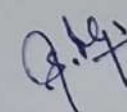
UNIT-II	ANALYSIS OF CONTINUOUS TIME SIGNALS	6 + 6
Fourier series for periodic signals - Fourier Transform – properties- Laplace Transforms and Properties - Inverse Fourier and inverse Laplace Transform		

UNIT-III	LINEAR TIME INVARIANT CONTINUOUS TIME SYSTEMS	6 + 6
Impulse response - convolution integrals- Differential Equation- Fourier and Laplace transforms in Analysis of CT systems - Systems connected in series / parallel.		

UNIT-IV	ANALYSIS OF DISCRETE TIME SIGNALS	6 + 6
Baseband signal Sampling–Fourier Transform of discrete time signals (DTFT)– Properties of DTFT - Z Transform & Properties		

UNIT-V	LINEAR TIME INVARIANT-DISCRETE TIME SYSTEMS	6 + 6
Impulse response–Difference equations - Convolution sum- Discrete Fourier Transform and Z Transform Analysis of Recursive & Non-Recursive systems-DT systems connected in series and parallel.		

L:30	T: 30	P: 0	Total: 60 Periods
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TEXT BOOKS

1. Oppenheim, Willsky and Hamid, "Signals and Systems", 2nd Edition, Pearson Education, New Delhi, 2017. (Units I - V)
2. Simon Haykin, Barry Van Veen, "Signals and Systems", 2nd Edition, Wiley, 2007.

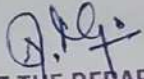
REFERENCES

1. B. P. Lathi, "Principles of Linear Systems and Signals", 2nd Edition, Oxford, 2009.
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, 2007.

COURSE OUTCOMES

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

- CO1: Classify a given signal or a system by analyzing the mathematical representation
- CO2: Determine the frequency components present in a deterministic signal.
- CO3: Characterize continuous LTI systems in the time domain and frequency domain
- CO4: Characterize discrete LTI systems in the time domain and frequency domain
- CO5: Compute the output of an LTI system in the time and frequency domains


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24UEC302	ANALOG ELECTRONICS	L	T	P	C
		3	0	0	3

Prerequisites:

Basic Electrical and Electronic Devices

COURSE OBJECTIVES:

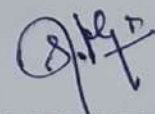
- To analyze the frequency response of small signal amplifiers
- To design and analyze single stage and multistage amplifier circuits
- To design and analyze Differential amplifier amplifier circuits
- To study about feedback amplifiers and oscillators principles
- To understand the analysis and design of multi vibrators

UNIT-I	AMPLIFIERS	9
Introduction of feedback & types, 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 and Source follower – Gain and frequency response- High frequency analysis.		

UNIT-II	SMALL SIGNAL ANALYSIS AND MULTI STAGE AMPLIFIERS	9
Small signal Amplifier, Amplifier Bandwidth, Hybrid model, analysis of transistor amplifier using h-parameter, Multistage Amplifier: Cascading amplifier, Boot-strapping Technique, Darlington amplifier, Coupling methods in multistage amplifier.		

UNIT-III	DIFFERENTIAL AMPLIFIER	9
Cascode amplifier, Differential amplifier – Common mode and Difference mode analysis – MOSFET input stages – 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		



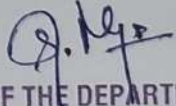
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UNIT-V	POWER AMPLIFIERS AND DC/DC CONVERTERS	9
Power amplifiers- class A-Class B-Class AB-Class C-Power MOSFET-Temperature Effect- Class AB Power amplifier using MOSFET –DC/DC convertors – Buck, Boost, Buck-Boost analysis and Design		

L:45	T: 0	P: 0	Total: 45 Periods
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TEXT BOOKS
<ol style="list-style-type: none"> 1. David A. Bell," Electronic Devices and Circuits", Oxford Higher Education press, 5thEdition, 2010. 2. Robert L. Boylestad and Louis Nasheresky, "Electronic Devices and Circuit Theory", 10thEdition, Pearson Education / PHI, 2008. 3. Adel. S. Sedra, Kenneth C. Smith, "Micro Electronic Circuits", Oxford University Press, 7thEdition, 2014
REFERENCES
<ol style="list-style-type: none"> 1. Donald.A. Neamen, "Electronic Circuit Analysis and Design", Tata McGraw Hill, 3rd Edition, 2010. 2. D.Schilling and C.Belove, "Electronic Circuits", McGraw Hill, 3rd Edition, 1989 3. Muhammad H.Rashid, "Power Electronics", Pearson Education / PHI , 2004

COURSE OUTCOMES
At the end of the course students should be able to
CO1: Design and analyze amplifiers.
CO2: Design Small Signal Analysis and Multi Stage Amplifiers
CO3: Design and analyze Differential Amplifier
CO4: Design and analyze feedback amplifiers and oscillator principles
CO5: Design and analyze power amplifiers and supply circuits


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24UEC303	CONTROL SYSTEMS ENGINEERING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

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

UNIT-I	SYSTEMS COMPONENTS AND THEIR REPRESENTATION	9
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		

UNIT-II	TIME RESPONSE ANALYSIS	9
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	9
Closed loop frequency response-Performance specification in frequency domain-Frequency response of standard second order system- Bode Plot - Polar Plot-Design of compensators using Bode Plots-Cascade lead compensation-Cascade lag compensation-Cascade lag-lead compensation		

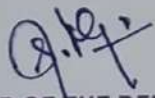
UNIT-IV	CONCEPTS OF STABILITY ANALYSIS	9
Concept of stability-Bounded-Input Bounded- Output stability-Routh stability criterion-Relative stability-Root locus concept-Guidelines for sketching root locus		

UNIT-V	CONTROL SYSTEM ANALYSIS USING STATE VARIABLE METHODS	9
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		

L:45	T:0	P:0	T: 45 PERIODS
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TEXT BOOKS

1. M. Gopal, "Control System- Principles and Design", Tata Mc Graw Hill, 4th Edition, 2012.


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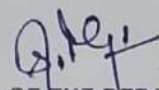
REFERENCES

1. J. Nagrath and M. Gopal, "Control System Engineering", New Age International Publishers, 5th Edition, 2007.
2. K. Ogata, "Modern Control Engineering", PHI, 5th Edition, 2012.
3. S.K. Bhattacharya, "Control System Engineering", Pearson, 3rd Edition, 2013.
4. Benjamin. C. Kuo, "Automatic Control Systems", Prentice Hall of India, 7th Edition, 1995.

COURSE OUTCOMES

At the end of the course students should be able to

- CO1: Compute the transfer function of different physical systems.
CO2: Analyse the time domain specification and calculate the steady state error.
CO3: Illustrate the frequency response characteristics of open loop and closed loop system response.
CO4: Analyse the stability using Routh and root locus techniques.
CO5: Illustrate the state space model of a physical system and discuss the concepts of sampled data control system.


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24UCS321	C PROGRAMMING AND DATA STRUCTURES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To introduce the basics of C programming language
- To learn the concepts of advanced features of C.
- To understand the concepts of ADTs and linear data structures.
- To know the concepts of non-linear data structure and hashing.
- 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 – Doubly-Linked Lists – Circular Linked List – Stack ADT – Implementation of Stack – Applications: Balancing Symbols – Evaluating arithmetic expressions – 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		

L: 45	T: 0	P:0	Total: 45 Periods
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TEXT BOOKS

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 1997.
2. Reema Thareja, "Programming in C", Second Edition, Oxford University Press, 2016.

REFERENCES

1. Brian W. Kernighan, Rob Pike, "The Practice of Programming", Pearson Education, 1999.
2. Paul J. Deitel, Harvey Deitel, "C How to Program", Seventh Edition, Pearson Education, 2013.
3. Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, 1983.
4. Ellis Horowitz, Sartaj Sahni and Susan Anderson, "Fundamentals of Data Structures", Galgotia, 2008

COURSE OUTCOMES

At the end of the course students should be able to:

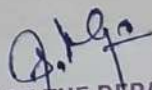
CO1 Develop C programs for any real world/technical application.

CO2 Apply advanced features of C in solving problems.

CO3 Write functions to implement linear and non-linear data structure operations.

CO4 Suggest and use appropriate linear/non-linear data structure operations for solving a given problem and Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.

CO5 Appropriately use sort and search algorithms for a given application.


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24UECI301	DIGITAL SYSTEM DESIGN	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

- To present the fundamentals of digital circuits and simplification methods
- To practice the design of various combinational digital circuits using logic gates
- To bring out the analysis and design procedures for synchronous and asynchronous Sequential circuits
- To Learn HDL for digital circuit design and modeling.
- To Understand and apply logic families and programmable devices for circuit implementation.

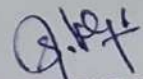
UNIT-I	BASIC CONCEPTS	9
Review of number systems-representation-conversions, Review of Boolean algebra-theorems, sum of product and product of sum simplification, canonical forms min term and max term, Simplification of Boolean expressions-Karnaugh map, completely and incompletely specified functions, Implementation of Boolean expressions using universal gates.		

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.		

UNIT-III	SEQUENTIAL CIRCUITS	9
Introduction to Synchronous and Asynchronous- 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 – Hazards, Essential Hazards.		

UNIT-IV	HDL MODEL	9
Introduction to HDL –HDL Design Abstractions- Behavioral Modeling, Dataflow Modeling, Structural Modeling- Basic gates of HDL programming - HDL Models of Combinational Circuits – Half Adder, Full Adder, Multiplexer, Demultiplexer, Encoder, Decoder - HDL Models of Sequential Circuits - Flip-Flops: D, JK, T using behavioral modeling, Modeling - 4-bit Register, counters.		

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.		


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L:45	T:0	P: 30	Total :75 Periods
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PRACTICAL EXERCISES

30 PERIODS

Hardware Based Experiments

1. Design of half adder and half subtractor
2. Design of code converters (Binary to Gray and vice versa)
3. Design of Multiplexers & Demultiplexers.
4. Design of Encoders and Decoders.

HDL -Based Programming

5. Design of full adder and full subtractor
6. Design of code converters (BCD to Excess-3 and vice versa)
7. Design of Magnitude Comparators (2 – bit)
8. Design and implementation of Synchronous Counter using Flip-Flops
9. Design and implementation of shift registers.

TEXT BOOKS

1. M.Morris Mano and Michael D.Ciletti, 'Digital Design', Pearson, 5th Edition, 2018. (Unit- I - V).

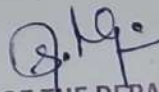
REFERENCES

1. Charles H. Roth, Jr, 'Fundamentals of Logic Design', Jaico Books, 4th Edition, 2002.
2. William I. Fletcher, "An Engineering Approach to Digital Design", Prentice- Hall of India, 1980.
3. Floyd T.L., "Digital Fundamentals", Charles E. Merrill publishing company, 1982.
4. John. F. Wakerly, "Digital Design Principles and Practices", Pearson Education, 4th Edition, 2007.

COURSE OUTCOMES

At the end of the course students should be able to

- CO1: Use Boolean algebra and simplification procedures relevant to digital logic
 CO2: Design various combinational digital circuits using logic gates
 CO3: Analyses and design synchronous sequential circuits
 CO4 : Develop HDL models for combinational and sequential circuits
 CO5: Build logic gates and use programmable devices.


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24UEC312	PCB Design and Development Using KiCad & EasyEDA	L	T	P	C
		1	0	3	2

COURSE OBJECTIVES:

- To introduce students to the KiCad and EasyEDA PCB design software, their interfaces, and features.
- To provide hands-on experience in designing basic electronic circuits and PCB layouts.
- To teach students the importance of component selection, layout design, and design rule checks (DRC) in PCB development.
- To design and simulate a thermistor-controlled mini DC fan circuit and multivibrator using the tools and techniques learned during the course.
- To help students develop a final PCB project, focusing on real-world applications and demonstrating the knowledge they have gained throughout the course.

LIST OF EXPERIMENTS

1. Introduction to KiCad / EasyEDA
2. Schematic Design and Component Selection
3. PCB Layout Design and Component Placement
4. Routing PCB Traces and Signal Integrity
5. Generating Gerber Files for PCB Fabrication
6. Thermistor controlled mini - DC fan
7. Design Multivibrator
8. Project development with KiCad / EasyEDA

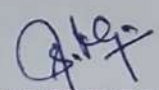
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TEXT BOOKS

1. KiCad Cookbook by Simon M. O'Donnell
2. PCB Design for Real-World Applications by Chris Schroeder
3. EasyEDA: A Complete Beginner's Guide by Philip J. P. Tseng
4. Practical Electronics for Inventors by Paul Scherz and Simon Monk

REFERENCES

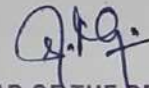
1. The Art of Electronics by Paul Horowitz and Winfield Hill
2. High-Speed Digital Design: A Handbook of Black Magic" by Howard Johnson and Martin Graham
3. Practical Design of Digital Circuits by John F. Wakerly
4. PCB Design for Manufacturing: A Designer's Guide to the Electronics Manufacturing Industry" by Chris Schroeder


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COURSE OUTCOMES

At the end of the course students should be able to

- CO1:** Demonstrate a clear understanding of PCB design software tools (KiCad & EasyEDA) for schematic capture, PCB layout, and Gerber file generation.
- CO2:** Design and simulate basic electronic circuits using KiCad and EasyEDA, including component selection, placement, and routing.
- CO3:** Apply principles of signal integrity and routing techniques to ensure efficient PCB layouts.
- CO4:** Generate Gerber files and other fabrication-related documentation required for PCB manufacturing.
- CO5:** Design a functional PCB-based project, such as a thermistor-controlled DC fan and a multivibrator circuit, and test their performance in real-world applications.

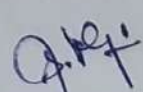


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24UEC311	ANALOG ELECTRONICS LABORATORY	L	T	P	C
		0	0	3	1.5
COURSE OBJECTIVES:					
<ul style="list-style-type: none"> To learn the characteristics of BJT and FET To learn the characteristics of MOSFET To study the characteristics of amplifier. To study the characteristics of Oscillator 					
LIST OF EXPERIMENTS					
Hardware Experiments					
<ol style="list-style-type: none"> MOSFET Drain current and Transfer Characteristics. Frequency response of CE amplifiers. Frequency response of CS amplifiers. CMRR measurement of Differential Amplifier Class A Transformer Coupled Power Amplifier. RC Phase shift oscillator 					
Software Experiments					
<ol style="list-style-type: none"> CB and CC Amplifiers – Frequency Response Cascode Amplifier - Frequency Response Shunt feedback amplifiers- Frequency response, Input and output impedance Series Feedback Amplifier Wien Bridge Oscillator Colpitts and Hartley Oscillators 					

L:0	T: 0	P: 30	Total: 45 Periods
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LIST OF EQUIPMENTS REQUIRED
Components and Accessories:
Transistors, Resistors, Capacitors, Inductors, diodes, Zener Diodes, Bread Boards, Transformers. SPICE Circuit Simulation Software: (any public domain or commercial software)
<ul style="list-style-type: none"> DC Power Supply Function Generator Oscilloscope
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


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TEXT BOOKS

1. David A. Bell, "Electronic Devices and Circuits", Oxford Higher Education press, 5thEdition, 2010.
2. Robert L. Boylestad and Louis Nasheresky, "Electronic Devices and Circuit Theory", 10thEdition, Pearson Education / PHI, 2008.
3. Adel.S. Sedra, Kenneth C. Smith, "Micro Electronic Circuits", Oxford University Press, 7th Edition, 2014

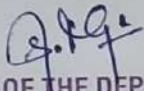
REFERENCES

1. Donald.A. Neamen, "Electronic Circuit Analysis and Design", Tata McGraw Hill, 3rdEdition, 2010.
2. D. Schilling and C. Belove, "Electronic Circuits", McGraw Hill, 3rd Edition, 1989
3. Muhammad H. Rashid, "Power Electronics", Pearson Education / PHI 2004

COURSE OUTCOMES

At the end of the course students should be able to

- CO1: Design and Testing of MOSFET amplifiers
- CO2: Design and Testing of BJT amplifiers
- CO3: Design of Differential Amplifier
- CO4: Analyze various types of feedback amplifiers
- CO5: Analyze various types of Oscillator


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24UCS322	C PROGRAMMING AND DATA STRUCTURES LABORATORY	L	T	P	C
		0	0	3	1.5

COURSE OBJECTIVES

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

LIST OF EXPERIMENTS:

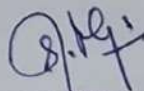
1. Download, install and explore the features of NumPy, SciPy, Jupyter, Statsmodels and Practice of C programming using statements, expressions, decision making and iterative statements
2. Practice of C programming using Functions and Arrays
3. Implement C programs using Pointers and Structures
4. Implement 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

COURSE OUTCOMES

At the end of the course students should be able to:

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

L: 0	T: 0	P: 45	Total: 45 Periods
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(An Autonomous Institution)

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

Recognized by UGC & Accredited by NAAC and NBA (CSE and ECE)



REGULATIONS 2024

B. E. ELECTRONICS AND COMMUNICATION ENGINEERING

CHOICE BASED CREDIT SYSTEM

SYLLABUS FOR IV SEMESTER

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24UEC401	ELECTROMAGNETIC FIELDS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES					
<ul style="list-style-type: none"> To impart knowledge on the basics of static electric field and the associated laws To impart knowledge on the basics of static magnetic field and the associated laws To give insight into coupling between electric and magnetic fields through Faraday's law, displacement current and Maxwell's equations To gain the behaviour of the propagation of EM waves 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.		

UNIT-II	ELECTROSTATICS	9
Electric field, Coulomb's law and field intensity, Electric field intensity due to straight line, Gauss's law and applications, Electric potential, Conductors and Dielectrics in static electric field, Electric flux density and dielectric constant, Boundary conditions, Capacitance - Parallel, coaxial and spherical capacitors, Electrostatic energy, Poisson's and Laplace's equations, Current density.		

UNIT-III	MAGNETOSTATICS	9
Lorentz force equation, Ampere's law, Vector magnetic potential, Biot-Savart law -Magnetic field intensity and idea of relative permeability, Calculation of magnetic field intensity for Straight wire, Behaviour of magnetic materials, Boundary conditions, Inductance for solenoid and toroid, 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 the Phenomenon of wave propagation with the aid of Maxwell's equations		

UNIT-V	PLANE ELECTROMAGNETIC WAVES	9
Polarization, 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		

L: 45	T: 0	P: 0	Total: 45 Periods
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G. R. J.
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Avinashipalayam, Tirupur-638660.

TEXT BOOKS

1. D.K. Cheng, Field and wave electromagnetics, 2nd ed., Pearson (India), 2002
2. M.N.O.Sadiku and S.V. Kulkarni, Principles of electromagnetics, 6th ed., Oxford (Asian Edition), 2015

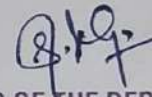
REFERENCES

1. Edward C. Jordan & Keith G. Balmain, Electromagnetic waves and Radiating Systems, Second Edition, Prentice-Hall Electrical Engineering Series, 2012.
2. W.H. Hayt and J.A. Buck, Engineering electromagnetics, 7th ed., McGraw-Hill (India), 2006.
3. B.M. Notaros, Electromagnetics, Pearson: New Jersey, 2011.

COURSE OUTCOMES

At the end of the course students should be able to:

- CO1: Relate the fundamentals of vector, coordinate system to electromagnetic concepts
CO2: Analyze the characteristics of Electrostatic field
CO3: Explain the concepts and characteristics of Magneto Static field in material space and solve boundary conditions.
CO4: Determine the significance of time varying fields
CO5: Explain how electromagnetic waves propagate in different media.



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24UEC402	LINEAR INTEGRATED CIRCUITS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To introduce the basic building blocks of linear integrated circuits
- To learn the linear and non-linear applications of operational amplifiers
- To introduce the theory and applications of analog multipliers and PLL
- To learn the theory of ADC and DAC
- 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.		

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, analog multiplier ICs and their applications, Operation of the basic PLL, Closed loop analysis, Voltage controlled oscillator, Monolithic PLL 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 Mode and 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, Multivibrators 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, Switched capacitor filter IC MF10, Audio Power amplifier, Video Amplifier		

L: 45	T: 0	P: 0	Total: 45 Periods
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TEXT BOOKS

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

REFERENCES

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, 2001.
3. S.Salivahanan & V.S. Kanchana Bhaskaran, "Linear Integrated Circuits", TMH, 2nd Edition, 4th Reprint, 2016.

COURSE OUTCOMES

At the end of the course students should be able to:

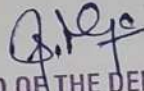
CO1: Explain the ideal characteristics of an operational amplifier.

CO2: Design linear and nonlinear applications of OP – AMPS.

CO3: Design applications using analog multiplier and PLL.

CO4: Design ADC and DAC using OP – AMPS.

CO5: Analyze special function ICs and generate waveforms using OP – AMP Circuits.


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24UEC403	COMMUNICATION SYSTEMS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To introduce Analog Modulation Schemes.
- To impart knowledge in random process.
- To study various Digital techniques.
- To introduce the importance of sampling & quantization.
- To impart knowledge in demodulation techniques.

UNIT-I	AMPLITUDE MODULATION	9
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, Super heterodyne Receiver.		

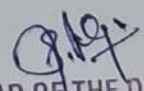
UNIT-II	NOISE EFFECTS & SAMPLING	9
Gaussian and white noise characteristics, Noise in Amplitude modulation systems, Noise in Frequency modulation systems. Pre-emphasis and De-emphasis. Low pass sampling – Aliasing-Signal Reconstruction-Quantization - Uniform & non-uniform quantization - quantization noise - Nyquist criterion – Pulse Modulation - PAM, PPM, PWM.		

UNIT-III	DIGITAL TECHNIQUES	9
PCM, Differential pulse code modulation. Delta modulation – Adaptive Delta modulation - Linear Block codes - Shannon – Fano coding, Huffman Coding, Line Coding Techniques - 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 - 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- Inter symbol Interference, Optimum demodulation of digital signals over band-limited channels.		

L: 45	T: 0	P: 0	Total: 45 Periods
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TEXT BOOKS

1. Simon Haykins, "Communication Systems", Wiley, 5th Edition, 2009. (Unit I - V)
2. B.P.Lathi, "Modern Digital and Analog Communication Systems", 4th Edition, Oxford University Press, 2021.

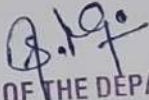
REFERENCES

1. Wayne Tomasi, Electronic Communication System, 5th Edition, Pearson Education, 2008.
2. D.Roody, J.Coolen, Electronic Communications, 4th edition PHI 2006.
3. A.Papoulis, "Probability, Random variables and Stochastic Processes", McGraw Hill, 3rd edition, 1991.
4. B.Sklar, "Digital Communications Fundamentals and Applications", 2nd Edition Pearson Education 2007.
5. H P Hsu, Schaum Outline Series - "Analog and Digital Communications" TMH 2006.
6. Couch.L., "Modern Communication Systems", Pearson, 2001.

COURSE OUTCOMES

At the end of the course students should be able to:

- CO1: Use amplitude, frequency, and phase modulation methods for communication operations.
- CO2: Implement sampling techniques including low-pass sampling, aliasing, signal reconstruction, and Nyquist criterion to convert analog signals into discrete signals.
- CO3: Apply digital coding techniques to encode and transmit information efficiently.
- CO4: Employ suitable digital modulation techniques to transmit digital data over communication channels.
- CO5: Execute appropriate demodulation techniques to retrieve the original information from modulated signals.


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24UGE401	ENVIRONMENTAL SCIENCE AND SUSTAINABILITY	L	T	P	C
		2	0	0	2

COURSE OBJECTIVES

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

UNIT-I	ENVIRONMENT AND BIODIVERSITY	6
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		

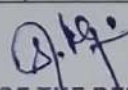
UNIT-II	ENVIRONMENTAL POLLUTION	6
Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts.		

UNIT-III	RENEWABLE SOURCES OF ENERGY	6
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	6
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	6
Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization- Socio economical and technological change.		

L: 30	T: 0	P: 0	Total: 30 Periods
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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.
3. Gilbert M. Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.
4. Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.
5. Bradley. A.S; Adebayo, A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning.
6. Environment Impact Assessment Guidelines, Notification of Government of India, 2006.
7. Mackenthun, K.M., Basic Concepts in Environmental Management, Lewis Publication, London, 1998.


REFERENCES

1. Wayner Tomasi, Electronic Communication System, 5th Edition, Pearson Education, 2008.
2. D. Roody, J. Coolen, Electronic Communications, 4th edition PHI 2006.
3. A. Papoulis, "Probability, Random variables and Stochastic Processes", McGraw Hill, 3rd edition, 1991.
4. B. Sklar, "Digital Communications Fundamentals and Applications", 2nd Edition Pearson Education 2007.
5. H P Hsu, Schaum Outline Series - "Analog and Digital Communications" TMH 2006.
6. Couch.L., "Modern Communication Systems", Pearson, 2001.

COURSE OUTCOMES

At the end of the course students should be able to:

- CO1: To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.
- CO2: To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.
- 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.
- CO4: To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
- CO5: To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.


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24UECI401	NETWORKS & SECURITY	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES

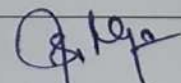
- To learn the Network Models and datalink layer functions.
- To understand routing in the Network Layer.
- To explore methods of communication and congestion control by the Transport Layer.
- To study the Network Security Mechanisms.
- To learn various hardware security attacks and their countermeasures.

UNIT-I	NETWORK MODELS AND DATALINK LAYER	9
Introduction to data communication – Network Models – OSI, TCP/IP, Addressing – Introduction to Data link Layer – Error Detection and Correction – Ethernet (802.3)- Wireless LAN – IEEE 802.11, Bluetooth – Flow and Error Control Protocols – HDLC – PPP.		
UNIT-II	NETWORK LAYER PROTOCOLS	9
Network Layer – IPv4 Addressing – Network Layer Protocols (IP, ICMP and Mobile IP) Unicast and Multicast Routing – Intra domain and Inter domain Routing Protocols – IPv6 Addresses – IPv6 –Datagram Format - Transition from IPv4 to IPv6.		
UNIT-III	TRANSPORT AND APPLICATION LAYERS	9
Transport Layer Protocols – UDP and TCP Connection and State Transition Diagram - Congestion Control and Avoidance (DEC bit, RED)- QoS - Application Layer Paradigms – Client – Server Programming – Domain Name System – World Wide Web, HTTP, Electronic Mail.		
UNIT-IV	NETWORK SECURITY	9
OSI Security Architecture – Attacks – Security Services and Mechanisms – Encryption –Advanced Encryption Standard – Public Key Cryptosystems – RSA Algorithm – Hash Functions – Secure Hash Algorithm – Digital Signature Algorithm.		
UNIT-V	HARDWARE SECURITY	9
Introduction to hardware security, Hardware Trojans, Side – Channel Attacks – Physical Attacks and Countermeasures – Design for Security. Introduction to Blockchain Technology.		

LIST OF EXPERIMENTS

Experiments using C

1. Implement the Data Link Layer framing methods,
 - i) Bit stuffing, (ii) Character stuffing
2. Implementation of Error Detection / Correction Techniques
 - i) LRC, (ii) CRC, (iii) Hamming code
3. Implementation of Stop and Wait, and Sliding Window Protocols
4. Implementation of Go back-N and Selective Repeat Protocols.
5. Implementation of Distance Vector Routing algorithm (Routing Information Protocol) (Bellman-Ford).
6. Implementation of Link State Routing algorithm (Open Shortest Path First) with 5 nodes (Dijkstra's).



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7. Data encryption and decryption using Data Encryption Standard algorithm.
8. Data encryption and decryption using RSA (Rivest, Shamir and Adleman) algorithm.
9. Implement Client Server model using FTP protocol.

LIST OF EQUIPMENTS REQUIRED

Experiments using Tool Command Language

1. Implement and realize the Network Topology - Star, Bus and Ring using NS2/C/Java/Python.
2. Implement and perform the operation of CSMA/CD and CSMA/CA using NS2/C/Java/Python.

L: 45	T: 0	P: 30	Total: 75 Periods
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TEXT BOOKS

1. Behrouz.A.Forouzan, Data Communication and Networking, Fifth Edition, TMH, 2017. (Unit – I,II,III)
2. William Stallings, Cryptography and Network Security, Seventh Edition, Pearson Education, 2017 (Unit-IV) IV) 3. Bhunia Swarup, Hardware Security –A Hands On Approach, Morgan Kaufmann, First edition, 2018. (Unit – V).

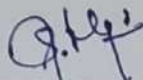
REFERENCES

1. James.F.Kurose and Keith.W.Ross, Computer Networking – A Top – Down Approach, Sixth Edition, Pearson, 2017.
2. Douglas .E.Comer, Computer Networks and Internets with Internet Applications, Fourth Edition, Pearson Education, 2008.

COURSE OUTCOMES

At the end of the course students should be able to:

- CO1: Explain the Network Models, layers and functions.
CO2: Categorize and classify the routing protocols.
CO3: Explain the functions of the transport and application layer
CO4: Evaluate and choose the network security mechanisms.
CO5: Discuss the hardware security attacks and countermeasures.


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24UECI402	DIGITAL SIGNAL PROCESSING	L	T	P	C
		3	0	2	4

Prerequisites:

- Signals and Systems

COURSE OBJECTIVES

- To learn discrete fourier transform, properties of DFT and its application to linear filtering
- To understand the characteristics of digital filters, design digital IIR and FIR filters and apply these filters to filter undesirable signals in various frequency bands
- To understand the effects of finite precision representation on digital filters
- To understand the fundamental concepts of multi rate signal processing and its applications
- To introduce the concepts of adaptive filters and its application to communication engineering

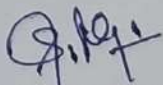
UNIT-I	DISCRETE FOURIER TRANSFORM	9
Sampling Theorem, concept of frequency in discrete-time signals, summary of analysis & synthesis equations for FT & DTFT, Discrete Fourier transform (DFT) - deriving DFT from DTFT, properties of DFT - periodicity, symmetry, circular convolution. Linear filtering using DFT - Filtering long data sequences - overlap save and overlap add method. Fast computation of DFT - Radix-2 Decimation-in-time (DIT) Fast Fourier transform (FFT), Decimation-in-frequency (DIF) Fast Fourier transform (FFT).		

UNIT-II	DESIGN AND REALIZATION OF IIR FILTERS	9
Introduction to filters - characteristics of commonly used analog filters – Design techniques of analog filters - Butterworth filters, Chebyshev filters. Design of IIR filters - Approximation of derivatives, Impulse invariance method, Bilinear transformation. Realization of IIR filters- direct form I, direct form II, Cascade, parallel realizations.		

UNIT-III	DESIGN AND REALIZATION OF FIR FILTERS	9
Design of FIR filters - symmetric and Anti-symmetric FIR filters - design of linear phase FIR filters using Fourier series method, windows (Rectangular, Hamming and Hanning window) Frequency sampling method. Realization of FIR filters - linear phase structure, direct form realizations.		

UNIT-IV	FINITE WORD LENGTH EFFECTS	9
Fixed point and floating point number representation - ADC - quantization - truncation and rounding - quantization noise - input / output quantization - coefficient quantization error - product quantization error - overflow error- limit cycle oscillations due to product quantization and summation - scaling to prevent overflow.		

UNIT-V	MULTIRATE SIGNAL PROCESSING AND DIGITAL SIGNAL PROCESSORS	9
Multirate signal processing: Decimation, Interpolation, Sampling rate conversion by a rational factor – Introduction to Digital Signal Processors - Architecture of TMS320C50 – Addressing modes.		


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LIST OF EXPERIMENTS

MATLAB / EQUIVALENT SOFTWARE PACKAGE/ DSP PROCESSOR BASED IMPLEMENTATION

1. Generation of elementary Discrete-Time sequences
2. Linear and Circular convolutions
3. Auto correlation and Cross Correlation
4. Computation of N – Point DFT using DIT & DIF algorithm
5. Design of FIR filters (LPF/HPF/BPF/BSF) and demonstrates the filtering operation
6. Design of Butterworth and Chebyshev IIR filters (LPF/HPF/BPF/BSF) and demonstrate the filtering operations
7. Implementation of Multirate signal processing – Interpolation and Decimation

EXPERIMENTS USING DSP PROCESSOR

8. Simple Addition, subtraction and logical programming
9. Generation of waveform
10. Implementation of Linear and circular convolution of two sequences

LIST OF EQUIPMENTS REQUIRED

Matlab / Equivalent Software Package/ DSP Processor Based Implementation

L: 45	T: 0	P: 30	Total: 75 Periods
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TEXT BOOKS

1. John G. Proakis and Dimitris G. Manolakis, Digital Signal Processing – Principles, Algorithms and Applications, Fourth Edition, Pearson Education / Prentice Hall, 2007. William Stallings, Cryptography and Network Security, Seventh Edition, Pearson Education, 2017 (Unit-IV) IV)
2. A. V. Oppenheim, R. W. Schaffer and J. R. Buck, —Discrete-Time Signal Processing”, 8th Indian Reprint, Pearson, 2004.

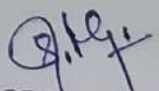
REFERENCES

1. Emmanuel C. Ifeachor & Barrie. W. Jervis, “Digital Signal Processing”, Second Edition, Pearson Education / Prentice Hall, 2002.
2. Sanjit K. Mitra, “Digital Signal Processing – A Computer Based Approach”, Tata Mc Graw Hill, 2007.
3. Andreas Antoniou, “Digital Signal Processing”, Tata Mc Graw Hill, 2006.

COURSE OUTCOMES

At the end of the course students should be able to:

- CO1: Apply DFT for the analysis of digital signals and systems.
- CO2: Design and realize IIR filters.
- CO3: Design and realize FIR filters.
- CO4: Characterize the effects of finite precision representation on digital filters.
- CO5: Explain the principles of operations in multirate signal processing and architecture of TMS320C50 processor.


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24UEC411	LINEAR INTEGRATED CIRCUITS LABORATORY	L	T	P	C
		0	0	3	1.5

COURSE OBJECTIVES

- To understand the basics of linear integrated circuits and available ICs
- To understand characteristics of operational amplifier.
- To apply operational amplifiers in linear and nonlinear applications.
- To acquire the basic knowledge of special function IC.
- To use SPICE software for circuit design

LIST OF EXPERIMENTS

DESIGN AND ANALYSIS OF THE FOLLOWING CIRCUITS

1. Inverting, Non-inverting amplifiers.
2. Integrator and Differentiator.
3. Instrumentation amplifier.
4. Active lowpass, High pass filters and Band pass filters.
5. Astable and Monostable multivibrators.
6. Schmitt trigger using Op-Amp
7. RC Phase shift and Wien bridge oscillators using Op-Amp.
8. PLL characteristics and its use as frequency multiplier.
9. DC power supply using LM317 and LM723.

SIMULATION USING SPICE

10. Simulation of Instrumentation amplifier.
11. Simulation of Active lowpass, Highpass and Bandpass.
12. Simulation of Astable and Monostable multivibrators and Schmitt trigger.
13. Simulation of RC Phase shift and Wien bridge oscillators.
14. Simulation of Astable and Monostable multivibrators.

L: 0	T: 0	P: 45	Total: 45 Periods
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LIST OF EQUIPMENTS REQUIRED

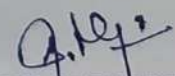
Transistors, Resistors, Capacitors, diodes, Zener diodes, Bread Boards, Transformers, wires, Power transistors, Potentiometer, A/D and D/A convertors, LEDs

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.

COURSE OUTCOMES

At the end of the course students should be able to:

- CO1: Design oscillators and amplifiers using operational amplifiers.
- CO2: Design filters using Opamp and perform experiment on frequency response.
- CO3: Analyse the working of PLL and use PLL as frequency multiplier.
- CO4: Design DC power supply using ICs.
- CO5: Analyse the performance of oscillators and multivibrators using SPICE.


 HEAD OF THE DEPARTMENT
 Department of ECE
 Jai Shriram Engineering College
 Avinashipalayam, Tirupur-638660.

24UEC412	COMMUNICATION SYSTEMS LABORATORY	L	T	P	C
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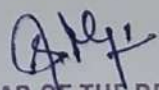
COURSE OBJECTIVES
<ul style="list-style-type: none"> • To study the AM & FM Modulation and Demodulation. • To learn and realize the effects of sampling and TDM. • To understand the PCM & Digital Modulation. • To Simulate Digital Modulation Schemes. • To Implement Equalization Algorithms and Error Control Coding Schemes.

LIST OF EXPERIMENTS
<ol style="list-style-type: none"> 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 – ASK, PSK, FSK. 9. Delta Modulation and Demodulation. 10. Simulation of ASK, FSK, 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.

L: 0	T: 0	P: 45	Total: 45 Periods
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LIST OF EQUIPMENTS REQUIRED
<p>Components and Accessories: Modulator and Demodulator Kit along with Transistors, Resistors, Capacitors, Inductors, diodes, Zener Diodes, Bread Boards, Transformers. SPICE Circuit Simulation Software: (any public domain or commercial software)</p>

COURSE OUTCOMES
At the end of the course students should be able to:
CO1:Design AM, FM & Digital Modulators for specific applications.
CO2:Compute the sampling frequency for digital modulation.
CO3:Simulate & validate the various functional modules of Communication system.
CO4:Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes.
CO5:Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of Communication system.


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