

SONA COLLEGE OF TECHNOLOGY, SALEM-5

(An Autonomous Institution)

B.E- Mechatronics 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)

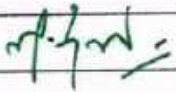
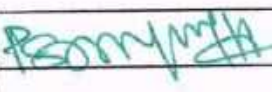
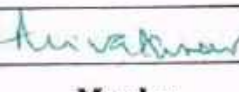
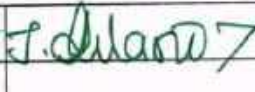

Courses of Study for B.E/B.Tech. Semester I under Regulations 2023 (CBCS)
Branch: Mechatronics Engineering

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.	U23PHY103C	Physics for Engineers	3	0	0	0	3	BS	45	T
4.	U23CHE104F	Engineering Chemistry	2	0	0	0	2	BS	30	T
5.	U23PPR105	Problem Solving using Python Programming	3	0	0	0	3	ES	45	T
6.	U23EGR107	Engineering Graphics	3	0	0	0	3	ES	45	T
7.	U23TAM101	தமிழர் மரபு /Heritage of Tamils	1	0	0	0	1	HS	15	T
8.	U23GE101	Basic Aptitude-I	2	0	0	0	0	AC	30	T
Practical courses										
9.	U23PCL108	Physics and Chemistry Laboratory	0	0	2	0	1	BS	30	L
10.	U23PPL112	Python Programming Laboratory	0	0	2	0	1	ES	30	L
Total Credits							21			
Optional Language Courses**										
11.	U23OL1101	French							15	T
12.	U23OL1102	German							15	T
13.	U23OL1103	Japanese	1	0	0	0	1	OL	15	T
14.	U23OL1104	Korean							15	T
15.	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, MCT BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr.M.Renuga	Dr.P.Suresh	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/ Mechatronics Engineering, First Semester B.E MCT Students and Staff, COE

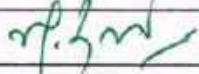
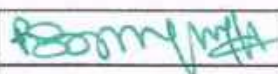
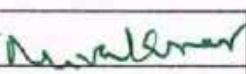


Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E./B.Tech. Semester II under Regulations 2023 (CBCS)
Branch: Mechatronics Engineering

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.	U23MAT202C	Vector Calculus and Differential Equations	3	1	0	0	4	BS	60	TT	
3.	U23PHY203G	Physics of Electronic Devices	2	0	0	0	2	BS	30	T	
4.	U23CHE204D	Materials Chemistry	3	0	0	0	3	BS	45	T	
5.	U23MC201	Engineering Mechanics-Statics and Dynamics	3	0	0	0	3	ES	45	T	
6.	U23MC202	Basic Electrical Engineering	3	0	0	0	3	ES	45	T	
7.	U23TAM201	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	1	0	0	0	1	HS	15	T	
8.	U23GE201	Basic Aptitude- II	2	0	0	0	0	AC	30	T	
Practical courses											
9.	U23WPL214	Workshop Practice	0	0	2	0	1	ES	30	L	
10.	U23MC203	Basic Electrical Engineering and Devices Laboratory	0	0	4	0	2	ES	60	L	
Total Credits							21				
Optional Language Courses**											
11.	U23OL1201	French-II	1	0	0	0	1	OL	15	T	
12.	U23OL1202	German-II							15	T	
13.	U23OL1203	Japanese-II							15	T	
14.	U23OL1204	Korean-II							15	T	
15.	U23OL1205	Hindi-II							15	T	

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**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, Mechatronics BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr.M.Renuga	Dr.P.Suresh	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

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HOD/ Mechatronics, Second Semester B.E. Mechatronics Students and Staff, COE

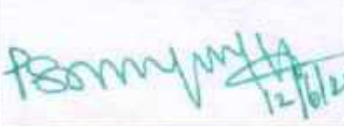
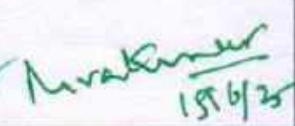
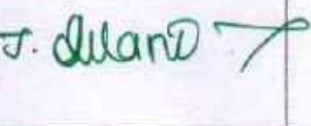

MCT
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Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III under Regulations 2023 (CBCS)
Branch: Mechatronics Engineering

S.No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type*
Theory courses										
1.	U23MC301	Fluid Mechanics and Machinery	3	0	0	0	3	PC	45	T
2.	U23MC302	Mechanics of Solids	3	0	0	0	3	ES	45	T
3.	U23MC303	Manufacturing Technology	3	0	2	0	4	PC	75	TL
4.	U23MC304	Electrical Drives and Control	3	0	0	0	3	PC	45	T
5.	U23MC305	Digital Electronics and Microprocessors	3	0	2	0	4	PC	75	TL
6.	noc25-mg106	NPTEL: Design Thinking - A Primer	1	0	0	0	1	ES	15	T
7.	U23GE302	Audit Course: Environment and Climate Science	2	0	0	0	0	AC	30	T
Practical courses										
8.	U23MC306	Fluid Mechanics and Strength of Materials laboratory	0	0	3	0	1.5	PC	45	L
9.	U23MC307	Electrical Drives and Control Laboratory	0	0	3	0	1.5	PC	45	L
10.	U23GE301	Soft Skills and Aptitude-I	0	0	2	0	1	EEC	30	L
Total Credits							22			

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Approved By

			
Chairperson, Mechatronics Engineering BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr.P.Suresh	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

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HOD/Mechatronics Engineering, Third Semester B.E.MCT 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: Mechatronics 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.	U23MC401	Theory of Machines	3	0	0	0	3	PC	45	T
3.	U23MC402	Thermal Systems Engineering	3	0	0	0	3	PC	45	T
4.	U23MC403	Microcontroller and Embedded Systems	3	0	0	2	4	PC	75	TP
5.	U23MC404	Sensors and Instrumentation	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.	U23MC405	Thermal Systems Engineering Laboratory	0	0	2	0	1	PC	30	L
9.	U23MC406	Sensors and Instrumentation Laboratory	0	0	2	0	1	PC	30	L
10.	U23CPL402	C Programming Laboratory	0	0	2	0	1	ES	30	L
11.	U23GE401	Soft Skills and Aptitude-II	0	0	2	0	1	EEC	30	L
Total Credits							24			

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Approved By

			
Chairperson, Mechatronics Engineering BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr.P.Suresh	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

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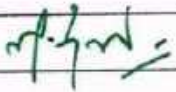
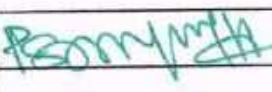
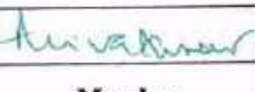
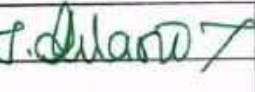

Courses of Study for B.E/B.Tech. Semester I under Regulations 2023 (CBCS)
Branch: Mechatronics Engineering

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.	U23PHY103C	Physics for Engineers	3	0	0	0	3	BS	45	T
4.	U23CHE104F	Engineering Chemistry	2	0	0	0	2	BS	30	T
5.	U23PPR105	Problem Solving using Python Programming	3	0	0	0	3	ES	45	T
6.	U23EGR107	Engineering Graphics	3	0	0	0	3	ES	45	T
7.	U23TAM101	தமிழர் மரபு /Heritage of Tamils	1	0	0	0	1	HS	15	T
8.	U23GE101	Basic Aptitude-I	2	0	0	0	0	AC	30	T
Practical courses										
9.	U23PCL108	Physics and Chemistry Laboratory	0	0	2	0	1	BS	30	L
10.	U23PPL112	Python Programming Laboratory	0	0	2	0	1	ES	30	L
Total Credits							21			
Optional Language Courses**										
11.	U23OL1101	French							15	T
12.	U23OL1102	German							15	T
13.	U23OL1103	Japanese	1	0	0	0	1	OL	15	T
14.	U23OL1104	Korean							15	T
15.	U23OL1105	Hindi							15	T

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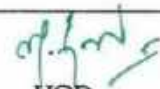
				
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U23ENG101A	Communication Skills in English (Common to ADS, AIML, BME, CSD, CSE, CIVIL, ECE, EEE, MCT, FT, IT Branches)										L	T	P	J	C
											2	0	2	0	3
Course Outcomes															
At the end of the course, the student will be able to															
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:															
<ul style="list-style-type: none"> • 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)					Attendance (5)					Course end survey					
CIE test II (10) (Theory)					Total CIE: 50 marks										
CIE test III (10) (Theory)					Semester End Examination (50)										
CIE test IV (10) (Practical)					(SEE – Theory (25 marks + Lab (25 marks)										
Assignment/seminar/Quiz (5)															
Unit 01:												6 Hours			
<ul style="list-style-type: none"> • 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					
<ul style="list-style-type: none"> • Tenses, Sentence Patterns • Instructions • Letter Writing - calling for quotations, placing orders 									
Unit 03:				6 Hours					
<ul style="list-style-type: none"> • Prefixes and Suffixes • Cover letter and resume writing 									
Unit 04:				6 Hours					
<ul style="list-style-type: none"> • Modal verbs, concord • Checklist • Letter Writing - Business communication, complaints, replies to queries from business customers 									
Unit 05:				6 Hours					
<ul style="list-style-type: none"> • If conditionals • Letter Writing - inviting dignitaries, accepting and declining invitations 									
Lab component:									
<ol style="list-style-type: none"> 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									
<ol style="list-style-type: none"> 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. / MECHATRONICS 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:															
<ul style="list-style-type: none"> Fundamentals of elementary algebra Fundamentals of calculus 							<ul style="list-style-type: none"> 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	3		3	2						3	2	3	3	
CO2	3	3		3	2						3	2	3	3	
CO3	3	3		3	2						3	2	3	3	
CO4	3	3		3	2						3	2	3	3	
CO5	3	3		3	2						3	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.	

S. Jayabharathi

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M. Renuga

Dr. M. RENUGA
BoS - Chairperson
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BoS Date: 08. 07. 2023

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D.E.M.B.Tech Regulations 2023
Professor & Head,
Department of Humanities & Languages,
Sona College of Technology,
SALEM - 636 005.

U23PHY103C	PHYSICS FOR ENGINEERS					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 arrangement of atoms and material properties.													
CO2:	Discuss the dual nature of matter and radiation and the application of wave nature of particles.													
CO3:	Describe the basic components of lasers													
CO4:	Distinguish the types of magnetic materials.													
CO5:	Elucidate the different modes of heat transfer.													
Pre-requisite:														
Basic knowledge in atomic physics and optics.														
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	2	-	-	2	2	2	-	3
CO2	3	2	-	-	-	2	2	-	-	2	2	2	-	3
CO3	3	2	-	-	-	2	2	-	-	2	2	2	-	3
CO4	3	2	-	-	-	2	2	-	-	2	2	2	-	3
CO5	3	2	-	-	-	2	2	-	-	2	2	2	-	3
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: CRYSTAL PHYSICS											9 Hours			
Importance of crystals - Types of crystals - Basic definitions in crystallography (Lattice -space lattice - unit cell - lattice parameters - basis) - Seven crystal systems and fourteen 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 and 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 - Particle nature of radiation - Compton effect - Expression for Compton shift (no derivation) - Wave nature of matter - 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 - Limitations of electron microscope.				
Unit 03: LASERS				9 Hours
Energy level - normal population - 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 - Homojunction and hetero junction laser - Holography - Construction and reconstruction of hologram - Application of laser in industry - Cutting, welding and drilling - Medical applications - Lasik.				
Unit 04: MAGNETIC MATERIALS				9 Hours
Basic definitions - Magnetic moment - Magnetic field - Magnetic field intensity - Magnetic permeability - Magnetization - Intensity of magnetization - Magnetic susceptibility - Types of magnetic materials - Dia, Para and Ferromagnetic materials - Domain theory of ferromagnetism - Origin of domains - Antiferromagnetic materials - Ferrites - Structure, properties and applications - Hysteresis - Hard and soft magnetic materials.				
Unit 05: THERMAL PHYSICS				9 Hours
Heat and temperature - Modes of heat transfer - Conduction, convection and radiation - Specific heat capacity - Thermal capacity and coefficient of linear thermal expansion - Thermal conductivity - Measurement of thermal conductivity of a good conductor - Forbe's method - Measurement of thermal conductivity of a bad conductor - Lee's disc method - Radial flow of heat - Cylindrical flow of heat - Practical applications of conduction of heat - Thermal radiations - Properties and applications of thermal radiations.				
Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs
TEXT BOOKS				
1.	M.N. Avadhanulu, P.G. Kshirsagar, "A Textbook of Engineering Physics", S.Chand & Company Ltd, New Delhi 2014.			
2.	D. K. Bhattacharya, Poonam Tandon "Engineering Physics", Oxford University Press 2017.			

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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.	Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, "Concepts of Modern Physics", McGraw-Hill (Indian Edition), 2017.
4.	R. Murugesan, Kiruthiga Sivaprasath, "Thermal Physics", S.Chand & Company Ltd, New Delhi 2018.
5.	R.Wolfson, "Essential University Physics", Volume 1 & 2. Pearson Education (Indian Edition), 2009.



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U23CHE104F	ENGINEERING CHEMISTRY	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:	Analyse the impurities of water, their removal methods and explain the conditioning methods for industrial uses.
CO2:	Outline the principles and applications of electrochemistry to engineering and technology.
CO3:	Analyse the types of corrosion and describe the methods of corrosion control.
CO4:	Discuss the principle and applications of surface chemistry and catalysis in engineering and technology.
CO5:	Describe the basics of nano chemistry, synthesis, properties and applications of nano materials in engineering and technology.

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					3							2
CO2	3	2												2
CO3	3	2					2							2
CO4	3	2												2
CO5	3	2					1							2

Course Assessment methods

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

Unit 01: WATER TECHNOLOGY

6 Hours

Introduction - Characteristics - hardness - estimation of hardness by EDTA method, alkalinity and its estimation - Boiler feed water - requirements - disadvantages of using hard water in boilers - internal conditioning (colloidal, phosphate, calgon and carbonate conditioning methods) - external conditioning - demineralization process, desalination of brackish water by reverse osmosis.

Unit 02: ELECTROCHEMISTRY

6 Hours

Electrode potential - Nernst Equation - derivation and problems based on single electrode potential

calculation - reference electrodes – definition and examples only – Ion selective electrode - glass electrode - measurement of pH – electrochemical series – significance – electrolytic and electrochemical cells – reversible and irreversible cells –potentiometric titration (redox – Fe²⁺ vs dichromate) – conductometric titration (acid-base – HCl vs NaOH).

Unit 03: CORROSION AND CORROSION CONTROL

6 Hours

Chemical corrosion - Pilling-Bedworth rule – electrochemical corrosion – mechanism - galvanic corrosion – differential aeration corrosion – factors influencing corrosion – corrosion control – sacrificial anode and impressed cathodic current methods – corrosion inhibitors – protective coatings – Paints - constituents and their functions.

Unit 04: SURFACE CHEMISTRY AND CATALYSIS

6 Hours

Adsorption-types-physical and chemical adsorption – adsorption of gases on solids-adsorption isotherms-Freundlich and Langmuir isotherms-adsorption of solutes from solution – applications of adsorption-role of adsorption in catalytic reactions – granular activated carbon in pollution abatement – catalysis - types - homogeneous and heterogeneous catalysis.

Unit 05: NANOCHEMISTRY

6 Hours

Basics - distinction between molecules, nanoparticles and bulk materials – size-dependent properties – nanoparticles: nano cluster, nano rod, nanotube (CNT) and nanowire – Synthesis: precipitation – hydrothermal – solvothermal – chemical vapour deposition - sol-gel technique – properties and applications of nano materials.

Theory: 30 Hrs

Tutorial: --

Practical: --

Project: --

Total Hours: 30 Hrs

TEXT BOOKS

1. P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi, 2018 (17th Edition).
2. Wiley Editorial Board, "Wiley Engineering Chemistry", 2nd Edition, Wiley India Pvt.Ltd, New Delhi, Reprint 2019.

REFERENCES

1. H.K. Chopra, A. Parmer, "Chemistry for Engineers", Narosa Publishing House, New Delhi, 110002, 2016.
2. Kannan P., Ravikrishnan A., "Engineering Chemistry", Sri Krishna Hi-tech Publishing Company Pvt. Ltd., Chennai, 2009.
3. B. Sivasankar "Engineering Chemistry" Tata McGraw-Hill Pub.Co.Ltd, New Delhi, 2008.
4. Ozin G. A. and Arsenault A. C., "Nanotechnology: A Chemical Approach to Nanomaterials", RSC Publishing, 2005.

4.8.2023 Version L0

Programme:

BE/B.Tech Regulations 2023

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U23PCL108	PHYSICS AND CHEMISTRY LABORATORY (For Mechatronics 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 properties of materials by applying the principles of optics and thermal Physics. |
| CO2: | Identify hardness and suggest the quality of water suitable for domestic purpose and analyse the concentration of carbonate, bicarbonate and hydroxide present in the given sample of water. |
| CO3: | Determine the thickness of the given wire used for household applications and the amount hardness present in the household water sample. |

Pre-requisite: Capable of using Screw gauge, Vernier calliper, Travelling microscope and Spectrometer.

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

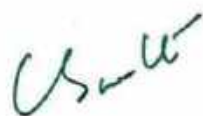
Course Assessment methods

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 (Physics part)

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 wavelength of laser, acceptance angle and numerical aperture of an optical fibre using diode laser.
4	Determination of particle size of lycopodium powder using diode laser.

5	Determination of dispersive power of the prism for various pairs of colors in the mercury spectrum using a spectrometer.
LIST OF EXPERIMENTS (Chemistry part)	
6	Estimation of hardness of water sample by EDTA method.
7	Estimation of alkalinity of water sample by indicator method.
8	Estimation of HCl by pH metry.
9	Estimation of HCl by conductometry. (HCl vs NaOH)
10	Estimation of ferrous ion by potentiometric titration.
	TOTAL : 30 HOURS



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

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					L	T	P	J	C				
	(Common to ADS, IT, CSE, CSE(AI ML), CSD, CIVIL, BME, ECE, EEE, MECH and MCT Branches)					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	PO9	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														
<ol style="list-style-type: none"> 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.


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.

9 Hours

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


HOD

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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 வரலாறு – மக்களும் பண் பொடும் – மக.மக. பிள்மள (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)
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12	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) - Reference Book.


HOD

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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	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			
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.			

S. Anita
15/09/2023

Dr.S.Anita
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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								

M. Renuga
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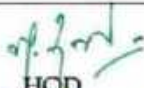
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SALEM - 636 007

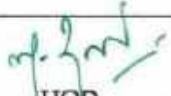
U23OL1102	German				L	T	P	J	C
					1	0	0	0	1
Course Outcomes									
At the end of the course, the student will be able to									
CO1:	Use common, everyday expressions to greet others and introduce themselves.								
CO2:	Construct simple sentences /questions.								
CO3:	Initiate and sustain basic 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) CIE test II (30) CIE test III (40)					Total CIE: 100 marks Semester End Examination: NIL Course end survey				
Unit 01:								3 Hours	
<ul style="list-style-type: none"> Greeting and taking leave, introducing oneself, introducing others 									
Unit 02:								3 Hours	
<ul style="list-style-type: none"> Alphabets, spelling, numbers 									
Unit 03:								3 Hours	
<ul style="list-style-type: none"> Age, Telephone/mobile numbers, Month, Date, Time 									
Unit 04:								3 Hours	
<ul style="list-style-type: none"> Languages, Family, Asking/giving information about family members 									
Unit 05:								3 Hours	
<ul style="list-style-type: none"> Hobbies, Professions 									
Theory: 15 Hrs		Tutorial: --		Practical: --		Project:--		Total Hours: 15 Hrs	
TEXT BOOKS									
1. Netzwerk A1									


 HOD
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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.					


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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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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) CIE test II (30) CIE test III (40)						Total CIE: 100 marks Semester End Examination: NIL			Course end survey		
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

Dr. M. RENUGA,
Professor & Head,

Department of Humanities & Languages

Annamalai University, Salem

SALEM - 636 012

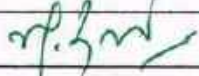
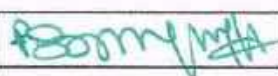
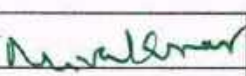
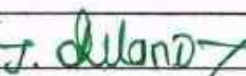
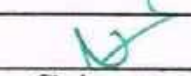
Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E./B.Tech. Semester II under Regulations 2023 (CBCS)
Branch: Mechatronics Engineering

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.	U23MAT202C	Vector Calculus and Differential Equations	3	1	0	0	4	BS	60	TT	
3.	U23PHY203G	Physics of Electronic Devices	2	0	0	0	2	BS	30	T	
4.	U23CHE204D	Materials Chemistry	3	0	0	0	3	BS	45	T	
5.	U23MC201	Engineering Mechanics-Statics and Dynamics	3	0	0	0	3	ES	45	T	
6.	U23MC202	Basic Electrical Engineering	3	0	0	0	3	ES	45	T	
7.	U23TAM201	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	1	0	0	0	1	HS	15	T	
8.	U23GE201	Basic Aptitude- II	2	0	0	0	0	AC	30	T	
Practical courses											
9.	U23WPL214	Workshop Practice	0	0	2	0	1	ES	30	L	
10.	U23MC203	Basic Electrical Engineering and Devices Laboratory	0	0	4	0	2	ES	60	L	
Total Credits							21				
Optional Language Courses**											
11.	U23OL1201	French-II	1	0	0	0	1	OL	15	T	
12.	U23OL1202	German-II							15	T	
13.	U23OL1203	Japanese-II							15	T	
14.	U23OL1204	Korean-II							15	T	
15.	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

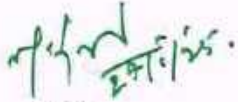
				
Chairperson, Science and Humanities BoS	Chairperson, Mechatronics BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr.M.Renuga	Dr.P.Suresh	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/ Mechatronics, Second Semester B.E. Mechatronics 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 transcoding													
CO5:	Read for understanding and interpreting information and to utilise information accordingly													
Pre-requisite:														
<ul style="list-style-type: none"> • 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			
<ul style="list-style-type: none"> • Comparative adjectives • Recommendations • Guided writing – Conversation in workplace context • Reading passages for specific information transfer 														

Unit 02:				6 Hours
<ul style="list-style-type: none"> • Prepositions, adverbs • Note making • Reading passage with multiple choice questions, reading for gist and reading for specific information 				
Unit 03:				6 Hours
<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • 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 <ol style="list-style-type: none"> 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

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

SEMESTER - II	VECTOR CALCULUS AND DIFFERENTIAL EQUATIONS											L	T	P	J	C
U23MAT202C	(Common to CIVIL, MECHANICAL and MECHATRONICS)											3	1	0	0	4
Course Outcomes																
At the end of the course, the student will be able to																
CO1:	apply the concepts of vector differentiation and integration to determine the line, surface and volume integrals.															
CO2:	apply the classical methods to solve linear ordinary differential equations.															
CO3:	apply the appropriate numerical methods to solve ordinary differential equations.															
CO4:	apply the classical methods to solve partial differential equations.															
CO5:	apply the appropriate finite difference schemes to solve partial differential equations.															
Pre-requisites:																
<ul style="list-style-type: none"> Fundamentals of elementary algebra Fundamentals of calculus 							<ul style="list-style-type: none"> 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	PSO2		
CO1	3	3	3	3	2							2	3	3		
CO2	3	3	3	3	2							2	3	3		
CO3	3	3	3	3	2							2	3	3		
CO4	3	3	3	3	2							2	3	3		
CO5	3	3	3	3	2							2	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	VECTOR CALCULUS											12 Hours				
Vector differentiation: Scalar and vector valued functions – Gradient of a scalar point function – Level surface, Unit normal vector, Angle between the two surfaces, directional derivatives – Divergence of a vector point function – Solenoidal vector – Curl of a vector point function – Irrotational vector – Problems based on vector identities – Scalar potential.																
Vector integration: Line, surface and volume integrals – Statements of Green's, Stoke's and Gauss divergence theorems – Simple applications involving squares, rectangles, cubes and rectangular parallelepiped.																
Unit 02	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 03	NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS	12 Hours
<p>Single Step Methods: Numerical solution of first order ordinary differential equations by Taylor's series, Euler and Modified Euler and Fourth order Runge – Kutta method.</p> <p>Multi Step Methods: Numerical solution of first order ordinary differential equations by Milne's and Adam's predictor-corrector methods.</p>		
Unit 04	PARTIAL DIFFERENTIAL EQUATIONS	12 Hours
<p>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.</p>		
Unit 05	NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS	12 Hours
<p>Classification of second order partial differential equations – Finite difference schemes for the solution of two dimensional Laplace's and Poisson's equations on rectangular domain – One dimensional heat flow equation by explicit (Bender-Schmidt's) and implicit (Crank Nicholson) methods.</p>		
Theory: 45 Hours	Tutorial: 15 Hours	Practical: - Project: - Total Hours: 60 Hours
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.	T. Veerarajan, "Numerical Methods", McGraw Hill Publishers, 1 st Edition, 2018.	
REFERENCE BOOKS:		
1.	J. Stewart, "Calculus", Cengage Publishers, 8 th Edition, 2016.	
2.	C. Prasad and R. Garg, "Advanced Engineering Mathematics", Khanna Publishers, 1 st Edition, 2018.	
3.	E. Kreyszig., "Advanced Engineering Mathematics", Wiley Publishers, 10 th Edition, Reprint, 2017.	
4.	B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 44 th Edition, 2018.	
5.	B. V. Ramana, "Higher Engineering Mathematics", McGraw Hill Publishers, 29 th Reprint, 2017.	
 Dr. S. JAYABHARATHI ASSOCIATE PROFESSOR & HEAD DEPARTMENT OF MATHEMATICS, SONA COLLEGE OF TECHNOLOGY, SALEM-636 005. Tamilnadu. Ph: 0427 - 4099999.		
BoS Date: 08. 07. 2023	HoD / Mathematics	

U23PHY203G		PHYSICS OF ELECTRONIC DEVICES					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:	Differentiate the electrical and thermal conductivity of metals.													
CO2:	Elucidate the classification of semiconducting materials.													
CO3:	Discuss the applications of diodes as rectifiers, photodiodes, LEDs, and solar cells.													
CO4:	Explain the operation of the bipolar transistor as an amplifier.													
CO5:	Explain the novel properties of shape memory alloys and nanomaterials.													
Pre-requisite:														
Basic Knowledge in electronics and electricity & semi-conductors.														
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	2	-	-	2	-	1	-	2
CO2	3	2	-	-	-	2	2	-	-	2	-	1	-	2
CO3	3	2	-	-	-	2	2	-	-	2	-	1	-	2
CO4	3	2	-	-	-	2	2	-	-	2	-	1	-	2
CO5	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: CONDUCTING MATERIALS											6 Hours			

Basic definitions - Classical free electron theory of metals - Expression for electrical conductivity - Expression for thermal conductivity - Wiedemann - Franz law - Lorentz number - Drawbacks of classical free electron theory - Fermi energy and Fermi distribution function - Effect of temperature on Fermi function - Density of energy states - Carrier concentration in metals.

Unit 02: SEMICONDUCTING MATERIALS

6 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) - Hall effect - Determination of Hall coefficient - Applications.

Unit 03: PN JUNCTION DIODE AND OPTOELECTRONIC DEVICES

6 Hours

PN junction diode - Formation of p-n junction - P-n junction diode under forward and reverse bias - Application of p-n junction diode as rectifier- Half wave and Full wave rectifier - Zener diode - Zener diode as voltage regulator -Basic idea of a clipper and clamper - Optoelectronic devices - Photodiodes and its applications - Light emitting diode (LED) - Principle, construction and working - Solar cell - Principle, construction and working.

Unit 04: BIPOLAR JUNCTION TRANSISTORS AND AMPLIFIERS

6 Hours

Bipolar junction transistors - Introduction - npn and pnp transistors - Transistor biasing - Transistor currents-Transistor circuit configuration- common base configuration - common emitter configuration-Transistor action in the common base mode - Static characteristics of transistor in common emitter mode - Relation between α and β - Amplifiers - Transistor as an amplifier - Introduction to Field effect transistors (FET) - Types of field effect transistors- Junction field effect transistor (JFET).

Unit 05: NEW ENGINEERING MATERIALS

6 Hours

Shape memory alloys (SMA) - Characteristics, properties of NiTi alloy, applications, advantages and disadvantages of SMA - Nanoscience and Nanotechnology - Significance of nanoscale - Different types of nanostructures (0-D, 1-D, 2-D and 3-D) - Fabrication of nanomaterials - Ball milling and Chemical vapour deposition technique (CVD) - Carbon nanotubes - Structure,

properties and applications - Fabrication - Pulsed laser deposition method.				
Theory: 30 Hrs	Tutorial: --	Practical: --	Project: --	Total Hours: 30 Hrs
TEXTBOOKS				
1.	V. Raghavan, "Materials Science and Engineering: A First Course" Prentice Hall India Learning Private Limited, 6th Edition, 2015.			
2.	B.K. Pandey and S. Chaturvedi, "Engineering Physics", Cengage Learning India Pvt. Ltd., Delhi, 2012.			
REFERENCES				
1.	"Physics for Electrical and Electronics Engineering", Sonaversity, Sona College of Technology, Salem, Revised Edition 2016.			
2.	William D. Callister Jr., David G. Rethwisch, "Callister's Materials Science and Engineering", 10th Edition, Global Edition 2019.			
3.	R. Wolfson, "Essential University Physics", Volume 1 & 2. Pearson Education (Indian Edition), 2009.			
4.	M. Arumugam, "Materials Science", Anuradha Publications, Kumbakonam, 2006.			
5.	V.K Mehta, Rohit Mehta "Principles of Electronics", S. Chand & Company Ltd, 10th Edition 2014.			

Dr. C. Shanthi
27.1.2025

Dr. C. Shanthi
HOD / Science

Dr. C. SHANTHI, M.Sc., M.E., Ph.D.,
Professor of Physics
Head, Department of Sciences
Sona College of Technology (Autonomous)
SALEM-636 005.

Dr. M. Renuga
27.1.2025

Dr. M. Renuga
BoS – Chairperson,
Science and Humanities

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

U23CHE204D	MATERIALS CHEMISTRY	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:	Describe the basic concepts of polymerisation reactions and analyze various types of composites for specific industrial applications based on their properties.
CO2:	Classify Nano fillers, assess the advantages and limitations of different synthesis methods for Nano composites and propose innovative approaches for improving their fabrication and performance.
CO3:	Discuss the principle, advantages and applications of organic electronic materials in electronic devices.
CO4:	Understand the statement of phase rule, industrial importance, types, composition and applications of alloys.
CO5:	Analyze isothermal transformation diagrams and cooling curves superimposed on them and application of heat treatment methods to enhance the surface properties of steel components for wear resistance and toughness.

Pre-requisite:

Basic knowledge on the concepts of engineering 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						3	3
CO2	2	2					2						2	3
CO3	3	2					2						3	3
CO4	3	3					2						3	3
CO5	3	3					2						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: CHEMISTRY OF POLYMERS AND COMPOSITES

9 Hours

Nomenclature and classifications of Polymers – Functionality – Types of Polymerization-addition-

condensation and copolymerization – Free Radical mechanism of addition polymerization – Properties of Polymers- T_g – tacticity - Moulding constituents of plastic – Moulding of plastics into articles-Injection-Compression and Blow moulding – Thermoplastic and Thermosetting Resins – Composites – Constituents – matrix and dispersed phase – various types of composites and their applications.

Unit 02: NANOSTRUCTURED COMPOSITES **9 Hours**

Definition of nanocomposites – Nanofillers: Classification, synthesis and properties– Synthesis of nanocomposites by physical methods - direct mixing and solution mixing - Chemical methods - Microemulsion synthesis, Microwave assisted synthesis and Sonochemical assisted synthesis-Types of nanocomposites - Core-Shell nanostructure, Organic-Inorganic hybrid nanocomposites, Quantum dot (QDs) synthesis.

Unit 03: 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 Diodes (OLEDs): construction, working principle and applications – Organic transistors: construction, working principle and applications in electronic industries.

Unit 04: PHASE RULE AND ALLOYS **9 Hours**

Statement and explanation of terms involved - limitations and applications of phase rule – Construction of phase diagram for one component system; water system – condensed phase rule – construction of phase diagram by thermal analysis – simple eutectic systems - Iron – Iron carbide equilibrium diagram, Classification of steel and cast-Iron, properties and application.

Alloys: Introduction - Significance of alloying, Functions and effect of alloying elements - ferrous alloys – nichrome and stainless steel – non-ferrous alloys – brass and bronze- Introduction to Aluminium alloys – Titanium alloys, Mg-alloys, Ni-based super alloys.

Unit 05: HEAT TREATMENT AND POWDER METALLURGY **9 Hours**

Definition – Full annealing, stress relief, recrystallization, and spheroidising –normalizing, hardening and tempering of steel. Isothermal transformation diagrams – cooling curves superimposed on I.T. diagram – continuous cooling Transformation (CCT) diagram – austempering, martempering – hardenability, Jominy end quench test -case hardening, carburizing, Nitriding, cyaniding, carbonitriding – Flame and Induction hardening – vacuum and plasma hardening – thermo- mechanical treatments.

Theory: 45 Hrs	Tutorial: 0	Practical: 0	Project:0	Total Hours: 45 Hrs
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TEXT BOOKS

1.	P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi , 17th Edition, 2018.
2.	Kenneth G.Budinski and Michael K. Budinski, "Engineering Materials", Prentice Hall of India Private Limited, 9th edition, 2018.

REFERENCES

1.	H.K. Chopra, A. Parmer, "Chemistry for Engineers", Narosa Publishing House, New Delhi, 110002, 2016.
2.	Kannan P., Ravikrishnan A., "Engineering Chemistry", Sri Krishna Hi-tech Publishing Company Pvt. Ltd., Chennai, 2009
3.	B. Sivasankar "Engineering Chemistry" Tata McGraw-Hill Pub.Co.Ltd, New Delhi, 2008
4.	Ozin G. A. and Arsenault A. C., "Nanochemistry: A Chemical Approach to Nano materials", RSC Publishing, 2005.
5.	G.S. Upadhyay and Anish Upadhyay, "Materials Science and Engineering", Viva Books Pvt.Ltd, New Delhi, 2020.

U. Shanthi
27.1.2025

Dr. C. Shanthi
HOD / Science

Dr. C. SHANTHI, M.Sc., M.E., Ph.D.,
Professor of Physics
Head, Department of Sciences
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SALEM-636 005.


M. Renuga
27.1.2025

Dr. M. Renuga
BoS - Chairperson
Science and Humanities

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

U23MC201	ENGINEERING MECHANICS – STATICS AND DYNAMICS					L	T	P	J	C				
						3	0	0	0	3				
Course Outcomes														
After successful completion of this course, the students should be able to														
CO1:	Analyse the forces in statically determinate structures using scalar and vector analytical techniques.													
CO2:	Examine the condition for equilibrium of rigid body using free body diagram.													
CO3:	Evaluate the effect of friction of bodies under equilibrium condition.													
CO4:	Determine the centroid, moment of inertia and polar moment of inertia of simple and composite sections.													
CO5:	Analyse the motion of a body with force and without force causing the motion.													
Pre-requisite														
Physics for Engineers														
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	2		2	2			1		1	3	2
CO2	3	3	3	2		2	2			1		2	3	2
CO3	3	3	3	2		2	2			1		2	3	2
CO4	3	3	3	2		2	2			1		1	3	2
CO5	3	3	3	2		2	2			1		2	3	2
Course Assessment methods														
Direct						Indirect								
CIE test I (9)					Assignment/seminar/Quiz (5)					Course end survey				
CIE test II (9)					Total CIE: 40 marks									
CIE test III (10)					Semester End Examination: 60 marks									
Objectives test (7)														
Unit 01: BASICS & STATICS OF PARTICLES											9 Hours			
Introduction – Units and Dimensions – Laws of Mechanics – Lamé's theorem, Parallelogram and triangular Law of forces – Vectors – Vectorial representation of forces and moments – Coplanar Forces – Resolution and Composition of forces – Equilibrium of a particle - Forces in space – Equilibrium of a particle in space – Equivalent systems of forces – Principle of transmissibility – Single equivalent force.														
Unit 02: EQUILIBRIUM OF RIGID BODIES IN 2 DIMENSIONS											9 Hours			
Free body diagram – Types of supports and their reactions – requirements of stable equilibrium – Moments and Couples – Moment of a force about a point – Varignon's theorem – Equilibrium of Rigid														

bodies in two dimensions.				
Unit 03: FRICTION				9 Hours
Frictional force – Laws of Coulomb friction – Angle of friction – cone of friction – Equilibrium of bodies on inclined plane- Ladder friction, Wedge friction, Screw friction.				
Unit 04: PROPERTIES OF SURFACES AND SOLIDS				9 Hours
Determination of Areas and Volumes – First moment of area and the Centroid of sections – Rectangle, circle, triangle from integration – T section, I section, Hollow section by using standard formula. Second and product moments of plane area – Rectangle, triangle, circle from integration – T section, I section by using standard formula – Parallel axis theorem and perpendicular axis theorem – Polar moment of inertia.				
Unit 05: DYNAMICS OF PARTICLES				9 Hours
Displacements, Velocity and acceleration, their relationship – Rectilinear and Curvilinear motion – Newton's law \equiv Work Energy Equation of particles \equiv Impulse and Momentum \equiv Impact of elastic bodies.				
Theory: 45 Hrs	Tutorial: –	Practical: –	Project:–	Total Hours: 45 Hrs
TEXT BOOKS				
1. Beer, F.P and Johnson Jr. E.R. "Vector Mechanics for Engineers: Statics and Dynamics", McGraw–Hill International 11 th Edition, 2016.				
2. Dr. N. Kottiswaran, "Engineering Mechanics (Statics and Dynamics)" ,Sri Balaji Publications 10th edition 2010.				
REFERENCES				
1. Rajasekaran, S, Sankarasubramanian, G., "Fundamentals of Engineering Mechanics", Vikas Publishing House Pvt. Ltd., (2011).				
2. Hibbeler, R.C., "Engineering Mechanics", Vol. 1 Statics, Vol. 2 Dynamics, Pearson Education Asia Pvt. Ltd., (2015).				
3. Palanichamy, M.S., Nagam, S., "Engineering Mechanics – Statics & Dynamics", Tata McGraw–Hill, (2004).				
4. MeriamJ.L,Kraigel.G,"Engineering Mechanics-Statics"6th Edition, Wiley, 2017.				
5. Irving H. Shames, "Engineering Mechanics – Statics and Dynamics", IV Edition– Pearson Education Asia Pvt. Ltd., (2006).				
6. Kumar, K.L., "Engineering Mechanics", 3rd Revised Edition, Tata McGraw-Hill Publishing company, New Delhi (2008)				


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U23MC202		BASIC ELECTRICAL ENGINEERING										L	T	P	J	C
												3	0	0	0	3
Course Outcomes																
After successful completion of this course, the students should be able to																
CO1:	Evaluate the behaviour of circuit elements in electric circuits.															
CO2:	Explain the principles of operation of magnetics circuits and transformers															
CO3:	Outline the construction and working principles of DC machines and synchronous machines.															
CO4:	Evaluate the electromagnetic energy conversion and operating principle of three phase induction motors.															
CO5:	Explain the principles of operations of single-phase induction and stepper motors.															
Pre-requisite																
Physics for Engineers																
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	2			2			2			3	2		
CO2	3	3	3	2			2			2			3	2		
CO3	3	3	3	2			2			2			3	2		
CO4	3	3	3	2			2			2			3	2		
CO5	3	3	3	2			2			2			3	2		
Course Assessment methods																
Direct										Indirect						
CIE test I (9)					Assignment/seminar/Quiz (5)					Course end survey						
CIE test II (9)					Total CIE: 40 marks											
CIE test III (10)					Semester End Examination: 60 marks											
Objectives test (7)																
Unit 01: FUNDAMENTAL LAWS OF ELECTRICAL ENGINEERING AND CIRCUIT ELEMENTS														9 Hours		
Electric current – Coulomb’s law – Ohm’s law – Faraday’s law of electromagnetic induction – Kirchhoff’s laws – Energy and Power – Resistance parameter – Inductance parameter –Capacitance parameter – Series and parallel combinations of resistances –RLC series-parallel circuits – Series RLC																

resonance circuits			
Unit 02: MAGNETIC CIRCUITS AND TRANSFORMERS			9 Hours
Ampere's Law – Flux, Flux density, Field strength, Permeability, Reluctance, Permeance – Theory of magnetism – Hysteresis and Eddy-current losses - Magnetic Circuit - Self-inductance, Mutual inductance, Co-efficient of coupling - Transformers – Equivalent circuit – Parameters from No-Load tests – Efficiency and Voltage regulation.			
Unit 03: DC MACHINES AND THREE-PHASE SYNCHRONOUS MACHINES			9 Hours
DC Generator: construction, working principle, EMF equation, Types - DC motor: working principle, Types, Speed torque characteristics - starters for DC motors - Generation of a three-phase voltage- Synchronous generator - Construction and working principle.			
Unit 04: ELECTROMAGNETIC ENERGY CONVERSION AND THREE PHASE INDUCTION MOTOR			9 Hours
Introduction-Basic analysis of Electromagnetic torque – Three-phase induction motor – Revolving Magnetic Field – Construction- Working principle- Types - Speed-Torque characteristic – Parameters from no load and blocked rotor tests – Equivalent circuit – Applications of three-phase induction motors.			
Unit 05: SINGLE PHASE INDUCTION MOTORS AND SPECIAL MACHINES			9 Hours
Single Phase Induction Motor types: Split phase induction motor, Capacitor start induction motor, Capacitor start capacitor run induction motor - Switched reluctance motor- Working principle of stepper Motors: Variable reluctance stepper Motor and Hybrid stepper motor - PM Brushless DC motors - Applications			
Theory: 45 Hrs	Practical: --	Project: --	Total Hours: 45 Hrs
Text Books			
1. B.L. Theraja and A. K. Theraja, "A Text Book of Electrical Technology", S.Chand Publication, Vol 2, 2014.			
2. A. Sudhakar and S.P Shyam Mohan, "Circuits, Network Analysis and Synthesis", Tata McGraw Hill, Fifth Edition, 2015.			
REFERENCES			
1. D.P. Kothari and I.J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, Fourth Edition, 2011.			
2. V.K.Metha, Rohit Metha, "Principles of Electrical Engineering and Electronics", Second edition, S.Chand Publication, 2015.			
3. S.K.Bhattacharya "Basic Electrical and Electronics Engineering" Pearson Education India, 2012.			
4. V.N. Mittle and Aravind Mittal "Basic Electrical Engineering", Tata McGraw Hill, Second edition, 2005.			

U23MC203	BASIC ELECTRICAL ENGINEERING AND DEVICES LABORATORY										L	T	P	J	C
											0	0	4	0	2
Course Outcomes															
After successful completion of this course, the students should be able to															
CO1:	Understand the usage of common electrical measuring instruments and basic characteristics of transformers and electrical machines.														
CO2:	Evaluate the characteristics of semiconductor devices.														
CO3:	Interpret the solutions for real time applications of electrical machines and semiconductor devices.														
Pre-requisite															
--															
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	PO 11	PO 12	PSO 1	PSO 2	
CO1	3	3	3	3						2			3	2	
CO2	3	3	3	3						2			3	2	
CO3	3	3	3	3						2			3	2	
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. Verification of Ohm's Law.															
2. Verification of Kirchoff's law.															
3. Measurement of power and power factor in series RLC circuit.															
4. Measurement of power and power factor in parallel RLC circuit.															
5. Measurement of transformer Efficiency and voltage regulation.															
6. Torque Speed Characteristic of DC series motor.															
7. Torque Speed Characteristic of DC shunt motor.															
8. Torque-slip characteristic of an induction motor.															
9. Verify the VI Characteristics of PN diode															
10. Verify the VI Characteristics of Zener diode															
11. Verify the VI Characteristics of SCR.															
12. Verify the VI Characteristics of MOSFET.															

U23WPL214	WORKSHOP PRACTICE (Common to MCT and 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:	Perform the various techniques of sheet metal fabrication.													
CO2:	Analyse various techniques of welding and carpentry works.													
CO3:	Solve the real-time problems using sheet metal, welding and carpentry.													
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	2	
CO2	1							3				2	2	
CO3	1							3				2	2	
Course Assessment methods														
Direct							Indirect							
CIE test I (15) Quiz I- (5) CIE test II (15) Quiz II- (5)							RIPS (10) Record (10) Total CIE: 60 marks Semester End Examination (40 marks)				Course end survey			

Importance of workshop practice- Introduction to Measuring and marking devices, Tools and equipment Maintenance - Workshop apparatus - Human safety practices - First aid procedures.
(Not for Examination)

LIST OF EXPERIMENTS

SECTION 1:	SHEET METAL Making of Cone, Dust Pan and Funnel.	8 hours
SECTION 2:	WELDING Arc welding of Butt joint and Lap Joint.	8 hours
SECTION 3:	CARPENTRY Making of Half Lap joint and Dovetail Joint.	8 hours
Demonstration:	FOUNDRY PRACTICES Simple pattern making	6 hours
		Total Number of hours: 30

Theory: --	Tutorial: --	Practical: 30 Hrs	Project: --	Total Hours: 30 Hrs
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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 <u>நெசவு மற்றும் பாணைத் தொழில்நுட்பம்:</u> சங்க காலத்தில் நெசவுத் தொழில் - பாணைத் தொழில்நுட்பம் - கரும்பு சிவப்பு பாண்டங்கள் பாண்டங்களில் கீறல் குறியீடுகள்.						
Unit 02: DESIGN AND CONSTRUCTION TECHNOLOGY						3 Hours
அலகு II <u>வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்:</u> 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 <u>உற்பத்தித் தொழில் நுட்பம்:</u> கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருக்குதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - 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 <u>வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்:</u> அணை, ஏரி, குளங்கள், மதுகு - 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 <u>அறிவியல் தமிழ் மற்றும் கணித்தமிழ்:</u> 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 Thoempu 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) பொருநை - 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)
6.	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
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.			

S. Anita
6/02/2024

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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		Course end survey				
CIE test II (30)			Semester End Examination: NIL						
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, corckeries									
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								

M. Renuga
13/2/24
HOD

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SALEM

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) CIE test II (30) CIE test III (40)					Total CIE: 100 marks Semester End Examination: NIL Course end survey				
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									

M. Renuga
HOD 13/2/24

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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.								

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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								


 13/2/24
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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 (Prathamc and Madhyama)									

M. R. Renuga
HOD

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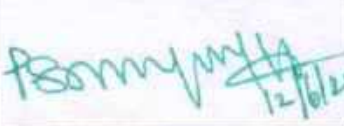
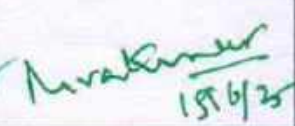
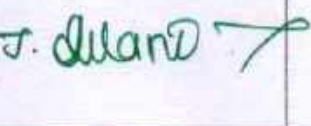

MCT
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Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III under Regulations 2023 (CBCS)
Branch: Mechatronics Engineering

S.No	Course Code	Course Title	L	T	P	J	C	Category	Total Contact Hours	Course Type ^a
Theory courses										
1.	U23MC301	Fluid Mechanics and Machinery	3	0	0	0	3	PC	45	T
2.	U23MC302	Mechanics of Solids	3	0	0	0	3	ES	45	T
3.	U23MC303	Manufacturing Technology	3	0	2	0	4	PC	75	TL
4.	U23MC304	Electrical Drives and Control	3	0	0	0	3	PC	45	T
5.	U23MC305	Digital Electronics and Microprocessors	3	0	2	0	4	PC	75	TL
6.	noc25-mg106	NPTEL: Design Thinking - A Primer	1	0	0	0	1	ES	15	T
7.	U23GE302	Audit Course: Environment and Climate Science	2	0	0	0	0	AC	30	T
Practical courses										
8.	U23MC306	Fluid Mechanics and Strength of Materials laboratory	0	0	3	0	1.5	PC	45	L
9.	U23MC307	Electrical Drives and Control Laboratory	0	0	3	0	1.5	PC	45	L
10.	U23GE301	Soft Skills and Aptitude-I	0	0	2	0	1	EEC	30	L
Total Credits							22			

*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

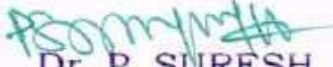
			
Chairperson, Mechatronics Engineering BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr.P.Suresh	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/Mechatronics Engineering, Third Semester B.E.MCT Students and Staff, COE

U23MC301	FLUID MECHANICS AND MACHINERY				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:	Apply mathematical knowledge to predict the properties of fluid and analyse the pressure measurement.													
CO2:	Evaluate the fluid flow problems using continuity equation and Bernoulli's equation with their applications. Distinguish laminar and turbulent flow through circular pipes.													
CO3:	Perform the dimensional analysis by using Buckingham's- π theorem.													
CO4:	Discuss the working principle of hydraulic turbines and analyze their performance.													
CO5:	Discuss the working principle of hydraulic pumps and analyze their performance.													
Pre-requisite:														
Physics for Engineers														
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	2
CO2	3	3	2	2									3	2
CO3	3	3	3	3								2	3	2
CO4	3	3	3	2		2							3	2
CO5	3	3	3	2		2							3	2
Course Assessment methods														
Direct					Indirect									
CIE test I (9)					Assignment/seminar/Quiz (5) Total CIE: 40 marks Semester End Examination: 60 marks					Course end survey				
CIE test II (9)														
CIE test III (10)														
Objectives Test (7)														
Unit 01: FLUID PROPERTIES AND PRESSURE MEASUREMENT										9 Hours				
Units & Dimensions -Properties of fluids: density, specific weight, viscosity, capillarity and surface tension, compressibility, vapor pressure and cavitation - Pressure Measurement: Pascal law, measurement of pressure using simple U-tube manometer and differential manometer.														
Unit 02: FLOW CHARACTERISTICS AND FLOW THROUGH PIPES										9 Hours				
Types of fluid flow- application of continuity equation, Euler's equation, Bernoulli's equation- Orifice meter, Venturi meter.														
Boundary layer concept-Laminar flow through circular pipes, Hagen-Poiseuille equation- turbulent flow through circular pipes, Darcy Weisbach equation –Energy losses in flow through pipes (description only)-														


Power transmission through pipes.				
Unit 03: DIMENSIONAL ANALYSIS				9 Hours
Dimensional homogeneity, methods of dimensional analysis – Buckingham's Π theorem, methods of selecting repeating variables- Model analysis- dimensionless parameters, model laws, classification of models (description only).				
Unit 04: HYDRAULIC TURBINES				9 Hours
Turbines: definition and classification – impulse and reaction- Pelton turbine - Francis turbine -Kaplan turbine - working principles - velocity triangles - work done - efficiencies and performance calculations- specific speed.				
Unit 05: HYDRAULIC PUMPS				9 Hours
Pumps: definition and classifications- Centrifugal pump: working principle, velocity triangle, head and efficiencies, performance calculations- Reciprocating pump: classification, working principle- performance calculations, function of air vessel - Rotary pumps: gear and vane pump, working principle.				
Theory: 45 Hrs	Tutorial: --	Practical: --	Project: --	Total Hours: 45 Hrs
TEXT BOOKS				
1.	Bansal, R.K., Fluid Mechanics and Hydraulics Machines, (revised 9th edition), Laxmi publications (P) Ltd, New Delhi, 2019.			
2.	Er.R.K.Rajput., A Textbook of Fluid Mechanics and Hydraulic Machines, S Chand & Company, 6 th edition, 2016.			
REFERENCES				
1.	C.S.P.Ojha, R.Berndtsson, P.N.Chandramouli., Fluid Mechanics and Machinery, Oxford University Press, New Delhi, 2010.			
2.	Modi P.N. and Seth, S.M. "Hydraulics and Fluid Mechanics", (22 nd edition) Standard Book House, New Delhi 2019.			
3.	Streeter, V. L. and Wylie E. B., "Fluid Mechanics", McGraw Hill Publishing Co. 2010.			
4.	Ramamritham. S, Fluid Mechanics, Hydraulics and Fluid Machines, (9 th edition) Dhanpat Rai & Sons, Delhi, 2014.			


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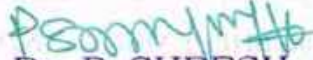
U23MC302		MECHANICS OF SOLIDS					L	T	P	J	C			
							3	0	0	0	3			
Course Outcomes														
At the end of the course, the student will be able to														
CO1:	Analyze stresses and strains in engineering components under different loading conditions.													
CO2:	Analyze stresses in mechanical structures, including principal stresses, strain energy, impact loading, and stresses in thin-walled cylinders.													
CO3:	Construct shear force and bending moment diagrams for different beams and loading conditions.													
CO4:	Analyze torsion and shear stress to design shafts and apply leaf and helical springs by evaluating shear stress and axial deflection.													
CO5:	Evaluate structural beams and columns considering deflection under various loading conditions.													
Pre-requisite:														
1. Engineering Mechanics – Statics and Dynamics														
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		1				3	2
CO2	3	3	3	3		2	2		1		2		3	2
CO3	3	3	3	3		2	2		1				3	2
CO4	3	3	3	3		2	2		1				3	2
CO5	3	3	3	3		2	2		1		2		3	2
Course Assessment methods														
Direct						Indirect								
CIE test I	(9)				Assignment/seminar/Quiz (5)					Course end survey				
CIE test II	(9)				Total CIE: 40 marks									
CIE test III	(10)				Semester End Examination:									
Objectives Test	(7)				60 marks									
Unit 01: STRESS, STRAIN AND DEFORMATION OF SOLIDS										9 Hours				
Introduction – mechanical properties of materials – types of stresses – stresses and strains due to axial force – stress-strain curve – Hooke's law – factor of safety – analysis of bars of varying sections – stresses in composite sections – thermal stresses – Poisson's ratio – shear modulus, bulk modulus, the relationship between elastic constants.														
Unit 02: STRESS ANALYSIS IN MECHANICAL STRUCTURES										9 Hours				
Principal planes and stresses – determining stresses on the oblique plane – analytical and graphical method – strain energy and Impact loading: gradually applied load – sudden load – Impact load – effect of shear stress – thin cylinders – Hoops stress – Longitudinal stress.														
Unit 03: SHEAR FORCE AND BENDING MOMENT OF BEAMS										9 Hours				

Introduction – Shear Force and Bending Moment diagram – SF and BM diagram for a cantilever beam, supported beam and overhanging beam – under varying load conditions – beams subjected to couples.				
Unit 04: TORSION IN SHAFTS AND SPRINGS				9 Hours
Analysis of torsion of circular bars and hollow circular sections– shear stress distribution – stepped shaft – power transmission – strength of a shaft and torsional rigidity – shafts of varying sections – composite shafts. Springs: classification – leaf springs, closed coil helical springs – application of various springs – maximum shear stress in spring – deflection of helical coil springs under axial loads.				
Unit 05: COLUMNS AND DEFLECTION OF BEAMS				9 Hours
Columns: Buckling of long columns due to axial load – equivalent length of a column – Euler's and Rankine's formulae for columns of different end conditions – slenderness ratio. Beams: Deflection of beams – slope and deflection using Macaulay's method – Moment area method.				
Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs
TEXT BOOKS				
1.	R K Bansal, "A textbook of Strength of Materials", Lakshmi Publications (P) Limited, New Delhi, Sixth Edition 2022.			
2.	R K Rajput, "Strength of Materials", S Chand & Co., New Delhi, Sixth Edition 2018.			
REFERENCES				
1.	Nash W.A, "Theory and problems in Strength of Materials", Schaum Outline Series, McGraw-Hill Book Co, New York, 1995.			
2.	Singh D.K "Mechanics of Solids" Pearson Education 2002.			
3.	Ryder G.H, "Strength of Materials", Macmillan India Ltd., Third Edition, 2002.			
4.	Popov E.P, "Engineering Mechanics of Solids", Prentice-Hall of India, New Delhi, 1997.			


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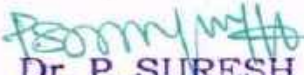
U23MC303		MANUFACTURING TECHNOLOGY				L	T	P	J	C				
						3	0	2	0	4				
Course Outcomes														
At the end of the course, the student will be able to														
CO1:	Elaborate the sand casting, pattern materials and welding, different welding processes.													
CO2:	Describe the various bulk deformation processes, different sheet metal operations and shaping of plastics using different moulding methods.													
CO3:	Identify the cutting tool materials and its specific purpose and explain about lathe details, main dissimilarity of capstan and turret lathes.													
CO4:	Illustrate the principle of reciprocating machine tools.													
CO5:	Explain the working principle of milling and grinding processes.													
Pre-requisite:														
Physics for Engineers & Workshop practice														
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			2	2			3		2	3	2
CO2	3	3	3			2	2			3		2	3	2
CO3	3	3	3			2	2			3		2	3	2
CO4	3	3	3			2	2			3		2	3	2
CO5	3	3	3			2	2			3		2	3	2
Course Assessment methods														
Direct										Indirect				
CIE test I (10) - Theory					Assignment / Quiz/ Seminar (5) Total CIE: 50 marks Semester End Examination: 50 marks [SEE- Theory (35 marks), Lab (15 marks)]					Course end survey				
CIE test II (10) - Theory														
CIE test III (10) - Theory														
CIE test IV(15) - Laboratory														
Unit 01: METAL CASTING AND METAL JOINING PROCESS										9 Hours				
Sand Casting- Moulding Tools- Types of Patterns- Pattern Materials- Moulding Sand- Properties- Melting Furnaces: Cupola, Crucible and Electric arc furnace. Special Casting Process: Shell, Investment Casting - Lost Wax Process- Gas welding- Arc welding -TIG welding- MIG welding-Resistant welding.														
Unit 02: SHEET METAL AND PLASTIC COMPONENTS										9 Hours				
Drawing Process: Wire drawing, Tube drawing, Metal Spinning. Rolling: Type of rolling mills- Extrusion: Principles of Extrusion – Types – Hot and Cold extrusion. Sheet metal: Rubber pad forming- Explosive forming. Moulding of thermoplastics- injection moulding-														

blow moulding – Rotational moulding.					
Unit 03: CENTRE LATHE				9 Hours	
Centre lathe: constructional features- various operations, tool and work holding devices- taper turning methods, thread cutting, special attachments. Special Purpose Lathe: Capstan and turret lathes – automats – single spindle- Swiss type- automatic screw type, multi spindle – Geneva mechanism, Bar feed mechanism.					
Unit 04: SPECIAL MACHINE TOOLS				9 Hours	
Construction, Types, Operations and mechanisms of Shaper, Planner and Slotter. Hole making: drilling –Reaming, Boring- Tapping- operations. Broaching machines: broach construction – push, pull, surface and continuous broaching machines.					
Unit 05: MILLING AND GEAR PROCESS				9 Hours	
Milling operations-types of milling cutter. Gear cutting – forming and generation principle and construction of gear milling, Hobbing and gear shaping processes –finishing of gears. Grinding: types of grinding process- types of grinding wheel – Abrasives - cylindrical grinding, surface grinding, centreless grinding – honing, lapping and buffing.					
List of Experiments				30 Hours	
1. Exercise on simple facing & Turning.					
2. Exercise on Step turning & taper turning.					
3. Exercises on V- thread cutting operation.					
4. Exercise on Radial drilling (Drilling, Tapping, Reaming, Counter Sink, Boring and Chamfering).					
5. Exercise on surface machining using shaper.					
6. Exercise on Gear milling.					
7. Exercise on cylindrical grinding.					
Theory: 45 Hrs		Tutorial: --	Practical: 30 Hrs	Project:--	Total Hours: 75 Hrs
TEXT BOOKS					
1.	Hajra Choudhury & Nirjhar Roy S.K, Elements Of Workshop Technology – Volume I & II - Machine Tools, Media Propoters & Publisher Pvt. 2018.				
2.	Mikell P. Groover , Fundamentals of Modern Manufacturing Materials, Processes, and Systems Fifth Edition, Wiley. 2012				
REFERENCES					
1.	P N Rao , Manufacturing Technology Vol1, Tata McGraw-Hill Publishing Limited, 5th Edition.2018.				
2.	Serope Kalpajian, Steven R.Schmid, Manufacturing Engineering and Technology, Pearson Education, Eighth Edition Inc. 2018.				
3.	Mikell P Groover, “Principles of Modern Manufacturing” Wiley India Pvt Ltd. 2014.				
4.	P C Sharma, A Textbook of Manufacturing Technology- I, S Chand Publishing, 2007.				


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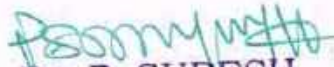
U23MC304		ELECTRICAL DRIVES AND CONTROL						L	T	P	J	C		
								3	0	0	0	3		
Course Outcomes														
At the end of the course, the student will be able to														
CO1:	Explain the concept of electrical drives and factors related to working.													
CO2:	Determine appropriate motor ratings for various drive applications, different starting and braking methods for induction motors.													
CO3:	Analyze various solid-state speed control techniques for DC drives.													
CO4:	Analyze and compare conventional and solid-state speed control techniques for AC drives.													
CO5:	Design speed control systems for special motor drives and evaluate their performance in various applications.													
Pre-requisite:														
Basic Electrical Engineering.														
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							3	2
CO2	3	3	2			2							3	2
CO3	3	3	3			2							3	2
CO4	3	3	3			2							3	2
CO5	3	3	3			2							3	2
Course Assessment methods														
Direct						Indirect								
CIE test I (9)			Assignment/seminar/Quiz (5)			Course end survey								
CIE test II (9)			Total CIE: 40 marks											
CIE test III (10)			Semester End Examination: 60 marks											
Objectives Test (7)														
Unit 01: INTRODUCTION OF ELECTRIC DRIVES										9 Hours				
Introduction – Parts of Electrical Drives- Types of Electric Drives- Factors Influencing the Choice of Electrical Drives – Fundamental Torque Equations – Speed Torque Conventions and Multiquadrant Operation – Nature & Classification of Load Torques - Closed-Loop Control of Drives –Thermal Model of motor for heating and cooling – Loading conditions and classes of duty														
Unit 02: STARTING AND SPEED CONTROL OF DRIVES										9 Hours				
Determination of motor rating for drive motors. Braking of Electrical motors –Induction Motor starters:														

Star-delta starter, Auto- Transformer Starter, Reactor starter, Rotor Resistance starter- Speed control of DC series and shunt motors – Armature and field control, Ward- Leonard control system applications.				
Unit 03: CONVENTIONAL AND SOLID-STATE SPEED CONTROL OF DC DRIVES				9 Hours
Single Phase and Three Phase Fully Controlled Converter: Principle of operation and waveforms of single phase and three phase fully controlled converter fed DC drive – Choppers Fed DC Motor Drive – Applications.				
Unit 04: CONVENTIONAL AND SOLID-STATE SPEED CONTROL OF AC DRIVES				9 Hours
Stator Control: control by AC voltage controllers - Variable frequency square wave VSI drives - PWM Drives - CSI drives - closed loop control. Rotor Control: Static rotor resistance control - Slip power recovery: Static Kramer drive -Static Scherbius drive.				
Unit 05: SPECIAL MOTOR DRIVES				9 Hours
Speed control of Stepper motors – Permanent magnet, Variable reluctance, Single and multi-stack configurations, Hybrid motor. Speed control of Switched reluctance motor – AC & DC Servo motors – Brushless DC motors				
Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours: 45 Hrs
TEXT BOOKS				
1.	G.K Dubey, "Fundamentals of Electrical Drives ", Narosa Publishing House, New Delhi, 2 nd Edition, 2002.			
2.	Boldea, Ion, and Syed A. Nasar, "Electric drives", CRC press, 2016.			
REFERENCES				
1.	M. D. Singh, "Power electronics", Tata McGraw-Hill Education, 2011.			
2.	Bimbhra, P.S., "Power Electronics", Second edition, Khanna Publishers, New Delhi 5 th Edition, 2015.			
3.	P.C.Sen "Principles of Electric Machines and Power Electronics" John Wiley & Sons, 2007.			
4.	Vedam Subramaniam "Electric drives", Tata McGraw-Hill.2001.			


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U23MC305	DIGITAL ELECTRONICS AND MICROPROCESSORS				L	T	P	J	C					
					3	0	2	0	4					
Course Outcomes														
At the end of the course, the student will be able to														
CO1:	Discuss the different number systems and implement Boolean functions using logic gates.													
CO2:	Design the combinational logic circuits.													
CO3:	Design the sequential circuits using flip-flops.													
CO4:	Analyze the architecture of the 8085 microprocessor with assembly language programming.													
CO5:	Analyze the peripheral interfacing and advanced microprocessors.													
Pre-requisite:														
Physics of 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			2	2	2			2	3	2
CO2	3	3	3	2			2	2	2			2	3	2
CO3	3	3	3	2			2	2	2			2	3	2
CO4	3	3	2	2			2	2	2			2	3	2
CO5	3	3	2	2			2	2	2			2	3	2
Course Assessment methods														
Direct										Indirect				
CIE test I (10) - Theory					Assignment / Quiz/ Seminar (5)					Course end survey				
CIE test II (10) - Theory					Total CIE: 50 marks									
CIE test III (10) - Theory					Semester End Examination: 50 marks									
CIE test IV(15) - Laboratory					[SEE- Theory (35 marks), Lab (15 marks)]									
Unit 01: BINARY SYSTEMS AND BOOLEAN ALGEBRA										9 Hours				
Number systems: Binary, Octal, Hexadecimal, BCD, Gray code, Excess 3 code – Binary arithmetic: 1's complements, 2's complements - Logic gates – Boolean laws and theorems – Minimization of Boolean expressions – SOP and POS forms – Karnaugh map minimization (up to 5 variables) – Realization of circuits using logic gates – Logic families: TTL, CMOS.														
Unit 02: COMBINATIONAL CIRCUITS										9 Hours				
Half and Full Adder, Half and Full Subtractor, Parallel Adder / Subtractor, Comparator, Parity generator and checker, Encoder, Decoder, Demultiplexer and Multiplexer – Implementation of combinational logic circuits using decoder, de-multiplexer and multiplexer.														

Unit 03: SEQUENTIAL CIRCUITS				9 Hours	
Flip flops: SR, JK, D, and T – Master-Slave flip-flop – Realization of one flip flop using other flip flops – Asynchronous Up / Down counter – Design of synchronous counters: Binary counters, Modulo-n counter, Decade counter, Ring counter and Johnson counter - Shift registers.					
Unit 04: 8085 MICROPROCESSOR				9 Hours	
8085 Architecture – Pin configuration - Instruction set – Addressing modes– Machine cycles and Timing diagrams – Interrupts - Memory interfacing - 8085 Assembly language programming.					
Unit 05: PERIPHERAL INTERFACING AND ADVANCED MICROPROCESSORS				9 Hours	
Peripheral ICs: 8255, 8279 and 8251 A – Architecture: ARM7, Intel i3 Processor, Intel i5 Processor.					
List of Experiments				30 Hours	
1. Verification of basic logic gates. (CO1)					
2. Design and Implementation of Combinational logic circuits for arithmetic operation (Adder, Subtractor). (CO2)					
3. Design and Implementation of MUX/DEMUX. (CO2)					
4. Design and Implementation of Encoder/Decoder. (CO2)					
5. Verification of Flipflops. (CO3)					
6. Design and Implementation of Counters. (CO3)					
7. Design and Implementation of Shift registers. (CO3)					
8. Assembly Language Programming of arithmetic operation using 8085 processor. (CO4)					
Theory: 45 Hrs		Tutorial: --	Practical: 30 Hrs	Project:--	Total Hours: 75 Hrs
TEXT BOOKS					
1.	M. Morris Mano and Michael D. Ciletti, "Digital Design: With an Introduction to the Verilog HDL, VHDL, and System Verilog", Pearson Education, 6 th edition, 2018.				
2.	Ramesh S. Gaonkar, "Microprocessor – Architecture, Programming and Applications with the 8085", Penram International Publisher, 6 th edition, 2013.				
REFERENCES					
1.	A. Anand Kumar, "Fundamentals of Digital Circuits", PHI India, 4th edition, 2016.				
2.	A.K.Ray & K.M Bhurchandi, "Advanced Microprocessor and Peripherals – Architecture, Programming and Interfacing", 3 rd Edition, Tata Mc Graw Hill, 2017				
3.	Charles H.Roth and Larry L. Kinney "Fundamentals of Logic Design", 7th Edition, Cengage Learning, 2014.				
4.	Donald D. Givone, "Digital Principles and Design", McGraw-Hill Education, 2016				


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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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U23GE302	ENVIRONMENT AND CLIMATE SCIENCE		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:	Describe the importance of the acute need for environmental awareness and discuss significant aspects of natural resources like forests, water and food resources.													
CO2:	Illustrate the concepts of an ecosystem and provide an overview of biodiversity and its conservation.													
CO3:	Analyze the causes, effects of various environmental pollution and their remedial measures.													
CO4:	Provide solutions to combat environmental issues like global warming, acid rain, ozone Layer depletion.													
CO5:	Analyze the effect of climate change in various sectors and their remedial measures.													
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	2				2	2							-
CO2	2	-					1							-
CO3	3	2				2	3							2
CO4	3	2				2	3							2
CO5	3	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: INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES												6 Hours		
Definition, Scope and Importance Forest Resources: - Use and over - exploitation, deforestation, Case Studies, Water Resources: - Use and Over-Utilization of Surface and ground water, Floods, Drought, Food Resources-Effects of Modern Agriculture, Fertilizer- Pesticide Problems-Role of an Individual in Conservation of Natural Resources.														
Unit 02: ECOSYSTEMS AND BIODIVERSITY												6 Hours		
Structure and Function of an Ecosystem-Energy Flow in the Ecosystem -Food Chains, Food Webs and Ecological Pyramids.														

Introduction to Biodiversity-Value of Biodiversity: Consumptive Use, Productive Use, Social, Ethical, Aesthetic and Option Values-India as a Mega-Diversity Nation-Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts – Endangered and Endemic Species of India-Conservation of Biodiversity: In-Situ and Ex-Situ conservation of Biodiversity.				
Unit 03: ENVIRONMENTAL POLLUTION				6 Hours
Definition – Causes, Effects and Control Measures of: - (A) Air Pollution (B) Water Pollution (C) Soil Pollution (D) Marine Pollution (E) Noise Pollution (F) Thermal Pollution, Solid Waste Management- Effects and Control Measures of Acid Rain – Role of an Individual in Prevention of Pollution.				
Unit 04: FUNDAMENTALS OF CLIMATE CHANGE				6 Hours
Sustainable Development-Climate Change- Causes and effects of Global Warming-Effect of global warming in food supply, plants, sea, coral reef, forest, agriculture, economy-Kyoto Protocol in reduction of greenhouse gases-Ozone Layer Depletion-mechanism, effects and control measures- Montreal Protocol to protect ozone layer depletion-Rainwater Harvesting-Effect of climate change due to air pollution Case study - CNG vehicles in Delhi.				
Unit 05: EFFECT OF CLIMATE CHANGE				6 Hours
Fungal diseases in forests and agricultural crops due to climatic fluctuations - Growing energy needs - effect of climate change due to non-renewable energy resources. Renewable energy resources in the prevention of climatic changes- Effect of climatic changes in ground water table, garments, monuments, buildings, consumption of energy, agriculture and in electric power sector - Carbon credit - carbon footprint - disaster management -Role of an individual to reduce climate change.				
Theory: 30	Tutorial: --	Practical: --	Project:--	Total Hours: 30 Hrs
TEXT BOOKS				
1.	Miller, T.G. Jr., "Environmental Science", Wadsworth Pub. Co. 2018.			
2.	Anubha Kaushik and Kaushik, "Environmental Science and Engineering" New Age International Publication, 4 th Multicolour Edition, New Delhi, 2014.			
REFERENCES				
1.	S. Radjarejesri et al., "Environmental Science" Sonaversity, Sona College of Technology, Salem, 2018.			
2.	Masters, G.M., "Introduction to Environmental Engineering and Science", Pearson Education Pvt., Ltd., 2 nd Edition, 2004.			
3.	Erach, B., "The Biodiversity of India", Mapin Publishing P.Ltd., Ahmedabad, India.			
4.	Erach Bharucha, "Textbook of Environmental Studies for Undergraduate Courses", 2005, University Grands Commission, Universities Press India Private Limited, Hyderguda, Hyderabad – 500029.			

14/6/25

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14.6.2025

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Head, Department of Sciences
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U23MC306	FLUID MECHANICS AND STRENGTH OF MATERIALS 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 and determine the coefficient of discharge of flow measuring instruments and evaluate the performance of the fluid machines.													
CO2:	Examine the mechanical properties of materials.													
CO3:	Solve the real time problems in the fluid flow and material strength analysis.													
Pre-requisite:														
Physics for Engineers														
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	2		2	3	2
CO2	3	3	3	3					3	2		2	3	2
CO3	3	3	3	3					3	3		3	3	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														
Part-A: Fluid Mechanics laboratory														
1. Determination of the coefficient of discharge of given Orifice meter / Venturi meter.														
2. Conducting experiments and drawing the characteristic curves of centrifugal pump / submersible pump.														
3. Conducting experiments and drawing the characteristic curves of reciprocating pump / Gear pump.														
4. Conducting experiments and drawing the characteristic curves of Pelton wheel.														
5. Conducting experiments and drawing the characteristics curves of Francis turbine.														
6. Conducting experiments and drawing the characteristic curves of Kaplan turbine.														
Part-B: Strength of Materials laboratory														
1. Brinell and Rockwell Hardness test on given specimen.														
2. Impact test by Charpy/Izod method.														
3. Deflection test on given beam.														

- | |
|--|
| 4. Tension test on MS Steel specimen. |
| 5. Double shear test on MS specimen. |
| 6. Tension / Compression test on spring. |

Total Hours: 45 Hrs



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U23MC307	ELECTRICAL DRIVES AND CONTROL 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:	Demonstrate various speed control methods for DC and induction motors.													
CO2:	Program advanced control systems using PLCs and DSPs for motor speed control.													
CO3:	Develop a real time application for electric drives.													
Pre-requisite:														
Basic Electrical Engineering Laboratory.														
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	2				3	2
CO2	3	3	3	3				3	2				3	2
CO3	3	3	3	3				3	2				3	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. Speed control of DC shunt motor (Armature, Field control).														
2. Speed control of three-phase slip ring Induction Motor.														
3. Study of the V/f control operation of induction motor drive.														
4. Stator Voltage control based speed control of three-phase induction motor.														
5. Speed control of Chopper controlled DC shunt motor.														
6. Speed control of PWM inverter-based induction motor drive.														
7. PLC-based Speed control of induction motor.														
8. Speed control of stepper motor.														
9. DSP controller-based speed control of induction motor drive.														
10. Speed control of controlled rectifier-based DC motor drive.														
11. Speed control of Brushless DC Motor.														
12. Speed Control of SRM motor.														
Total Hours: 45 Hrs														

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

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

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

CIE test I (15)	RTPS (10)
Quiz - I (5)	Record (10)
CIE test II (15)	Total CIE marks : 60 marks
Quiz - II (5)	Semester End Examination : 40 marks

Indirect

Course end survey

Demonstrating soft-skill capabilities with reference to the following topics:

- Attitude building
- Self-awareness and self-acceptance
- Dealing with criticism
- Innovation and creativity
- Problem solving and decision making
- Public speaking
- Group discussions.

1.Soft Skills

<p>2. Quantitative Aptitude and Logical Reasoning</p>	<p>Solving problems with reference to the following topics:</p> <ol style="list-style-type: none"> Vedic Mathematics Simplification Number Properties Averages Percentage Profit Loss and Discount Ratio & Mixtures Equation Problem on Ages Data interpretation 			
<p>3. Verbal Aptitude</p>	<p>Demonstrating English language skills with reference to the following topics:</p> <ol style="list-style-type: none"> Verbal analogy Tenses Prepositions Reading comprehension Choosing correct / incorrect sentences Describing pictures 			
<p>Theory : ---</p>	<p>Tutorial : ---</p>	<p>Practical : 30hrs</p>	<p>Project : ---</p>	<p>Total hours : 30hrs</p>

S. Anita
6/06/2025

Dr.S.Anita
Professor & Head
Department of Training





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Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester IV under Regulations 2023 (CBCS)
Branch: Mechatronics 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.	U23MC401	Theory of Machines	3	0	0	0	3	PC	45	T
3.	U23MC402	Thermal Systems Engineering	3	0	0	0	3	PC	45	T
4.	U23MC403	Microcontroller and Embedded Systems	3	0	0	2	4	PC	75	TP
5.	U23MC404	Sensors and Instrumentation	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.	U23MC405	Thermal Systems Engineering Laboratory	0	0	2	0	1	PC	30	L
9.	U23MC406	Sensors and Instrumentation Laboratory	0	0	2	0	1	PC	30	L
10.	U23CPL402	C Programming Laboratory	0	0	2	0	1	ES	30	L
11.	U23GE401	Soft Skills and Aptitude-II	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, P- Project


Approved By

			
Chairperson, Mechatronics Engineering BoS	Member Secretary, Academic Council	Dean-Academics	Chairperson, Academic Council & Principal
Dr.P.Suresh	Dr.R.Shivakumar	Dr.J.Akilandeswari	Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/Mechatronics Engineering, Fourth Semester B.E.MCT 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:																
<ul style="list-style-type: none"> Fundamentals of elementary algebra Fundamentals of calculus 								<ul style="list-style-type: none"> 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.	
		
B. E / B. TECH REGULATIONS 2023		HOD/ MATHEMATICS
BoS DATE: 14.06.2025		Dr. S. JAYABHARATHI ASSOCIATE PROFESSOR & HEAD DEPARTMENT OF MATHEMATICS, SONA COLLEGE OF TECHNOLOGY, SALEM-836 005. Tamilnadu. Ph: 0427 - 4099999.

U23MC401	THEORY OF 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:	Analyze the basic components and layout of linkages in the assembly of a system/ machine and learn about the mechanisms.
CO2:	Design and evaluate the performance of different cams and followers.
CO3:	Evaluate the toothed gearing and kinematics of gear trains and the effects of friction in motion transmission and in machine components.
CO4:	Interpret the force analysis of simple mechanisms.
CO5:	Design and evaluate the performance of rotating & reciprocating masses, and value the principles in mechanisms used for governing of machines.

Pre-requisite:

Engineering Mechanics - Statics & Dynamics

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	-	-	3	-	3	3	3
CO2	3	3	3	3	-	-	3	-	-	2	-	-	3	3
CO3	3	3	3	3	-	-	-	-	-	2	-	2	3	3
CO4	3	3	3	3	-	-	-	-	-	2	-	-	3	3
CO5	3	3	3	3	-	-	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: KINEMATICS OF MECHANISMS				9 Hours
Mechanisms: Definitions Link or Element, Kinematic Pairs, Kinematic chain, Degrees of Freedom, Grubler's Criterion (without derivation), Kinematic Chain, Mechanism, Structure, Mobility of Mechanism, Mechanical Advantage, Transmission angle. Inversions of Kinematic Chains: Four bar chain, Single slider and Double slider. Kinematics analysis in simple mechanisms: Velocity and acceleration polygons.				
Unit 02: KINEMATICS OF CAM				9 Hours
Cams: Types of cams, Types of followers. Displacement, Velocity & Acceleration Time curves for cam Profiles. Disc cam with Reciprocating Inline follower of Knife- Edge with Uniform velocity, Roller with SHM. Disc cam with Reciprocating Offset follower of Flat-face follower with SHM and uniform acceleration & retardation.				
Unit 03: GEARS AND GEAR TRAINS				9 Hours
Spur gear: law of toothed gearing, involute gearing, Interchangeable gears, Gear tooth action interference and undercutting. Gear trains: simple gear train, Compound gear train, Reverted gear train, Epicyclic gear train.				
Unit 04: FORCE ANALYSIS				9 Hours
Static force analysis: Static equilibrium. Equilibrium of two and three force members. Members with two forces and torque, free body diagrams. Static force analysis of four-bar mechanism and slider-crank mechanism with and without friction. Dynamics force analysis: Alembert's principle, Inertia force, inertia torque, Dynamic force analysis of reciprocating engine (Analytical method). Introduction to vibration.				
Unit 05: BALANCING OF MASSES				9 Hours
Balancing of Rotating Masses: Static and dynamic balancing, Balancing of several rotating masses by balancing masses in same plane and in different planes. Balancing of Reciprocating Masses: Balancing of Two cylinder uncoupled Locomotives.				
Theory: 45 Hrs	Tutorial: --	Practical: --	Project: --	Total Hours:45 Hrs
TEXT BOOKS				
1.	Ratan, S.S., "Theory of Machines", Tata McGraw Hill Publishing company Ltd., 5th Edition, 2019.			
2.	Sadhu Singh., "Theory of Machines: Kinematics and Dynamics", Pearson Education India, 3rd Edition 2013.			
3.	Thomas Bevan, "Theory of Machines", Pearson Education India, 1948, 3rd Edition, 2010.			
REFERENCES				
1.	R. S. Khurmi, J. K. Gupta. "Theory of Machines" S Chand, 14 th Edition 2020.			
2.	John J. Uicker, Gordon R. Pennock and Joseph E. Shigley, "Theory of Machines and Mechanisms", Oxford University Press, 4th Edition, 2014.			
3.	Rao J.S and Dukkipati R.V, "Mechanism and Machine Theory", New Age Intl., New Delhi, 2nd Edition, Reprint 2014.			
4.	Ambekar A. G, "Mechanism and machine theory", PHI Learning Pvt. Ltd, New Delhi, 2007.			

U23MC402	THERMAL SYSTEMS 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:	Enumerate the basic concepts and laws of thermodynamics.
CO2:	Explain the construction features and operating principles of S.I and C.I engines.
CO3:	Evaluate the refrigeration cycles and analyse the psychrometric processes based on human comfort.
CO4:	Examine the systems subjected to conduction and radiation modes of heat transfer.
CO5:	Correlate the convection and phase change heat transfer and analyse the heat exchangers.

Pre-requisite:

1. Physics for Engineers
2. Fluid Mechanics and Machinery

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	2
CO2	3	3	-	-	-	-	2	-	-	-	-	2	3	2
CO3	3	3	3	-	-	-	2	-	-	-	-	2	3	3
CO4	3	3	3	-	-	-	2	-	-	-	-	2	3	2
CO5	3	3	3	-	-	-	2	-	-	-	-	2	3	3

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: LAWS OF THERMODYNAMICS

9 Hours

Thermodynamic systems, properties, process, path, cycle – Zeroth law. First law – application to closed and open systems, Second Law of thermodynamics – Kelvin Plank and Clausius statements -entropy.

Unit 02: INTERNAL COMBUSTION ENGINES

9 Hours

Classification of I.C engines, four stroke and two stroke cycle engines, Comparison between SI and CI engine, Valve and port timing diagrams – super-charging - Ignition system and fuel injection system. Cooling and lubrication system. Engine tests – performance test (**Qualitative Treatment Only**).

Unit 03: REFRIGERATION AND AIR-CONDITIONING

9 Hours

Introduction- refrigerator & heat pump cycle, refrigerants, refrigerant properties, refrigerant selection, vapour compression refrigeration cycle, vapour absorption cycle.

Psychrometric properties, Psychrometric processes- Air-conditioning types, working principle.

Unit 04: CONDUCTION AND RADIATION

9 Hours

Introduction to heat transfer- modes of heat transfer, Fourier's law of conduction - one dimensional heat conduction through plain walls, composite walls, cylinder walls, spheres.

Heat transfer through radiation, Stefan Boltzman Law, black body radiation, grey body, shape factor, radiation shield.

Unit 05: CONVECTION AND HEAT EXCHANGER

9 Hours

Types of Convection- Forced Convection - External Flow, Flow over Plates- Internal Flow, flow through pipes- Introduction to free Convection- Introduction to Boiling, Pool Boiling, Flow Boiling- Condensation, film wise, drop wise condensation (**Qualitative Treatment Only**)).

Heat Exchangers - types - Overall Heat Transfer Coefficient - Fouling Factor - LMTD Method - Effectiveness - NTU Method - Introduction to compact heat exchangers.

Theory: 45 Hrs

Tutorial: --

Practical: --

Project: --

Total Hours:45 Hrs

TEXT BOOKS

1. Khurmi R. S, Gupta J. K, A Textbook of Thermal Engineering, S.Chand and company Ltd, New Delhi, 2020.
2. Rajput R.K, Thermal Engineering, 10th edition, Laxmi Publications (P) Ltd, New Delhi, 2018.

REFERENCES

1. Nag P. K, 'Engineering Thermodynamics' Tata McGraw-Hill, 6th Edition, 2017.
2. Michael A. Boles, Yunus A. Cengel, YunusCengel, "Thermodynamics", 8th Edition, Mc Graw-Hill India, 2017.
3. Holman.J.P., "Thermodynamics", 4th Edition. McGraw-Hill, 1988.
4. C. P. Kothandaraman, S. Domkundwar and A. V. Domkundwar, A course in Thermal Engineering, Dhanpatrai and Co. Pvt. Ltd., New Delhi, 2012.
5. R.C Sachdeva, Fundamentals of Engineering Heat and Mass Transfer, New Age International Publishers, New Delhi, 2017.




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U23MC403	MICROCONTROLLER AND EMBEDDED SYSTEMS					L	T	P	J	C				
						3	0	0	2	4				
Course Outcomes														
At the end of the course, the student will be able to														
CO1:	Analyze the architecture, instruction set and interrupts of 8051 microcontroller.													
CO2:	Explain the fundamentals of embedded system design with real time systems.													
CO3:	Select the communication devices and Buses for real time embedded design.													
CO4:	Explain the concepts of real time operating systems.													
CO5:	Develop the applications using embedded system.													
Pre-requisite:														
Digital Electronics and Microprocessors														
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	3	2
CO2	3	3	2	-	-	-	-	2	2	-	-	2	3	2
CO3	3	3	2	-	-	-	-	2	2	-	-	2	3	2
CO4	3	3	2	-	-	-	-	2	2	-	-	2	3	2
CO5	3	3	2	-	-	-	-	2	2	-	-	2	3	2
Course Assessment methods														
Direct											Indirect			
CIE test I (10) - Theory CIE test II (10) - Theory CIE test III (10) - Theory CIE test IV(10) - Project Attendance (5)					Assignment / Quiz/ Seminar (5) Total CIE: 50 marks Semester End Examination: 50 marks [SEE- Theory (35 marks), Project (15 marks)]						Course end survey			
Unit 01: MICROCONTROLLER											9 Hours			
Overview of microprocessor and microcontroller – Functions of ALU – 8051 microcontroller: Architecture – Memory organization – Instruction sets – Addressing modes – I/O ports – Timer and counter – Interrupts.														
Unit 02: EMBEDDED SYSTEM											9 Hours			
Introduction to embedded systems – Classification – Hardware and software units in a system – Design and architecture – Embedded system on chip – Design process – Design challenges – Introduction to Arduino – Arduino IDE – Developing code for writing to LED, buzzer, sensor and relay.														

Unit 03: COMMUNICATION DEVICES AND BUSES				9 Hours
Serial and parallel communication devices – Wireless devices – Timer and Counting devices – Distributed network embedded systems – Serial communication using I ² C, CAN and USB buses – Parallel communication using ISA, PCI and PCI/X buses - Wireless and mobile system protocol.				
Unit 04: REAL-TIME OPERATING SYSTEM CONCEPTS				9 Hours
RTOS's: Function and Types – Multiple process and threads – Tasks and data – Signals – Semaphores – Queues and mailboxes – Pipes – Timer and event function.				
Unit 05: DEVELOPMENT OF EMBEDDED SYSTEM APPLICATIONS				9 Hours
Case study of an automatic chocolate vending machine, developing digital camera, developing adaptive crucial system, developing smart card – Development of IoT applications.				
PROJECT				30 Hours
Theory: 45 Hrs	Tutorial: --	Practical: --	Project: 30 Hrs	Total Hours: 75 Hrs
TEXT BOOKS				
1.	Muhammed Ali Mazidi, Janice Gillispie Mazidi, Rolin D. McKinlay, "The 8051 Microcontroller and Embedded Systems: Using Assembly and C", Pearson Education, 2nd Edition, 2013.			
2.	Rajkamal," Embedded Systems: Architecture, Programming and Design", Tata McGraw Hill Publisher, 3rd Edition, 2017.			
REFERENCES				
1.	Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Naraig Manjikian."Computer Organization and Embedded Systems", Tata McGraw Hill Publisher, 6th Edition, 2022.			
2.	Wayne Wolf, "Computers as Components: Principles of Embedded Computing System Design (The Morgan Kaufmann Series in Computer Architecture and Design)", 5th Edition, 2022			
3.	Rajkamal," Embedded Systems: SoC, IoT, AI and Real-Time Systems", Tata McGraw Hill Publisher, 4th Edition, 2020.			
4.	Shibu K.V.," Introduction to Embedded Systems", Tata McGraw Hill Publisher, 2nd Edition, 2016.			


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Verified
 N.V.Z.

U23MC404	SENSORS AND INSTRUMENTATION	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:	Understand the concepts of sensors, measurements and its transduction principles.
CO2:	Utilize the sensors for measurement of motion, force and torque.
CO3:	Apply the sensors Measurement of Pressure, Temperature and Flow.
CO4:	Design appropriate signal conditioning circuits for different sensors.
CO5:	Develop the smart sensor systems for different applications.

Pre-requisite:

Basic Electrical Engineering

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	2	-	-	2	-	-	2	-	2	3	3
CO2	3	3	3	2	-	-	2	-	-	2	-	2	3	3
CO3	3	3	3	2	-	-	2	-	-	2	-	2	3	3
CO4	3	3	3	2	-	-	2	-	-	2	-	2	3	3
CO5	3	3	3	2	-	-	2	-	-	2	-	2	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

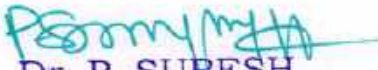
Unit 01: INTRODUCTION TO MEASUREMENTS AND TRANSDUCTION PRINCIPLES

9 Hours

Basic elements of instrumentation systems – Sensors and Transducers – Active and Passive Transducers - Errors – Calibration – standards - static and dynamic characteristics of instruments. Transduction principles: Resistive, Capacitive, Inductive, Piezoresistive, Piezoelectric, optical, Photovoltaic, Thermoelectric and Hall effect.

Unit 02: MEASUREMENT OF MOTION, FORCE AND TORQUE				9 Hours
Motion Measurement: Displacement measurement using different types of Proximity Sensors, Potentiometers, LVDT, RVDT, Optical Encoders. Speed measurement using encoders and tacho-generators, accelerometers, gyroscopes, magnetometers. Force and Torque Measurement: Strain gauge and piezo electric transducers for Force and Torque measurements, Load cells, Dynamometers.				
Unit 03: MEASUREMENT OF PRESSURE, TEMPERATURE AND FLOW				9 Hours
Pressure Measurement: Basics of Pressure measurement, Manometers, Bourdon gauges, elastic transducers – diaphragms and bellows, Vacuum Pressure measurement. Temperature Sensors: Thermometers, Metallic Sensors, RTD, Thermistors, Thermocouples, IC sensors. Flow Sensors: Venturi-tubes, Rotameters, Anemometers.				
Unit 04: SIGNAL CONDITIONING AND DATA ACQUISITION SYSTEMS				9 Hours
Amplifiers: Operational amplifiers, Instrumentation amplifiers. Filters: High and low pass filters. Signal conversion: ADC: Successive approximation register. DAC: Binary weighted resistor. Data acquisition system.				
Unit 05: DATA TRANSMISSION DEVICES AND SMART SENSORS SYSTEMS				9 Hours
Transmission and Storage: Cables, Buses, Fibre-optic, Radio-telemetry, storage and retrieval systems. Smart sensor system: Smart sensor – Self calibration – Wireless sensors - energy harvesting techniques – Web based instrumentation.				
Theory: 45 Hrs	Tutorial: --	Practical: --	Project:--	Total Hours:45 Hrs
TEXT BOOKS				
1.	A K Sawhney, A Course in Electrical and Electronic Measurements and Instrumentation, 2021, Dhanpat rai & Co.			
2.	Ernest. O. Doebelin, Danish N. Manik, Measurement Systems, 2019, 7th Edition, McGraw Hill Book co.			
REFERENCES				
1.	Bentley JP, Principles of measurement systems, 2012, Pearson Publishers.			
2.	John G. Webster, HalitEren, Measurement, Instrumentation, and Sensors Handbook, 2014, Second Edition, CRC Press.			
3.	D. V. S. Murty, Transducers and Instrumentation, 2010, PHI Learning Pvt. Ltd.			
4.	D. Patranabis, Principles of Industrial Instrumentation, 2010, Third Edition, Tata McGraw-Hill Pvt. Ltd.			
5.	Lin Y.L., Smart Sensors and systems, 1 st Edition, 2017, Springer Nature.			

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

Shanthi
20-12-2024

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M. Renuga
20/12/24

Dr. M. RENUGA,
Professor & Head,
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U23MC405	THERMAL SYSTEMS ENGINEERING LABOARTORY	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 valve/port opening and closing timing of four/two stroke I.C engines, assess the characteristics of fuel and lubricant and evaluate the performance of HVAC systems.
CO2:	Apply the principles of heat transfer modes to evaluate the given system and compare the performance of flow arrangements in a heat exchanger.
CO3:	Evaluate the real time problems in basic function of I.C engine, R&AC systems and heat exchanger.

Pre-requisite:

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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	3	3
CO2	3	3	3						3			2	3	3
CO3	3	3	3						3			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

List of Experiments

1. Construction of valve timing and port timing diagrams.
2. Determination of viscosity using Red Wood Viscometer.
3. Determination of flash point and fire point.
4. Determination of COP of a refrigeration system.
5. Determination of COP of an air conditioning system.
6. Determination of thermal conductivity of metal bar.
7. Determination of overall heat transfer coefficient for composite wall.
8. Analysis of the natural convection heat transfer from a vertical cylinder.
9. Determination of Stefan- Boltzman constant.
10. Evaluation of the effectiveness of parallel/ counter flow heat exchanger.

Total Hours: 30 Hrs


Dr. P. SURESH
Professor and Head

U23MC406	SENSORS AND INSTRUMENTATION LABOARTORY					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:	Characterise the sensors for different measurement applications.													
CO2:	Develop appropriate measurement systems for different physical quantities.													
CO3:	Design and construct experiments to measure, analyse and interpret the data.													
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	2	2				3			2	3	2
CO2	3	3	3	2	2				3			2	3	2
CO3	3	3	3	2					3			3	3	2
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. Measurement of linear displacement using LVDT.														
2. Measurement of force using strain gauge.														
3. Measurement of torque using torque measurement set-up.														
4. Measurement of pressure using pressure measurement set-up.														
5. Measurement of temperature using thermistor.														
6. Study the characteristics of RTD for temperature measurement.														
7. Vibration and acceleration measurements using piezo-electric sensor.														
8. Measurement of flow using flow measurement set-up.														
9. Object detection using inductive (PNP/NPN) and capacitive (PNP/NPN) proximity sensors.														
10. Study on data acquisition systems and interfacing sensors with computer.														
Total Hours: 30 Hrs.														

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	PO9	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
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Dr. B. SATHIYABHAMA, B.E., M.Tech., Ph.D.
 PROFESSOR & HEAD,
 Dept. of Computer Science and Engineering

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						
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						

