

SONA COLLEGE OF TECHNOLOGY, SALEM-5

(An Autonomous Institution)

B.E- Electrical and Electronics Engineering

CURRICULUM and SYLLABI

[For students admitted in 2024-2025]

B.E / B.Tech Regulations 2023

Approved by BOS and Academic Council meetings

Sona College of Technology, Salem
(An Autonomous Institution)

Courses of Study for B.E/B.Tech. Semester I under Regulations 2023 (CBCS)

Branch: Electrical and Electronics Engineering

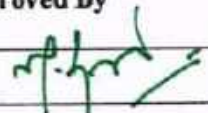
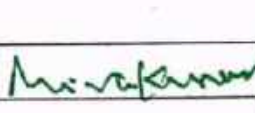
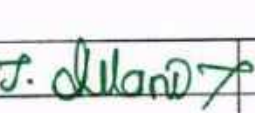
S.No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type*
Theory Courses										
1.	U23ENG101A	Communication Skills in English	2	0	2	0	3	HS	60	TL
2.	U23MAT102A	Linear Algebra and Calculus with MATLAB	3	0	2	0	4	BS	75	TL
3.	U23CHE104C	Chemistry For Electrical Engineering	3	0	0	0	3	BS	45	T
4.	U23PPR105	Problem Solving using Python Programming	3	0	0	0	3	ES	45	T
5.	U23EGR107	Engineering Graphics	3	0	0	0	3	ES	45	T
6.	U23TAM101	தமிழர் மரபு / Heritage of Tamils	1	0	0	0	1	HS	15	T
7.	U23GE101	Basic Aptitude-I	2	0	0	0	0	AC	30	T
Practical Courses										
8.	U23CHL111B	Chemistry Laboratory	0	0	2	0	1	BS	30	L
9.	U23PPL112	Python Programming Laboratory	0	0	2	0	1	ES	30	L
Total Credits							19			
Optional Language Courses**										
10.	U23OL1101	French	1	0	0	0	1	OL	15	T
11.	U23OL1102	German							15	T
12.	U23OL1103	Japanese							15	T
13.	U23OL1104	Korean							15	T
14.	U23OL1105	Hindi							15	T

*T- Theory, TT- Theory with Tutorial, TL- Theory with Laboratory, TP- Theory with Project, TLP- Theory with Laboratory and Project, L-Laboratory, LT- Laboratory with Theory, LP- Laboratory with Project

**Students may opt for foreign languages viz., German/French/Japanese/Korean/Hindi with additional one credit

(Not accounted for CGPA calculation)

Approved By

				
Chairperson, Science and Humanities BoS	Chairperson, EEE BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr. M. Renuga	Dr. S. Padma	Dr. R. Shivakumar	Dr. J. Akilandeswari	Dr. S. R. R. Senthil Kumar

Copy to:- HOD/ Electrical and Electronics Engineering, First Semester B.E. EEE Students and Staff, COE

Sona College of Technology, Salem

(An Autonomous Institution)

Courses of Study for B.E/B.Tech. Semester II under Regulations 2023 (CBCS)

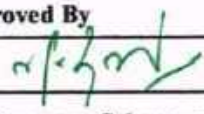
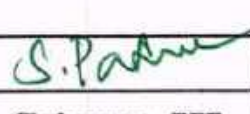
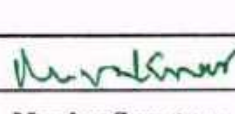
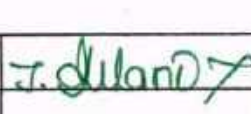
Branch: Electrical and Electronics Engineering

S.No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type*
Theory courses										
1.	U23ENG201A	Technical English	2	0	0	0	2	HS	30	T
2.	U23MAT202B	Transforms and Differential Equations	3	1	0	0	4	BS	60	TT
3.	U23PHY203D	Engineering Physics	3	0	0	0	3	BS	45	T
4.	U23EE201	Electrical Circuit Analysis	3	1	0	0	4	PC	60	TT
5.	U23ME204	Thermodynamics and Fluid Machines	3	0	0	0	3	ES	45	T
6.	U23TAM201	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	1	0	0	0	1	HS	15	T
7.	U23GE201	Basic Aptitude -II	2	0	0	0	0	AC	30	T
Practical courses										
8.	U23PHL210B	Engineering Physics Laboratory	0	0	2	0	1	BS	30	L
9.	U23EE202	Electrical Circuits Laboratory	0	0	3	0	1.5	PC	45	L
Total Credits							19.5			
Optional Language Courses**										
10.	U23OL1201	French - II	1	0	0	0	1	OL	15	T
11.	U23OL1202	German - II							15	T
12.	U23OL1203	Japanese - II							15	T
13.	U23OL1204	Korean - II							15	T
14.	U23OL1205	Hindi - II							15	T

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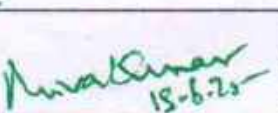
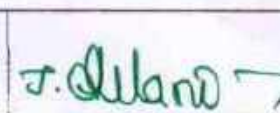
HOD/ Electrical and Electronics Engineering, Second Semester B.E. EEE, Students and Staff, COE

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III under Regulations 2023 (CBCS)
Branch: Electrical and Electronics Engineering

S.No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type*
Theory courses										
1.	U23EE301	Network Analysis and Synthesis	3	0	0	0	3	PC	45	T
2.	U23EE302	DC Machines and Transformers	3	0	0	0	3	PC	45	T
3.	U23EE303	Electronic Devices and Circuits	3	0	0	0	3	PC	45	T
4.	U23EE304	Electromagnetic Theory	3	0	0	0	3	PC	45	T
5.	U23EE305	Digital Systems Design	2	1	0	0	3	PC	45	TT
6.	U23EE306	Measurements and Instrumentation	2	0	2	0	3	PC	60	TL
7.	Noc25 – mg106	NPTEL : Design Thinking – A Primer	1	0	0	0	1	ES	15	T
Practical courses										
8.	U23EE307	DC Machines and Transformers Laboratory	0	0	3	0	1.5	PC	45	L
9.	U23EE308	Electronic devices and circuits Laboratory	0	0	3	0	1.5	PC	45	L
10.	U23EE309	Digital Systems Design Laboratory	0	0	2	0	1	PC	30	L
11.	U23GE301	Soft Skills and Aptitude-I	0	0	2	0	1	EEC	30	L
Total Credits							24			

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Approved By

			
Chairperson, Electrical and Electronics Engineering BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr.S.Padma	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/ Electrical and Electronics Engineering, Third Semester B.E. EEE Students and Staff, COE

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester IV under Regulations 2023 (CBCS)
Branch: Electrical and Electronics Engineering

S.No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type*
Theory courses										
1.	U23MAT401C	Probability and Statistical Methods	3	1	0	0	4	BS	60	TT
2.	U23EE401	Signals and Systems	3	0	0	0	3	PC	45	T
3.	U23EE402	Synchronous and Induction Machines	3	0	0	0	3	PC	45	T
4.	U23EE403	Linear Integrated Circuits	3	0	2	0	4	PC	75	TL
5.	U23EE404	Generation, Transmission and Distribution Systems	3	0	0	0	3	PC	45	T
6.	U23CPR401	Programming in C	3	0	0	0	3	ES	45	T
7.	U23GE402	Audit Course - Essence of Indian Traditional Knowledge	2	0	0	0	0	AC	30	T
Practical courses										
8.	U23EE405	Synchronous and Induction Machines Laboratory	0	0	3	0	1.5	PC	45	L
9.	U23CPL402	C Programming Laboratory	0	0	2	0	1	ES	30	L
10.	U23GE401	Soft Skills and Aptitude-II	0	0	2	0	1	EEC	30	L
11.	U23EE406	Mini Project-I	0	0	0	2	1	PC	30	P
Total Credits							24.5			

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Approved By

			
Chairperson, Electrical and Electronics Engineering BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr.S.Padma	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/ Electrical and Electronics Engineering, Fourth Semester B.E. EEE Students and Staff, COE

Sona College of Technology, Salem
(An Autonomous Institution)

Courses of Study for B.E/B.Tech. Semester I under Regulations 2023 (CBCS)

Branch: Electrical and Electronics Engineering

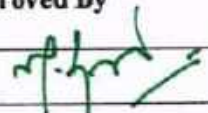
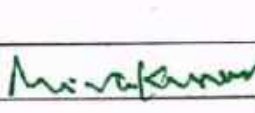
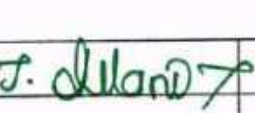
S.No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type*
Theory Courses										
1.	U23ENG101A	Communication Skills in English	2	0	2	0	3	HS	60	TL
2.	U23MAT102A	Linear Algebra and Calculus with MATLAB	3	0	2	0	4	BS	75	TL
3.	U23CHE104C	Chemistry For Electrical Engineering	3	0	0	0	3	BS	45	T
4.	U23PPR105	Problem Solving using Python Programming	3	0	0	0	3	ES	45	T
5.	U23EGR107	Engineering Graphics	3	0	0	0	3	ES	45	T
6.	U23TAM101	தமிழர் மரபு / Heritage of Tamils	1	0	0	0	1	HS	15	T
7.	U23GE101	Basic Aptitude-I	2	0	0	0	0	AC	30	T
Practical Courses										
8.	U23CHL111B	Chemistry Laboratory	0	0	2	0	1	BS	30	L
9.	U23PPL112	Python Programming Laboratory	0	0	2	0	1	ES	30	L
Total Credits							19			
Optional Language Courses**										
10.	U23OL1101	French	1	0	0	0	1	OL	15	T
11.	U23OL1102	German							15	T
12.	U23OL1103	Japanese							15	T
13.	U23OL1104	Korean							15	T
14.	U23OL1105	Hindi							15	T

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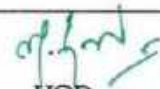
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U23ENG101A	Communication Skills in English (Common to ADS, AIML, BME, CSD, CSE, CIVIL, ECE, EEE, MCT, FT, IT Branches)							L	T	P	J	C		
								2	0	2	0	3		
Course Outcomes														
At the end of the course, the student will be able to														
CO1:	Use grammatical components effectively in both written and spoken communication													
CO2:	Develop speaking skills for self-introduction, delivering speeches and technical presentation													
CO3:	Demonstrate effective listening skills for academic and professional purposes													
CO4:	Write emails and formal letters and build resumes and construct paragraphs													
CO5:	Develop speaking skills both in terms of fluency and comprehensibility													
Pre-requisite:														
• Knowledge and Understanding of Grammar • Fundamental Language Skills (LSRW)														
CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1	1	1	3	3	2	3	3	2	3	2	3
CO2	1	1	1	1	1	3	3	3	3	3	3	3	3	3
CO3	1	2	3	2	2	3	3	2	3	3	3	3	3	3
CO4	1	2	1	2	2	3	3	3	3	3	3	3	3	3
CO5	1	2	2	3	2	3	3	3	3	3	3	3	3	3
Course Assessment methods														
Direct									Indirect					
CIE test I (10) (Theory) CIE test II (10) (Theory) CIE test III (10) (Theory) CIE test IV (10) (Practical) Assignment/seminar/Quiz (5)						Attendance (5) Total CIE: 50 marks Semester End Examination (50) (SEE – Theory (25 marks + Lab (25 marks)				Course end survey				
Unit 01:											6 Hours			
• General vocabulary, Parts of Speech, Articles • Email, fixing an appointment, cancelling appointments, conference details, hotel accommodation, order for equipment, training programme details, paper submission for seminars and conferences • Paragraph writing – Describing – defining – providing examples or evidences														

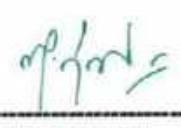
Unit 02:				6 Hours	
• Tenses, Sentence Patterns • Instructions • Letter Writing - calling for quotations, placing orders					
Unit 03:				6 Hours	
• Prefixes and Suffixes • Cover letter and resume writing					
Unit 04:				6 Hours	
• Modal verbs, concord • Checklist • Letter Writing - Business communication, complaints, replies to queries from business customers					
Unit 05:				6 Hours	
• If conditionals • Letter Writing - inviting dignitaries, accepting and declining invitations					
Lab component: 1. Self-introduction, personal information, name, home background, study details, area of interest, hobbies, strengths and weaknesses, projects and paper presentations, likes and dislikes in food, travel, clothes, special features of home town. 2. Mini presentation - Office Arrangements, Facilities, Office Functions, Sales, Purchases, Training Recruitment, Advertising, Applying for financial assistance, applying for a job. 3. Listening - understanding short conversations or monologues, taking down phone messages, orders, notes, etc. 4. Listening – entering information in tabular form 5. Loud Reading					
Theory: 30 Hrs		Tutorial: --	Practical: 30 hours-	Project:--	Total Hours: 60 Hrs
TEXT BOOKS					
1.	Technical English I & II, Dr. M. Renuga et al. Sonaversity, 2016				
2.	Extensive Reading 1. She is Dancing Back to Life – A Short Story” 2. The Story of Google – Sara Gilbert, published by Jaico 3. The Story of Amazon.com- Sara Gilbert, published by Jaico				
REFERENCES					
1.	Norman Whitby, Business Benchmark – Pre-Intermediate to Intermediate, Students Book, Cambridge University Press, 2006.				
2.	A Course in Communication Skills, P. Kiranmai Dutt, Geetha Rajeevan, C. L. N. Prakash, published by Cambridge University Press India Pvt. Ltd.				


HOD
Dr. M. RENUGA,
Professor & Head,
Department of Humanities & Languages,
Sona College of Technology,
SALEM - 6

B. E. / ELECTRICAL AND ELECTRONICS ENGINEERING															
SEMESTER - I		LINEAR ALGEBRA AND CALCULUS WITH MATLAB									L	T	P	J	C
U23MAT102A											3	0	2	0	4
Course Outcomes															
At the end of the course, the student will be able to															
CO1:	find the rank of the matrix and solve linear system of equations by direct and indirect methods														
CO2:	apply the concepts of vector spaces and linear transformations in real world applications														
CO3:	apply the concepts of eigenvalues and eigenvectors of a real matrix and their properties to diagonalize the matrix.														
CO4:	find the Taylor's series expansion, Jacobians and the maxima and minima of functions of two variables														
CO5:	apply the appropriate techniques of multiple integrals to find the area and volume.														
Pre-requisites:															
- Fundamentals of elementary algebra - Fundamentals of calculus							- Fundamentals of geometry - Fundamentals of trigonometry								
CO/PO, PSO Mapping															
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
CO1	3	2		3	2						2	2	3	3	
CO2	3	2		3	2						2	2	3	3	
CO3	3	2		3	2						2	2	3	3	
CO4	3	2		3	2						2	2	3	3	
CO5	3	2		3	2						2	2	3	3	
Course assessment methods [Theory with laboratory course]															
Direct							Indirect								
CIE test I (10) (Theory) CIE test II (10) (Theory) CIE test III (10) (Theory) CIE test IV (10) (Practical) Attendance (5) Assignment/Quiz/Seminar (5)					Total CIE: 50 marks Semester End Examination (50) [SEE- Theory (35) + Lab(15) marks]					Course end survey					
Unit 01	LINEAR SYSTEM OF EQUATIONS											9 Hours			
Rank of a matrix – solution of linear system of equations by matrix method, Gauss elimination, Gauss-Jordan, Gauss-Jacobi and Gauss-Seidel methods.															
Unit 02	VECTOR SPACES											9 Hours			
Vector space – linear independence and dependence of vectors – basis – dimension – linear transformations (maps) – matrix associated with a linear map – range and kernel of a linear map.															
Unit 03	EIGENVALUES AND EIGENVECTORS											9 Hours			
Eigenvalues and eigenvectors of real matrices – properties of eigenvalues and eigenvectors – Cayley-Hamilton theorem – diagonalization of real symmetric matrices.															

Unit 04	MULTIVARIABLE CALCULUS	9 Hours
Functions of several variables – partial differentiation – total derivative – Jacobians – Taylor’s theorem for functions of two variables – maxima and minima of functions of two variables without constraints – constrained maxima and minima by Lagrange’s method of undetermined multipliers.		
Unit 05	MULTIPLE INTEGRALS	9 Hours
Double integrals – change of order of integration – change of variables from Cartesian to polar coordinates – area as double integrals in Cartesian coordinates – triple integrals – volume as triple integrals in Cartesian coordinates.		
List of MATLAB Programs		
1.	Programs based on elementary operations on matrices	
2.	Computing the rank of a matrix	
3.	Finding eigenvalues and eigenvectors of a matrix	
4.	Finding partial derivatives of functions of several variables	
5.	Computing stationary points of functions of two variables	
6.	Taylors series expansion of functions of two variables	
7.	Evaluating double integrals	
8.	Finding area as double integrals	
9.	Evaluating triple integrals	
10.	Finding volume as triple integrals	
Theory: 45 Hrs	Tutorial: -	Practical: 30 Hrs
		Project:--
		Total Hours: 75 Hrs
TEXT BOOKS:		
1.	T. Veerarajan, “Linear Algebra and Partial Differential Equations”, McGraw Hill Publishers, 1 st Edition, 2018.	
2.	T. Veerarajan, “Engineering Mathematics for Semesters I & II”, McGraw Hill Publishers, 1 st Edition, 2019.	
3.	W. Yang, Y. K. Choi, K. Jaekwon, M. C. Kim, H. J. Kim and T. Im, “Engineering Mathematics with MATLAB”, CRC Press Publishers, 1 st Edition, 2017.	
REFERENCE BOOKS:		
1.	S. Lipschutz and M. L. Lipson, “Linear Algebra”, McGraw Hill Publishers, 6 th Edition, 2018.	
2.	E. Kreyszig, “Advanced Engineering Mathematics”, Wiley Publishers, 10 th Edition, Reprint, 2017.	
3.	C. Prasad and R. Garg, “Advanced Engineering Mathematics”, Khanna Publishers, 1 st Edition, 2018.	
4.	B. V. Ramana, “Higher Engineering Mathematics”, McGraw Hill Publishers, 29 th Reprint, 2017.	
5.	B. S. Grewal, “Higher Engineering Mathematics”, Khanna Publishers, 44 th Edition, 2018.	
6.	D. Xu, “Calculus problem solutions with MATLAB”, Walter de Gruyter Publishers, 1 st Edition, 2020.	


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 Head / Department of Mathematics
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Dr. M. RENUGA
 BoS - Chairperson
 Science and Humanities
 Sona College of Technology
 Salem – 636 005

BoS Date: 08. 07. 2023

B.E / B.Tech Regulations 2023

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Dr. M. RENUGA,
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 Sona College of Technology,
 SALEM - 636 005.

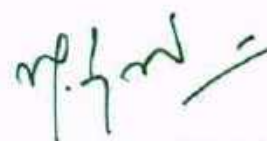
U23CHE104C	CHEMISTRY FOR ELECTRICAL ENGINEERING (Common to Electrical and Electronics Engineering & Electrical and Computer Engineering)		L	T	P	J	C							
			3	0	0	0	3							
Course Outcomes														
At the end of the course, the student will be able to														
CO1:	Outline the principle of electrochemistry and its engineering applications.													
CO2:	Describe the construction, working principle and applications of energy storage devices for electronic appliances.													
CO3:	Analyse the types of polymers, polymerization reactions, polymerization techniques and fabrication methods of polymers for engineering applications.													
CO4:	Explain the electrochemical processes carried out in electronic industries.													
CO5:	Discuss the principle, advantages and applications of organic electronic materials in electronic device fabrication.													
Pre-requisite: Basic knowledge on the concepts of organic, inorganic and physical chemistry.														
CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2												2
CO2	3	2					2							2
CO3	3	2					2							2
CO4	3	2					2							2
CO5	3	2					2							2
Course Assessment methods														
Direct										Indirect				
CIE test I (8) CIE test II (8) CIE test III (8) Assignment/seminar/Quiz (5)						Objectives Test (6) Attendance (5) Total CIE: 40 marks Semester End Examination (60)				Course end survey				
Unit 01: ELECTROCHEMISTRY												9 Hours		
Introduction – basic terminologies - electrode potential – Nernst Equation – derivation and problems based on single electrode potential calculation – reference electrodes – standard hydrogen electrode – saturated calomel electrode – Ion selective electrode – glass electrode – measurement of pH – electrochemical series – significance – electrolytic and electrochemical cells – EMF – Measurement of emf by Pogendorff's method –														

potentiometric titrations (redox – Fe ²⁺ vs dichromate) – conductometric titrations (acid-base – HCl vs NaOH).					
Unit 02: CHEMISTRY OF ENERGY STORAGE DEVICES				9 Hours	
Reversible and irreversible Cells – Batteries - types of batteries – battery characteristics-voltage-current-capacity-electricity storage density-power-discharge rate-cycle life-energy efficiency and shelf Life – Fabrication and working of alkaline battery-Lead-acid battery-Ni-Cd-Lithium ion batteries and Solar cells – Recycling methods of used batteries and conventional solar cells - Fuel Cells – Hydrogen-Oxygen fuel cell – Nano batteries- construction-working-advantages and applications.					
Unit 03: ELECTROCHEMICAL PROCESSES IN ELECTRONIC INDUSTRIES				9 Hours	
Electroplating – Principle and process - plating parameters- current and energy efficiency - Electroplating of nickel - Fundamentals of electroless deposition – electroless plating of nickel, fabrication of PCB's - electrochemical etching of copper from PCBs - Anodizing - definition, principle and working methodology of aluminium anodizing process – Cyclic voltammetry- basic principles and applications - Sensors – definitions and examples.					
Unit 04: POLYMER CHEMISTRY				9 Hours	
Nomenclature of Polymers – classification of polymers - functionality – tacticity, degree of polymersation, glass transition temperature in polymers - types of polymerization-addition-condensation and copolymerization – free radical mechanism of addition polymerization – techniques of polymerization-bulk and solution only – Thermoplastic and Thermosetting Resins - Plastics – moulding constituents of plastics – moulding of plastics into articles-Injection, Compression and Blow moulding – Rubbers-types-applications-vulcanization of rubber.					
Unit 05: CHEMISTRY OF ORGANIC ELECTRONIC MATERIALS				9 Hours	
Organic semiconducting materials – working principle and advantages over inorganic semiconducting materials - p-type and n-type organic semiconducting materials - Pentacene Fullerenes-C-60 – Organic dielectric material-definition-working principle and examples - Polystyrene – PMMA – Organic light emitting polymer – structure-properties and applications of Polythiophene – Conducting polymers, types and applications – Organic Light Emitting Diodes (OLEDs) - construction-working principle and applications – Organic transistors- construction-working principle and applications in electronic Industries.					
Theory: 45 Hrs		Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs
TEXT BOOKS					
1.	P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi , 17th Edition, 2018.				
2.	Wiley Editorial Board, "Wiley Engineering Chemistry", 2nd Edition, Wiley India Pvt.Ltd, New Delhi, Reprint 2019.				
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1.	Gowariker V.R. , Viswanathan N.V. and Jayadev Sreedhar, "Polymer Science", New Age International P (Ltd.), Chennai, 2006.
2.	Electroplating, Anodizing and Metal treatment", Hand book, NIIR board, 2004.
3.	Hagen Klauk, "Organic Electronics: Materials, Manufacturing and Applications", Wiley-VCH, 2006.
4.	A. Ravikrishnan, "Engineering Chemistry", Sri Krishna Publications, Chennai, 2017.



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U23CHL111B	CHEMISTRY LABORATORY (Common to Mechanical, EEE, EECE & FT branches)	L	T	P	J	C
		0	0	2	0	1

Course Outcomes

At the end of the course, the student will be able to

CO1:	Analyse the given water sample to determine the amount of hardness, alkalinity and analyse the quality of brass by estimating copper in brass solution.
CO2:	Estimate the amount of HCl in a given sample by pH metry, conductometry and estimate the amount of iron in a sample by potentiometry and spectrophotometry.
CO3:	Determine the molecular weight of water soluble polymer and estimate the amount of chromium in waste water.

Pre-requisite: Capable of handling pipette, burette, standard measuring flask and conical flask.

CO/PO, PSO Mapping

(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2		1		1			1					2
CO2	3	2		1		1			1					2
CO3	3	2		1		1			1					2

Course Assessment methods

Direct		Indirect
CIE test I (15)	RTPS (10)	Course end survey
Quiz 1 (5)	Record (10)	
CIE test II (15)	Total CIE:60 marks	
Quiz 2 (5)	Semester End Examination (40 marks)	

LIST OF EXPERIMENTS

1	Estimation of hardness of water sample by EDTA method.
2	Estimation of alkalinity of water sample by indicator method.
3	Estimation of copper in brass by EDTA method.
4	Estimation of HCl by pH metry.
5	Estimation of HCl by conductometry. (HCl vs NaOH)
6	Estimation of mixture of acids by conductometry. (HCl + CH ₃ COOH vs NaOH)

7	Estimation of ferrous ion by potentiometric titration.	
8	Estimation of chromium prepared from electroplating sludge by Permanganometry.	
9	Determination of molecular weight of a polymer by viscosity measurements.	
10	Estimation of iron content in water by spectrophotometry.	
		TOTAL : 30 HOURS

C. Shanthi
24.7.2024

Dr. C. Shanthi
HOD / Science

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M. Renuga
24/7/24

Dr.M. Renuga
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U23PPR105	PROBLEM SOLVING USING PYTHON PROGRAMMING (Common to ADS, IT, CSE, CSE(AIML), CSD, CIVIL, BME, ECE, EEE, MECH and MCT Branches)								L	T	P	J	C	
									3	0	0	0	3	
Course Outcomes														
At the end of the course, the student will be able to														
CO1:	Develop algorithmic solutions to simple computational problems													
CO2:	Write simple Python programs													
CO3:	Write programs with the various control statements and handling strings in Python													
CO4:	Develop Python programs using functions and files													
CO5:	Analyze a problem and use appropriate data structures to solve it.													
Pre-requisite: NIL														
CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3	1	1									1
CO2	2	2	3	1	1									1
CO3	2	2	3	1	1									1
CO4	2	2	3	1	1									1
CO5	2	2	3	1	1									1
Course Assessment methods														
Direct										Indirect				
CIE test I (8) CIE test II (8) CIE test III (8) Assignment/seminar/Quiz (5)						Objectives Test (6) Attendance (5) Total CIE: 40 marks Semester End Examination (60)				Course end survey				
Unit 01: ALGORITHMIC PROBLEM SOLVING												9 Hours		
Need for computer languages, 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).														
Unit 02: BASICS OF PYTHON PROGRAMMING												9 Hours		
Introduction-Python Interpreter-Interactive and script mode -Values and types, variables, operators, expressions, statements, precedence of operators, Multiple assignments, comments, input function, print function, Formatting numbers and strings, implicit/explicit type conversion.														
Unit 03: CONTROL STATEMENTS AND STRINGS												9 Hours		
Conditional (if), alternative (if-else), chained conditional (if-elif-else). Iteration-while, for, infinite loop, break, continue, pass, else. Strings-String slices, immutability, string methods and operations.														

Unit 04: FUNCTIONS, FILES AND MODULES				9 Hours	
Functions - Introduction, inbuilt functions, user defined functions, passing parameters - positional arguments, default arguments, keyword arguments, return values, local scope, global scope and recursion. Files -Text files, reading and writing files. Modules – create – import.					
Unit 05: DATA STRUCTURES: LISTS, SETS, TUPLES, DICTIONARIES				9 Hours	
Lists-creating lists, list operations, list methods, mutability list functions, searching and sorting, Sets-creating sets, set operations. Tuples-Tuple assignment, Operations on Tuples, lists and tuples, Tuple as return value- Dictionaries-operations and methods, Nested Dictionaries, Union Operation.					
Theory: 45 Hrs		Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs
TEXT BOOKS					
1.	Reema Thareja, "Problem Solving and Programming with Python" Oxford University Press, 2 nd Edition 2023.				
REFERENCES					
1.	Ashok Namdev Kamthane, Amit Ashok Kamthane, "Programming and Problem Solving with Python" Mc-Graw Hill Education, 2018.				
2.	Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem Solving Focus" Wiley India Edition, 2013.				
3.	Allen Downey, "Think Python: How to Think Like a Computer Scientist" O'Reilly Media, 2nd Edition 2016.				
4.	Timothy A. Budd," Exploring Python" Mc-Graw Hill Education (India) Private Ltd., 2015.				


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U23PPL112	PYTHON PROGRAMMING LABORATORY (Common to ADS, IT, CSE, CSE(AIML), CSD, CIVIL, BME, ECE, EEE, MECH and MCT Branches)		L	T	P	J	C							
			0	0	2	0	1							
Course Outcomes														
At the end of the course, the student will be able to														
CO1:	Implement the algorithms using basic control structures in Python													
CO2:	Develop Python programs to use functions, strings and data structures to solve different types of problems													
CO3:	Implement persistent storing information through file operations													
Pre-requisite: NIL														
CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	3	2	1								1
CO2	3	3	3	3	2	2								1
CO3	3	3	3	3	2	2								1
Course Assessment methods														
Direct								Indirect						
CIE test I (15) Quiz I- (5) CIE test II (15) Quiz II- (5)					RTPS (10) Record (10) Total CIE: 60 marks Semester End Examination (40 marks)				Course end survey					
LIST OF EXPERIMENTS														
1. Draw flowchart using any open source software.														
2. Implement programs with simple language features.														
3. Implement various branching statements in python.														
4. Implement various looping statements in python.														
5. Develop python programs to perform various string operations like concatenation, slicing, indexing.														
6. Implement user defined functions using python.														
7. Implement recursion using python.														
8. Implement python program to perform operations on file and module.														
9. Develop python programs to perform operations on list and tuples.														
10. Implement dictionary and set in python.														
Theory: --		Tutorial: --		Practical: 30Hrs		Project: --		Total Hours: 30 Hs						

U23EGR107		ENGINEERING GRAPHICS						L	T	P	J	C		
								3	0	0	0	3		
Course Outcomes														
At the end of the course, the student will be able to														
CO1:	Construct –Ellipse, Parabola, Hyperbola, Cycloids and Involutes.													
CO2:	Draw the projection of Point, Line and Plane surfaces.													
CO3:	Draw the projection of simple solids by rotating object method.													
CO4:	Develop the section of simple solids and lateral surface of truncated solids.													
CO5:	Draw the isometric view to orthographic projection.													
Pre-requisite: Nil														
CO/PO, PSO Mapping														
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1							3		2			1	
CO2					3			2		2		2		2
CO3					3			2		2		2	1	2
CO4					3			2		2		2	1	2
CO5			2					2		2		2	1	
Course Assessment methods														
Direct										Indirect				
CIE test I (8) CIE test II (8) CIE test III (8) Assignment/seminar/Quiz (5)						Objectives Test (6) Attendance (5) Total CIE: 40 marks Semester End Examination (60)				Course end survey				
CONCEPTS AND CONVENTIONS - (Not for Examination). Importance of graphics in engineering applications - Use of drafting instruments - BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.												9 Hours		
Unit 01: PLANE CURVES - (Manual drafting). Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of Involute of circle – Drawing of tangents and normal to the above curves.														

Unit 02: PROJECTION OF POINTS, LINES AND PLANE SURFACES (CAD software). Orthographic projection- principles-principal planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes -Determination of true lengths and true inclinations by rotating line method. Projection of planes (polygonal and circular surfaces) inclined to one of the principal plane by rotating object method.					9 Hours
Unit 03: PROJECTION OF SOLIDS (CAD software). Projection of simple solids - prisms, pyramids, cylinder and cone, when the axis is inclined to one of the principal planes and parallel to the other by change of position method.					9 Hours
Unit 04: PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES (CAD software). Section of solids in simple vertical position when the cutting plane is inclined to one of the principal planes and perpendicular to the other — (obtaining true shape of section is not required). Development of lateral surfaces of truncated solids — Prisms, pyramids cylinders and cones.					9 Hours
Unit 05: ISOMETRIC TO ORTHOGRAPHICS PROJECTION- (Manual drafting). Representation of three dimensional objects – General Principles - Need for importance of multiple views – First angle projection – layout of views – Conversion of isometric view to orthographic views. Practicing three dimensional modelling of simple objects using CAD Software (Not for examination)					9 Hours
Theory: 45 Hrs Tutorial: -- Practical: -- Project:-- Total Hours: 45 Hrs					
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				
4.	P.Suresh., “Engineering Graphics and Drawing”, Sonaversity, Sona College of Technology, Salem, Revised edition, 2012.				

REFERENCES	
1.	BasantAgarwal and Agarwal C.M., "Engineering Drawing", McGraw Hill, 2nd Edition, 2019.
2.	Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Publications, Bangalore, 27thEdition, 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, 2009.
6.	Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2008.


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U23TAM101	தமிழர் மரபு / Heritage of Tamils		L	T	P	J	C
			1	0	0	0	1
Course Outcomes							
At the end of the course, the student will be able to							
CO1:	Describe Tamil Language and Literature						
CO2:	Analyse Heritage - Rock Art Paintings To Modern Art – Sculpture						
CO3:	Explain Folk and Martial Arts						
CO4:	Describe Thinaï Concept of Tamils						
CO5:	Analyse Contribution of Tamils to Indian National Movement and Indian Culture						
Course Assessment methods							
Direct				Indirect			
CIE test I (30)		Total CIE: 100 marks		Course end survey			
CIE test II (30)		Semester End Examination: NIL					
CIE test III (40)							
அலகு 1 : மொழி மற்றும் இலக்கியம்							3 Hours
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.							
அலகு 2 : மரபு – பாறை ஓவியங்கள் முதல் ஓவியங்கள் வரை – சிற்பக் கலை							3 Hours
நடுகல் முதல் 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							
அலகு 3: நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்							3 Hours
தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டம், தோலபாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.							
அலகு 4: தமிழர்களின் திணைக் கோட்பாடுகள்							3 Hours
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.

அலகு 5: இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு

3 Hours

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள் கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்ச வரலாறு.

Theory: 15 Hrs

Tutorial: --

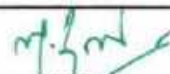
Practical: --

Project:--

Total Hours: 15 Hrs

REFERENCES

1	தமிழக வரலாறு - மக்களும் பண்பாடு - 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	பொருதை -ஆற்றங்னரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL - (in print)
6	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies)
7	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) - Reference Book.


HOD

Dr. M.RENUGA,
Professor & Head,
Department of Humanities & Languages,
Sona College of Technology,
SALEM - 636 005.

U23TAM101	தமிழர் மரபு / Heritage of Tamils		L	T	P	J	C
			1	0	0	0	1
Course Outcomes							
At the end of the course, the student will be able to							
CO1:	Describe Tamil Language and Literature						
CO2:	Analyse Heritage - Rock Art Paintings To Modern Art – Sculpture						
CO3:	Explain Folk and Martial Arts						
CO4:	Describe Thinaï Concept of Tamils						
CO5:	Analyse Contribution of Tamils to Indian National Movement and Indian Culture						
Course Assessment methods							
Direct				Indirect			
CIE test I (30)		Total CIE: 100 marks		Course end survey			
CIE test II (30)		Semester End Examination: NIL					
CIE test III (40)							
Unit 01: LANGUAGE AND LITERATURE						3 Hours	
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 02: HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE						3 Hours	
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 03: FOLK AND MARTIAL ARTS						3 Hours	
Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils							
Unit 04: THINAI CONCEPT OF TAMILS						3 Hours	
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 05: CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE						3 Hours	
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							
Theory: 15 Hrs		Tutorial: --		Practical: --		Project:--	
Total Hours: 15 Hrs							
REFERENCES							
1	தமிழக வரலொறு – மக்களும் பண் பொடும் – மக.மக. பிள்ளை (தவளியீடு: தமிழ்நொடு பொடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).						
2	கணினித் தமிழ் – முமனவர ஂல. சுந்தரம் . (விகடன் பிரசுரம்).						

3	கீழடி - மவமக நதிக்கமரயில் ெங்ககொல நகர நொகரிகம் (ததொல்லியல் துமறதவளியீடு)
4	பொருமந - ஆற்றங்கமர நொகரிகம். (ததொல்லியல் துமற தவளியீடு)
5	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies)
7	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.


HOD

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SALEM - 636 012

U23GE101	BASIC APTITUDE-1					L	T	P	J	C		
						2	0	0	0	0		
Course Outcomes												
At the end of the course, the student will be able to												
CO1:	Solve the problems in Divisibility , Division algorithm ,Successive Division and HCF & LCM. Identify Synonyms and Antonyms.											
CO2:	Elucidate the problems in BODMAS rule, Approximation, Surds and Indices, Algebraic Simplification and Square root and Cube root. Choose appropriate Verbal Analogies and edit the given passages.											
CO3:	Crack the problems involving Ratio and Proportion, and discuss Proportionality Theorems. Comprehend the given passages for Reading Comprehension activity and answer the questions correctly.											
CO4:	Deduce the problems involving Linear equation and Quadratic equation. Demonstrate good vocabulary skill by doing the one word substitution and sentence filler exercise with high degree of accuracy.											
CO5:	Interpret the logical reasoning problems from Number series ,Coding and Decoding and Exhibit good expertise in detecting errors in the given sentences.											
Pre-requisite:												
• Basic English language and Grammar knowledge • Knowledge in Basic Mathematics												
CO/PO, PSO Mapping												
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak												
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12
CO1	3	3	3	2	1	1	1	3	3	3	2	3
CO2	3	3	3	2	1	1	1	3	3	3	2	3
CO3	3	3	3	2	1	1	1	3	3	3	2	3
CO4	3	3	3	2	1	1	1	3	3	3	2	3
CO5	3	3	3	2	1	1	1	3	3	3	2	3
Course Assessment methods												
Direct								Indirect				
CIE test I (30) - Theory					Total CIE: 100 marks Semester End Examination – NIL			Course end survey				
CIE test II (30) - Theory												
CIE test III (40) – Theory												

Unit 01				6 Hours
Number Properties: Classification of numbers - Divisibility - Division algorithm - Successive Division - HCF and LCM –Problems Verbal Aptitude: Synonyms and b. Antonyms				
Unit 02				6 Hours
Simplification: BODMAS Rule - Approximation - Surds and Indices - Algebraic Simplification - Square root and Cube root – Problems Verbal Aptitude: Verbal analogy, Editing passages				
Unit 03				6 Hours
Ratio and Proportion : Ratio - Properties of Ratios - Compound Ratio - Coin based problems - Proportion - Proportionality Test - Proportionality Theorems - Inverse Proportion - Variation - Problems Verbal Aptitude: Reading Comprehension				
Unit 04				6 Hours
Equations: a. Linear equation: Simultaneous Linear Equations - Consistent System - Inconsistent System - Problems b. Quadratic Equation: Different Ways to Express the Quadratic Equation - Discriminant of the Quadratic Equations - Roots - Nature of the Roots - Relation between roots and coefficient of equation - Formation of a Quadratic Equation – Problems Verbal Aptitude: One word substitution , Sentence filler words				
Unit 05				6 Hours
Logical Reasoning : Number series – Coding and Decoding – Problem Verbal Aptitude: Error detection				
Theory: 30 Hrs	Tutorial: 0	Practical: 0	Project: 0	Total Hours: 30 Hrs
TEXT BOOKS				
1.	S.Chand and Dr.R.S.Aggarwal, “Quantitative Aptitude for competitive examinations”, S Chand and Company Limited 2019.			
2.	Nishit K.Sinha, “Logical Reasoning and Data Interpretation”, Pearson 2021.			


Dr.S.Anita
 Head/Training
Dr. S. ANITA
 Professor and Head
 Department of Training,
SONA COLLEGE OF TECHNOLOGY,
SALEM-636 005.

U23OL1101	French		L	T	P	J	C
			1	0	0	0	1
Course Outcomes							
At the end of the course, the student will be able to							
CO1:	Read French phrases, Spell French phonitis, practice French accents, differentiate French and English sounds						
CO2:	Introduce oneself, talk about someone, ask others personal information, identify an object, ask and respond politely in a conversation						
CO3:	Read and write a small announcement, describe about neighbours, write a small portrait						
CO4:	Express one's wishes, talk about one's hobbies, ask time, describe one's status of life in a blog, justify a choice, express one's preferences, write a list of needs						
CO5:	Suggest to do something, appreciate something, talk about a movie, write a postal card						
Course Assessment methods							
Direct				Indirect			
CIE test I (30)		Total CIE: 100 marks		Course end survey			
CIE test II (30)		Semester End Examination: NIL					
CIE test III (40)							
Unit 01:				3 Hours			
Hr 2: Alphabets, Basic wishes, self-introduction, basic verbs: avoir and être							
Hr 4: Nationalities and countries, colors, days & months							
Hr 6: Definite articles, numbers 0-20, write about one's identification							
Unit 02:				3 Hours			
Hr 8: Professions, conjugation: 1 st group verbs, indefinite articles							
Hr 10: Preposition of place, identity card, negative sentence							
Hr 12: Things around us, subjective and ephatic pronouns, self-introduction online							
Unit 03:				3 Hours			
Hr 14: Talk about accommodation, conjugation: aller and venir, possessive adjectives							
Hr 16: Adjective's gender, noun's gender, things in a room, simple prepositions							
Hr 18: Physical description, speak about accommodation, writing a self-potrait							
Unit 04:				3 Hours			
Hr 20: Hobbies, conjugation: vouloir, pouvoir and devoir, connected articles							
Hr 22: Interrogative adjectives, daily activities, time and seasons, pronominal verbs							
Hr 24: Near future tense, talk about preferences, write a mail							
Unit 05:				3 Hours			
Hr 26: Outing activities, conjugation: faire and sortir, demonstrative adjectives							
Hr 28: Adverbs of frequency, family members, past tenses (passé composé and imparfait)							
Hr 30: French arts, talk about a film, and write a postal card							
Theory: 15 Hrs		Tutorial: --		Practical: --		Project:--	
						Total Hours: 15 Hrs	
TEXT BOOKS							
1.	The course faculty will provide relevant audios, videos, handouts and notes						
2.	Books : Saison (Méthode de français, cahier d'activités)						
3.	Reference books : La conjugaison, Dondon, Echo						

(Signature)
HOD

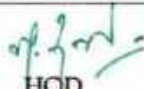
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SALEM - 636 007

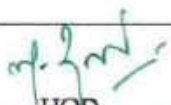
U23OL1102	German		L	T	P	J	C
			1	0	0	0	1
Course Outcomes							
At the end of the course, the student will be able to							
CO1:	Use common, everyday expressions to greet others and introduce themselves.						
CO2:	Construct simple sentences /questions.						
CO3:	Initiate and sustain basic conversation based on family, professions,						
CO4:	Hobbies and food.						
CO5:	Identify differences in using nouns based on gender.						
Course Assessment methods							
Direct				Indirect			
CIE test I (30)			Total CIE: 100 marks Semester End Examination: NIL		Course end survey		
CIE test II (30)							
CIE test III (40)							
Unit 01:					3 Hours		
• Greeting and taking leave, introducing oneself, introducing others							
Unit 02:					3 Hours		
• Alphabets, spelling, numbers							
Unit 03:					3 Hours		
• Age, Telephone/mobile numbers, Month, Date, Time							
Unit 04:					3 Hours		
• Languages, Family, Asking/giving information about family members							
Unit 05:					3 Hours		
• Hobbies, Professions							
Theory: 15 Hrs		Tutorial: --		Practical: --		Project:--	
Total Hours: 15 Hrs							
TEXT BOOKS							
1.	Netzwerk A1						


HOD
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SALEM - 637 002

U23OL1103	Japanese		L	T	P	J	C
			1	0	0	0	1
Course Outcomes							
At the end of the course, the student will be able to							
CO1:	Use words and phrases of greeting in Japanese, write the letters of the alphabet, identify names of objects and do a self-introduction using short and simple sentences						
CO2:	Demonstrate the use of time-related words and verb conjunctions and make light conversation asking for directions and answering questions						
CO3:	Use different kinds of verbs through the day and those used for giving things, and demonstrate the use of adjectives						
CO4:	Express liking for the Japanese language, describe the locations of different things and demonstrate counting in Japanese						
CO5:	Make comparisons of stated things, express a willingness to go to Japan and use 'Te-form' verbs						
Course Assessment methods							
Direct				Indirect			
CIE test I (30)		Total CIE: 100 marks		Course end survey			
CIE test II (30)		Semester End Examination: NIL					
CIE test III (40)							
Unit 01:						3 Hours	
Hr 1-2: Greeting words and phrases; the Japanese alphabet: 104 Hiragana and 104 Katakana letters							
Hr 3-4: Identifying words from pictures or objects shown							
Hr 5-6: Self-introduction							
Unit 02:						3 Hours	
Hr 7-8: Asking for directions when shopping							
Hr 9-10: Time words and Verb Conjugations							
Hr 11-12: Making light conversation							
Unit 03:						3 Hours	
Hr 13-14: Expressions to use verbs from morning to night							
Hr 15-16: Verbs used for giving things							
Hr 17-18: Adjectives							
Unit 04:						3 Hours	
Hr 19-20: Ways to show liking for the Japanese language							
Hr 21-22: Describing the location of things (or where things are)							
Hr 23-24: Japanese numbers and counting							
Unit 05:						3 Hours	
Hr 25-26: Making comparisons							
Hr 27-28: Expressions wishing for something, like 'I want to go to Japan ...!'							
Hr 29-30: Using 'Te-form' Verb							
Theory: 15 Hrs		Tutorial: --		Practical: --		Project:--	
Total Hours: 15 Hrs							
TEXT BOOKS							
1.	The course faculty will provide handouts / notes / course material.						
2.	Books on Basic Japanese language available in the college library.						


HOD
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Department of Humanities & Language

U23OL1104	Korean		L	T	P	J	C
			1	0	0	0	1
Course Outcomes							
At the end of the course, the student will be able to							
CO1:	Use single vowels and consonants syllable structure.						
CO2:	Greet others and introduce themselves.						
CO3:	Identify time , date and week						
CO4:	Explain location and places						
CO5:	Construct simple sentences / questions.						
Course Assessment methods							
Direct				Indirect			
CIE test I (30)		Total CIE: 100 marks		Course end survey			
CIE test II (30)		Semester End Examination: NIL					
CIE test III (40)							
Unit 01: Hangeul					3 Hours		
Single Vowels & Consonants Syllable Structure							
Tense Consonants							
Aspirated Consonants							
Double Vowels							
Final Consonants							
Double Final Consonants							
Liaison							
Unit 02: Introduction					3 Hours		
Greetings							
Talking about names							
Self-introduction							
Introducing my family members							
Unit 03: Time and Date					3 Hours		
Talking about location							
Talking about dates and days of the week							
Talking about doing something in the past							
Unit 04: Location and Places					3 Hours		
Talking about location							
Talking about doing something at a location							
Talking about directions							
Unit 05: Future					3 Hours		
Talking about doing something in the future							
Talking about plans for the future							
Talking about hope for the future							
Theory: 15 Hrs		Tutorial: --	Practical: --	Project:--	Total Hours: 15 Hrs		
REFERENCES							
1	Vitamin Korean - 1						


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Sona College of Technology,

U23OL1105	Hindi		L	T	P	J	C
			1	0	0	0	1
Course Outcomes							
At the end of the course, the students will be able to							
CO1:	Write स्वर(अ - अः), व्यंजन(क - श्र)						
CO2:	Identify and write बारहखडी(क - श्रः)						
CO3:	Coin 2,3&4 letters words						
CO4:	Read and frame sentences (grammar, verb, noun, pronoun, adjective, etc...)						
CO5:	Communicate effectively using tenses (with Continuous)						
Course Assessment methods							
Direct				Indirect			
CIE test I (30)		Total CIE: 100 marks		Course end survey			
CIE test II (30)		Semester End Examination: NIL					
CIE test III (40)							
Unit 01: स्वर (अ - अः), व्यंजन (क - श्र)						3 Hours	
Hindi letters learning Letters identification Reading Writing Letters pronunciation							
Unit 02: बारहखडी (क - श्रः)						3 Hours	
Hindi letters learning Letters identification Reading Writing Letters pronunciation							
Unit 03: 2,3 & 4 letters words						3 Hours	
Words making Words meaning Reading & Writing							
Unit 04 : Grammar, (Verb, noun, pronoun, adjective, etc...)						3 Hours	
Words meaning Reading & Writing Sentence framing							
Unit 05 : Tenses (with Continuous)						3 Hours	
Talking about school Talking about family, friends Talking about doing something in the past, present, future Translation							
Theory: 15 Hrs		Tutorial: --		Practical: --		Project:--	
						Total Hours: 15 Hrs	
REFERENCES							
1	Diploma in Hindi (department of higher education, Delhi)						


HOD

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SALEM - 636 012

Sona College of Technology, Salem

(An Autonomous Institution)

Courses of Study for B.E/B.Tech. Semester II under Regulations 2023 (CBCS)

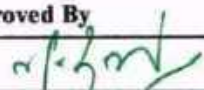
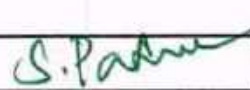
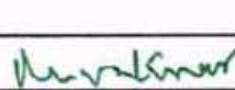
Branch: Electrical and Electronics Engineering

S.No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type ^a
Theory courses										
1.	U23ENG201A	Technical English	2	0	0	0	2	HS	30	T
2.	U23MAT202B	Transforms and Differential Equations	3	1	0	0	4	BS	60	TT
3.	U23PHY203D	Engineering Physics	3	0	0	0	3	BS	45	T
4.	U23EE201	Electrical Circuit Analysis	3	1	0	0	4	PC	60	TT
5.	U23ME204	Thermodynamics and Fluid Machines	3	0	0	0	3	ES	45	T
6.	U23TAM201	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	1	0	0	0	1	HS	15	T
7.	U23GE201	Basic Aptitude -II	2	0	0	0	0	AC	30	T
Practical courses										
8.	U23PHL210B	Engineering Physics Laboratory	0	0	2	0	1	BS	30	L
9.	U23EE202	Electrical Circuits Laboratory	0	0	3	0	1.5	PC	45	L
Total Credits							19.5			
Optional Language Courses**										
10.	U23OL1201	French - II	1	0	0	0	1	OL	15	T
11.	U23OL1202	German - II							15	T
12.	U23OL1203	Japanese - II							15	T
13.	U23OL1204	Korean - II							15	T
14.	U23OL1205	Hindi - II							15	T

*T- Theory, TT- Theory with Tutorial, TL- Theory with Laboratory, TP- Theory with Project, TLP- Theory with Laboratory and Project, L-Laboratory, LT- Laboratory with Theory, LP- Laboratory with Project

**Students may opt for foreign languages viz., German/French/Japanese/Korean/Hindi with additional one credit (Not accounted for CGPA calculation)

Approved By

				
Chairperson, Science and Humanities BoS	Chairperson, EEE BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr.M.Renuga	Dr.S.Padma	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/ Electrical and Electronics Engineering, Second Semester B.E. EEE, Students and Staff, COE

U23ENG201A	Technical English (Common to ADS, AIML, BME, CSD, CSE, CIVIL, ECE, EEE, MCT, FT, IT, EXE, EFE Branches)							L	T	P	J	C		
								2	0	0	0	2		
Course Outcomes														
At the end of the course, the student will be able to														
CO1:	Frame sentences correctly, both in written and spoken forms of language with accuracy and fluency													
CO2:	Develop effective reading skills and reinforce language skills required for using grammar and building vocabulary													
CO3:	Organise ideas and supporting arguments logically													
CO4:	Develop skills for writing conversations, proposals, reports and transcribing													
CO5:	Read for understanding and interpreting information and to utilise information accordingly													
Pre-requisite:														
- Knowledge and Understanding of Grammar - Fundamental Language Skills (LSRW)														
CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	2	3	2	3	3	3	3	3	3	3	3	3
CO2	2	2	2	3	2	3	3	3	3	3	3	3	3	3
CO3	3	2	2	3	2	3	3	3	3	3	3	3	3	3
CO4	3	3	2	3	2	3	3	3	3	3	3	3	3	3
CO5	3	3	2	3	2	3	3	3	3	3	3	3	3	3
Course Assessment methods														
Direct									Indirect					
CIE test I (9) CIE test II (9) CIE test III (10) Objectives Test (7) Assignment/seminar/Quiz (5)						Total CIE: 40 marks Semester End Examination: 60 marks				Course end survey				
Unit 01:											6 Hours			
- Comparative adjectives - Recommendations - Guided writing – Conversation in workplace context - Reading passages for specific information transfer														

Unit 02:				6 Hours	
• Prepositions, adverbs • Note making • Reading passage with multiple choice questions, reading for gist and reading for specific information					
Unit 03:				6 Hours	
• Collocations, direct and indirect speech • Memo • Proposal: establishing a lab, introducing a subject in the curriculum, training programme for students • Short reading passage: gap-filling exercise related to grammar					
Unit 04:				6 Hours	
• Cause and effect • Technical report writing – feasibility report, accident report, survey report • Short reading passages for sentence matching exercises, picking out specific information in a short text					
Unit 05:				6 Hours	
• Active, passive and impersonal passive voices • Transcoding – bar chart, pie chart, tabular column, graph, flow chart					
Theory: 30 Hrs		Tutorial: --	Practical: -	Project:--	Total Hours: 30 Hrs
TEXT BOOKS					
1.	Technical English I & II, Dr. M. Renuga et al. Sonaversity, 2016				
2.	Extensive Reading 1. Who Moved my Cheese? – Spencer Johnson-G. P. Putnam's Sons 2. Discover the Diamond in You – Arindham Chaudhari – Vikas Publishing House Pvt. Ltd.				
REFERENCES					
1.	Norman Whitby, Business Benchmark – Pre-Intermediate to Intermediate, Students Book, Cambridge University Press, 2006.				
2.	A Course in Communication Skills, P. Kiranmai Dutt, Geetha Rajeevan, C. L. N. Prakash, published by Cambridge University Press India Pvt. Ltd.				


HOD

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SEMESTER - II		TRANSFORMS AND DIFFERENTIAL EQUATIONS										L	T	P	J	C
U23MAT202B		(Common to EEE, ECE, BME, EFE and EXE)										3	1	0	0	4
Course Outcomes																
At the end of the course, the student will be able to																
CO1:	apply the classical methods to solve linear ordinary differential equations with constant coefficients.															
CO2:	apply the Laplace transforms technique and its properties to solve ordinary differential equations.															
CO3:	express a periodic signal as an infinite sum of sine and cosine wave components using Fourier series.															
CO4:	apply the Fourier transform techniques to convert the signal in terms of the frequencies of the waves.															
CO5:	find the general and singular solutions of linear and nonlinear partial differential equations.															
Pre-requisites:																
- Fundamentals of elementary algebra - Fundamentals of calculus										- Fundamentals of trigonometry - Fundamentals of geometry						
CO/PO, PSO Mapping																
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak																
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1 (EEE,ECE EFE, EXE)	PSO2 (EEE, BME & EFE)	PSO3 (BME)	
CO1	3	3	3	3	2							2	3	3	1	
CO2	3	3	3	3	2							2	3	3	1	
CO3	3	3	3	3	2							2	3	3	1	
CO4	3	3	3	3	2							2	3	3	1	
CO5	3	3	3	3	2							2	3	3	1	
Course Assessment methods																
DirectIndirect																
CIE test I (9) CIE test II (9) CIE test III (10) Objectives Test (7)						Assignment/seminar/Quiz (5) Total CIE: 40 marks Semester End Examination: 60 marks						Course end survey				
Unit 01		ORDINARY DIFFERENTIAL EQUATIONS												12 Hours		
Higher order linear ordinary differential equations with constant coefficients – Cauchy’s and Legendre’s linear ordinary differential equations – Method of variation of parameters.																

Unit 02	LAPLACE TRANSFORMS	12 Hours
Laplace transform: Conditions for existence – Transform of elementary functions – Basic properties – Transform of derivatives and integrals – Transform of unit step function and impulse function – Initial and final value theorems – Transform of periodic functions. Inverse Laplace transform: Standard results – Statement of convolution theorem and its applications – Solution of second order linear ordinary differential equations with constant coefficients using Laplace transform.		
Unit 03	FOURIER SERIES	12 Hours
General Fourier series – Dirichlet's conditions – Change of intervals – Odd and even functions – Half range sine and cosine series – Root mean square – Parseval's identity – Harmonic analysis.		
Unit 04	FOURIER TRANSFORMS	12 Hours
Statement of Fourier integral theorem – Infinite Complex Fourier transform pair and their Properties – Infinite Fourier sine and cosine transforms pair and their properties – Transforms of simple functions – Parseval's identity.		
Unit 05	PARTIAL DIFFERENTIAL EQUATIONS	12 Hours
Formation of partial differential equations – Lagrange's partial differential equation – Clairaut's form of partial differential equations – Second order linear partial differential equation with constant coefficients.		
Theory: 45 Hours	Tutorial: 15 Hours	Practical: - Project: - Total Hours: 60 Hours
TEXT BOOKS:		
1.	T. Veerarajan, "Transforms and Partial Differential Equations", McGraw Hill Publishers, 3 rd Edition, 2016.	
2.	T. Veerarajan, "Engineering Mathematics for Semesters I & II", McGraw Hill Publishers, 1 st Edition, 2019.	
REFERENCE BOOKS:		
1.	E. Kreyszig, "Advanced Engineering Mathematics", Wiley Publishers, 10 th Edition, Reprint, 2017.	
2.	C. Prasad and R. Garg, "Advanced Engineering Mathematics", Khanna Publishers, 1 st Edition, 2018.	
3.	B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 44 th Edition, 2018.	
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BoS Date: 08. 07. 2023		HoD / Mathematics

U23PHY203D	ENGINEERING PHYSICS (Common to Electrical and Electronics Engineering & Electrical and Computer Engineering)											L	T	P	J	C
												3	0	0	0	3
Course Outcomes																
At the end of the course, the student will be able to																
CO1:	Analyse the relation between the arrangement of atoms and material properties.															
CO2:	Discuss the dual nature of matter and radiation and the application of the wave nature of particles.															
CO3:	Describe the basic components of lasers.															
CO4:	Differentiate the electrical and thermal conductivity of metals.															
CO5:	Elucidate the classification and theory of semiconducting materials.															
Pre-requisite:																
Basic Knowledge of atomic physics, optics, and electricity.																
CO/PO, PSO Mapping																
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak																
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2		
CO 1	3	2	-	-	-	2	2	-	-	2	-	1	-	2		
CO 2	3	2	-	-	-	2	2	-	-	2	-	1	-	2		
CO 3	3	2	-	-	-	2	2	-	-	2	-	1	-	2		
CO 4	3	2	-	-	-	2	2	-	-	2	-	1	-	2		
CO 5	3	2	-	-	-	2	2	-	-	2	-	1	-	2		
Course Assessment methods																
Direct										Indirect						
CIE test I (9) CIE test II (9) CIE test III (10) Objectives Test (7)						Assignment/seminar/Quiz (5) Total CIE: 40 marks Semester End Examination (60)				Course end survey						

Unit 01: CRYSTAL PHYSICS		9 Hours
Importance of crystals - Types of crystals - Basic definitions in crystallography (Lattice -space lattice - unit cell - lattice parameters - basis) - Bravais lattices - Lattice planes and Miller indices - Interplanar distance - d spacing in cubic lattice - Calculation of number of atoms per unit cell - Atomic radius - Coordination number - Atomic Packing Factor for SC, BCC, FCC and HCP structures - Polymorphism and allotropy - Crystal imperfections - Point, line and surface defects - Burger vector.		
Unit 02: QUANTUM PHYSICS		9 Hours
Limitations of classical theory - Dual nature of matter and radiation - Compton effect - Expression for Compton shift (no derivation) - de Broglie waves - Heisenberg's Uncertainty Principle - Schrödinger's time independent and time dependent wave equations - Physical significance of wave function - Energy and wave function of an electron trapped in one dimensional box - Application of wave nature of particles - Electron microscope - Comparison of optical and electron microscope - Scanning electron microscope - Transmission electron microscope - Limitations of electron microscope.		
Unit 03: LASERS		9 Hours
Energy level - Stimulated absorption - Population inversion - Meta stable state - Spontaneous emission - Stimulated emission - Basic components of a laser - Einstein's theory of spontaneous and stimulated emission of radiation - Types of lasers - Solid state laser - Nd: YAG laser - Gas laser - CO ₂ laser - Semiconductor laser - Homo junction and hetero junction laser - Holography - Construction and reconstruction of hologram - Application of laser in industry - Cutting, welding and drilling - Medical applications - Lasik.		
Unit 04: CONDUCTING MATERIALS		9 Hours
Basic definitions - Classical free electron theory of metals - Expression for electrical conductivity and thermal conductivity - Wiedemann Franz law - Lorentz number - Drawbacks of classical free electron theory - Quantum theory - band theory of solids (qualitative treatment only) - Fermi energy and Fermi distribution function - Effect of temperature on Fermi function - Density of energy states - Carrier concentration in metals.		

Unit 05: SEMICONDUCTING MATERIALS					9 Hours
Intrinsic semiconductors - Energy band diagram - Direct and indirect band gap semiconductors - Carrier concentration in intrinsic semiconductors - Fermi level - Variation of Fermi level with temperature - Electrical conductivity - Band gap determination - Extrinsic semiconductors - Carrier concentration in n-type and p-type semiconductors (Qualitative Treatment only) - Variation of Fermi level with temperature and impurity concentration - Hall effect - Determination of Hall coefficient - Applications.					
Theory: 45 Hrs		Tutorial: --	Practical: --	Project: --	Total Hours: 45 Hrs
TEXTBOOKS					
1.	M.N. Avadhanulu, P.G. Kshirsagar, "A Textbook of Engineering Physics", S. Chand & Company Ltd, New Delhi 2014.				
2.	B D. K. Bhattacharya, Poonam Tandon "Engineering Physics", Oxford University Press 2017.				
REFERENCES					
1.	"Engineering Physics", Sonaversity, Sona College of Technology, Salem, Revised Edition 2018.				
2.	B. K. Pandey and S. Chaturvedi, "Engineering Physics", Cengage Learning India Pvt. Ltd., Delhi, 2021.				
3.	V. Raghavan, "Materials Science and Engineering: A First Course" Prentice Hall India Learning Private Limited, 6 th Edition, 2015.				
4.	William D. Callister Jr., David G. Rethwisch, "Callister's Materials Science and Engineering", 10 th Edition, Global Edition 2019.				
5.	R. Wolfson, "Essential University Physics", Volume 1 & 2. Pearson Education (Indian Edition), 2009.				

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Dr. C. Shanthi

HOD / Science

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Dr. M. Renuga
27/1/25

Dr. M. Renuga

BoS – Chairperson,

Science and Humanities

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U23PHL210B	ENGINEERING PHYSICS LABORATORY (Common to I Year B.E. Electrical and Electronics Engineering & Electrical and Computer Engineering)								L	T	P	J	C	
									0	0	2	0	1	
Course Outcomes														
At the end of the course, the student will be able to														
CO1:	Determine the optical, thermal and electrical properties of materials by various physics laboratory equipment.													
CO2:	Access, process and analyse scientific information.													
CO3:	Solve problems individually and collaboratively.													
Pre-requisite: Capable of using Screw gauge, Vernier calliper, Travelling microscope, able to handle interferometer.														

CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2		1		1			1					2
CO2	3	2		1		1			1					2
CO3	3	2		1		1			1					2
Course Assessment methods														
Direct										Indirect				
CIE test I (15)					RTPS (10)					Course end survey				
Quiz 1 (5)					Record (10)									
CIE test II (15)					Total CIE:60 marks									
Quiz 2 (5)					Semester End Examination (40 marks)									
LIST OF EXPERIMENTS														
1	Determination of the thickness of a thin wire by forming interference fringes using air wedge apparatus.													
2	Determination of velocity of ultrasonic waves and compressibility of the given liquid using ultrasonic interferometer.													
3	Determination of the wavelength of a diode laser.													
4	Determination of particle size of lycopodium powder using diode laser.													
5	Determination of acceptance angle and numerical aperture of an optical fibre using diode laser.													

6	Determination of coefficient of viscosity of liquid by Poiseuille's method.
7	Determination of wavelength of mercury spectrum using spectrometer.
8	Determination of the thermal conductivity of a bad conductor using Lee's Disc apparatus.
9	Determination of band gap of the given semiconductor diode.
10	Determination of specific resistance of a given wire using Carey Foster's bridge.
TOTAL : 30 HOURS	

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U23EE201	ELECTRICAL CIRCUIT ANALYSIS (Common to EEE & EFE)	L	T	P	J	C
		3	1	0	0	4

Course Outcomes

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

CO1:	solve AC & DC circuits using Ohm's law and Kirchhoff's laws.
CO2:	apply the concepts of different theorems to solve complex problems in DC circuits
CO3:	analyze the steady state behaviour of series and parallel RL, RC, and RLC circuits.
CO4:	analyze the transient behavior of RL, RC, and RLC circuits with step and sinusoidal excitations.
CO5:	analyze the three-phase balanced and unbalanced systems in star & delta configurations.

Pre-requisite:

- Linear Algebra and Calculus with MATLAB

CO/PO, PSO Mapping

(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2		2						3	3	3
CO2	3	3	2	2		2						3	3	3
CO3	3	3	2	2		2						3	3	3
CO4	3	3	2	2		2						3	3	3
CO5	3	3	2	2		2						3	3	3

Course Assessment methods

Direct

CIE test I (9)
CIE test II (9)
CIE test III (10)
Assignment/seminar/Quiz (5)

Objectives Test (7)
Total CIE: **40 marks**
Semester End Examination: **60 marks**

Indirect

Course end survey

Unit 01: DC AND AC FUNDAMENTALS

12 Hours

Introduction – Voltage, Current, Power and Energy – Circuit Elements – Energy Sources – Ohm's law – Kirchhoff's Laws – R, L & C in series and Parallel – Voltage Division – Current Division – Star-Delta Transformation – Source transformations – Sine Wave Equation – Terminologies – RMS Value, Average Value, Form factor and Peak factor for Sine Waveform.

Unit 02: DC NETWORK ANALYSIS

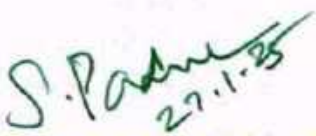
12 Hours

Mesh Analysis – Nodal analysis – Superposition Theorem – Thevenin's Theorem – Norton's Theorem – Maximum Power Transfer Theorem – Reciprocity Theorem.

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Unit 03: AC NETWORK ANALYSIS				12 Hours	
RL, RC and RLC - Series and Parallel circuits - Impedance, Current, Voltage, Power and Power Factor – Impedance Triangle-Power Triangle - RLC Series and Parallel Resonance-resonant frequency-Q factor-Bandwidth.					
Unit 04: CIRCUIT TRANSIENT ANALYSIS				12 Hours	
Introduction – transient response of RL and RC for step and sinusoidal inputs –transient response of RLC series circuit for step input using Laplace transform method. (only qualitative treatment for sinusoidal input)					
Unit 05: THREE PHASE CIRCUITS				12 Hours	
Polyphase Systems – Advantages of a Three-Phase System – Generation of Three-Phase Voltages - Phase Sequence – Voltage, Current, and Power in a Star Connected and Delta-Connected System – Three-Phase Balanced & Unbalanced loads — Power and power factor Measurement by two wattmeter method.					
Theory: 45 Hrs		Tutorial: 15 Hrs	Practical: --	Project:--	Total Hours: 60 Hrs
TEXT BOOKS					
1.	Shyam Mohan S.P., Sudhakar A, “Circuits and Network Analysis & Synthesis”, Tata McGraw Hill, 5 th edition, 2015.				
2.	V N Mittle and Arvind Mittal, “Basic Electrical Engineering”, McGraw Hill, 2 nd edition, 2018.				
REFERENCES					
1.	Charles K Alexander, Matthew Sadiku, Fundamentals of Electric Circuits, McGraw Hill Education, 7 th edition, 2022.				
2.	William Hayt, Jack Hemmerly, Jaime Phillips, Steven Durbin, “Engineering Circuit Analysis”, McGraw Hill Education, 9 th edition, 2020.				
3.	Ravish. R. Singh, Network Analysis & Synthesis, McGraw Education, 2 nd Edition, 2019.				
4.	Arumugam M and Premkumaran, “Electric Circuit Theory”, Khanna Publishers, 5 th Edition, 2000.				


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U23EE202	ELECTRICAL CIRCUITS LABORATORY (Common to EEE & EFE)							L	T	P	J	C		
								0	0	3	0	1.5		
Course Outcomes														
At the end of the course, the students will be able to														
CO1:	analyze the basic laws and theorems of electric circuits.													
CO2:	analyze the single phase and three phase circuits.													
CO3:	design and analyse a circuit for specific application.													
CO/PO, PSO Mapping														
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2	2			3	2	2	3	3	3
CO2	3	3	2	2	2	2			3	2	2	3	3	3
CO3	3	3	2	2	2	2			3	2	2	3	3	3
Course Assessment methods														
Direct									Indirect					
CIE test I (15) Quiz I- (5) CIE test II (15) Quiz II- (5)						RTPS (10) Record (10) Total CIE: 60 marks Semester End Examination :40 marks				Course end survey				

Students may use LTSPICE / TinkerCad tool for simulating the below experiments.

List of Experiments:

1. Verification of Ohm's law and Kirchoff's laws.
2. Verification of Superposition theorem.
3. Verification of Thevenin's theorem.
4. Verification of Norton's theorem.
5. Verification of Maximum power transfer theorem.
6. Verification of Reciprocity theorem.
7. Calculation of Resonant Frequency, Bandwidth and Q factor for RLC Circuits.
8. Determination of RMS Value, Average Value, Form factor and Peak factor for Sinusoidal Waveform.
9. Simulate the transient behaviour of RL and RC circuits for various inputs.
10. Simulate the transient behaviour of RLC circuits for various inputs.
11. Measurement of voltage, current and power for a 3 phase load.
12. Power and power factor measurements by two wattmeter method.

Theory: --	Tutorial: --	Practical: 45 Hrs	Project: --
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U23ME204		THERMODYNAMICS AND FLUID MACHINES						L	T	P	J	C		
								3	0	0	0	3		
Course Outcomes														
At the end of the course, the student will be able to														
CO1:	Discuss the thermodynamic properties of system and apply First Law of Thermodynamics to solve engineering problems.													
CO2:	Apply the Second law of Thermodynamics to various processes and analyze its performance													
CO3:	Determine the Thermodynamic properties of steam and summarize the principle of operation of various conventional power plants.													
CO4:	Explain the types of Refrigeration system and calculate the cooling, heating and humidifier capacities for various air-conditioning components by using psychrometric charts.													
CO5:	Analyze the performances of hydraulic turbines and discuss the working principle of pumps.													
Pre-requisite: Fundamentals of Mathematics, Physics.														
CO/PO, PSO Mapping														
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	1	2	1					2	2	2
CO2	3	3	2	2	1	2	1					2	2	2
CO3	3	3	3	3	1	2	1					3	2	2
CO4	3	3	3	3	1	2	1					3	2	2
CO5	3	3	3	3	2	3	1					3	2	2
Course Assessment methods														
Direct								Indirect						
CIE test I (9) CIE test II (9) CIE test III (10) Objectives Test (7)					Assignment/seminar/Quiz (5) Total CIE: 40 marks Semester End Examination: 60 marks					Course end survey				
Unit 01: FUNDAMENTALS AND FIRST LAW OF THERMODYNAMICS											9 Hours			
Introduction to Thermodynamics – Concept of a System – Types of Systems – Thermodynamic Equilibrium – Properties - State - Process and Cycle – Zeroth Law – Energy Interactions – Heat and Work – First Law: Cycle and Process – Applications to non-flow and flow processes, simple problems.														

Unit 02: SECOND LAW OF THERMODYNAMICS				9 Hours
Kelvin-Planck and Clausius Statements of the Second Law - Heat engine, Heat pump and Refrigerator, Equivalence of kelvin-Planck and Clausius statements, Reversible and Irreversible processes - Carnot Cycle, Carnot theorem and its corollaries, Concept of entropy, simple problems.				
Unit 03: STEAM PROPERTIES AND CONVENTIONAL POWER PLANTS				9 Hours
Steam properties- enthalpy, entropy, specific volume, Dryness fraction - Use of Steam Table and Mollier Chart. - Simple Rankine cycle, simple problems. Working of Steam, Gas Turbine, Nuclear and Diesel Power plant.				
Unit 04: REFRIGERATION & AIR CONDITIONING				9 Hours
Refrigeration-COP-Vapour compression and vapour absorption Refrigeration system. Refrigerants, Desirable properties of refrigerants (Qualitative). Study of Psychrometric terms, psychrometric process-psychrometric chart, simple problems -Air conditioning – Types, working of summer and winter air-conditioning.				
Unit 05: HYDRAULIC TURBINES & PUMPS				9 Hours
Layout Hydro power plant – Hydraulic Turbines - Classification and working principle. Pelton wheel turbine - Francis turbine -Kaplan turbine - Velocity triangle - work done – Efficiencies - Performance calculations. Pumps- Classification- Working principle of Centrifugal Pump, Reciprocating Pump, Comparison (Qualitative)				
Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs
TEXT BOOKS				
1. Mahesh M Rathore, “ Thermal Engineering” Tata McGraw-Hill Education(India), 2010				
2. R.K.Rajput, “Thermal Engineering” , Laxmi Publications, New Delhi, 11th edition, 2020.				
3. R. K. Bansal, “Fluid Mechanics and Hydraulics Machines, (10th edition), Laxmi publications (P) Ltd, New Delhi, 2019.				
REFERENCES				
1. Yunus A Cengel, “ Thermodynamics: An Engineering Approach” McGraw Hill Education (India), 9th Edition 2019.				
2. P.K.Nag, “Engineering Thermodynamics” McGraw Hill Education (India), Sixth Edition, 2018				
3. R.S.Khurmi, J.K.Gupta, “A Textbook of Thermal Engineering” S. Chand Publishing, New Edition, 2020.				
4. R.K.Rajput, “ Power Plant Engineering”, Laxmi Publications, New Delhi, 5th edition, 2016				
5. Sukumar Pati., “ Fluid Mechanics and Hydraulics Machines”, Tata McGraw Hill publications (p) Ltd, 2015				
6. Yunus A Cengel, “ Fluid Mechanics” McGraw Hill Education (India), 4th Edition 2019				


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U23TAM201	தமிழரும் தொழில்நுட்பமும்		L	T	P	J	C
			1	0	0	0	1
Course Outcomes							
At the end of the course, the student will be able to							
CO1:	Describe the weaving and ceramic technology						
CO2:	Explain the design and construction technology						
CO3:	Analyse the manufacturing technology						
CO4:	Describe the agriculture and irrigation technology						
CO5:	Explain the Scientific Tamil and Tamil Computing						
Course Assessment methods							
Direct				Indirect			
CIE test I (30)		Total CIE: 100 marks		Course end survey			
CIE test II (30)		Semester End Examination: NIL					
CIE test III (40)							
Unit 01: WEAVING AND CERAMIC TECHNOLOGY							3 Hours
அலகு I நெசவு மற்றும் பாணைத் தொழில்நுட்பம்: சங்க காலத்தில் நெசவுத் தொழில் - பாணைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் பாண்டங்களில் கீறல் குறியீடுகள்.							
Unit 02: DESIGN AND CONSTRUCTION TECHNOLOGY							3 Hours
அலகு II வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்: சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு- சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரம் சிற்பங்களும், கோவில்களும் - 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.							
Unit 03: MANUFACTURING TECHNOLOGY							3 Hours
அலகு III உற்பத்தித் தொழில் நுட்பம்: கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருக்குதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சுத்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - கடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத்துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.							
Unit 04: AGRICULTURE AND IRRIGATION TECHNOLOGY							3 Hours
அலகு IV வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்: அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குழுவித் தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்.							
Unit 05: SCIENTIFIC TAMIL & TAMIL COMPUTING							3 Hours
அலகு V அறிவியல் தமிழ் மற்றும் கணித்தமிழ்: அறிவியல் தமிழின் வளர்ச்சி -கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்.							

Theory: 15 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 15 Hrs
TEXT BOOKS				
1.	தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).			
2.	கணிணித் தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்). கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு) பொருளை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)			
REFERENCES				
3.	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)			
4.	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies).			
5.	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).			
6.	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)			
7.	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)			
8.	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)			
9.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)			
10.	Journey of Civilization Indus to Vaigai (R.Ramakrishna) (Published by: RMRL) – Reference Book.			


HOD

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U23TAM201	TAMILS AND TECHNOLOGY		L	T	P	J	C
			1	0	0	0	1
Course Outcomes							
At the end of the course, the student will be able to							
CO1:	Describe the weaving and ceramic technology						
CO2:	Explain the design and construction technology						
CO3:	Analyse the manufacturing technology						
CO4:	Describe the agriculture and irrigation technology						
CO5:	Explain the Scientific Tamil and Tamil Computing						
Course Assessment methods							
Direct				Indirect			
CIE test I (30)		Total CIE: 100 marks		Course end survey			
CIE test II (30)		Semester End Examination: NIL					
CIE test III (40)							
Unit 01: WEAVING AND CERAMIC TECHNOLOGY						3 Hours	
Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries							
Unit 02: DESIGN AND CONSTRUCTION TECHNOLOGY						3 Hours	
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 03: MANUFACTURING TECHNOLOGY						3 Hours	
Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gem stone types described inSilappathikaram.							
Unit 04: AGRICULTURE AND IRRIGATION TECHNOLOGY						3 Hours	
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 05: SCIENTIFIC TAMIL & TAMIL COMPUTING						3 Hours	
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							
Theory: 15 Hrs		Tutorial: --		Practical: --		Project:--	
Total Hours: 15 Hrs							
TEXT BOOKS							
1.	தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).						
2.	கணினித் தமிழ் –முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்). கீழ்க் -வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு) பொருதை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)						

REFERENCES

1.	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
2.	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies).
3.	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
4.	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
5.	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)
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7.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
8.	Journey of Civilization Indus to Vaigai (R.Ramakrishna) (Published by: RMRL) – Reference Book.


HOD

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U23GE201	BASIC APTITUDE-II (Common to All Departments)	L	T	P	J	C
		2	0	0	0	0

Course Outcomes

At the end of the course, the student will be able to

CO1:	Solve the problems in Percentage, Conversion of Percentage to Ratio and Ratio into Percentage and work on verbal aptitude questions
CO2:	Elucidate the problems in Profit and loss and percentage of profit and loss. Choose appropriate sentence fillers and Idioms and phrase
CO3:	Crack the problems involving Geometry, Area, Perimeter/Circumference, Surface area and Volume. Comprehend the given passages for Reading Comprehension activity and answer the questions correctly.
CO4:	Deduce the problems involving Trigonometry and exhibit good expertise in detecting errors in the given sentences.
CO5:	Interpret the problems on Ages & logarithm and work on logical reasoning and demonstrate good vocabulary skill by spotting errors.

Pre-requisite:

- Basic English language and Grammar knowledge
- Knowledge in Basic Mathematics

CO/PO, PSO Mapping

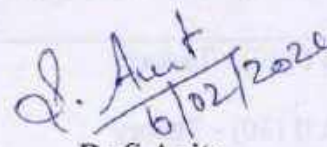
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	1	1	1	3	3	3	2	3
CO2	3	3	3	2	1	1	1	3	3	3	2	3
CO3	3	3	3	2	1	1	1	3	3	3	2	3
CO4	3	3	3	2	1	1	1	3	3	3	2	3
CO5	3	3	3	2	1	1	1	3	3	3	2	3

Course Assessment methods

Direct		Indirect
CIE test I (30) - Theory	Total CIE: 100 marks Semester End Examination – NIL	Course end survey
CIE test II (30) - Theory		
CIE test III (40) – Theory		

Unit 01					6 Hours				
Percentage: Conversion of a Percentage into a Fraction – Conversion of a Percentage into a Ratio – Conversion of a Ratio into a Percentage - Percentage Change – Successive percentage – Problems									
Verbal Aptitude: Jumbled sentences & Reconstructions of sentences (PQRS)									
Unit 02					6 Hours				
Profit Loss: Types of prices – Profit – Loss – Percentage of Profit and Loss - Common Gain or Loss – Selling Price and Cost Price Equality – Successive Profit and Loss – Problems									
Verbal Aptitude: Sentence fillers two words & Idioms and phrase									
Unit 03					6 Hours				
Geometry: Angles – Complementary and Supplementary angles – Lines – Triangle – Types of triangles – Properties of Triangles – Problems									
Area, Perimeter / Circumference: Triangles - Rectangles and Squares – Parallelogram, Rhombus and Trapezium – Circles – Problems									
Surface area, curved surface area & Volume: Cuboid – Cube – Right circular cylinder – Right circular cone – Sphere – Hemisphere– Problems									
Verbal Aptitude: Reading comprehension.									
Unit 04					6 Hours				
Trigonometry: Value of Trigonometry ratios for particular values – Sign of Trigonometrical ratios – Trigonometrical ratios for sum or difference of angles Problems									
Verbal Aptitude: Spotting errors									
Unit 05					6 Hours				
Averages – Problems on ages – Logarithm - Logical Reasoning: Alpha Series – Venn diagram – Problems									
Verbal Aptitude: Writing captions for given pictures.									
Theory: 30 Hrs		Tutorial: 0		Practical: 0		Project: 0		Total Hours: 30 Hrs	
TEXT BOOKS									
1.	S.Chand and Dr.R.S.Aggarwal, “Quantitative Aptitude for competitive examinations”, S Chand and Company Limited 2019.								
2.	Nishit K.Sinha, “Logical Reasoning and Data Interpretation”, Pearson 2021.								


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U23OL1201	French - II		L	T	P	J	C
			1	0	0	0	1
Course Outcomes							
At the end of the course, the student will be able to							
CO1:	Accept and refuse of an invitation, give some instruction of do's and don'ts, converse in commercial centres, write an invitation						
CO2:	Describe a city, locate a place in a city, ask further details, describe one's hometown						
CO3:	Talk about things around us, recite a past event, identify sign boards, express agree and disagree, express obligation and prohibition, sell an object in online						
CO4:	Talk about one's goals, express one's feelings, write a list of things to do, express an opinion, talk about weather, draft a mail response						
CO5:	Express one's interest and wish, describe a pet animal, express one's aversions, encourage others, write to ask for a help, narrate a past event, write a biography						
Course Assessment methods							
Direct				Indirect			
CIE test I (30)		Total CIE: 100 marks Semester End Examination: NIL		Course end survey			
CIE test II (30)							
CIE test III (40)							
Unit 01:				3 Hours			
Hr 2: City shopping and services, conjugation: payer, manger and acheter, negative sentence							
Hr 4: Imperative sentence, food and beverages, utensils, cutleries, crockeries							
Hr 6: Quantitative articles, quantities, pronoun 'en', express appreciation, write an invitation							
Unit 02:				3 Hours			
Hr 8: City and localities, Conjugation: prendre, adjectives of place, pronoun 'y'							
Hr 10: Transport, leisure activities, preposition of place, degrees of comparison							
Hr 12: Asking information about a new place, describe a city							
Unit 03:				3 Hours			
Hr 14: Things in a store, conjugation : faire, imparfait 2, passé composé							
Hr 16: Things in a repairing shop, computer, relative pronouns: que and qui							
Hr 18: Imperative negative, express obligation and interdiction, online sale and response							
Unit 04:				3 Hours			
Hr 20: Professions, conjugation: croire, voir, recent past tense							
Hr 22: Traveling formalities, expressing about health condition, future tense							
Hr 24: Pronoun COD, talk about weather condition, write about one's plans and projections							
Unit 05:				3 Hours			
Hr 26: Citizenship and solidarity, conjugation: connaitre and savoir, depuis vs pendant							
Hr 28: Imparfait vs passé composé, nature and environment, indirect pronouns COI							
Hr 30: Animals, conditional, talk on supporting others, write a biography							
Theory: 15 Hrs		Tutorial: --		Practical: --		Project:--	
						Total Hours: 15 Hrs	
TEXT BOOKS							
1.	The course faculty will provide relevant audios, videos, handouts and notes.						
2.	Books : Saison (Méthode de français, cahier d'activités)						
3.	Reference books : La conjugaison, Dondon, Echo						

HOD

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U23OL1202	German - II		L	T	P	J	C
			1	0	0	0	1
Course Outcomes							
At the end of the course, the student will be able to							
CO1:	Use grammatical expressions appropriately in day-to-day conversation.						
CO2:	Make them frame simple sentences /questions.						
CO3:	Accentuate to start and sustain basic conversation						
CO4:	Helps them articulate thoughts in German						
CO5:	Identify the different forms of the verb						
Course Assessment methods							
Direct				Indirect			
CIE test I (30)		Total CIE: 100 marks Semester End Examination: NIL		Course end survey			
CIE test II (30)							
CIE test III (40)							
Unit 01:					3 Hours		
Nominative/accusative case, adjectives							
Unit 02:					3 Hours		
Modes of transportation, orientation, giving/understanding simple directions							
Unit 03:					3 Hours		
• Food and beverages, Modal verbs, Separable verbs							
Unit 04:					3 Hours		
• Simple sentences using modal / separable verbs							
Unit 05:					3 Hours		
• Articles of clothing							
Theory: 15 Hrs		Tutorial: --	Practical: --	Project:--	Total Hours: 15 Hrs		
TEXT BOOKS							
1.	Netzwerk A1						

[Signature]
HOD 13/11/23

Dr. M.RENUGA,
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Sona College of Technology,
SALEM - 636 :

U23OL1203	Japanese - II		L	T	P	J	C
			1	0	0	0	1
Course Outcomes							
At the end of the course, the student will be able to							
CO1:	Use verbs in polite conversation or for dissuasion and describe two different activities						
CO2:	Demonstrate the application of causative verbs and those that express ability or possibility, and describe experiences						
CO3:	Use plain-style expressions, those that state opinions, and verbs and adjectives that go with nouns						
CO4:	Express sentences that use 'when' and 'if' and those that describe how services are given and received						
CO5:	Read 126 letters of Kanji, and demonstrate adequate knowledge of the lessons learnt in Levels I and II to pass the Japanese Language Proficiency Test (JLPT) for the N5 Level						
Course Assessment methods							
Direct				Indirect			
CIE test I (30)		Total CIE: 100 marks		Course end survey			
CIE test II (30)		Semester End Examination: NIL					
CIE test III (40)							
Unit 01:						3 Hours	
Hr 1-2: Words and verbs expressing requests / Kanji 1-10							
Hr 3-4: Asking for permission; making statements to prohibit something / Kanji 11-20							
Hr 5-6: Describing two activities / Kanji 21-30							
Unit 02:						3 Hours	
Hr 7-8: Verbs that express 'I have to ...' / Kanji 31-40							
Hr 9-10: Verbs which express ability or possibility / Kanji 41-50							
Hr 11-12: Describing experience / Kanji 51-60							
Unit 03:						3 Hours	
Hr 13-14: Plain-style expressions / Kanji 61-70							
Hr 15-16: Expressions like 'I think that ...' / Kanji 71-80							
Hr 17-18: Qualifying nouns with verbs and adjectives / Kanji 81-90							
Unit 04:						3 Hours	
Hr 19-20: Expressions using 'When ...' / Kanji 91-100							
Hr 21-22: Describing the giving and receiving of services / Kanji 101-110							
Hr 23-24: Expressions using 'If ...' / Kanji 111-126							
Unit 05:						3 Hours	
Hr 25-26: Preparing for JLPT N5							
Hr 27-28: Preparing for JLPT N5							
Hr 29-30: Preparing for JLPT N5							
Theory: 15 Hrs		Tutorial: --		Practical: --		Project:--	
Total Hours: 15 Hrs							
TEXT BOOKS							
1.	The course faculty will provide handouts / notes / course material.						
2.	Books on Basic Japanese language available in the college library.						

HOD

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U23OL1204	Korean - II	L	T	P	J	C
		1	0	0	0	1
Course Outcomes						
At the end of the course, the student will be able to						
CO1:	Identify time					
CO2:	Identify the date and days of the week					
CO3:	Explain location and places					
CO4:	Explain destination					
CO5:	Construct simple sentences / questions.					
Course Assessment methods						
Direct				Indirect		
CIE test I (30)		Total CIE: 100 marks Semester End Examination: NIL		Course end survey		
CIE test II (30)						
CIE test III (40)						
Unit 01: Time				3 Hours		
Talking about time						
Unit 02: Date				3 Hours		
Talking about dates and days of the week Talking about doing something in the past						
Unit 03: Location				3 Hours		
Talking about location Talking about doing something at a location						
Unit 04: Direction				3 Hours		
Talking about directions						
Unit 05: Future				3 Hours		
Talking about doing something in the future Talking about plans for the future Talking about hope for the future						
Theory: 15 Hrs		Tutorial: --		Practical: --		Project:--
Total Hours: 15 Hrs						
REFERENCES						
1	Vitamin Korean - 1					

Dr. M. Renuga
13/2/24
HOD

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U23OL1205	Hindi - II		L	T	P	J	C
			1	0	0	0	1
Course Outcomes							
At the end of the course, the students will be able to							
CO1:	Write Tenses and Self – Introduction						
CO2:	Write Hindi numbers & sentence Translations						
CO3:	Read and Write comprehension question & days of the week						
CO4:	Read and frame sentences (Story) & part of the body						
CO5:	Communicate effectively using tenses (Conversation)						
Course Assessment methods							
Direct				Indirect			
CIE test I (30)		Total CIE: 100 marks		Course end survey			
CIE test II (30)		Semester End Examination: NIL					
CIE test III (40)							
Unit 01: Tenses and Self – Introduction					3 Hours		
Learning Hindi pronunciation Speaking based on Tenses (Present, past & future) Reading Writing							
Unit 02: Hindi Numbers & Sentence Translations					3 Hours		
Reading Writing Letters pronunciation Meanings learning							
Unit 03: Comprehension question & Days of the week					3 Hours		
Reading & analysing the meaning Learning							
Unit 04 : Story and Part of the body					3 Hours		
Words meaning Reading & Writing Sentence framing							
Unit 05 : Conversation and Colours name					3 Hours		
Conversation between a boy and Doctor Coersation between Taxi driver and Passenger							
Theory: 15 Hrs		Tutorial: --		Practical: --		Project:--	
Total Hours: 15 Hrs							
REFERENCES							
1	Diploma in Hindi (department of higher education, Delhi)						
2	Hindi Prachara sabha exam books (Pratham and Madhyama)						

M. R. Renuga
HOD

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Sona College of Technology, Salem
(An Autonomous Institution)

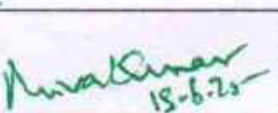
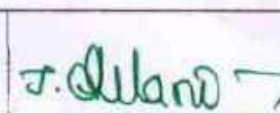
Courses of Study for B.E/B.Tech. Semester III under Regulations 2023 (CBCS)

Branch: Electrical and Electronics Engineering

S.No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type*
Theory courses										
1.	U23EE301	Network Analysis and Synthesis	3	0	0	0	3	PC	45	T
2.	U23EE302	DC Machines and Transformers	3	0	0	0	3	PC	45	T
3.	U23EE303	Electronic Devices and Circuits	3	0	0	0	3	PC	45	T
4.	U23EE304	Electromagnetic Theory	3	0	0	0	3	PC	45	T
5.	U23EE305	Digital Systems Design	2	1	0	0	3	PC	45	TT
6.	U23EE306	Measurements and Instrumentation	2	0	2	0	3	PC	60	TL
7.	Noc25 – mg106	NPTEL : Design Thinking – A Primer	1	0	0	0	1	ES	15	T
Practical courses										
8.	U23EE307	DC Machines and Transformers Laboratory	0	0	3	0	1.5	PC	45	L
9.	U23EE308	Electronic devices and circuits Laboratory	0	0	3	0	1.5	PC	45	L
10.	U23EE309	Digital Systems Design Laboratory	0	0	2	0	1	PC	30	L
11.	U23GE301	Soft Skills and Aptitude-I	0	0	2	0	1	EEC	30	L
Total Credits							24			

*T- Theory, TT- Theory with Tutorial, TL- Theory with Laboratory, TP- Theory with Project, TLP- Theory with Laboratory and Project, L-Laboratory, LT- Laboratory with Theory, LP- Laboratory with Project

Approved By

			
Chairperson, Electrical and Electronics Engineering BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr.S.Padma	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/ Electrical and Electronics Engineering, Third Semester B.E. EEE Students and Staff, COE

U23EE301	NETWORK ANALYSIS AND SYNTHESIS	L	T	P	J	C
		3	0	0	0	3

Course Outcomes

At the end of the course, the student will be able to

- CO1: solve the electrical circuits using graph technique.
- CO2: solve complex networks using network functions.
- CO3: solve coupled circuits.
- CO4: design different types of filters.
- CO5: synthesize RL, RC and LC networks

Pre-requisite:

- Linear Algebra, Laplace and Calculus with MATLAB, Electrical Circuit Analysis

CO/PO, PSO Mapping

(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO	3	3	2	2		2				2		3	3	3
CO	3	3	2	2		2				1		3	3	3
CO	3	3	2	2		2				2		3	3	3
CO	3	3	2	2		2				1		3	3	3
CO	3	3	2	2		2				1		3	3	3

Course Assessment methods

Direct		Indirect
CIE test I (9)	Objectives Test (7)	Course end survey
CIE test II (9)		
CIE test III (10)	Total CIE: 40 marks	
Assignment/seminar/Quiz (5)	Semester End Examination : 60 marks	

Unit 01: NETWORK TOPOLOGY

09 Hours

Graph of a network, definitions associated with graph - Incidence matrix, Reduced incidence matrix, Tie-set matrix and Cut-set matrix - Equilibrium equations using tie-set and cut-set matrices - Duality.

Unit 02: ONE PORT AND TWO PORT NETWORKS

09 Hours

One port network: driving point impedance and admittance
Two-port networks: Z parameters, Y parameters, ABCD parameters, h parameters, Inter relationship between parameters - Interconnection of two port networks - T & π networks.

Unit 03: COUPLED CIRCUITS

09 Hours

Self-inductance, Mutual inductance, Coefficient of coupling - Dot rule - Analysis of coupled circuits - Coupled circuits in series and parallel - Tuned circuits: Single tuned and double tuned circuits.

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14.6.2025 Version 1.1 B.E - Electrical and Electronics Engineering

Regulations 2023

Department of EEE,
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Unit 04: FILTERS**09 Hours**

Classification of filters - Characteristic impedance of T and π networks - Characteristics of filters - Constant k low pass and high pass filters - m-derived low pass and high pass filters - Band pass and elimination filters.

Unit 05: ELEMENTS OF NETWORK SYNTHESIS**09 Hours**

Hurwitz polynomials - Properties of Hurwitz polynomials - PR functions - Necessary and sufficient conditions of PR function - Synthesis of RL, RC and LC functions.

Theory: 45 Hrs**Tutorial: --****Practical: --****Project:--****Total Hours: 45 Hours****TEXT BOOKS**

1. Ravish R Singh, "Network Analysis and Synthesis", McGraw Hill, 2nd Edition 2019.
2. Shyam Mohan S.P., Sudhakar A, "Circuits and Network Analysis & Synthesis", Tata McGraw Hill, 5th edition, 2015.

REFERENCES

1. Arumugam M and Premkumaran, "Electric Circuit Theory", Khanna Publishers, 5th Edition, 2000.
2. Soni M.L and Gupta J.C, "Electrical Circuit Analysis", Dhanpatrai and Sons, Delhi, 1990.
3. Behrouz Peikari, "Fundamentals of Network Analysis & Synthesis", Jaico Publishing House, 2006
4. Kuo F.F., "Network Analysis and Synthesis", Wiley International Edition, Second Edition, 1996



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U23EE302	DC MACHINES AND TRANSFORMERS	L	T	P	J	C
		3	0	0	0	3

Course Outcomes

At the end of the course, the student will be able to

CO1:	select a suitable DC Generator for the given application, based on characteristics.
CO2:	explain the speed control and applications of DC motors.
CO3:	explain the operation of single phase transformer .
CO4:	explain different three phase transformer connections and applications of various transformers.
CO5:	analyze the performance of DC Machines and Transformers.

Pre-requisite:

Engineering Physics , Electric Circuit Analysis

CO/PO, PSO Mapping

(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	1	2						1	3	3
CO2	3	3	3	3	1	2						1	3	3
CO3	3	3	3	3	1	2						1	3	3
CO4	3	3	3	3	1	2						1	3	3
CO5	3	3	3	3	1	2						1	3	3

Course Assessment methods

Direct		Indirect
CIE test I (9)	Objectives Test (7)	Course end survey
CIE test II (9)	Total CIE: 40 marks	
CIE test III (10)	Semester End Examination : 60	
Assignment/seminar/Quiz (5)	marks	

Unit 01: DC GENERATORS

9 Hours

Electromechanical Energy conversion: Energy Balance, Laws of Electromagnetism, Energy flow in electromechanical energy conversion device.

Principle of operation, constructional details, armature windings, EMF equation- voltage build up process- methods of excitation - separate, shunt, series and compound excitations - no-load and load characteristics -armature reaction - commutation -inter poles, compensating windings - applications.

Unit 02: DC MOTORS

9 Hours

Principle of operation, constructional details -types of motors - torque equation - electrical and mechanical characteristics of DC shunt, series and compound motors - power flow equation- DC

starters - Braking of DC Shunt and series motors - Speed control methods of DC shunt and series motor-applications.

Unit 03: SINGLE PHASE TRANSFORMERS

9 Hours

Principle of operation - construction - classification of transformers - EMF equation - transformation ratio - transformer on no-load and load - Phasor diagrams - equivalent circuit - voltage regulation - Autotransformer -copper saving in Autotransformer -parallel operation of single phase transformers -applications.

Unit 04: THREE PHASE TRANSFORMERS

9 Hours

Principle of operation - Construction - Difference between Power transformer and distribution transformer, Three phase transformer connections - star, zig-zag, open-delta, Scott connection- three-phase to single-phase conversion - parallel operation. Types and Applications: Tap-changers on transformers, Traction Transformer, Rectifier Transformer, Converter Transformer, Audio frequency transformers, Pulse Transformers, dry type transformers.

Unit 05: TESTING OF DC MACHINES AND TRANSFORMERS

9 Hours

Losses and efficiency in DC machines and transformers - condition for maximum efficiency - testing of DC machines - brake test, Swinburne's test and Hopkinson's test - Field's test - separation of losses.

Testing of transformers - polarity test, load test -open circuit and short circuit tests - phasing out test - Sumpner's test- condition for maximum efficiency, all day efficiency.

Theory: 45 Hrs

Tutorial: --

Practical: --

Project:--

Total Hours: 45 Hrs

TEXT BOOKS

1. D.P. Kothari and I.J. Nagrath, "Electric Machines", McGraw Hill Publishing Company Ltd, Fourth Edition, 2014.
2. B.L. Theraja and A.K. Theraja, "A Text Book of electrical Technology", S.Chand Publisher, Vol 2, 2014.

REFERENCES

1. Samarajit Ghosh, "Electrical Machines", Pearson Education, second edition, 2012.
2. Stephen J Chapman, "Electric Machinery Fundamentals, Tata McGraw-Hill Education Private Ltd, Fifth Edition, 2012.
3. M.Ramamoorthy, O.Chandra Sekhar, "Electrical Machines", PHI Learning Pvt.Ltd., 2018.
4. S.K.Sahdev, "Electrical Machines", Cambridge University Press, 2018.

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U23EE303	ELECTRONIC DEVICES AND CIRCUITS	L	T	P	J	C								
		3	0	0	0	3								
Course Outcomes														
At the end of the course, the student will be able to														
CO1:	Analyze the characteristics of P-N junction diode and special purpose diodes.													
CO2:	Design small signal models for different configurations of transistor.													
CO3:	Discuss the I/O characteristics of various converter switches.													
CO4:	Explain different types of large signal and feedback amplifiers.													
CO5:	Illustrate different types of multistage amplifiers and oscillators.													
Pre-requisite: Engineering physics														
CO/PO, PSO Mapping														
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2		2	2			2		3	3
CO2	3	3	3	3	2		2	2			2		3	3
CO3	3	3	3	2	3		2	2			2		3	2
CO4	3	3	3	2	2		2	2			2		3	2
CO5	3	3	3	3	2		2	2			2		3	3
Course Assessment methods														
Direct							Indirect							
CIE test I (9)					Objectives Test (7)					Course end survey				
CIE test II (9)														
CIE test III (10)					Total CIE: 40 marks									
Assignment/seminar/Quiz (5)					Semester End Examination : 60 marks									
Unit 01: P-N JUNCTION DIODES												9 Hours		
P-N Junction diode – Structure, operation and V-I characteristics, Diode current equation, switching characteristics, diffusion and transition capacitance, - Diode rectifiers – working of half wave and full wave rectifiers, diode clipper and clamper circuits – Zener diode – Structure, operation and V-I characteristics – Zener as a voltage regulator.														
Special purpose electronic devices: Principle of operation and Characteristics of Tunnel Diode, Varactor Diode, photo diode and LED and their applications.														


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Unit 02: TRANSISTOR AND ITS ANALYSIS**9 Hours**

Bipolar Junction Transistor – structure, operation, CB, CE, CC configurations and I/O characteristics, switching characteristics – Transistor as an amplifier – current amplification factors - Analysis of h-parameters for CE, CB, CC configurations with input impedance, forward current gain, reverse voltage gain and output admittance – Comparison – Bias stability – dc load line, ac load line, operating point, stability factor, thermal runaway – Methods of transistor biasing – Bias compensation.

Unit 03: FIELD EFFECT TRANSISTORS AND CONVERTER SWITCHES**9 Hours**

JFET - Construction, principle of operation and VI characteristics, Pinch-off voltage. MOSFET - Construction, principle of Operation in Enhancement and Depletion modes, VI characteristics, Comparison of BJT, JFET and MOSFET. IGBT - Construction, principle of Operation in Enhancement and Depletion modes, VI characteristics.

Construction, principle of operation and VI characteristics – SCR, DIAC, TRIAC – SCR triggering circuits.

Unit 04: LARGE SIGNAL AND FEEDBACK AMPLIFIERS**9 Hours**

Differential amplifier – Common mode and Difference mode analysis - analysis of Class A, B, C and AB Power amplifiers – Feedback Amplifiers - Concept of feedback, General characteristics of negative feedback amplifiers - Effect of feedback on I/O resistance- types of negative feedback amplifiers – stability of feedback amplifier.

Unit 05: MULTISTAGE AMPLIFIERS AND OSCILLATORS**9 Hours**

Introduction – different coupling schemes in amplifiers – operation, advantages and disadvantages of RC coupled, transformer coupled, cascade, direct coupled and darlington amplifiers - Condition for Oscillations – UJT relaxation oscillator - RC phase shift Oscillators with transistor and FET- Hartley and Colpitts Oscillators - Wein-Bridge Oscillator - Crystal Oscillator- Frequency and Amplitude Stability Oscillators.

Theory: 45 Hrs**Tutorial: --****Practical: --****Project:--****Total Hours: 45 Hrs****TEXT BOOKS**

1. Integrated Electronics Analog Digital Circuits, Jacob Millman and D. Halkias, McGraw Hill, 2022
2. Electronic Devices and Circuits Theory, Boylestad, Prentice Hall Publications, 2021

REFERENCES

1. Electronic Devices and Circuits, S.Salivahanan, N.Suresh kumar, McGraw Hill, 2022
2. David A. Bell, "Electronic devices and circuits", Oxford University higher education, 5th edition 2008.
3. Thomas L.Floyd, "Electronic devices" Conventional current version, Pearson prentice hall, 10th Edition, 2017.
4. Balbir Kumar, Shail.B.Jain, "Electronic devices and circuits" PHI learning private limited, 2nd edition, 2021.

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U23EE304	ELECTROMAGNETIC THEORY	L	T	P	J	C
		3	0	0	0	3

Course Outcomes

At the end of the course, the student will be able to

CO1:	relate the fundamentals of vector, coordinate system to electromagnetic concepts.
CO2:	analyse the characteristics of Electrostatic field and interpret the concepts of Electric field in material space and solve the boundary conditions.
CO3:	interpret the concepts and characteristics of Magneto Static field in material space and solve boundary conditions.
CO4:	illustrate the concepts related to Faraday's law, induced EMF and Maxwell's equation.
CO5:	interpret the significance of time varying fields.

Pre-requisite:

Engineering Physics, Mathematics

CO/PO, PSO Mapping

(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	1	1								2	1
CO2	3	3	3	1	1								2	1
CO3	3	3	3	1	1								2	1
CO4	3	3	3	2	1								2	1
CO5	3	3	3	1	1								2	1

Course Assessment methods

Direct		Indirect
CIE test I (9)	Objectives Test (7) Total CIE: 40 marks Semester End Examination : 60 marks	Course end survey
CIE test II (9)		
CIE test III (10)		
Assignment/seminar/Quiz (5)		

Unit 01: VECTOR CALCULUS

9 Hours

Scalar and Vector fields – Properties and applications of Dot and Cross product - Coordinate systems; Cartesian, Cylindrical and Spherical Coordinate systems - relationship between Coordinate systems – types of charge distributions - types of integral related to EMF - Gradient - Curl - Divergence theorem – Stoke's theorem.

Unit 02: ELECTROSTATICS

9 Hours

Coulombs' law - Electric field intensity, electric flux density and electric potential due to various charge distributions - Electric field intensity due to infinite line charge, charged circular ring, infinite sheet of charge - Gauss's law and applications - Electric dipole - Boundary conditions between two perfect

Dielectrics - Capacitance; capacitance of parallel conductors, capacitance of an isolated sphere, concentric spheres and coaxial cables.				
Unit 03: MAGNETOSTATICS				9 Hours
Lorentz law of force - Biot-Savart law - Ampere's circuital law - Magnetic field intensity and Magnetic flux density - B and H due to finite length of conductor, at any point along the axis of circular coil, at any point along the axis of solenoid, at the centre of toroidal coil - Magnetic Materials - Magnetic dipole - Magnetization - Boundary conditions at the magnetic surface - Magnetic torque - Inductance; self and mutual inductance, inductance of solenoid and toroid, coaxial cable, two transmission lines.				
Unit 04: ELECTRODYNAMIC FIELDS				9 Hours
Faraday's law of electromagnetic induction - Maxwell's equations (differential and integral form) - Maxwell's equations for free space - Conduction current - Displacement current - Current densities in electric and magnetic field - Equation of continuity - Energy stored in electric and magnetic fields; energy density - Relation between field theory and circuit theory.				
Unit 05: ELECTROMAGNETIC WAVES				9 Hours
Electromagnetic wave equations - Wave equations for free space - Wave parameters; velocity, intrinsic impedance - Wave propagation in a lossless medium, wave propagation in a conducting medium, wave propagation in good dielectrics and good conductors - Depth of penetration - Poynting theorem.				
Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs
TEXT BOOKS				
1. Griffiths DJ, Introduction to Electrodynamics, 5th edition, Cambridge University, 2024.				
2. Ulaby FT, Ravaioli U, Fundamentals of Applied Electromagnetics, 8th ed, Pearson, 2020.				
REFERENCES				
1. K A Gangadhar, 'Electromagnetic Field Theory', Khanna Publishers; 16 th Edition, Reprint: 2015.				
2. Kraus/Fleisch, "Electromagnetics with Applications", 5th Edition, McGraw Hill Education (India) Edition 2017.				
3. Matthew N.O. Sadiku, "Principles of Electromagnetics", 6th Edition, International Version, Oxford University Press 2015.				
4. W.H.Hayt, J.A.Buck and M.Jallel Akhtar, "Engineering Electromagnetics", 8 th Edition, McGraw Hill Education (India) Private Limited, Special Indian Edition 2018.				

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U23EE305		DIGITAL SYSTEMS DESIGN								L	T	P	J	C
										2	1	0	0	3
Course Outcomes:														
At the end of the course, the student will be able to														
CO1:	Optimise logic functions using minimisation techniques & compare the properties of digital families.													
CO2:	Implement the combinational logic circuits using logic gates.													
CO3:	Implement the synchronous sequential logic circuits using flip-flops and gates.													
CO4:	Implement the asynchronous sequential logic circuits using flip-flops and gates.													
CO5:	Implement the digital systems using Verilog HDL.													
Pre-requisite: Basic mathematics; Electronic devices														
CO – PO/PSO Mapping (3/2/1 indicates the strength of correlation) 3 - Strong, 2 - Medium, 1 - Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	-	1	-	-	-	2	-	2	3	3
CO2	3	3	3	3	-	1	-	-	-	2	-	2	3	3
CO3	3	3	3	3	-	1	-	-	-	2	-	2	3	3
CO4	3	3	3	3	-	1	-	-	-	2	-	2	3	3
CO5	3	3	2	2	3	1	-	-	-	2	-	2	3	3
Course Assessment methods														
Direct Assessment (80%)										Indirect Assessment (20%)				
CIE test I (9) CIE test II (9) CIE test III (10) Assignment/seminar/Quiz (5)					Objectives Test (7) Total CIE: 40 marks Semester End Examination : 60 marks					Course end survey				
Unit 1: Boolean Algebra and Logic Families													9 Hours	
Number systems: Binary, Octal, and Hexa-Decimal – Binary codes: Gray and BCD – Logic gates – Boolean algebra: Laws and theorems, Simplification – Minterm and Maxterm – Minimization using K-Map (up to 5 variables). Logic families: Terminologies, Types – TTL, ECL, CMOS – Comparison.														
Unit 2: Combinational Logic Circuits and PLDs													9 Hours	
Analysis and Design procedure – Design of half, full adders and subtractors – Code Converters (Binary, Gray & BCD) – Decoder, Demultiplexer, and Multiplexer – Realization of combinational circuits using decoders and multiplexer – Hazards in combinational circuits: Types, hazards free realisation. PLDs: PROM, PAL, and PLA – Comparison – Implementation of Boolean functions using PLDs.														
Unit 3: Synchronous Sequential Logic Circuits													9 Hours	
SR Latch – Triggering – Flip-flops: SR, JK, D, and T – Conversion of flip-flops – Clocked sequential circuits: Moore and Mealy model – Analysis of synchronous circuits – Design of synchronous circuits: State reduction – Shift registers (SISO, SIPO, PISO, and PIPO) – Synchronous counters (Up, Down, Modulo and Sequence).														

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Unit 4: Asynchronous Sequential Logic Circuits	9 Hours
Introduction to Asynchronous circuits – Analysis procedure: Transition table, flow table – Circuits with SR latches – Design procedure: Reduction of the primitive flow table, Implication table, Merger diagram – Race conditions, Race-free state assignment – Asynchronous counters (Up, Down, and Modulo).	

Unit 5: Verilog HDL for Digital Circuits	9 Hours
---	----------------

Introduction to HDL – Types – Module and Ports declaration – User-defined primitives – Gate level modeling – Dataflow modeling – Behavioral modeling – Test bench – Truth table model – State diagram-based models.

Verilog code for logic gates, Boolean functions, half and full adders, half and full subtractors, flip-flops, shift registers, and counters.

Theory: 30 Hrs.

Tutorial: 15 Hrs.

Practical: 0

Project: 0

Total Hours: 45 Hrs.

TEXTBOOKS

1. Morris Mano M and Michael D. Ciletti, "Digital Design", Pearson Education, 6th Edition, 2018.
2. Anand Kumar A, "Fundamentals of Digital Circuits", PHI Learning, 4th Edition, 2018.

REFERENCES

1. Thomas L. Floyd, "Digital Fundamentals", Pearson India, 11th Edition, 2018.
2. J Stephen Brown and Zvonko Vranesic, "Fundamentals of Digital Logic with Verilog Design", McGraw Hill, 3rd edition, 2014.
3. Ananda Natarajan R, "Digital Design", PHI Learning, 2015.
4. Bhasker J, "A Verilog HDL Primer", BS Publications, 3rd Edition, 2008.

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U23EE306	MEASUREMENTS AND INSTRUMENTATION	L	T	P	J	C
		2	0	2	0	3

Course Outcomes

At the end of the course, the student will be able to

CO1:	Explain the static & dynamic characteristics, Calibration and Standards of measuring instruments.
CO2:	Explain the analog electrical measuring instruments.
CO3:	Calculate unknown resistance, inductance and capacitance using bridges.
CO4:	Explain the principle of operation, and applications of various Digital instruments.
CO5:	Calculate non-electrical parameters using transducers/sensors.

Pre-requisite:

Electrical Circuit Analysis, Engineering Physics and Basic Mathematics

CO/PO, PSO Mapping

(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3										3	3
CO2	3	3	3	1	3				3			1	3	3
CO3	3	3	3	1	3				3			1	3	3
CO4	3	3	3	1	3				3			1	3	3
CO5	3	3	3	1	3				3			1	3	3

Course Assessment methods

Direct		Indirect
CIE test I (10) – Theory CIE test II (10) – Theory CIE test III (10) – Theory CIE test IV (15) – Laboratory	Assignment/Quiz/Seminar (5) Total CIE (Internal) : 50 marks Semester End Examination : 50 marks [SEE – Theory (25 marks), Lab (25 marks)]	Course end survey

Unit 01: INTRODUCTION

6 Hours

Functional elements of an instrument – static characteristics: true value, static error, static correction, reproducibility, drift, repeatability, noise, signal to noise ratio, accuracy and precision, sensitivity, linearity, threshold, dead zone, resolution. Dynamic characteristics: speed of response, fidelity, lag, and dynamic error – errors: gross error, systematic error and random error – statistical evaluation of measurement data – standards and calibration.

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Unit 02: ELECTRICAL AND ELECTRONICS INSTRUMENTS	6 Hours
Principle and operation of analog voltmeters and ammeters: moving iron: attraction and repulsion type instruments. Moving coil instruments; PMMC, dynamometer type, torque equation – single phase dynamometer type watt meter: torque expression, errors - Extension of voltmeter and ammeter – single phase induction type energy meters – measurement of power using instrument transformers –Smart Energy Meter and Net Metering for energy measurements.	
Unit 03: BRIDGES & INTERFERENCE TECHNIQUES	6 Hours
DC bridges: Wheatstone bridge, Kelvin double bridge – AC bridges: Anderson, Schering, Wein bridge - interference & screening – grounding techniques – Measurement of earth resistance.	
Unit 04: DIGITAL INSTRUMENTS AND DISPLAY DEVICES	6 Hours
Analog to Digital and Digital Analog Conversion - Digital voltmeter: ramp, integrating and successive approximation – Digital multi- meter – Dot matrix display, LED and LCD display, digital energy meter, Digital Storage Oscilloscope (DSO) – digital printers and plotters – Recorders: X-Y graphic recorders - Special instruments: measurement of solar radiation and Wind velocity.	
Unit 05: TRANSDUCERS AND SENSORS	6 Hours
Transducers–selection of transducers – resistive, capacitive and inductive transducers – measurement of temperature – RTD, thermistors and thermocouples – piezoelectric transducers – digital transducers – optical encoders – Introduction to data acquisition – Sensors: Temperature, Infrared.	

Theory: 30 Hrs	Tutorial: --	Practical: 30 Hrs	Project:--	Total Hours: 60 Hrs
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TEXT BOOKS

1. A.K.Sawhney, "A Course in Electrical & Electronic Measurements &Instrumentation", Dhanpat Rai and Co, 7th Edition, 2015.
2. R.K.Rajput, "Electrical Measurements and Measuring Instruments", S.Chand and Company Pvt. Ltd., Second Edition, 2013.

REFERENCES

1. E.O.Doebelin, "Measurement Systems – Application and Design", Tata McGraw Hill Publishing company, 2016.
2. D.V.S. Moorthy, "Transducers and Instrumentation", Prentice Hall of India Pvt Ltd, 2008.
3. J. B. Gupta, "A Course in Electronic and Electrical Measurements", S. K. Kataria & Sons, Delhi, 2008.
4. R. K. Rajput, "Electrical and Electronics Measurements and Instrumentation", Chand Pub, 2016


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LIST OF EXPERIMENTS:

30 Hrs

1. Range Extension of voltmeter and ammeter.
2. Measurement of Low, and Medium resistance.
3. Measurement of earth resistance.
4. Measurement of Inductance and capacitance.
5. Measurement of power using instrument transformers.
6. Measurement of energy using smart meter.
7. Energy import and export measurement using net meter.
8. Measurement of linear displacement using LVDT.
9. Temperature measurement using thermocouple.
10. R-2R ladder type analog to digital and digital to analog converters.



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ABOUT THE COURSE

Design thinking is a systematic method of solving problems. This method is unique that it starts and ends with humans. The design thinkers start by observing, interviewing or just plain experiencing a situation. Then, they proceed to improve the situation of the humans by solving problems for them.

COURSE LAYOUT

- Week 1 : Introduction to Design Thinking
- Week 2 : Empathize Phase: Customer Journey Mapping
- Week 3 : Analyze Phase: 5-Whys and How might we...
- Week 4 : Solve Phase: Ideation: Free Brainstorming & Make/Test Phase: Prototype

TOTAL HOURS : 15**BOOKS AND REFERENCES**

Prescribed Textbook for the course:

- 1.Karmic Design Thinking by Prof. Bala Ramadurai, available at Amazon (paperback), Amazon (e-book), Flipkart, Pothe, bookspace.in

REFERENCES

- 1.Design: Creation of Artifacts in Society by Prof. Karl Ulrich, U. Penn
- 2.Change by Design by Tim Brown.


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U23EE307	DC MACHINES AND TRANSFORMERS LABORATORY	L	T	P	J	C
		0	0	3	0	1.5

Course Outcomes

At the end of the course, the student will be able to

CO1:	Analyse the performance characteristics of DC machines.
CO2:	Analyse the efficiency and regulation of the transformer.
CO3:	Analyse the performance characteristics of DC Machines and transformers for industrial applications.

Pre-requisite:

CO/PO, PSO Mapping

(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak

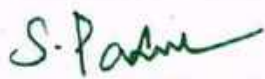
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2						3	1			3	3
CO2	3	3	2						3	1			3	3
CO3	3	3	2						3	1			3	3

Direct		Indirect
CIE test I (15)	RTPS (10)	Course end survey
Quiz 1 (5)	Record (10)	
CIE test II (15)	Total CIE: 60 marks	
Quiz 2 (5)	Semester End Examination: 40 marks	

List of Experiments

1. Open circuit and load characteristics of separately excited DC shunt generator.
2. Load test on DC compound generator.
3. Load test on DC shunt motor.
4. Load test on DC series motor.
5. Load test on DC compound motor.
6. Speed control of a DC shunt motor by field and armature control method.
7. Swinburne's test and Hopkinson's test on DC motor-generator set.
8. Load test on single-phase transformer
9. Sumpner's test and open circuit and short circuit tests on transformer.
10. Separation of no-load losses in single-phase transformer.

Theory: --	Tutorial: --	Practical: 45 Hrs	Project:--	Total Hours: 45 Hrs
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U23EE308		ELECTRONIC DEVICES AND CIRCUITS LABORATORY					L	T	P	J	C			
							0	0	3	0	1.5			
Course Outcomes														
At the end of the course, the students will be able to														
CO1:	design different rectifier and switching circuits and verify their output waveforms.													
CO2:	design oscillator circuits and verify their output waveforms.													
CO3:	design amplifier and oscillator circuits for motor control applications.													
Pre-requisite:														
CO/PO, PSO Mapping														
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	1	1				2		3	3
CO2	3	3	3	3	3	1	1				2		3	3
CO3	3	3	3	2	3	1	1				2		3	3
Course Assessment methods														
Direct						Indirect								
CIE test I (15) Quiz 1 (5) CIE test II (15) Quiz 2 (5)						RTPS (10) Record (10) Total CIE: 60 marks Semester End Examination: 40 marks						Course end survey		
1. Obtain the characteristics of PN junction diode and Zener diode.														
2. Design of Half wave and Full Wave Rectifier circuits using diode for the given specifications.														
3. Obtain the I/O characteristics of CE and CB Configurations of BJT.														
4. Obtain the characteristics of JFET.														
5. Obtain the characteristics of MOSFET.														
6. Design of relaxation oscillator circuit using UJT for the given specifications.														
7. Design of SCR circuit for the given specifications.														
8. Calculate CMRR of a BJT differential Amplifier.														
9. Design of Hartley and Colpitt's Oscillators using single stage transistor amplifier circuit for the given specifications.														
10. Design of Phase shift and Wein-bridge Oscillator using single stage transistor amplifier circuit for the given specifications.														
Theory: ---		Tutorial: --		Practical: 45 Hrs			Project:--		Total Hours: 45 Hrs					

U23EE309	DIGITAL SYSTEMS DESIGN LABORATORY	L	T	P	J	C
		0	0	2	0	1

Course Outcomes:

At the end of the course, the student will be able to

CO1: Implement the combinational circuits using digital ICs and Verilog HDL.

CO2: Implement the sequential circuits using digital ICs and Verilog HDL.

CO3: Implement a digital circuit for the given logic using digital ICs and Verilog HDL.

Pre-requisite: NIL

CO - PO/PSO Mapping

(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak

Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

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

Course Assessment methods

Direct

CIE Test 1 (15)	RTPS (10)
CIE Test 2 (15)	Record (10)
Quiz 1 (5)	Total CIE : 60 Marks
Quiz 2 (5)	Semester End Examination : 40 Marks

Indirect

Course End Survey

List of Experiments

Implement the circuits using Digital ICs and Verilog HDL

Design of Combinational Circuits

- 1) Verification of logic gates.
- 2) Implementation of Boolean functions.
- 3) Implementation of code converters.
- 4) Implementation of half and full Adders.
- 5) Implementation of half and full subtractors.

Design of Sequential Circuits

- 6) Verification of (D & JK) Flip-flops.
- 7) Conversion of D flip-flop to JK / T flip-flop.
- 8) Implementation of SISO & SIPO Shift Registers.
- 9) Design and implementation of asynchronous counters.
- 10) Design and implementation of synchronous counters.

Theory: 0

Tutorial: 0

Practical: 30 Hrs.

Project: 0

Total Hours: 30 Hrs.

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14.6.2025

Version 1.1

B.E. - Electrical and Electronics Engineering
Sona College of Technology
Salem-636 005, Tamil Nadu.

Regulations 2023

U23GE301		SOFT SKILLS AND APTITUDE - I								L	T	P	J	C
										0	0	2	0	1
Course Outcomes														
At the end of the course, the student will be able to														
CO1:	Demonstrate capabilities in specific soft-skill areas using hands-on and/or case-study approaches													
CO2:	Solve problems of greater intricacy than those in BA-I and II in stated areas of quantitative aptitude and logical reasoning													
CO3:	Demonstrate higher than BA-I and II levels of verbal aptitude skills in English regarding specific topics.													
Pre-requisite: Basic Aptitude I & II														
CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1	1	1	2	2	3	3	3	1	3	1	1
CO2	3	3	3	2	2	2	1	3	3	2	1	3	2	2
CO3	1	1	1	1	1	1	1	3	3	3	1	3	1	1
Course Assessment methods														
Direct										Indirect				
CIE test I (15)					RTPS (10)					Course end survey				
Quiz - I (5)					Record (10)									
CIE test II (15)					Total CIE marks : 60 marks									
Quiz – II (5)					Semester End Examination : 40 marks									
1.Soft Skills					Demonstrating soft-skill capabilities with reference to the following topics: a. Attitude building b. Self-awareness and self -acceptance c. Dealing with criticism d. Innovation and creativity e. Problem solving and decision making f. Public speaking g. Group discussions.									

2. Quantitative Aptitude and Logical Reasoning		Solving problems with reference to the following topics: a. Vedic Mathematics b. Simplification c. Number Properties d. Averages e. Percentage f. Profit Loss and Discount g. Ratio & Mixtures h. Equation i. Problem on Ages j. Data interpretation		
3. Verbal Aptitude		Demonstrating English language skills with reference to the following topics: a. Verbal analogy b. Tenses c. Prepositions d. Reading comprehension e. Choosing correct / incorrect sentences f. Describing pictures		
Theory : —	Tutorial : —	Practical : 30hrs	Project : —	Total hours : 30hrs

S. Anita
6/06/2025

Dr.S.Anita

**Professor & Head
Department of Training**

Dr. S. ANITA

**Professor and Head
Department of Training,
SONA COLLEGE OF TECHNOLOGY,
SALEM-636 005.**

Sona College of Technology, Salem

(An Autonomous Institution)

Courses of Study for B.E/B.Tech. Semester IV under Regulations 2023 (CBCS)

Branch: Electrical and Electronics Engineering

S.No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type*
Theory courses										
1.	U23MAT401C	Probability and Statistical Methods	3	1	0	0	4	BS	60	TT
2.	U23EE401	Signals and Systems	3	0	0	0	3	PC	45	T
3.	U23EE402	Synchronous and Induction Machines	3	0	0	0	3	PC	45	T
4.	U23EE403	Linear Integrated Circuits	3	0	2	0	4	PC	75	TL
5.	U23EE404	Generation, Transmission and Distribution Systems	3	0	0	0	3	PC	45	T
6.	U23CPR401	Programming in C	3	0	0	0	3	ES	45	T
7.	U23GE402	Audit Course - Essence of Indian Traditional Knowledge	2	0	0	0	0	AC	30	T
Practical courses										
8.	U23EE405	Synchronous and Induction Machines Laboratory	0	0	3	0	1.5	PC	45	L
9.	U23CPL402	C Programming Laboratory	0	0	2	0	1	ES	30	L
10.	U23GE401	Soft Skills and Aptitude-II	0	0	2	0	1	EEC	30	L
11.	U23EE406	Mini Project-I	0	0	0	2	1	PC	30	P
Total Credits							24.5			

*T- Theory, TT- Theory with Tutorial, TL- Theory with Laboratory, TP- Theory with Project, TLP- Theory with Laboratory and Project, L-Laboratory, LT- Laboratory with Theory, LP- Laboratory with Project, P-Project.

Approved By

			
Chairperson, Electrical and Electronics Engineering BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr.S.Padma	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/ Electrical and Electronics Engineering, Fourth Semester B.E. EEE Students and Staff, COE

SEMESTER – IV		PROBABILITY AND STATISTICAL METHODS										L	T	P	J	C
U23MAT401C		(Common to EEE, MCT and EFE)										3	1	0	0	4
COURSE OUTCOMES																
At the end of the course, the students will be able to																
CO1:	apply the concepts of measures of central tendency, dispersion to the given data and analyze the results.															
CO2:	compute simple and partial correlation coefficients and analyse regression equations for estimation and prediction purposes.															
CO3:	apply the concepts of random variables and their properties to generate the moments.															
CO4:	fit the suitable distribution and its properties to the real world problems and interpret the results.															
CO5:	apply the concepts of joint probability distribution and its properties to find the covariance.															
Pre-requisites:																
- Fundamentals of elementary algebra - Fundamentals of calculus										- Fundamentals of trigonometry - Fundamentals of geometry						
CO / PO, PSO Mapping																
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak																
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
CO1	3	3	3	3	2							2	2	2		
CO2	3	3	3	3	2							2	2	2		
CO3	3	3	3	3	2							2	2	2		
CO4	3	3	3	3	2							2	2	2		
CO5	3	3	3	3	2							2	2	2		
Course Assessment methods																
Direct										Indirect						
CIE test I (8)					Attendance (5)					Course end survey						
CIE test II (8)					Assignment/seminar/Quiz (5)											
CIE test III (8)					Total CIE: 40 marks											
Objectives Test (6)					Semester End Examination: 60 marks											
Unit 01	MEASURES OF CENTRAL TENDENCY AND DISPERSION												12 Hours			
Measures of central tendency (simple arithmetic mean, median, mode) – Quartiles – Measures of dispersion - Absolute and relative measures (range, inter-quartile range, quartile deviation, mean deviation about mean, standard deviation, coefficient of variation).																
Unit 02	CORRELATION AND REGRESSION												12 Hours			
Simple and rank correlations – Multiple and partial correlations – Linear regression – Relation between simple correlation and regression - Curve fitting (straight line and parabola).																
Unit 03	ONE DIMENSIONAL RANDOM VARIABLE												12 Hours			
One dimensional random variable – Discrete random variable – Distribution function of the discrete random variable – Probability mass function - Properties – Continuous random variable – Distribution function of the continuous random variable - Probability density function – Properties – Moments – Mathematical expectations – Moment generating function and its properties.																

Unit 04	THEORETICAL DISTRIBUTIONS				12 Hours
Discrete distributions – Binomial distribution – Additive property, moment generating function, mean, variance and standard deviation of binomial distribution – Poisson distribution - Additive property, moment generating function, mean, variance and standard deviation of Poisson distribution – Poisson distribution as limiting form of binomial distribution (Statement only) – Geometric distribution - Memoryless property, moment generating function, mean, variance and standard deviation of Geometric distribution – Continuous distributions - Uniform distribution - Moment generating function, mean, variance and standard deviation of Uniform distribution - Exponential distribution - Memoryless property, moment generating function, mean, variance and standard deviation of exponential distribution - Normal distribution - Additive property, moment generating function, mean, variance and standard deviation of normal distribution (without derivation) – Normal distribution as limiting form of binomial distribution (Statement only) – Problems based on real time applications in discrete and continuous distributions.					
Unit 05	TWO DIMENSIONAL RANDOM VARIABLES				12 Hours
Two dimensional discrete random variables – Joint probability distribution of discrete random variables – Marginal and conditional probability distributions – Two dimensional continuous random variables – Joint probability density function – Joint probability distribution function for continuous two dimensional random variables - Marginal and conditional density functions – Covariance – Correlation.					
Theory: 45 Hours		Tutorial: 15 Hours		Practical: -	Project: -
Total Hours: 60 Hours					
TEXT BOOKS:					
1.	S. C. Gupta and V. K. Kapoor, “Fundamentals of Mathematical Statistics”, Sultan Chand and Sons Publishers, 11 th Edition, Reprint, 2019.				
2.	T. Veerarajan, “Probability, Statistics and Random Processes with Queuing Theory and Queuing Networks”, McGraw Hill Publishers, 4 th Edition, 7 th Reprint, 2018.				
REFERENCE BOOKS:					
1.	R. A. Johnson and C. B. Gupta, “Miller and Freund’s, Probability and Statistics for Engineers”, Pearson Publishers, 9 th Edition, 2018.				
2.	S. Ross, “A First Course in Probability”, Pearson Publishers, 9 th Edition, 2019.				
3.	S. P. Gupta, “Statistical Methods”, Sultan Chand and Sons Publishers, 46 th Edition, 2023.				

U23EE401	SIGNALS AND SYSTEMS						L	T	P	J	C			
							3	0	0	0	3			
Course Outcomes														
At the end of the course, the students will be able to														
CO1:	find the type of signals and Systems based on their classification.													
CO2:	perform Laplace transform & Fourier transform on continuous time signals and systems.													
CO3:	apply Z-transform, DTFT and their properties for the analysis of discrete time systems.													
CO4:	analyse LTI systems in the time domain and various transform domains.													
CO5:	analyse various discrete Fourier transforms properties.													
Pre-requisite:														
Engineering Mathematics														
CO/PO, PSO Mapping														
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	3	2	1	1	1	2	1	3	3	3
CO2	3	3	2	3	3	2	1	1	1	2	1	3	3	3
CO3	3	3	2	3	3	2	1	1	1	2	1	3	3	3
CO4	3	3	2	3	3	2	1	1	1	2	1	3	3	3
CO5	3	3	2	3	3	2	1	1	1	2	1	3	3	3
Course Assessment methods														
Direct							Indirect							
CIE test I (8) CIE test II (8) CIE test III (8) Objectives Test (6) Attendance (5)							Assignment/seminar/Quiz (5) Total CIE: 40 marks Semester End Examination: 60 marks Course end survey							
Unit 01: CLASSIFICATION OF SIGNALS AND SYSTEMS							9 Hours							
Continuous Time signals (CT signals) – Discrete Time signals (DT signals) – step, ramp, pulse, impulse, sinusoidal, exponential, classification of CT and DT signals –periodic & aperiodic signals, deterministic & random signals, energy & power signals – CT systems and DT systems classification of systems – static & dynamic, linear & nonlinear, time-variant & time-invariant, causal & non-causal, stable & unstable systems.														
Unit 02: ANALYSIS OF CONTINUOUS TIME SIGNALS AND LINEAR TIME INVARIANT (LTIV) SYSTEMS							9 Hours							
Fourier and Laplace transforms in CT Signal analysis – Fourier and Laplace transforms in analysis of CT systems – Dirichlet's Conditions - Properties of Fourier and Laplace Transform s - Initial Value, Final Value and Parseval's Theorems.														

Unit 03: ANALYSIS OF DISCRETE TIME SIGNALS				9 Hours	
Baseband sampling – Sampling Theorem for Low pass Signals - under sampling - Nyquist Rate and Nyquist Interval - Discrete Time Fourier Transform (DTFT) – properties of DTFT – Z transform – properties of Z transform.					
Unit 04: LINEAR TIME INVARIANT DISCRETE TIME SYSTEMS				9 Hours	
Difference equations – Block diagram representation - Direct form I and Direct Form II structures – impulse response – convolution sum – discrete Fourier and Z transform analysis – Magnitude / Phase Transfer Function using Fourier Transform – Pole-Zero Plots.					
Unit 05: DISCRETE TRANSFORMS				9 Hours	
Discrete Fourier Transform (DFT) – definition – properties, computation of Discrete Fourier Transform (DFT) using Fast Fourier Transform (FFT) algorithm – Decimation in Time (DIT) domain and Decimation in Frequency (DIF) domain – Fast Fourier Transform (FFT) using radix-2 – Butterfly structure – computation of Inverse Discrete Fourier Transform (IDFT) using DFT- Architecture of TMS320C54X Processor.					
Theory: 45 Hrs		Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs
TEXT BOOKS					
1.	Allan V.Oppenheim, S.Wilsky and S.H.Nawab, “Signals and Systems”, Pearson Education, Reprint 2019.				
2.	Edward W Kamen& Bonnie’s Heck, “Fundamentals of Signals and Systems using web and MATLAB”, Pearson Education, 2007.				
REFERENCES					
1.	H.P.Hsu, Rakesh Ranjan, “Signals and Systems”, Schaum’s Outlines, Tata McGraw Hill, Indian Reprint, 2007.				
2.	P. Ramesh Babu, “Digital signal Processing”, Scitech Publication, 7 th edition, 2018.				
3.	B. P. Lathi, “Principles of Linear Systems and Signals”, 3nd Edition, Oxford, 2017.				
4.	Anand Kumar A, “Signals and systems”, PHI Learning Private Limited, Third Edition, 2013.				

U23EE402	SYNCHRONOUS AND INDUCTION MACHINES							L	T	P	J	C		
								3	0	0	0	3		
Course Outcomes														
At the end of the course, the students will be able to														
CO1:	calculate the voltage regulation of alternator using various methods.													
CO2:	calculate the performance characteristics of synchronous motor.													
CO3:	obtain the performance of three phase induction motor.													
CO4:	explain the starting and speed control methods of three phase induction motor.													
CO5:	obtain the performance of single phase induction motor.													
Pre-requisite:														
Engineering physics, Electric circuit analysis & DC machines and transformers														
CO/PO, PSO Mapping														
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	2	2	1	1	2	1	3	3	3
CO2	3	3	3	3	2	2	2	1	1	2	1	3	3	3
CO3	3	3	3	3	2	2	2	1	1	2	1	3	3	3
CO4	3	3	3	3	2	2	2	1	1	2	1	3	3	3
CO5	3	3	3	3	2	2	2	1	1	2	1	3	3	3
Course Assessment methods														
Direct										Indirect				
CIE test I (8)					Assignment/seminar/Quiz (5) Total CIE: 40 marks Semester End Examination: 60 marks					Course end survey				
CIE test II (8)														
CIE test III (8)														
Objectives Test (6)														
Attendance (5)														
Unit 01: ALTERNATOR												9 Hours		
Constructional details – types of rotors – armature windings –types of armature winding - EMF equation – alternator on load, synchronous reactance – phasor diagram – equivalent circuit - voltage regulation – synchronous impedance (EMF) method, ampere turns (MMF) method and zero power-factor (ZPF) method – synchronizing of alternators – synchronizing current and power – Blondel's theory – determination of direct axis and quadrature axis synchronous reactance using slip test.														

Unit 02: SYNCHRONOUS MOTOR				9 Hours	
Constructional details – principle of operation – starting methods – power flow – synchronous motor on no-load and synchronous motor on load – analysis of phasor diagram - effect of change of excitation and load – expression for back EMF – power equations – power/power angle relations – construction of V and Inverted V-curves – hunting – synchronous condenser – Applications					
Unit 03: THREE PHASE INDUCTION MOTOR				9 Hours	
Constructional details – principle of operation – slip and its importance – torque equations – condition for maximum torque – torque-slip characteristics – torque ratios – effect of change of rotor resistance on torque – power and efficiency – relationship between rotor input power, rotor copper loss and gross mechanical power – equivalent circuit – crawling and cogging – induction generator.					
Unit 04: STARTING, TESTING AND SPEED CONTROL OF THREE PHASE INDUCTION MOTOR				9 Hours	
Starters – types of starters - stator resistance, auto-transformer, star-delta, DOL and rotor resistance starters – No load and blocked rotor test –construction of circle diagram –load test – speed control – stator voltage, voltage/frequency and rotor resistance – cascaded connection.					
Unit 05: SINGLE-PHASE INDUCTION MOTOR				9 Hours	
Constructional details - principle of operation – double revolving field theory – types of single-phase induction motor and torque speed characteristics – split phase induction motor – capacitor start induction motor – capacitor start capacitor run induction motor – shaded pole induction motor– no load and blocked rotor test – equivalent circuit with and without core losses – performance calculation – linear induction motor and -universal motor – applications.					
Theory: 45 Hrs		Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs
TEXT BOOKS					
1.	B.L.Theraja and A.K.Theraja, "A Textbook of Electrical Technology Volume 2 : AC and DC Machines" (In S.I. Units) - S.Chand Publisher, 24th Edition Paperback , 2024.				
2.	D.P.Kothari and I.J.Nagrath, "Electric Machines", Tata McGraw Hill Publishing Company Ltd, Fifth Edition, Published: August 8, 2017				
REFERENCES					
1.	A.E.Fitzgerald, Charles Kingsley, Stephen.D.Umans, "Electric Machinery", Tata McGraw Hill Publishing Company Ltd, 2013.				
2.	K.Murugesh Kumar, "Induction & Synchronous Machines", Vikas Publishing House Pvt. Ltd, 2000.				
3.	M.V Deshpande, "Electrical Machines", Wheeler Publishing, 2011.				
4.	M. G. Say, "Performance and Design of AC Machines", CBS Publishers, 3 rd edition, 2002.				
5.	Ashfaq Husain, "Electric Machines" Dhanpat Rai & CO.(P) LTD., 3 rd edition, 2016				

U23EE403	LINEAR INTEGRATED CIRCUITS		L	T	P	J	C							
			3	0	2	0	4							
Course Outcomes														
At the end of the course, the students will be able to														
CO1	explain the process of IC Fabrication for active and passive components.													
CO2	explain the DC & AC characteristics of Operational Amplifier.													
CO3	analyse an analog circuit using operational amplifiers.													
CO4	design an electronic system using special ICs for a specific application.													
CO5	design a power supply system using voltage regulators.													
Pre-requisite:														
Electronic Devices and Circuits														
CO/PO, PSO Mapping														
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	3	2	3	1	1	2	1	3	3	3
CO2	3	3	3	2	2	2	3	1	1	2	1	3	3	3
CO3	3	3	2	3	3	2	3	1	1	2	1	3	3	3
CO4	3	3	3	2	1	1	3	1	1	2	1	3	3	3
CO5	3	3	2	3	3	2	3	1	1	2	1	3	3	3
Course Assessment methods														
Direct						Indirect								
CIE test I (10) - Theory CIE test II (10) - Theory CIE test III (10) - Theory CIE test IV(10) – Laboratory Attendance (5)				Assignment / Quiz/ Seminar (5) Total CIE: 50 marks Semester End Examination: 50 marks [SEE- Theory (35 marks),Lab (15 marks)]				Course end survey						
Unit 01: IC FABRICATION						9 Hours								
IC classification, fundamentals of monolithic IC technology – basic planner process – epitaxial growth, masking and etching, realization of monolithic ICs and packaging. Fabrication of active and passive components (R, C, diodes, transistors, FETs) in ICs.														

Unit 02: CHARACTERISTICS OF OP-AMP				9 Hours
Block diagram of differential amplifier, packing characteristics, ideal op-amp – ideal differential amplifier – differential mode, common mode, CMRR –ideal op-amp characteristics – practical op-amp characteristics – open loop and closed loop configuration of ideal and practical op-amp as an inverting amplifier, non-inverting amplifier, voltage follower, DC characteristics, AC characteristics – frequency response, slew rate, frequency compensation.				
UNIT 03: APPLICATIONS OF OP-AMP				9 Hours
summing amplifier – adder, subtractor, low pass and high pass filters, three op-amp instrumentation amplifier, log and antilog amplifiers, waveform generator (triangular, saw tooth and stair case waveforms), clippers and clampers, sample and hold circuit, differentiator, integrator, comparators & its characteristics, Schmitt trigger, peak detector, precision rectifiers.				
Unit 04: SPECIAL ICS AND APPLICATIONS				9 Hours
555 timer circuit – functional block, applications - monostable multi-vibrator, astable multi-vibrator, 565 phase locked loop – functional blocks, capture range, lock range, applications – frequency multiplier, FSK, AM detection, FM demodulator, 566 voltage controlled oscillator circuit – functional block, voltage to frequency conversion factor, analog multiplier ICs.				
Unit 05: VOLTAGE REGULATORS AND APPLICATION ICS				9 Hours
Fixed voltage regulators (IC78xx, 79xx), adjustable voltage regulators (LM317, 337), LM 380 power amplifier, ICL 8038 Function generator IC, general purpose voltage regulator (IC723), switching voltage regulator (IC μ A 78S40) – SMPS, isolation amplifier, Opto-coupler, Opto-electronic ICs.				
Theory: 45 Hrs	Tutorial: --	Practical: 30 Hrs	Project:--	Total Hours: 75 Hrs
TEXT BOOKS				
1.	D.Roy Choudhry, Shail Jain, “Linear Integrated Circuits”, New Age International Pvt. Ltd., 6 th Edition, 2021.			
2.	Ramakant A.Gayakwad, ‘Op-amps and Linear Integrated Circuits’, IV edition, Pearson Education, PHI 2021.			
REFERENCES				
1.	Jacob Millman, Christos C. Halkias, “Integrated Electronics – Analog and Digital Circuit System”, Tata McGraw Hill, 2009.			
2.	David A. Bell, ‘Op-amp & Linear ICs’, Oxford, Third Edition, 2011			
3.	S.Salivahanan& V.S. Kanchana Bhaskaran, “Linear Integrated Circuits”, TMH, 2014.			
4.	K.R. Botkar, “Integrated Circuits”, Khanna Publisher, 5 th Edition, 2010.			

U23EE403	LINEAR INTEGRATED CIRCUITS	L	T	P	J	C
		3	0	2	0	4

LIST OF EXPERIMENTS

1. Design of adder and subtractor using op-amp.
2. Design of Integrator and differentiator (IC741) using op-amp.
3. Design of Low Pass Filter and High Pass Filters using op-amp.
4. Design of instrumentation amplifier using op-amp.
5. Design of Schmitt trigger using op-amp.
6. Design of Precision rectifiers using op-amp.
7. Design of clipper and clamper circuits using op-amp.
8. Design of log and anti-log circuits using op-amp.
9. Design of Astable and Monostable multi vibrators using IC555 timer.
10. Analyze line and load regulation of fixed voltage regulators using IC 7805 and IC 7905.

Total: 30 Hours

U23EE404	GENERATION, TRANSMISSION AND DISTRIBUTION SYSTEMS					L	T	P	J	C				
						3	0	0	0	3				
Course Outcomes														
At the end of the course, the students will be able to														
CO1:	explain the working of various power plants and its characteristics													
CO2:	calculate the transmission network parameters for various configurations													
CO3:	calculate the performance characteristics of transmission lines													
CO4:	calculate string efficiency of the suspension type insulators and the insulation resistance, capacitance and grading of cables													
CO5:	determine the voltage at a point on the given type of distribution System													
Pre-requisite:														
Electric Circuit Analysis														
CO/PO, PSO Mapping														
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3	2	2	1	2	1	1	2	1	2	3	3
CO2	2	3	3	3	2	1	2	1	1	2	1	2	3	3
CO3	2	3	3	3	2	1	2	1	1	2	1	2	3	3
CO4	2	3	3	3	2	1	2	1	1	2	1	2	3	3
CO5	2	1	3	2	1	1	2	1	1	2	1	2	3	3
Course Assessment methods														
Direct									Indirect					
CIE test I (8)						Assignment/seminar/Quiz (5) Total CIE: 40 marks Semester End Examination: 60 marks					Course end survey			
CIE test II (8)														
CIE test III (8)														
Objectives Test (6)														
Attendance (5)														
Unit 01: POWER GENERATION AND ECONOMICS											9 Hours			
Power plants: construction and working principle of steam, hydroelectric, nuclear, solar and wind power plants.														
Sources of electric energy – structure of electric power system –load characteristics – load curve, load duration curve, important terms and factors – types of loads – selection of generating units – base load and peak load on station (related problems in load characteristics) – economic aspects.														

Unit 02: TRANSMISSION LINE PARAMETERS				9 Hours	
Transmission line conductors – solid, stranded and bundled conductors – parameters of single and three phase transmission lines – inductance calculation, single phase two-wire, three-phase symmetrical and unsymmetrical space (single and double circuits) – transposition of transmission line conductors – concept of self-GMD and mutual-GMD (single and group of conductors), applications – electric potential – capacitance calculation, single phase two-wire, three-phase symmetrical and unsymmetrical spacing – skin and proximity effects.					
Unit 03: ANALYSIS OF TRANSMISSION LINES				9 Hours	
Classification of overhead lines: important terms, calculation of transmission efficiency and voltage regulation of short line, medium line (end condenser, nominal T, nominal π method) and long line (rigorous method) – equivalent circuits – Ferranti effect and corona loss – calculation of sag and tension (equal, unequal supports and effect of wind and ice).					
Unit 04: INSULATORS AND CABLES				9 Hours	
Insulators: properties and types of insulators – Voltage distribution in insulator string – calculation of string efficiency – improvement of string efficiency.					
Underground cables: classification of cable – constructional features of LT and HT cables – calculation of capacitance and dielectric stress of a single core cable – grading of cables – thermal resistance of cable.					
Unit 05: DISTRIBUTION SYSTEMS AND FACTS				9 Hours	
Distribution system: feeders, distributor and service mains – radial, ring-main and interconnected system – AC distribution, primary and secondary distribution – DC distribution: 2 wire and 3 wire DC distribution – AC distribution: 3 phase 4 wire system and single phase 2 wire distribution.					
FACTS: principle of operation of SVC, TCSC, STATCOM, UPFC– merits & demerits of FACTS technology.					
Theory: 45 Hrs		Tutorial: --	Practical: -	Project:--	Total Hours: 45 Hrs
TEXT BOOKS					
1.	V.K.Mehta and Rohit Mehta, “Principles of Power System”, S. Chand Publishers, Reprint Edition, 2022.				
2.	S.N. Singh, “Electric Power Generation, Transmission and Distribution”, Prentice Hall of India Pvt. Ltd, New Delhi, 2 nd Edition, 2008.				
REFERENCES					
1.	M.L. Soni, Gupta, Bhatnagar, Chakrabarthy, “A Text book on Power Systems Engineering”, Dhanpat Rai & Sons, 2007.				
2.	B.R. Gupta, “Generation of Electrical Energy”, S.Chand company Ltd., 2009.				
3.	Wadhwa, C.L., ‘Electrical Power Systems’, John Wiley and sons Ltd., 2009.				
4.	G.Ramamurthy, “Handbook of Electrical power Distribution,” Universities Press, 2013.				


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U23CPR401	PROGRAMMING IN C (Common to EEE and MCT Branches)	L	T	P	J	C
		3	0	0	0	3

Course Outcomes

At the end of the course, the student will be able to

CO1:	Write simple C programs using console input and output functions
CO2:	Write C programs using arrays, decision making and looping statements
CO3:	Design and develop simple application using functions and pointers.
CO4:	Design and develop real-time applications using structures and unions
CO5:	Design and develop real-time applications using file operation

Pre-requisite:

CO/PO, PSO Mapping

(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	3	2	2	2	-	2	-	2	2	3	3	2	2
CO2	2	2	3	2	2	1	-	2	-	2	2	3	2	2	2
CO3	2	3	3	2	2	1	-	2	-	2	2	3	3	2	2
CO4	2	3	3	2	2	1	-	2	-	2	1	3	3	2	2
CO5	2	3	3	2	2	2	-	2	-	2	2	3	3	2	2

Course Assessment methods

Direct		Indirect
CIE test I (8) CIE test II (8) CIE test III (8) Objectives Test (6) Attendance (5)		Assignment/seminar/Quiz (5) Total CIE: 40 marks Semester End Examination: 60 marks Course end survey

Unit 01: C PROGRAMMING BASICS

9 Hours

Structure of a C program - C Character set, Identifiers and Keywords, Data Types, Declarations, Expressions, Statements and Symbolic constants, Operators – Arithmetic Operators – Unary operators – Relational and Logical Operators – Assignment operators – Conditional operators. Unformatted and formatted Input/Output functions, pre-processor directives and storage classes.

Unit 02: CONTROL STATEMENTS, ARRAYS AND STRING

9 Hours

Conditional statements, Unconditional statements, branching and looping statements - Arrays – Initialization – Declaration – One dimensional and Two dimensional arrays. String- String operations – String Arrays. Simple programs- sorting- searching – matrix operations.

Unit 03: FUNCTIONS AND POINTERS

9 Hours

Function – Library functions and user-defined functions – Function prototypes and function definitions – Call by value – Call by reference – Recursion – Pointers - Definition – Initialization – Pointers arithmetic – Pointers and

arrays – Pointers and Functions - Dynamic memory Allocation - Example Programs.					
Unit 04: STRUCTURES AND UNIONS					9 Hours
Need for structure data type – structure definition – Structure declaration – Structure within a structure – Passing structures to functions – Array of structures – Pointers to structures – Union - Programs using structures and Unions					
Unit 05: FILE MANIPULATIONS					9 Hours
Files-File operations- Binary files and text files – Types of File processing-Sequential access -Random Access File - Command line arguments.					
Theory: 45 Hrs	Tutorial: 0	Practical: 0	Project:0		Total Hours: 45 Hrs
TEXT BOOKS					
1. Deitel and Deitel, “C How to Program”, Pearson Education, New Delhi, 2011.					
2. Yashavant P. Kanetkar. “Let Us C”, BPB Publications, 14th edition, 2016.					
REFERENCES					
1. Kernighan,B.W and Ritchie,D.M, “The C Programming language”, Second Edition, Pearson Education, 2006.					
2. Byron S Gottfried, “Programming with C”, Schaum’s Outlines, Second Edition, Tata McGraw-Hill, 2006.					
3. Anita Goel and Ajay Mittal, “Computer Fundamentals and Programming in C”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.					
4. E. Balagurusamy, “Programming in ANSI C”, seventh edition, Tata McGraw Hill, 2016.					


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 SALEM - 636 005

U23CPL402	C PROGRAMMING LABORATORY (Common to EEE and MCT Branches)						L	T	P	J	C				
							0	0	2	0	1				
Course Outcomes															
At the end of the course, the student will be able to															
CO1:	Design and develop simple programs using branching, looping statements														
CO2:	Develop programs using functions, arrays, structures and string handling														
CO3:	Write programs using pointers and dynamic memory allocation and file handling														
Pre-requisite:															
CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	3	2	2	2	-	-	-	-	-	-	1	2	2
CO2	2	2	3	2	2	1	-	-	-	-	-	-	1	2	2
CO3	2	3	3	2	2	1	-	-	-	-	-	-	1	2	2
Course Assessment methods															
Direct									Indirect						
CIE test I (15) Quiz 1- (5) CIE test II (15) Quiz 2- (5)						RTPS (10) Record (10) Total CIE: 60 marks Semester End Examination: 40 marks			Course end survey						
List of Experiments:															
1. Programs using Input, Output and assignment statements.															
2. Programs using Branching statements															
3. Programs using Looping statements															
4. Programs using Functions															
5. Programs using Arrays															
6. Programs using Structures															
7. Programs using Strings															
8. Programs using Pointers (both data pointers and function pointers)															
9. Programs using dynamic memory allocation															
10. Programs using Recursion															
11. Programs using Files															
Theory: 0		Tutorial: 0		Practical: 30Hrs		Project:0		Total Hours: 30 Hrs							

U23EE405	SYNCHRONOUS AND INDUCTION MACHINES LABORATORY	L	T	P	J	C
		0	0	3	0	1.5

Course Outcomes

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

CO1:	determine the regulation of three-phase alternator using EMF, MMF, ZPF, slip test, inductive and capacitive load methods.
CO2:	analyse the performance of three-phase synchronous motor, single-phase and three-phase induction motor for various loads.
CO3:	analyse the performance of Synchronous and Induction machines for various applications in the industry.

CO/PO, PSO Mapping

(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	2	3	1	3	2	1	2	3	3
CO2	3	3	3	3	2	2	3	1	3	2	1	2	3	3
CO3	3	3	3	3	2	2	3	1	3	2	1	2	3	3

Course Assessment methods

Direct		Indirect
CIE test I (15)	RTPS (10)	Course end survey
Quiz I (5)	Record (10)	
CIE test II (15)	Total CIE: 60 marks	
Quiz 2(5)	Semester End Examination: 40 marks	

LIST OF EXPERIMENTS:

1. Regulation of three-phase alternator by Synchronous impedance (EMF) and Ampere turns (MMF) methods
2. Regulation of three-phase alternator by Zero power-factor (ZPF) method or potier triangle method.
3. Regulation of three-phase salient pole alternator by slip test.
4. Performance analysis of three-phase alternator.
5. Plotting V and inverted V curve of three-phase synchronous motor.
6. Performance analysis of three phase induction motor (squirrel cage, slip ring)
7. No load and blocked rotor test of three-phase induction motor (circle diagram).
8. Speed control of three phase induction motor.
9. Performance analysis of single-phase induction motor.
10. No load and blocked rotor test on single-phase induction motor (Equivalent circuit)

Theory: --	Tutorial: --	Practical: 45 Hrs	Project: --	Total Hours: 45 Hrs
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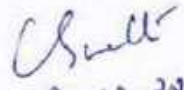
U23EE406		MINI PROJECT-I						L	T	P	J	C		
								0	0	0	2	1		
Course Outcomes														
At the end of the course, the students will be able to														
CO1:	apply core engineering knowledge to identify an issue related to society, environment, engineering and technology.													
CO2:	formulate, analyze and develop a prototype for the identified problem.													
CO3:	evaluate the solution and compile the report for oral presentation.													
CO/PO, PSO Mapping														
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2	2	2	2	3	1	3	3	3	3
CO2	1	3	3	3	3	2	3	3	3	2	3	3	3	3
CO3	3	3	2	1	3	2	2	2	3	3	3	3	3	3
Course Assessment methods														
Direct								Indirect						
Review- I - 10 Review- II - 10 Review- III - 10 Final Project Report – 10 marks						Total CIE: 40 marks Semester End Examination: 60 marks SEE: Hackathon mode				Course end survey				
The mini project is introduced to develop practical skills to solve real time problems related to the industry in the field of electrical and electronics engineering. This course will develop investigative, research skills and work in team; it provides an opportunity to learn a chosen topic in considerable depth.														
Description:														
- Project work should be done batch wise with the strength of maximum four members per team. - Identify the thrust area and problem statement. - During review-1, 2 &3, the students' group shall present their problem statement, solution methodology and progress made on the prototype development respectively. - The evaluation of mini project shall be conducted in the form of Hackathon. During the first two days of hackathon, they shall complete prototype and showcase the same on the third day as video presentation/demonstration of the working model to the evaluators.														
Theory: --		Tutorial: --		Practical: --		Project:30 Hrs		Total Hours: 30 Hrs						

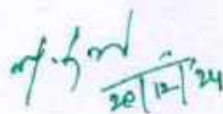
S. Padma
4.1.25

U23GE402		ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE								L	T	P	J	C	
										2	0	0	0	0	
Course Outcomes															
At the end of the course, the student will be able to															
CO1:	Analyze the basics of Indian Traditional knowledge in modern scientific perspectives.														
CO2:	Explain the basics of Vedic science and its applications in modern days.														
CO3:	Discuss the introduction and objectives of modern science.														
CO4:	Describe the contribution of Noble laureates for India's achievements in Science and Technology.														
CO5:	Analyze the various traditional practices for holistic health care of human beings.														
Pre-requisite:															

CO/PO, PSO Mapping															
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2			2	-							2	2
CO2	2	2	2			2	-							2	2
CO3	2	2	2			2	-							2	2
CO4	2	2	2			2	-							2	2
CO5	2	2	2			2	-							2	2
Course Assessment methods															
Direct										Indirect					
CIE test I (30) - Theory CIE test II (30) - Theory CIE test III (40)- Theory						Total CIE: 100 marks Semester End Examination - NIL				Course end survey					
Unit 01: BASIC STRUCTURE OF INDIAN KNOWLEDGE SYSTEM												6 Hours			
Indian Traditional Scriptures, Exposure to 4 – Vedas (the Rigveda, the Yajurveda, the Samaveda and the Atharvanaveda), 4 – Upavedas (Ayurveda, Dhanurveda, Gandharvaveda, Sthapatya, etc.), 6 – Vedangas (Shiksha, Kalp, Nirukta, Vyakaran, Jyotish).															
Unit 02: INDIAN KNOWLEDGE SYSTEM AND MODERN SCIENCE												6 Hours			
Relevance of Science and Spirituality, Science and Technology in ancient India, Superior intelligence of Indian sages and scientists.															

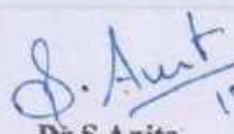
Unit 03: INDIAN TRADITION AND CULTURE					6 Hours
The Indian way of life, Introduction to Indian tradition, The Scientific Outlook and Human Values – Basics of Applied Vedic Science – modern day application of Vedas and procedure – Ancient Indian Scientific thoughts.					
Unit 04: INDIAN ARTISTIC TRADITION					6 Hours
Introduction and overview of significant art forms in ancient India such as painting, sculpture, Civil Engineering, Architecture, Music, Dance, Literature, etc.					
Unit 05: YOGA AND HOLISTIC HEALTH CARE					6 Hours
Fundamentals of yoga and holistic health – Human biology – Importance and Practice of Yoga, Pranayama and other prevailing health care techniques – Diet and nutrition – Life management – Contemporary yogic models – case study.					
Theory: 30		Tutorial: --	Practical: --	Project:--	Total Hours: 30 Hrs
REFERENCES					
1.	Sivaramakrishnan, V., Cultural Heritage of India- Course Material, Bharatiya Vidya Bhavan, Mumbai, 5 th Edition, 2014.				
2.	Capra F., Tao of Physics, Shambhala, 2010				
3.	Chatterjee S.C. and Datta D.M., An Introduction to Indian Philosophy, University of Calcutta, 1984.				
4.	RN Jha, Science of Consciousness Psychotherapy and Yoga Practices, Vidyanidhi Prakasham, Delhi, 2016.				
5.	Raja Ram Mohan Roy, Vedic Physics, Mount Meru Publication ISBN: 9781988207049.				
6.	Swami Jitatmanand, Modern Physics and Vedant, Bharatiya Vidya Bhavan.				


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 SALEM-636 005.


 20/12/24.
Dr. M. RENUGA,
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 SALEM - 636

U23GE401		SOFT SKILLS AND APTITUDE – II						L	T	P	J	C	
								0	0	2	0	1	
Course Outcomes													
At the end of the course, the students will be able to													
CO1:	Demonstrate capabilities in additional soft-skill areas using hands-on and/or case-study approaches												
CO2:	Solve problems of increasing difficulty than those in SSA-I in given areas of quantitative aptitude and logical reasoning and score 65-70% marks in company-specific internal tests												
CO3:	Demonstrate greater than SSA-I level of verbal aptitude skills in English regarding the given topics and score 65-70% marks in company-specific internal tests												
Pre-requisite:													
CO/PO, PSO Mapping													
(3/2/1 indicates the strength of correlation) 3-Strong, 2-Medium, 1-Weak													
CO-PO Mapping	Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
	CO1	1	1	1	1	1	2	2	3	3	3	1	3
	CO2	3	3	3	2	2	2	1	3	3	2	1	3
	CO3	1	1	1	1	1	1	1	3	3	3	1	3
Course Assessment methods													
Direct								Indirect					
CIE test I (15) Quiz I (5) CIE test II (15) Quiz II (5)						RTPS (10) Record (10) Total CIE marks : 60 marks Semester End Examination : 40 marks				Course end survey			
1.Soft Skills						Demonstrating soft-skill capabilities with reference to the following topics:							
						a. SWOT			e. Mindfulness				
						b. Goal setting			f. Interpersonal and Intrapersonal skills				
						c. Time management			g. Presentation skills				
						d. Stress management			h. Group discussions				

<table><tr><td>C</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr></table>					C	1	2	3	4	1	0	0	0	0	Solving problems with reference to the following topics:				
C	1	2	3	4															
1	0	0	0	0															
2. Quantitative Aptitude and Logical Reasoning					a. Logarithm														
					b. Progression														
					c. Time & Work														
					d. Simple Interest														
					e. Compound Interest														
					f. Time Speed & Distance														
					g. Plane Geometry														
					h. Mensuration for 2D														
					i. Mensuration for 3D														
					j. Syllogism														
3. Verbal Aptitude					Demonstrating English language skills with reference to the following topics:														
					a. Critical reasoning														
					b. Theme detection														
					c. Verbal analogy														
					d. Prepositions														
					e. Articles														
					f. Cloze test														
					g. Company specific aptitude questions														
Theory: 0		Tutorial: 0		Practical: 30hrs		Project: 0		Total Hours: 30hrs											


 12/12/2025

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