PAAVAI ENGINEERING COLLEGE, NAMAKKAL – 637018

(AUTONOMOUS)

B.E. MECHANICAL ENGINEERING

REGULATIONS 2023

(CHOICE BASED CREDIT SYSTEM)

(Applicable to the students admitted during the academic year 2023 – 2024 onwards)

CURRICULUM

SEMESTER - I

S.No	Category	Course Code	Course Title	L	T	P	C
1			Induction Programme				
Theory							
2	HS	GE23101	தமிழர்மரபு/Heritage of Tamils	1	0	0	1
3	BS	MA23101	Matrices and Calculus	3	1	0	4
4	BS	PH23103	Materials Science	3	0	0	3
5	ES	ME23101	Engineering Graphics	2	0	2	3
6	ES	CS23101	Problem Solving and Python Programming	3	0	0	3
Theory with Laboratory							
7	HS	EN23101	Communication Skills for Engineers I	2	0	2	3
Practical							
8	BS	PH23106	Materials Science Laboratory	0	0	2	1
9	ES	GE23103	Civil and Mechanical Engineering Practices Laboratory	0	0	2	1
10	ES	CS23103	Problem Solving and Python Programming Laboratory	0	0	4	2
TOTAL				**14**	**1**	**12**	**21**

SEMESTER – II

S.No	Category	Course Code	Course Title	L	T	P	C
Theory							
1	HS	GE23201	தமிழரும்தொழில்நுட்பமும்/ Tamils and Technology	1	0	0	1
2	BS	MA23201	Complex Variables and Differential Equations	3	1	0	4
3	BS	CH23202	Chemistry for Engineers	3	0	0	3
4	ES	ME23202	Engineering Mechanics	3	0	0	3
5	ES	EE23201	Basic Electrical and Electronics Engineering	3	0	0	3
Theory with Laboratory							
6	HS	EN23201	Communication Skills for Engineers II	2	0	2	3
Practical							
7	BS	CH23204	Chemistry Laboratory	0	0	2	1
8	ES	GE23202	Electrical and Electronics Engineering Practices Laboratory	0	0	2	1
9	ES	ME23203	Computer Aided Drafting Laboratory	0	0	2	1
TOTAL				**15**	**1**	**8**	**20**

GE23101	தமிழர் மரபு/ HERITAGE OF TAMILS	L	T	P	C
	(அனைத்து பொறியியல் மற்றும் தொழில்நுட்பப் பாடப்பிரிவுகளுக்கும்)	1	0	0	1

பாடத்திட்டத்தின் நோக்கங்கள்

மாணவர்களுக்கு பயன்படும் வகையில்

1	திராவிட மொழிக் குடும்பத்தையும் தமிழ் செம்மொழியின் சிறப்புகள், திருக்குறளின் மேலாண்மைக் கருத்துகள். பக்தி இலக்கியங்கள், நவீன இலக்கிய வளர்ச்சிகளையும் மாணவர்களுக்கு புரிந்து கொள்ள செய்தல்
2	பழங்குடியினரின் கைவினைப் பொருட்கள், இசைக்கருவிகள், திருவள்ளுவரின் சிலையின் தொழில்நுட்பம், நடுகல் வரலாறு பற்றிய விழிப்புணர்வை ஏற்படுத்துதல்.
3	நாட்டுப்புறக் கலைகளில் நிகழ்த்தும் கலை, நிகழ்த்தாத கலைகள், தமிழர்களின் பாரம்பரிய விளையாட்டுகளை பற்றிய அறிவியலை மாணவர்களுக்கு அறிய செய்தல்.
4	சங்ககாலத் தமிழர்களின் அகத்திணை புறத்திணைக் கோட்பாடுகளையும், சங்ககால தமிழர்களின் எழுத்தறிவு, நகரங்கள், துறைமுகங்கள் ஏற்றுமதி - இறக்குமதி மற்றும் சோழர்களின் வெற்றிகளைப் புரிந்துக் கொள்ள செய்தல்
5	இந்திய விடுதலைப் போரில் தமிழர்களின் பங்களிப்பு, சுயமரியாதை இயக்கம், சித்த மருத்துவம், அச்சு கலைகளின் வரலாறுகளை புரிந்துக் கொள்ள செய்தல்.

அலகு 1	மொழி மற்றும் இலக்கியம்	3

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 நவீன ஓவியங்கள் வரை	3

நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக் கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம், - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு 3	நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்	3

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியன் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு 4	தமிழர்களின் திணைக் கோட்பாடுகள்	3

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அறம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்ககால நகரங்களும் துறைமுகங்களும் - சங்க காலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு 5	இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு	3

இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில் சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்கள் அச்சு வரலாறு.

	மொத்த பாடவேளைகள்	15

பாடநூல்:
ஆ.பூபாலன், தமிழர் மரபு, வி.ஆர்.பி . பதிப்பகம் பிரைவேட் லிட் 2022
பார்வை நூல்கள்:
தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே.பிள்ளை. (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
கணினித் தமிழ் – முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்).
கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு).
பொருநை – ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு).

கற்றல் விளைவுகள்:		BT Mapped (Highest Level)
	மாணவர்களின் கற்றல் விளைவுகளின் மதிப்பீடுகள்	
CO1	தமிழ் மொழி மற்றும் இலக்கிய புரிதலோடு மதிப்புமிக்க கருத்துக்களை விளக்க முடியும்.	Understanding (L2)
CO2	தமிழர்களின் சிற்பம், ஓவியம் பழங்குடியினர் கைவினை கலைகள், வழிபாட்டு முறைகள் பற்றி விளக்க முடியும்.	Understanding (L2)
CO3	தமிழர்களின் விளையாட்டுகள் மற்றும் தற்காப்பு கலைகள் குறித்து சுருக்கமாக கூற முடியும்.	Understanding (L2)
CO4	தமிழர்கள் வகுத்த திணைக்கோட்பாடுகள் பற்றி விளக்க முடியும்.	Understanding (L2)
CO5	இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு பற்றி விளக்க முடியும்.	Understanding (L2)

CO PO MAPPING Mapping of Course Outcomes with Programme Outcomes :
(1,2,3 indicates the strength of correlation) 3 – Strong , 2 – Medium , 1 – Weak

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

GE23101	HERITAGE OF TAMILS/ தமிழர் மரபு	L	T	P	C
	(Common to All Engineering and Technology Branches)	1	0	0	1

COURSE OBJECTIVES

To enable the students to

1	understand the human values and rights in Tamil Literature
2	learn the art and culture being practiced by the people of Tamil Nadu
3	understand various games, dance and folklore practices by the people of Tamil Nadu
4	learn the concepts of Sangam literature and the Bravery of Kings
5	learn the history of freedom fighters, vedic herbs and developments in the style.

UNITI	Language and Literature	3

Language Families in India-Dravidian Languages—Tamil as a Classical Language-Classical Literature in Tamil—Secular Nature of Sangam Literature—Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact Of Buddhism & Jainism in Tamil land - Bhakti Literature Azhwars and Nayanmars - Forms of Minor Poetry - Development of Modern Literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

UNITII	Heritage-Rock Art Paintings to Modern Art – Sculpture	3

Hero Stone to Modern Sculpture - Bronze Icons - Tribes and their handicrafts - Art of Temple Car Making - Massive Terracotta Sculptures, Village Deities, Thiruvalluvar Statue at Kanyakumari, Making of Musical Instruments - Mridangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNITIII	Folk and Martial Arts	3

Therukoothu– Karagattam- Villu Pattu - Kaniyan Koothu –Oyillattam - Leather Puppetry– Silambattam–Valari- Tiger dance- Sports and games of tamils.

UNITIV	Thinai Concept of Tamils	3

Flora and fauna of Tamils & Aham And Puram concept from Tholkappiyam and Sangam Literature-Aram Concept of Tamils -Education and Literacy During Sangam age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

UNITV	Contribution of Tamils to Indian National Movement and Indian Culture	3

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

Total Periods:15

TEXT BOOK:	
1.	S.Muthuramalingam,M.Saravanakumar,Heritage of Tamils,Yes Dee Publishing Pvt Ltd,2023.
REFERENCES:	
1.	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukarasu) (Published by : International Institute of Tamil Studies).
2.	The Contribution of Tamil of the Tamils to Indian Culture, Dr.M.Valarmathi, Puplishedby International Institute of Tamil Studies.
3.	Keeladi'Sangam City Civilzation on the Banks of River Vaigai; (Jointly Published by:Department of Archaeology & Tamilnadu Text Book and Educational Services Corporation, Tamilnadu).

COURSEOUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Know about the language families in India, impact of religions and the contribution of Bharathiyar and Bharathidasan.	Understanding (L2)
CO2	Observe the growth of Sculpture, making of Musical Instruments and the Role of Temples in socio and economic lives.	Understanding (L2)
CO3	Understand the significance of Folklore and Martial Arts	Understanding (L2)
CO4	Learn the Sangam Literature, Sangam Age and Overseas Conquest of Cholas	Understanding (L2)
CO5	Understand the contribution of Tamils to Indian freedom struggle, role of Siddha medicine and print history of Tamil books.	Understanding (L2)

CO PO MAPPING

Mapping of Course Outcomes with Programme Outcomes : (1,2,3 indicates the strength of correlation) 3 – Strong , 2 – Medium , 1 – Weak														
CO's	**PO's**												**PSO's**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO1	-	-	-	-	-	3	3	2	2	-	3	-	1	1
CO2	-	-	-	-	-	3	3	2	2	-	3	-	-	1
CO3	-	-	-	-	-	3	3	2	2	-	3	-	-	-
CO4	-	-	-	-	-	3	3	2	2	-	3	-	-	-
CO5	-	-	-	-	-	3	3	2	2	-	3	-	1	-

MA23101 MATRICES AND CALCULUS 3 1 0 4

(COMMON TO ALL BRANCHES)

OBJECTIVES

To enable the students to

- understand the concepts of Eigen values and Eigen vectors of real matrices and its applications in the process of diagonalization of real symmetric matrices.
- study applications of Rolle's and Mean Value Theorems and also to understand the concept of maxima and minima using derivatives.
- learn the concept of partial differentiation and its applications to maxima and minima of functions of two or more variables.
- develop a thorough knowledge of definite and indefinite integrals
- learn the concepts of multiple integrals and their applications

UNIT I MATRICES 12

Characteristic equation; Eigenvalues and Eigenvectors of a real matrix, Properties; Statement and applications of Cayley-Hamilton theorem; Diagonalisation of a real symmetric matrix by Similarity and Orthogonal transformation; Quadratic form - Reduction of quadratic form to canonical form by orthogonal transformation – Applications: Stretching of an elastic membrane.

UNIT II DIFFERENTIAL CALCULUS 12

Limits and Continuity, properties of limit and classification of discontinuities; Tangent problems; Differentiation – Standard forms, Successive differentiation and Leibnitz theorem, Mean value theorem, Rolle's theorem – Applications : Maxima and Minima of functions of one variable.

UNIT III FUNCTIONS OF SEVERAL VARIABLES 12

Partial derivatives; Euler's theorem for homogenous functions; Total derivatives; Differentiation of implicit functions – Jacobians, Taylor's expansion – Applications: Maxima and minima of functions of two variables and Lagrange's method of undetermined multipliers.

UNIT IV INTEGRAL CALCULUS 12

Definite and indefinite integrals; Properties of integrals; Methods of integration – Substitution method, Integration by parts, Bernoulli's formula – Reduction formulae involving exponential and trigonometric functions.

UNIT V MULTIPLE INTEGRALS 12

Double integration – Cartesian and polar coordinates, Change of order of integration, Change of Variables; Triple integration in Cartesian co-ordinates – Area as double integral – Volume as triple integral.

TOTAL PERIODS: 60

OUTCOMES

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

- determine eigen values and eigen vectors and diagonalize real symmetric matrices.
- classify various types of functions involved in engineering fields, their differentiation techniques and applications
- find partial derivatives and apply the same to find maxima and minima of two or more variables
- implement different methods of integration used in engineering problems
- execute suitable integration techniques to calculate surface areas and volumes.

TEXT BOOKS

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, 42nd Edition, New Delhi, 2017.
2. T. Veerarajan., "Engineering Mathematics", 3rd Edition, Tata McGraw Hill, 2011.

REFERENCE BOOKS

1. Erwin Kreyszig., "Advanced Engineering Mathematics" 10th Edition, Wiley Publications, New Delhi, 2016.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
3. Dass, H.K., and Er. Rajnish Verma, "Higher Engineering Mathematics", S. Chand Private Ltd, 2011.
4. Glyn James, "Advanced Modern Engineering Mathematics", 3rd Edition, Pearson Education, 2012.
5. James Stewart, "Calculus", 8th Edition, Cengage Learning, USA, 2015 reprint.

CO/PO Mapping
(3/2/1 indicates strength of correlation) 3- Strong, 2-Medium, 1-Weak

CO	Programmes Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO1 1	PO12	PSO1	PSO2
CO1	3	3	3	3	-	-	-	-	-	-	-	3	2	3
CO2	3	3	3	3	-	-	-	-	-	-	-	3	2	3
CO3	3	3	3	3	-	-	-	-	-	-	-	3	2	3
CO4	3	3	3	3	-	-	-	-	-	-	-	3	2	3
CO5	3	3	3	3	-	-	-	-	-	-	-	3	2	3

PH23103	MATERIAL SCIENCE	3	0	0	3
	(COMMON TO AERO, CIVIL, MECH, MCT)				

COURSE OBJECTIVES

To enable the students to

1	understand the basic concepts of properties of matter.
2	identify the different types of crystal structures and crystal growth techniques.
3	acquire the knowledge in the areas of sound and its applications.
4	recognize the properties of nanoparticles and their uses.
5	learn the common characterization methods to determine the properties of materials.

UNIT I PROPERTIES OF MATTER 9

Hooke's Law - Bending of beams - Young's modulus: Cantilever - uniform bending: Theory and Experiment - Young's modulus by non - uniform bending: Theory and Experiment; Twisting couple on a cylinder - Torsional pendulum - Rigidity modulus and moment of inertia (without mass).

UNIT II CRYSTALLINE SOLIDS 9

Crystalline solids and amorphous solids; Lattice points - Space lattice - unit cell and lattice parameters - seven crystal systems with 14 Bravais lattices, atomic radius, Co - ordination number and packing factor of SC, BCC, FCC - Miller indices, inter planer spacing of Cubic crystal system.

UNIT III ACOUSTICS AND ULTRASONICS 9

Acoustics: Classification of sound - Characteristics of sound - Reverberation and reverberation time - Factors affecting acoustics of buildings and the remedies.

Ultrasonics: Properties of ultrasonic waves - Generation of ultrasonic waves – Magnetostriction generator and Piezoelectric generator - non-destructive testing - Flaw detection.

UNIT IV NANOMATERIAL PROPERTIES AND NANOCOMPOSITES 9

Nanomaterial properties: Origin of Nanotechnology - Influence of Nano structuring on Mechanical, optical, electronic, magnetic and chemical properties - Quantum confinement - Quantum structures -0D,1D,2D,3D- Surface to Volume Ratio.

Nanocomposites: Definition - Properties - classification - Ceramic nanocomposite - Metal nanocomposites - graphene nanocomposites - Applications.

UNIT V PREPARATION AND CHARACTERIZATION TECHNIQUES 9

Preparation: Bottom - up Fabrication: Sol-gel Process, Co-precipitation – Hydrothermal; Top-down approach: Ball milling process - Laser ablation method - Sputtering method.

Characterization Techniques: Scanning Electron Microscope (SEM) - Transmission Electron Microscope (TEM) - Scanning Tunneling Microscope (STM) - Atomic Force Microscope (AFM)- Elemental Analysis (EDAX).		
	TOTAL PERIODS	**45**

COURSE OUTCOMES		
At the end of the course, the students will be able to		**BT Mapped** (Highest Level)
CO1	determine the elastic properties of the materials for specific applications.	Apply (K3)
CO2	interpret the basics of crystals and its structures for identifing the properties of materials.	Understanding (K2)
CO3	express the fundamental knowledge of sounds and their applications in engineering and medical field.	Apply (K3)
CO4	review the different quantum structures and nanocomposites to understand the properties of low dimensional materials.	Understanding (K2)
CO5	discuss material synthesis and their morphology for engineering applications.	Apply (K3)

TEXT BOOKS

1. A.Marikani, Material Science, PHI, New Delhi, 2017.
2. Verma, N.K, Physics for Engineers, PHI learning Private Limited, 2017.

REFERENCE BOOKS

1. Gopala Rangarajan, Materials Science, Tata McGraw - Hill Publishing Private Company Limited, 2006.
2. Umesh K Mishra & Jasprit Singh, Semiconductor Device Physics and Design, Springer,2008.
3. P K Palanisamy, Engineering Physics II, SciTech Publications, 2009.
4. Charles Kittel, Paul McEuen, Introduction to Solid State Physics, John Wiley & Sons, Limited, 2018.

CO PO MAPPING

Mapping of Course Outcomes with Programme Outcomes :
(1,2,3 indicates the strength of correlation) 3 – Strong , 2 – Medium , 1 – Weak

	PO's												PSO's	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	2	2	-	-	-	-	-	2	2	-	1	-	-
CO2	3	2	2	-	-	-	-	-	2	2	-	1	-	-
CO3	3	2	2	-	-	-	-	-	2	2	-	1	-	-
CO4	3	2	2	1	-	-	-	-	2	2	-	1	1	-
CO5	3	2	2	-	-	-	-	-	2	2	-	1	-	1

ME23101 ENGINEERING GRAPHICS 2 0 2 3

(Common to All Branches)

COURSE OBJECTIVES

To enable the students to

- familiarize concepts like dimensioning, conventions and standards related to engineering drawing and imbibe knowledge on plane curves and projection of points.
- understand on projection of lines and plane surfaces
- develop the visualization skills for understanding the projection of solids
- illustrate on sectioning of solids and development of surfaces for simple solids
- acquire knowledge in the fundamentals of Internet of Things and Industrial Internet of Things

CONCEPTS AND CONVENTIONS (Not for Examination) 2

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

UNIT I PLANE CURVES AND PROJECTION OF POINTS 8

Basic Geometrical constructions, Curves used in Engineering Practices: Conics – Construction of Ellipse, Parabola and Hyperbola by eccentricity method – Construction of cycloid – Construction of involutes of square and circle – Construction of spiral curve – Drawing of tangents and normal to the above curves - Projection of points in four quadrants.

UNIT II PROJECTION OF LINES AND PLANES 9

Projection of straight lines (only First angle projections) inclined to both the HP & VP -Determination of true lengths and true inclinations by Change of Position method. Projection of Planes (Square, Pentagon, Hexagon and Circle) inclined to both the principal planes by rotating object method.

UNIT III PROJECTION OF SOLIDS 8

Projection of simple solids like Square Prism, Pentagonal Prism, Hexagonal Prism, Square Pyramid, Pentagonal Pyramid, Hexagonal Pyramid, Cylinder and Cone when the axis is inclined to one of the principal planes (either horizontal or vertical plane).

UNIT IV SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES 9

Sectioning of Prisms (Square, Pentagon, Hexagon) and Pyramids (Square, Pentagon, Hexagon), cylinder and cone in simple vertical position when the cutting plane is inclined to one of the principal planes (HP & VP) and perpendicular to the other – obtaining true shape of section; Development of lateral surfaces of simple and sectioned solids mentioned above.

UNIT V ORTHOGRAPHIC AND ISOMETRIC PROJECTIONS 9

Representation of Three-dimensional objects –Need for importance of multiple views and their placement – First angle projection – layout views –developing visualization skills through multiple views from pictorial views of objects; Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids -Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions - Conversion of Isometric view to orthographic projection.

TOTAL PERIODS: 45

COURSE OUTCOMES

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

- draw the basic curves and projection of points in four quadrants
- delineate the projections of straight lines and plane surfaces in given quadrant
- comprehend the projection of solids in various positions in first quadrant
- generate the sectioning of solids and development of surfaces
- interpret orthographic and isometric projection of simple solids

TEXT BOOKS

1. Natrajan K.V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2016.
2. Prabhakaran.S, Makesh.M, Subburam.V, "Engineering Graphics", Maruthi Publishers, Chennai, 2018.

REFERENCES

1. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Stores, Bangalore, 2007.
2. 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.
3. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson, 2nd Edition, 2009
4. N.D.Bhatt., "Engineering Drawing", Charotar Publishing House Pvt Ltd, Fifty third edition, 2014.

CO - PO Mapping

Mapping of Course Outcomes with Programme Outcomes:

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

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	-	2	-	-	-	-	2	-	2	2	2
CO2	3	2	2	-	2	-	-	-	-	2	-	2	2	2
CO3	3	2	2	-	2	-	-	-	-	2	-	2	2	2
CO4	3	2	2	-	2	-	-	-	-	2	-	2	2	2
CO5	3	2	2	-	2	-	-	-	-	2	-	2	2	2

CS23101 PROBLEM SOLVING AND PYTHON PROGRAMMING 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- know the basics of problem solving and number systems
- know about the expressions and control statements in python programs.
- develop programs with strings and functions
- understand the concepts class, objects and lists.
- acquire knowledge data structures and modules.

UNIT I PROBLEM SOLVING AND NUMBER SYSTEMS 9

Need for computer languages. Algorithms - Building blocks of algorithms (statements, state, control flow, functions); notation (pseudo code, flow chart, and programming language); algorithmic problem solving - simple strategies for developing algorithms (iteration, recursion). Number Systems - Binary, Octal, Decimal, Hexadecimal numbers. Introduction to Python - Python interpreter, Modes: Interactive mode and Script mode

UNIT II EXPRESSION AND CONTROL STATEMENTS 9

Tokens in python – Variables, Data Types, Operators, Constants, Special Symbols: Input / Output statements - I/O using built-in functions, Type Conversion (implicit and explicit conversions). Control Statements - Conditional (if) - alternative (if - else), chained conditional (if- elif - else), Iteration (while, for), break, continue.

UNIT III FUNCTIONS AND STRINGS 9

Functions - Types of functions -in built functions, user defined functions, positional arguments, default arguments, keyword arguments, return values, recursion functions; Strings handling mechanism in python – string assignments - string slices - string functions.

UNIT IV CLASS, OBJECTS AND LISTS 9

Classes-Defining Class, The Self Parameter and Adding Methods to a class: The _init_ Method; Introduction to data structures – Lists, Introduction Creating List, Accessing the Elements of a list, Negative Indices , List slicing, Python In build Functions for Lists, The List operator, List Methods.

UNIT V TUPLES, SETS, DICTIONARIES AND MODULES 9

Tuples - tuple assignment, tuple as return value; Set – set operations, set methods; Dictionaries - operations and methods; modules - Introduction to modules – creating own modules- importing modules; Working with File- Error handling in python.

TOTAL PERIODS: 45

COURSE OUTCOMES

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

- develop algorithmic solutions to simple computational problems.
- develop python programs with expressions and also read, write, execute simple Python programs.
- write python programs blocks of code that would be executed by using conditions.
- use class object concept for reuse program elements and write functions.
- Signifies compound data using Python lists, tuple, set, dictionaries and packages.

TEXT BOOKS

1. Ashok Namdev kamthane, Amit Ashok kamthane, —Programming and Problem Solving with Python, Second Edition McGraw-Hill, 2022.
2. Martin C. Brown, ``The Complete Reference -Python'', McGraw-Hill 2018.

REFERENCES

1. R.Shankar, M.Senthil, K.Palani, " Fundamentals of computing and Programming", Sri Krishna Publications,2008
2. Robert Sedge wick, Kevin Wayne, Robert Dondero,Introduction to Programming in Python: An Inter- disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
3. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python3.2, Network Theory Ltd., 2011.
4. Timothy A.Budd,—Exploring Python), Mc-Graw Hill Education (India) Private Ltd.,2015.

CO/PO Mapping

Mapping of Course Out comes with Programme Out come (1,2,3 indicates the strength of correlation) (1-LOW;2-MEDIUM;3-HIGH)														
CO	Programme Outcome(POs)												Programme Specific Outcome(PSO)	
	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	-	2	1	-	-	-	-	-	1	2	1
CO3	3	2	1	-	2	1	-	-	-	-	-	1	2	1
CO4	3	2	1	-	2	1	-	-	-	-	-	1	2	1
CO5	3	2	1	1	2	1	-	-	-	-	-	1	2	1

EN23101	COMMUNICATIONSKILLS FOR ENGINEERS I	2	0	2	3

(Common to All Branches)

COURSE OBJECTIVES

To enable students to

- gain knowledge about the significance of vocabulary and syntax.
- develop a strong base in the use of English language.
- enhance the reading skill soft the students to communicate confidently.
- improve their basic speaking skills in delivering impromptu talks and confidently participating in conversations
- draft effective essays and emails for effective communication.

UNIT I	6

Language focus–Word Formation –Prefix and suffix, Synonyms, Antonyms; Reading - Sub-skills of Reading, Skimming, Scanning, inferring; Writing –Description of Gadgets & Process; Sounds in English.

UNIT II	6

Language focus - Spelling – Homophones - Homonyms – Words used as Nouns and Verbs – Comparative Adjectives; Reading - Extensive reading,; Letter writing–invitation; acceptance & declining letter- simple expressions.

UNIT III	6

Language focus – Phrasal verbs - Acronyms - Abbreviations - Tenses; Use of Adjectives & Adverbs; Reading - Note Making; Writing – Paragraph Writing –compare and contrast, and Analytical. Discourse markers, travelogue.

UNIT IV	6

Language focus - Cause and Effect Expressions - Subject Verb Agreement - Wh questions - Yes or No questions; Reading- Developing analytical skills, Deductive and inductive reasoning; - Writing - Instructions, Minutes of meeting.

UNIT V	6

Language focus - Articles - Sentence Structures -Single line definition; Reading -, Interpreting visual information, Writing-- Flow Chart, Pie Chart, Bar Chart and Tabular column.

TOTAL PERIODS:	30

List of Exercises

1. Self-Introduction
2. JAM
3. Narration of a story or an incident

4. My day
5. Short speeches by adopting the speakers of your choice
6. Short speeches by adopting the speakers of your choice
7. Presentation Skills

	PERIODS:	**30**
	TOTALPERIODS:	**60**

COURSE OUTCOMES

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

- develop their vocabulary and grammar and express their ideas both in speaking and writing.
- comprehend humanistic values to develop peace in the world.
- develop their writing skills with the sufficient vocabulary
- effectively Interpret and analyze the given text with the proper grammatical patterns, besides, use cohesive devices in professional communication either written or spoken.
- write the creative topics with the flair of language skills.
- Write minutes, essays and letters with out errors.

TEXT BOOKS

1. Sharma, S.P. Moral and Value Education; Principles and Practices, Kanishka publishers, 2013.
2. Mahalakshmi.S.N.English and Workbook for Engineers. V.K.Publications, Sivakasi.2017

REFERENCES

- Raman, Meenakshi & Sangeetha Sharma. Technical Communication: Principles and practice. Oxford University Press, NewDelhi.2011.
- Rizvi,Ashraf.M. Effective Technical Communication. Tata McGraw-Hill, NewDelhi.2005.
- Rutherford, Andrea.J Basic Communication Skills for Technology. Pearson,NewDelhi,2001.

CO/PO MAPPING :

CO/PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

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

PH23106 **MATERIAL SCIENCE LABORATORY** 0 0 2 1

(COMMON TO AERO, CIVIL, MECH, MCT)

COURSE OBJECTIVES

To enable the students to

- study the maximum stress applied to the given beam by uniform and non-uniform bending method.
- learn the concept of moment of inertia and rigidity modulus using torsional pendulum.
- demonstrate the velocity and compressibility of the various liquids.
- understand the interaction of light with materials and learn about interference.

LIST OF EXPERIMENTS

1. Determination of Young's modulus by non- uniform bending method.
2. Determination of Young's modulus by uniform bending method.
3. Determination of rigidity modulus - Torsion pendulum.
4. Determination of velocity of sound and compressibility of liquid - Ultrasonic interferometer.
5. To determine the work function and threshold frequency using Einstein's Photoelectric effect.
6. Determine the thickness of the given specimen by using air wedge method.
7. Determination of solar cell characteristics.

TOTAL PERIODS: 30

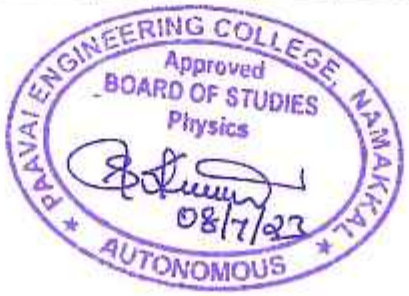
COURSE OUTCOMES

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

- evaluate the Young's modulus and rigidity modulus of the given material.
- find the moment of inertia and rigidity modulus of the given material.
- calculate the velocity of ultrasonic waves,compressibility of the given liquid.
- determine the thickness, work function and minimum frequency of the material.

Mapping of Course Outcomes with Programme Outcomes
(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programmes Outcomes (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	-	2	2	-	-	-	2	3	1	-
CO2	3	3	2	2	-	2	2	-	-	-	2	3	-	-
CO3	3	3	2	2	-	2	2	-	-	-	2	3	-	1
CO4	3	2	2	2	-	2	2	-	-	-	2	3	-	-



GE23103 **CIVIL AND MECHANICAL ENGINEERING PRACTICES LABORATORY** **0 0 2 1**

COURSE OBJECTIVES

To enable the students to

- develop their knowledge in basic civil engineering practices such as plumbing, carpentry and its tool usages.
- practice joints by sawing, planning and cutting.
- develop their knowledge in basic mechanical engineering practices such as welding, sheet metal work and its tool usages.
- practice some of mechanical basics such as, fitting, drilling and basic machining.

I. CIVIL ENGINEERING PRACTICE

PLUMBING WORKS

Hands-on-training: Exercise for plumbing works.

1. Single Tap Connection with Shower.
2. Multi Tap Connection for a house plumbing.
3. Connection of two Galvanized Iron pipes.

CARPENTRY WORKS

Hands-on-training: Exercise for carpentry works.

1. Making of T- Joint for the given dimensions.
2. Making of Mortise and Tenon Joint for the given dimensions.
3. Making of Dovetail Joint for the given dimensions.

II. MECHANICAL ENGINEERING PRACTICE

LIST OF EXPERIMENTS:

1. Preparation of Arc Welding of Butt Joints, Lap Joints and Tee-Joints
2. Square Tray, Rectangular Tray and Funnel
3. Vee Fitting, Square Fitting
4. Simple Turning
5. Facing
6. Drilling Practice

TOTAL PERIODS: 30

COURSE OUTCOMES

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

- understand carpentry work in the building, installation of doors and windows.
- install plumbing systems in the building.
- prepare models by welding, machining and sheet metal.
- make the practice for drilling and fittings.

CO - PO Mapping

Mapping of Course Outcomes with Programme Outcomes: (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium , 1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	1	-	-	-	-	-	-	2	1	2	2	3	2
CO2	3	1	-	-	-	-	-	-	2	1	2	2	3	2
CO3	3	1	-	-	-	-	-	-	2	1	2	2	3	2
CO4	3	1	-	-	-	-	-	-	2	1	2	2	3	2

CS23103 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY 0 0 4 2

COURSE OBJECTIVES

To enable the students to

- acquire programming skills in core python concepts
- study about object oriented skills in python.
- study about list, tuples, set, dictionaries.
- study file handling mechanisms, exception handling techniques in python

LIST OF EXPERIMENTS

1. Programs that take command line arguments (word count)
2. Compute the GCD of two numbers
3. Find the square root of a number (Newton's method)
4. First n prime numbers
5. Exponentiation (power of a number)
6. Find the maximum of a list of numbers
7. Find the factorial of the number using recursive function
8. Working with nested for loop.
9. Class and Objects.
10. File creation and access file content in python.
11. Find the most frequent words in a text read from a file
12. Working with Modules
13. Python Exception handling

TOTAL PERIODS: 60

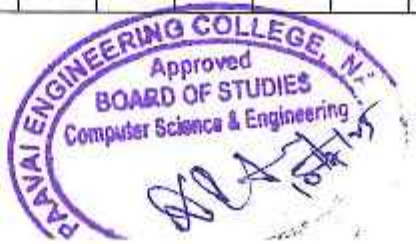
COURSE OUTCOMES

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

- create python program using various looping and control statements.
- work with object, class, functions, strings and lists in python.
- implement tuples and dictionaries in python programming.
- develop python program to perform file operations, Modules and handle the exceptions.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcome (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	2	1	1	1	-	-	1	-	1	1	1	-
CO2	2	2	2	1	1	1	-	-	1	-	-	1	2	-
CO3	3	2	2	3	1	1	-	-	2	-	-	2	2	2
CO4	3	2	2	3	1	1	-	-	2	-	-	2	2	1



GE23201	தமிழரும் தொழில்நுட்பமும்/ TAMILS AND TECHNOLOGY (அனைத்து பொறியியல் மற்றும் தொழில்நுட்பப் பாடப்பிரிவுகளுக்கும்)	L	T	P	C
		1	0	0	1

பாடத்திட்டத்தின் நோக்கங்கள்

மாணவர்களுக்கு பயன்படும் வகையில்

1	சங்ககாலத்தில் நெசவு மற்றும் பானைத் தொழில் நுட்பத்தையும், கருப்பு- சிவப்பு மட்பாண்டங்களின் தொழில் நுட்பத்தையும் மாணவர்களுக்கு புரிந்து கொள்ள செய்தல்.
2	சங்ககால தமிழர்களின் கட்டுமானங்களின் வடிவமைப்பு, கற்றளி கோவில்களின் கட்டிடத் தொழில் நுட்பம் பற்றிய விழிப்புணர்வை ஏற்படுத்துதல்.
3	பண்டைய கால கப்பல் கட்டும் தொழில் நுட்பம், உலோகவியல், மணி உருவாக்கும் தொழில்நுட்பத்தினை அனைத்து நிலைகளிலும் வேறுபடுத்தி அறிய மாணவர்களுக்கு உதவுதல்.
4	சோழர்க்கால நீர்ப்பாசனத் தொழில் நுட்பம், குமிழித் தூம்பு தொழில் நுட்பம், கடல்சார் அறிவு, அறிவுசார் சமூகமாக பண்டைய தமிழர்களின் தொழில் நுட்பத்தினை புரிந்துக் கொள்ள செய்தல்.
5	தமிழின் அறிவியல் தமிழ், கணினித் தமிழ், மின் நூலகம், தமிழ் இணையக் கல்விக் கழகத்தைப் பற்றி புரிந்துக் கொள்ள செய்தல்.

அலகு 1	நெசவு மற்றும் பானைத் தொழில்நுட்பம்	3

சங்க காலத்தில் நெசவுத் தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.

அலகு 2	வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்	3

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் &சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை வடிவமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக் கோயில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டி நாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ - சாரோசெனிக் கட்டிடக்கலை.

அலகு 3	உற்பத்தி தொழில் நுட்பம்	3

கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பு உருக்குதல், எஃகு - வரலாற்றுச் சின்னங்களாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் -எலும்புத் துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

அலகு 4	வேளாண்மை மற்றும் நீர்பாசனத் தொழில்நுட்பம்	3

அணை - ஏரி, குளங்கள், மதகு - சோழர்காலக் குமிழித் தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு -அறிவுசார் சமூகம்.

அலகு 5	அறிவியல் தமிழ் மற்றும் கணித்தமிழ்	3

அறிவியல் தமிழின் வளர்ச்சி -கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்.

	மொத்த பாடவேளைகள்	15

பாடநூல்:

ஆ.பூபாலன், **தமிழரும் தொழில்நுட்பமும், வி.ஆர்.பி . பதிப்பகம் பிரைவேட் லிட்** 2022

பார்வை நூல்கள்:

தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே.பிள்ளை. (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).

கணினித் தமிழ் - முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்).

கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு).

பொருநை - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு).

கற்றல் விளைவுகள்: மாணவர்களின் கற்றல் விளைவுகளின் மதிப்பீடுகள்		**BT Mapped (Highest Level)**
CO1	பண்டைய காலத் தமிழர்களின் நெசவு மற்றும் பானைத் தொழில்நுட்பத்தை சங்க இலக்கிய சான்றுகளோடு விளக்க முடியும்	Understanding (L2)
CO2	சங்ககால கட்டுமானங்கள், தமிழர்களின் கற்றளி கோவில்களின் தொழில்நுட்பம், சிற்பங்கள் நடுகல் வழிபாட்டு முறைகளைப் பற்றி விளக்க முடியும்.	Understanding (L2)
CO3	சங்ககால தமிழர்களின் உலோகவியல் உற்பத்தித் தொழில்நுட்பத்தைச் சங்க இலக்கியச் சான்றுகளோடு கூற முடியும்.	Understanding (L2)
CO4	சோழர்களின் நீர்ப்பாசனம், வேளாண்மையில் மேலாண்மைக் கோட்பாடுகள் பற்றி விளக்க முடியும்.	Understanding (L2)
CO5	அறிவியல் தமிழின் வளர்ச்சி , மின் நூலகம், இணையக் கல்விக்கழகம்,சொற்குவைப் பற்றி விளக்க முடியும்.	Understanding (L2)

CO PO MAPPINGMapping of Course Outcomes with Programme Outcomes :

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

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

GE23201	TAMILS AND TECHNOLOGY/தமிழரும் தொழில்நுட்பமும்	L	T	P	C
	(Common to All Engineering and Technology Branches)	1	0	0	1

COURSE OBJECTIVES

To enable the students to

1	To facilitate the students to understand Weaving and Ceramic Technology of Sangam Age.
2	To create an awareness on structural design of Tamils during Sangam Age
3	To help students to distinguish between all the levels of Manufacturing Technology in Ancient Period
4	To understand the Ancient knowledge of Agriculture and Irrigation Technology
5	To enable the students to understand the Digitalization of Tamil Language

UNITI	WEAVING AND CERAMIC TECHNOLOGY	3

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

UNITII	DESIGN AND CONSTRUCTION TECHNOLOGY	3

Designing and Structural construction, House & Designs in household materials during Sangam Age – Building materials and Hero stones of Sangam Age Details of Stage Constructions in Silappathikaram–Sculptures and Temples of Mamallapuram–Great Temples of Cholas and other worship places – Temples of Nayaka Period – Type study (Madurai Meenakshi Temple) – Thirumalai Nayakar Mahal – Chettinadu Houses, Indo – Saracenic Architecture at Madras during British Period.

UNITIII	MANUFACTURING TECHNOLOGY	3

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

UNITIV	AGRICULTURE AND IRRIGATION TECHNOLOGY	3

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

UNITV	SCIENTIFIC TAMIL & TAMIL COMPUTING	3

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

TEXT BOOK:

1.	S.Muthuramalingam,M.Saravanakumar,Heritage of Tamils,Yes Dee Publishing PvtLtd,2023.

REFERENCES:	
1	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D.Thirunavukarasu) (Publishedby:International Institute of Tamil Studies)
2	The Contribution of the Tamils to Indian Culture(Dr.M.Valarmathi) (Published by International Institute of Tamil Studies).
3	Keeladi – 'Sangam City Civilzation on the banks of river Vaigai; (Jointly Published by: Departmentof Archaeology & Tamilnadu Text Book and Educational Services Corporation, Tamil Nadu)
4	Studies in the History of India with Special Reference to Tamil Nadu , Published by: The Author Dr.K.K.Pillay.
5	Porunai Civilization (Jointly Published by: Department of Archaeology &Tamil Nadu Textbook and Educational Services Corporation, Tamil Nadu)
6	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by:RMRL).

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Describe the importance of Weaving and Ceramic Technology of Sangam Age	Understanding (L2)
CO2	Illustrate the Knowledge on Structural Design of Tamils during Sangam Age	Understanding (L2)
CO3	Demonstrate a strong foundational knowledge in Manufacturing Technology of Ancient Tamils	Understanding (L2)
CO4	Describe the importance of Ancient Agriculture and Irrigation Technology of Tamils	Understanding (L2)
CO5	Explain the concept of Digitalization of Tamil language	Understanding (L2)

CO PO MAPPING

Mapping of Course Outcomes with Programme Outcomes : (1,2,3 indicates the strength of correlation) 3 – Strong , 2 – Medium , 1 – Weak														
CO's	**PO's**												**PSO's**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO1	-	-	-	-	-	3	-	3	2	2	-	-	1	-
CO2	-	-	-	-	-	3	-	3	2	2	-	-	-	1
CO3	-	-	-	-	-	3	-	3	2	2	-	-	1	-
CO4	-	-	-	-	-	3	-	3	2	2	-	-	-	1
CO5	-	-	-	-	-	3	-	3	2	2	-	-	-	-

MA23201 COMPLEX VARIABLES AND DIFFERENTIAL EQUATIONS 3 1 0 4

(Common to AGRI, AERO, BME, BIOTECH, CIVIL, CHEMICAL, ECE, EEE, FOOD, MECH, MCT, ROBOTICS, PHARMA)

OBJECTIVES

To enable the students to

- develop analytical techniques to solve various higher order differential equations with constant and variable coefficients
- study Laplace Transforms of various standard functions, periodic functions and understand the techniques of solving ordinary differential equations using Laplace Transform methods.
- gain knowledge on differentiation and integration of vector-valued functions
- understand the differential calculus of complex variables and analytic functions
- recognize the concept of complex integration applied in engineering disciplines

UNIT I ORDINARY DIFFERENTIAL EQUATIONS 12

Higher order linear differential equations with constant coefficients; Method of variation of parameters; Method of undetermined coefficients; Cauchy's and Legendre's linear equations.

UNIT II LAPLACE TRANSFORM 12

Laplace transform - Transform of elementary functions, Properties; Transform of periodic functions; Definition of Inverse Laplace transforms - Statement and applications of Convolution theorem; Initial and Final value theorems; Solution of linear ODE of second order with constant coefficients by Laplace transforms.

UNIT III VECTOR CALCULUS 12

Gradient, Divergence and Curl, Directional derivative; Irrotational and solenoidal vector fields; Vector integration – Statement of Green's, Gauss divergence and Stokes' theorem, Verification and Simple applications.

UNIT IV ANALYTIC FUNCTIONS 12

Functions of a complex variable; Analytic functions - Statement of Cauchy-Riemann equations; Harmonic functions and orthogonal properties, Harmonic conjugate, Construction of analytic functions; Conformal mapping - w = z+c, cz, 1/z and Bilinear transformation.

UNIT V COMPLEX INTEGRATION 12

Complex integration - Statement and applications of Cauchy's integral theorem and Cauchy's integral formula; Taylor and Laurent expansions; Singular points - Residues, Residue theorem; Contour integration - evaluation of circular and semicircular Contour.

TOTAL PERIODS: 60

COURSE OUTCOMES

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

- solve higher order differential equations with constant and variable coefficients.
- determine Laplace transforms of various functions and solve initial value problems using Laplace transforms.
- familiarize with vector calculus concepts.
- gain knowledge on the analytic functions and related concepts.
- solve real definite integrals with the help of complex integration techniques.

TEXT BOOKS

1. Grewal. B.S., "Higher Engineering Mathematics", 42nd Edition, Khanna Publications, Delhi, 2011.
2. Erwin Kreyszig., "Advanced Engineering Mathematics", 10th Edition, John Wiley and Sons, New Delhi, 2016.

REFERENCE BOOKS

1. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, 2008.
2. T. Veerarajan., "Engineering Mathematics", 3rd Edition, Tata McGraw Hill, 2011.
3. Peter V. O'Neil, "Advanced Engineering Mathematics", 7th Edition, Cengage learning, 2012.
4. Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009.
5. Dass, H.K., and Er. Rajnish Verma, "Higher Engineering Mathematics", S. Chand Private Ltd., (2014).

CO/PO Mapping
(3/2/1 indicates strength of correlation) 3- Strong, 2-Medium, 1-Weak

CO	Programmes Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	-	-	-	-	-	-	-	2	2	3
CO2	3	2	3	2	-	-	-	-	-	-	-	3	2	3
CO3	3	3	3	2	-	-	-	-	-	-	-	2	2	3
CO4	3	2	3	3	-	-	-	-	-	-	-	3	2	3
CO5	3	3	2	3	-	-	-	-	-	-	-	3	2	3

CH23102/CH23202 CHEMISTRY FOR ENGINEERS 3 0 0 3

(Common to all Agri, Civil, Mech, MCT, Aero and R&A Programmes)

COURSE OBJECTIVES

To enable the students to

- inculcate sound understanding of water quality parameters and water treatment techniques.
- facilitate the understanding of different types of fuels, their preparation, properties and combustion characteristics..
- introduce the basic concepts and applications of phase rule and alloys.
- establish basic knowledge of polymer composition from monomers.
- familiarize with the corrosion mechanism and organic coating.

UNIT I WATER CHEMISTRY 9

Water-sources and impurities – water quality parameter: colour, odour, pH, hardness, alkalinity, TDS, COD, BOD, and heavy metals. Hardness of water –types –expression of hardness –units –estimation of hardness of water by EDTA–boiler troubles (scale and sludge, priming and foaming, caustic embrittlement and boiler corrosion) –boiler feed water –Treatments-Internal treatment (phosphate and calgon conditioning) external treatment –Ion exchange process–desalination-Reverse Osmosis.

UNIT II FUELS AND COMBUSTION 9

Fuels: Introduction -classification of fuels -coal -analysis of coal (proximate and ultimate) -carbonization -manufacture of metallurgical coke (Otto Hoffmann method) -octane number -cetane number -natural gas -compressed natural gas (CNG) -liquefied petroleum gases (LPG). Combustion : Introduction -calorific value -higher and lower calorific values-flue gas analysis (ORSAT Method)- Preparation of power alcohol, properties and uses.

UNIT III PHASE RULE AND ALLOYS 9

Phase rule: Introduction, and explanation of terms with examples, One Component System: Water System- Reduced phase rule- Two Component Systems- Lead- Silver system, Zn-Mg system. Alloys: Introduction – Definition – properties of Alloys- Functions - Ferrous alloys- Nichrome and Stainless Steel- Heat treatment of steel: Non Ferrous alloys; Brass and Bronze.

UNIT IV POLYMERS 9

Introduction: Classification of polymers – Natural and Synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerization: Addition (Free Radical, cationic and anionic); condensation and copolymerization. Preparation, properties and uses of Nylon 6, Teflon and polycarbonate (Lexan). Compounding and Fabrication Techniques: Injection, Extrusion, Blow and Calendaring.

UNIT V CORROSION AND ITS CONTROL 9

Corrosion-Causes-Types-Chemical corrosion and mechanism - 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 – Electroplating(Au) - Electroless plating (Nickel) – organic coatings (paints). Paints: Constituents and functions.

TOTAL PERIODS : 45

COURSE OUTCOMES

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

- infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.
- compare and contrast the performance of different fuels by its calorific value.
- differentiate the various states in a equilibrium on a heterogeneous system.
- interpret the thermodynamic laws in energy calculations.
- elaborate the effects and control of corrosion

TEXT BOOKS

1. Jain P.C. and Jain. M., Engineering Chemistry, 17/e, 2014 Dhanpat Rai Publishing Company, New Delhi, Reprint 2017.
2. B.K. Sharma – "Industrial Chemistry", 11th ed., (2015), Goel Publication, Meerut.U.P.

REFERENCES

1. Puri B.R., Sharma L.R., Pathania, M.S. Principles of physical chemistry,15/e 2015 ,Vishal Publishing Co., Meerut, Reprint 2017.
2. Stephen Zoepf., Electric Vehicle Engineering First Edition., McGraw – Hill Education(India) Private Limited 2021.
3. Dara S.S. and Umare S.S., A text book of Engineering Chemistry,12/e,2014 S.Chand and Company Limited, New Delhi,Reprint 2016.
4. Engineering Chemistry, Wiley India Editorial Team, Wiley Eastern Pub, New Delhi 2018.

CO/PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

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

ME23202 **ENGINEERING MECHANICS** 3 0 0 3

(COMMON TO AERO / CIVIL / MECH / MCT / ROBOTICS & AUTOMATION)

COURSE OBJECTIVES

To enable the students to

- learn the use scalar and vector analytical techniques for analyzing forces in statically determinate structures
- introduce the statics of rigid bodies
- study and understand the distributed forces, surface, loading on beam and intensity
- develop basic dynamics concepts – force, momentum, work and energy
- learn the principles of friction, forces and to determine the apply the concepts of frictional forces at the contact surfaces of various engineering systems.

UNIT I STATICS OF PARTICLES 9

Introduction - Laws of Mechanics - Lame's theorem, Parallelogram and triangular Law of forces - Principle of transmissibility –Coplanar forces - Resolution and Composition of forces- Free body diagram- Equilibrium of a particle in plane - Vectorial representation of forces - Equilibrium of a particle in space.

UNIT II STATICS OF RIGID BODIES 9

Moments: moment of a force about a point - Varignon's theorem- moment and couple – Equivalent systems of forces – Single equivalent force - Types of supports and their reactions - Requirements of stable equilibrium – equilibrium of rigid body in two dimensions.

UNIT III PROPERTIES OF SURFACES 9

Determination of Areas and Volumes - First moment of area - Centroid of sections - T section, I section, Angle section, Hollow section by using standard formula – Moment of inertia - T section, I section, Angle section, Hollow section by using standard formula - Parallel axis theorem and perpendicular axis theorem - Polar moment of inertia.

UNIT IV DYNAMICS OF PARTICLES 9

Displacements, Velocity and acceleration, their relationship – Rectilinear motion: horizontal motion- vertical downward and vertical upward motion – curvilinear motion, projectile motion - Newton's law - D'Alemberts principle-motion of inclined surfaces.

UNIT V FRICTION 9

Friction and its types – limiting friction – coefficient of friction and angle of friction – coulomb's laws of dry Friction –impending motion – angle of repose - friction in simple contact surfaces - friction of a body lying on an inclined plane, ladder friction.

TOTAL PERIODS: 45

COURSE OUTCOMES

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

- represent the forces in vector components (both 2D and 3D) and apply equilibrium conditions

- calculate the moment produced by various force systems and conclude the static equilibrium equations for rigid body system
- compute the centroid, center of gravity and moment of inertia of geometrical shapes and solids respectively
- apply the different principles to study the motion of a body and analyses their constitutive equations
- manipulate the effect of friction and its applications.

TEXT BOOKS

1. Dubey N.H., "Engineering Mechanics: Statics and Dynamics", 1st Edition, McGraw Hill Education, New Delhi, 2017.
2. Dr.N.Kottiswaran, "Engineering Mechanics" 10th Edition, Sri Balaji Publications 2017.

REFERENCES

1. Beer Ferdinand P., Russel Johnston Jr., David F. Mazure, Philip J. Cornwell, Sanjeev Sanghi, "Vector Mechanics for Engineers: Statics and Dynamics", 12th Edition, McGraw Hill Education, Chennai, 2019.
2. Hibbeler R.C., "Engineering Mechanics", 14th Edition, Pearson Education, New Delhi, 2017.
3. Shames I. H., Engineering Mechanics, Statics and Dynamics, Pearson Prentice, 2016.
4. Bhavikatti, S. S and Rajashekarappa, K.G., Engineering Mechanics, New Age International (P) Limited Publishers, 2016.

CO - PO Mapping

Mapping of Course Outcomes with Programme Outcomes: (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	2	1	1	-	-	-	-	-	-	-	1	-	3
CO2	3	2	1	1	-	-	-	-	-	-	-	1	-	3
CO3	3	2	1	1	-	-	-	-	-	-	-	1	-	3
CO4	3	2	1	1	-	-	-	-	-	-	-	1	-	3
CO5	3	2	1	1	-	-	3	-	-	-	-	1	-	3

EE23201 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- know the electrical circuit concepts.
- familiarize the basics of electrical machines.
- provide the knowledge about the semiconductor device and basic switching circuits.
- impart the knowledge on instruments used for measurements.
- recognize the wiring system, earthing and protective devices for domestic purpose.

UNIT I ELECTRICAL CIRCUITS 9

DC circuits - Ohm's law, resistance in series and parallel, Kirchhoff's laws, mesh current method, nodal voltage method; AC circuits - Phase, average value, RMS value, form factor, peak factor, instantaneous power, real power, reactive power and apparent power, power factor, RLC series circuits (Simple problems only).

UNIT II ELECTRICAL MACHINES (Quantitative only) 9

DC machines - Construction and working principle, EMF equations, types and applications; Transformer- Construction, working principle and application; Single phase induction motor- Construction and principle of operation; Starting methods - Split phase motor, capacitor start motor, shaded pole motor.

UNIT III ANALOG AND DIGITAL ELECTRONICS 9

Operation and characteristics of PN junction diodes, zener diode, bipolar junction transistor, JFET, MOSFET; Application - Rectifier and voltage regulators; Operational amplifier - Characteristics, basic applications; Basic switching circuits - JK and RS flip flop; 555 Timer - Functional block diagram; Astable and monostable multivibrator.

UNIT IV MEASUREMENTS AND INSTRUMENTATION 9

Concept of measurements; Instruments and their classification; Moving iron instruments – Construction of attraction type and repulsion type instruments; Moving coil instruments - Principle, construction and working principle; Construction and working of dynamometer type wattmeter and induction type energy meter; Digital multimeter; Instrument transformer – Current transformer (CT), potential transformer (PT).

UNIT V DOMESTIC WIRING AND SAFETY 9

Types of wiring; Earthing – Purpose of earthing, equipment earthing, system earthing; Methods of earthing - Pipe earthing, plate earthing; Protective devices - Fuse, miniature circuit breaker (MCB), earth leakage circuit breaker (ELCB), residual current circuit breaker (RCCB).

TOTAL PERIODS: 45

COURSE OUTCOMES

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

- analyze the electrical circuit concepts in electrical parameter calculations.
- describe about different types of electrical machines.
- explain about the semiconductor device and basic switching circuits.
- identify the instruments used for measuring different electrical quantities.
- apply wiring system earthing and protective device concept for domestic purpose.

TEXTBOOK

1. C.L.Wadhwa, "Basic Electrical Engineering", New age international Publishers, Fourth edition, Reprint 2021.
2. S.K.Bhattacharya, "Basic Electrical and Electronics Engineering", Pearson Education India, Second edition, 2017.

REFERENCES

1. D P Kothari, I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition, McGraw Hill Education, 2020.
2. S.K.Sahdev, " Basic Electrical Engineering ", Pearson India Education Services Pvt. Ltd, First Edition, 2015.
3. J.B. Gupta, "Basic Electrical Engineering", S.K. Kataria & Sons Publishers, Seventeenth Edition, 2023.
4. R.K.Rajput, "Basic Electrical and Electronics Engineering", University Science Press, Second Edition, Reprint 2017.

CO-PO MAPPING

Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes PSO's
(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

CO's	Programme Outcomes PO's												PSO's	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	2	-	-	-	-	1	-	-	2	2	-	-
CO2	3	2	1	-	-	-	-	1	-	-	2	2	-	-
CO3	3	1	-	-	-	-	-	1	-	-	2	2	-	-
CO4	3	1	-	-	-	-	-	1	-	-	2	2	-	-
CO5	3	2	-	-	-	-	-	1	-	-	2	2	-	-

EN23201	COMMUNICATION SKILLS FOR ENGINEERS II	2	0	2	3

(Common to All Branches)

COURSE OBJECTIVES

To enable students to

- Enhance the ability to listen, read, write and speak English.
- Comprehend and draft reports related to their branches of specialization.
- Augment their ability to read and comprehend technical exits
- equip the learners to make effective presentations on topics in engineering and technology.
- Participate successfully in Group Discussions

UNIT I — **6**

Language focus - One word substitutions, Active Voice and Passive Voice, Spotting the Errors ; Reading - critical reading; Writing -Checklist, Recommendation;

UNIT II — **6**

Language focus - Collocations - Fixed expressions (adhere to, on the part of etc.) – Idioms and Phrases; Reading - Extensive reading, Summarizing; Writing - Writing ajob application–Resume, E-mail format; blog writing on social media.

UNIT III — **6**

Language focus - Compound Nouns - Numerical Expression – Preposition; Reading -Reading articles in newspapers; Writing Technical Reports - Industrial Visit report, Accident report, Feasibility report, Survey report;

UNIT IV — **6**

Language focus-Direct and Indirect Speech - If Conditionals- Purpose expression; Reading - journals articles; Writing – writing a review of a Book, film- Drafting project proposal, Letter writing – Business Correspondence - Calling for quotation, Placing orders, complaint .

UNIT V — **6**

Language focus - Editing - Extended Definitions - Silent Letters; Listening to speech by technologists; Reading-English Corner; Writing–Essay writing, instructional manual, memos, agenda, circular, notices.

TOTAL PERIODS: 30

List of Exercises

1. Advertising Your Product
2. Description of An Event/Competition
3. SOP (Statement of Purpose)
4. TED Talks
5. Video Profile Making
6. Resume Writing Format
7. GD

8. Mock Interview	
PERIODS:	30
TOTAL PERIODS:	60

COURSE OUTCOMES

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

- Converse with clarity and confidence.
- interpret and analyze a given text.
- draft comprehensive reports, job applications and e-mails.
- Make effective presentations using power point.
- Participate successfully in Group Discussions and interviews.

TEXT BOOKS

- N P Sudharshana, C.Savitha. English Technical Communication. Cambridge University Press India Pvt. Ltd, New Delhi.2016.
- Mahalakshmi.S.N.English and Workbook for Engineers.V.K.Publications,Sivakasi.2017.

REFERENCES

- Raman, Meenakshi & Sangeetha Sharma. Technical Communication: Principles and practice. Oxford University Press, NewDelhi.2011.
- Rizvi,Ashraf.M.Effective Technical Communication.Tata McGraw-Hill, NewDelhi.2005.
- Rutherford, Andrea.JBasic Communication Skills for Technology. Pearson,NewDelhi,2001.

CO/PO MAPPING :

CO/PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

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

PAAVAI ENGINEERING COLLEGE, NAMAKKAL * AUTONOMOUS *
Approved
BOARD OF STUDIES
English
24/6/23

CH23104/CH23204 **CHEMISTRY LABORATORY** 0 0 2 1

(Common to all B.E/B.Tech Programmes)

COURSE OBJECTIVES

To enable the students to

- acquire practical skills in the determination of water parameter through volumetric and instrumental analysis.
- acquaint with the determination of molecular weight of a polymer.
- explain the amount of corrosion in steel by instrumentation.
- elucidate the presence of metals in aqueous media by volumetric analysis.

LIST OF EXPERIMENTS (Any Eight Experiments)

1. Estimation of Chloride content in water sample by Argentometric method.
2. Determination of Calcium and Magnesium in water sample by complexometric method.
3. Determination of strength of acid by using pH meter.
4. Determination of strength of acids in a mixture using conductivity meter.
5. Conductometric titration of strong acid Vs Strong base.
6. Determination of alkalinity in water sample.
7. Estimation of copper in the water sample using Iodometric titration.
8. Estimation of iron content in the water sample using potentiometric titration.
9. Determination of molecular weight of polymer using Oswald viscometer.
10. Corrosion studies by weight loss method.

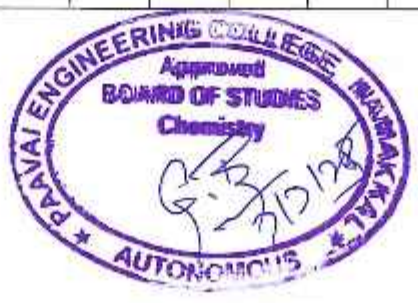
TOTAL PERIODS : 30

COURSE OUT COMES

- At the end of the course, the students will be able to
- Outfitted with hands-on experience in the quantitative analysis of water quality parameters.
- Evaluate the weight loss in steel.
- Calculate the molecular weight of a given polymer.
- Interpret the presence of metals in aqueous media.

CO/PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programmes Outcomes (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	2	2	1	-	-	-	2	-	-	2	1	-
CO2	2	3	2	2	1	-	-	-	2	-	-	-	-	1
CO3	1	2	1	2	1	-	-	-	1	-	-	-	1	1
CO4	2	1	1	1	2	-	-	-	2	-	-	2	-	-



GE23202 **ELECTRICAL AND ELECTRONICS ENGINEERING PRACTICES LABORATORY** **0 0 2 1**

COURSE OBJECTIVES

To enable the students to

- understand the various wiring concepts.
- know about the energy measuring apparatus.

ELECTRICAL ENGINEERING PRACTICES

LIST OF EXPERIMENTS

1. Stair-case wiring.
2. Fluorescent lamp wiring.
3. Residential house wiring.
4. Wiring of ceiling fan with capacitor.
5. Measurement of energy using single phase energy meter.

TOTAL PERIODS: 15

COURSE OUTCOMES

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

- implement wiring practice in real time.
- measure the energy consumed in real time.

ELECTRONICS ENGINEERING PRACTICES

COURSE OBJECTIVES

To enable the students to

- know about basic logic gates, soldering and assembling of electronic components.
- gain hands-on experience in simple electronic circuits.

LIST OF EXPERIMENTS

1. Soldering simple electronic circuits and checking continuity.
2. Implementation of half wave Rectifier using diodes
3. Generation of clock signal
4. Verification of basic logic gates

COURSE OUTCOMES

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

- solder and test simple electronic circuits and verify basic logic gates.
- verify rectifier and clock generator circuits.

TOTAL PERIODS: 15

CO-PO MAPPING

Mapping of Course Outcome (CO's) with Programme Outcomes (PO's) and Programme Specific Outcomes PSO's
(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

CO's	Programme Outcomes PO's												PSO's	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	-	-	-	2	-	-	1	-	-	1	1	-
CO2	3	2	-	-	-	2	-	-	1	-	-	1	2	-
CO3	[illegible]	2	[illegible]	-	-	2	-	-	1	-	-	1	1	-
CO4	3	2	-	[illegible]	[illegible]	2	-	[illegible]	1	-	-	1	2	-

ME23203 COMPUTER AIDED DRAFTING LABORATORY 0 0 2 1

(COMMON TO AEEO / CIVIL / MCT / MECH / ROBOTICS & AUTOMATION)

COURSE OBJECTIVES

To enable the students to

- prepare assembly drawings both manually and using standard CAD packages
- familiarize the students with Indian Standards on drawing practices and standard components
- gain practical experience in handling 2D drafting and 3D modeling software systems.
- make the students understand and interpret drawings of machine components.

LIST OF EXERCISES USING SOFTWARE CAPABLE OF DRAFTING

1. Study of capabilities of software for Drafting and Modelling - Coordinate systems (absolute, relative, polar, etc.) - Creation of simple figures like polygon and general multi-line figures.
2. Drawing of a Title Block with necessary text and projection symbol.
3. Drawing of curves like parabola, ellipse, hyperbola, involute using B-Spline or cubic spline.
4. Drawing of front view and top view of simple solids like prism, pyramid, cylinder, cone, etc., and dimensioning.
5. Drawing front view, top view and side view of objects from the given pictorial views (eg. V-block, Simple stool, Objects with hole and curves).
6. Drawing of a plan of residential building (Two bed rooms, kitchen, hall, etc.)
7. Drawing of a simple steel truss.
8. Drawing sectional views of prism, pyramid, cylinder, cone, etc.,
9. Drawing isometric projection of simple objects.
10. Creation of 3-D models of simple objects and obtaining 2-D multi-view drawings from 3-D model.
11. Development of prism, pyramid, cylinder, cone, etc., in 2-Dimensional

TOTAL PERIODS: 30

COURSE OUTCOMES

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

- develop competency in basic drafting, enabling them to pursue careers in engineering, professional arenas, or to further their academic pursuits.
- apply the knowledge about computer aided drafting and design.
- demonstrate an understanding of engineering and mechanical cad drafting and 3D Design
- re-create part drawings, sectional views and assembly drawings as per standards

CO - PO Mapping

Mapping of Course Outcomes with Programme Outcomes: (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium , 1-Weak														
COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	1	-	-	-	-	1	1	2	1
CO2	3	3	3	3	3	1	-	-	-	-	1	1	2	1
CO3	3	3	3	3	3	1	-	-	-	-	1	1	2	1
CO4	3	3	3	3	3	1	-	-	-	-	1	1	2	1