E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

NAGAPATTINAM – 611 002.

(Affiliated to Anna University, Chennai | Accredited by NAAC with 'A++' Grade
Accredited by NBA | Approved by AICTE, New Delhi)

REGULATIONS - R2023

B.E. / B.Tech. – SECOND SEMESTER CURRICULUM

MECHANICAL ENGINEERING									
COURSE CODE	**COURSE NAME**	**CATEGORY**	**L**	**T**	**P**	**C**	**MAX. MARKS**		
							CA	**ES**	**TOTAL**
2301MA203	Statistics and Numerical Methods	BSC	3	1	0	4	40	60	100
2301PH202	Materials Science	BSC	3	0	0	3	40	60	100
2301GEX01	Foundation of Electrical and Electronics Engineering	ESC	3	0	0	3	40	60	100
2301GEX02	Engineering Graphics	ESC	2	1	0	3	40	60	100
	Language Elective	EEC	2	0	0	2	100	0	100
2301TA201	Tamils and Technology / தமிழரும் தொழில்நுட்பமும்	HSMC	1	0	0	1	100	0	100
Laboratory Courses									
2301HS251	Engineering Exploration	HSMC	0	0	2	1	100	0	100
2301GE251	CAD Laboratory	ESC	0	0	2	1	100	0	100
2301GEX51	Computer Practices Laboratory	ESC	0	0	2	1	100	0	100
2301GEX53	Foundation of Electrical and Electronics Engineering Laboratory	ESC	0	0	2	1	60	40	100
2301LS201	Life Skills – II		0	0	0	0	100	0	100
TOTAL			**14**	**2**	**8**	**20**	**820**	**280**	**1100**

2301MA203	STATISTICS AND NUMERICAL METHODS (Common to Mechanical & Civil)	L	T	P	C
		3	1	0	4

PREREQUISITE:
1. Basic concepts of Statistics
2. Basic concepts of Numerical

COURSEOBJECTIVES:

CO 1:	To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems?
CO 2:	To introduce the basic concepts of solving algebraic and transcendental equations.
CO 3:	To introduce the numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines.
CO 4:	To acquaint the knowledge of various techniques and methods of solving ordinary differential equations.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Apply the concept of testing of hypothesis for small and large samples in real life problems.
CO2:	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
CO3:	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
CO4:	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
CO5:	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

COs Vs Pos MAPPING:

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

CO s Vs PSOs MAPPING

COs	PSO1	PSO2	PSO3
CO1	1		
CO2	1		
CO3	1		
CO4	1		
CO5	1		

COURSE CONTENTS:

MODULEI	TESTING OF HYPOTHESIS	9Hours

Sampling distributions - Tests for single mean, proportion and difference of means (Large and small samples) Tests for single variance and equality of variances – Chi square test for goodness of fit – Independence of attributes.

MODULEII	DESIGN OF EXPERIMENTS	9Hours

One way and two way classifications - Completely randomized design – Randomized block design – Latin square design - 22 factorial design.

MODULEIII	SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS	9Hours

Solution of algebraic and transcendental equations - Fixed point iteration method – Newton Raphson method- Solution of linear system of equations - Gauss elimination method – Pivoting - Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel - Eigen values of a matrix by Power method and Jacobi's method for symmetric matrices.

MODULEIV	INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION	9Hours
Lagrange's and Newton's divided difference interpolations – Newton's forward and backward difference interpolation – Approximation of derivates using interpolation polynomials – Numerical single and double integrations using Trapezoidal and Simpson's 1/3 rules.		
MODULEV	NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS	9Hours
. Single step methods: Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge - Kutta method for solving first order differential equations - Multi step methods: Milne's and Adams - Bash forth predictor corrector methods for solving first order differential equations		
	TOTAL:45+15=60HOURS	

REFERENCES:
1. G.B.Thomas and R.L. Finney, Calculus and Analytic geometry,9th Edition, Pearson, Reprint, 2002.
2. Erwinkreyszig, Advanced EngineeringMathematics,9th Edition,JohnWiley&Sons,2006.
3. W.E.Boyce and R.C.DiPrima, Elementary Differential Equations and Boundary Value Problems,9th Edn, Wiley India, 2009.
4. S.L.Ross,DifferentialEquations,3rd Ed.,WileyIndia,1984
5. J.W.Brown and R.V.Churchill, Complex Variables and Applications,7th Ed., McGrawHill, 2004.
6. N.P.Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications,Reprint, 2008.
7. B.S.Grewal,Higher Engineering Mathematics, Khanna Publishers,36th Edition,2010.

2301PH202	MATERIALS SCIENCE	L	T	P	C
	(Mech and Civil)	3	0	0	3

PREREQUISITE:
1. Basic knowledge in Solid State Physics

COURSE OBJECTIVES:

CO 1:	To make the students to understand the basics of crystallography and its importance in studying materials properties.
CO 2:	To understand the electrical properties of materials including free electron theory, applications of quantum mechanics and magnetic materials.
CO 3:	To instil knowledge on physics of semiconductors, determination of charge carriers and device applications
CO 4:	To establish a sound grasp of knowledge on different optical properties of materials, optical displays and applications
CO 5:	To inculcate an idea of significance of nano structures, quantum confinement and ensuing nano device applications.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Understand the basics of crystallography and its importance for varied materials properties
CO2:	Differentiate between the electrical and magnetic properties of materials and their applications
CO3:	Apply the concepts of semiconductor physics in functioning of semiconductor devices
CO4:	Apply the properties of dielectric materials and working principles of various devices
CO5:	Understand the importance of functional nanoelectronic devices.

COs Vs POs MAPPING:

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

COs Vs PSOs MAPPING

COs	PSO1	PSO2	PSO3
CO1			
CO2			
CO3			
CO4			
CO5			

COURSE CONTENTS:

MODULE I	CRYSTALLOGRAPHY	9 Hours

Crystal structures: BCC, FCC and HCP – directions and planes - linear and planar densities – crystal imperfections- edge and screw dislocations – grain and twin boundaries - Burgers vector and elastic strain energy- Slip systems, plastic deformation of materials - Polymorphism – phase changes – nucleation and growth – homogeneous and heterogeneous nucleation.

MODULE II	ELECTRICAL AND MAGNETIC PROPERTIES OF MATERIALS	9 Hours

Classical free electron theory - Expression for electrical conductivity – Thermal conductivity, expression - Quantum free electron theory :Tunneling – degenerate states – Fermi- Dirac statistics – Density of energy states – Electron in periodic potential – Energy bands in solids - Magnetic materials: Dia, para and ferromagnetic effects – paramagnetism in the conduction electrons in metals – exchange interaction and ferromagnetism – quantum interference devices – GMR devices.

MODULE III	SEMICONDUCTORS AND TRANSPORT PHYSICS	9 Hours

Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors – Variation of carrier concentration with temperature – Carrier transport in Semiconductors: Drift, mobility and diffusion – Hall effect and devices – Ohmic contacts – Schottky diode.

MODULE IV	DIELECTRIC PROPERTIES OF MATERIALS	9 Hours
Polarization mechanisms: electronic, ionic, orientational, interfacial and total polarization – frequency dependence – local field/ Internal field derivation and Causius-Mossetti equation – dielectric constant and dielectric loss.		
MODULE V	NANOELECTRONIC DEVICES	9 Hours
Quantum confinement – Quantum structures – quantum wells, wires and dots – Zener-Bloch oscillations – Resonant tunneling – quantum interference effects - mesoscopic structures - Single electron phenomena – Single electron Transistor. Semiconductor photonic structures – 1D, 2D and 3D photonic crystal. Active and passive optoelectronic devices – photo processes – spintronics – carbon nanotubes: Properties and applications.		
		TOTAL: 45 HOURS

REFERENCES:
1. V.Raghavan. Materials Science and Engineering: A First Course, Prentice Hall India Learning Private Limited, 2015.
2. S.O. Kasap, Principles of Electronic Materials and Devices, Mc-Graw Hill, 2018
3. Jasprit Singh, Semiconductor Devices: Basic Principles, Wiley (India), 2007.
4. Jasprit Singh, Semiconductor Optoelectronics: Physics and Technology, Mc-Graw Hill India (2019)
5. G.W.Hanson. Fundamentals of Nanoelectronics. Pearson Education (Indian Edition), 2009.
6. https://archive.nptel.ac.in/courses/108/108/108108122/
7. https://onlinecourses.nptel.ac.in/noc20_ph24/preview

2301GEX01	FOUNDATION OF ELECTRICAL AND ELECTRONICS ENGINEERING	L	T	C
	(Common to CSE, IT, AIDS, BME, MECH, CIVIL)	3	0	3

PREREQUISITE:

1. Physics

COURSE OBJECTIVES:

CO 1:	To introduce basic DC and AC circuits
CO 2:	To impart knowledge in the basic working principles and applications of electrical machines and measuring instruments
CO 3:	To educate the fundamental concepts of analog and digital electronics.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Acquire basic knowledge on DC, AC circuits and wiring.
CO2:	Understand the construction, working principle and applications of Electrical Machines.
CO3:	Understand the various measuring instruments and concepts of transducers.
CO4:	Obtain the knowledge of semiconductor devices and their applications.
CO5:	Acquire basic knowledge on logic gates and Boolean algebra.

COs Vs POs MAPPING:

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

COs Vs PSOs MAPPING

COs	PSO1	PSO2	PSO3
CO1	3		3
CO2	3		
CO3	3		
CO4		3	3
CO5		3	3

COURSE CONTENTS:

MODULE I	ELEMENTARY CIRCUIT CONCEPTS	9 Hours

Introduction to DC and AC circuits - Ohm's Law, Kirchhoff's Laws, Simple problems; Mesh analysis, Nodal Analysis; Generation of AC waveform - average value, RMS value, form factor, peak factor; Introduction to three phase systems; Electrical safety (not for examination)

MODULE II	ELECTRICAL MACHINES	9 Hours

Construction, working principle, EMF equation, types and applications of DC Generators, working principle of DC Motors, Torque equation, Types and application. Working principle and applications of single phase transformers and single phase induction motors, three phase alternator.(Simple approach)

MODULE III	MEASURING INSTRUMENTS	9Hours

Measuring instruments; Classification of instruments -PMMC, MI instruments, dynamometer type wattmeter, static watt-hour meter; CRO- Principle and operation; Introduction to transducers- RTD, LVDT.

MODULE IV	ANALOG ELECTRONICS	9Hours

Semiconductor devices- V-I characteristics of PN junction diode and Zener diode; Rectifiers - Half wave and full wave rectifiers; BJT, SCR, MOSFET construction and operation (simple approach)

MODULE V	DIGITAL ELECTRONICS	9 Hours

Binary Number System; Logic Gates; Boolean algebra; De-Morgan's theorem; Half and Full Adder. SOP and POS forms, K-map representations - minimization using K maps (Simple Problems only)

TOTAL: 45 HOURS

REFERENCES:
1. Mittle N., "Basic Electrical Engineering", Tata McGraw Hill Edition, New Delhi, 1990.
2. Sedha R.S., "Applied Electronics", S. Chand & Co., 2006.
3. Smarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", 2nd Edition, PHI Learning, 2010.
4. R. Muthusubramaniam, S. Salaivahanan and K.A. Mureleedharan, "Basic Electrical Electronics and Computer Engineering",Tata McGraw Hill, 2004
5. D.P. Kothari and I.J. Nagrath, "Theory and Problems of Basic Electrical Engineering", PHI learning, New Delhi, 2004.
6. J.B. Gupta, "Fundamentals of Electrical Engineering and Electronics", S.K. Kataria and Sons, Reprint 2012 Edition
7. R.L. Boylestad and L. Nashelsky, "Electronic Devices and Circuit Theory", Pearson, 11th Edition,2013.
8. Donald P. Leach, Albert Paul Malvino and Goutam Saha, "Digital Principles and Applications", McGraw-Hill Education, 8th Edition, 2014.

2301GEX02	ENGINEERING GRAPHICS	L	T	P	C
		2	1	0	3

Prerequisite:
1. Basic knowledge about geometry
2. Lettering and Dimensioning

COURSE OBJECTIVES:

CO 1:	To develop in students, graphic skills for communication of concepts, ideas and design of Engineering products
CO 2:	To expose them to existing national standards related to technical drawings

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Construct conic curves, involutes and cycloids
CO2:	Solve problems involving projection of points, lines and plane surfaces
CO3:	Draw the projection of a sectioned simple solids
CO4:	Draw the development of a sectioned simple solids
CO5:	Draw the orthographic, isometric projection of simple solids

COs Vs POs / PSOs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2		2					3		2	2	2	
CO2	3	1	2		2					3		2	2	2	
CO3	3	1	2		2					3		2	2	2	
CO4	3	1	2		2					3		2	2	2	
CO5	3	1	2		2					3		2	2	2	

COURSE CONTENTS:

MODULE I	BASIC CONCEPTS OF TECHNICAL DRAWING AND PLANE CURVES	9 Hours

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, Scale, layout and folding of drawing sheets – Lettering and dimensioning.
Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves.

MODULE II	PROJECTION OF POINTS, LINES AND PLANE SURFACES	9 Hours

Principal Planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and traces. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

MODULE III	PROJECTION OF SOLIDS	9 Hours

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by rotating object method.

MODULE IV	PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES	9 Hours

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones.

MODULE V	ORTHOGRAPHIC AND ISOMETRIC PROJECTION	9 Hours

Visualization concepts–Representation of Three-Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of Objects.
Isometric view - Prisms, pyramids, cylinders, cones. 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 and miscellaneous problems.

	TOTAL: 45 HOURS

REFERENCES:

1.   Bhatt N.D. and Panchal V.M., 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. Basant Agarwal and Agarwal C.M., "Engineering Drawing", McGraw Hill, 2n d Edition, 2019.
5. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Publications, Bangalore,27th Edition, 2017
6. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson Education India, 2nd Edition, 2009.
7. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2008.

2301FLX01	ADVANCED ENGLISH COMMUNICATION	L	T	P	C
		2	0	0	2

COURSEOBJECTIVES:

	1. To understand the basics of communication skills.
	2.To speak English fluently in public places.
	3.To read and write legibly in English.
	4. To understand the verbal and non-verbal communication.

COURSE OUTCOMES:

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

CO1:	Understand the importance of oral and written communication in day-to-day working of the organization
CO2:	Develop their inter personal skills and problem-solving skills.
CO3:	Understand the role of body language in effective communicate
CO4:	Implement the soft skills in theoretical and practical ways.
CO5:	Adapt the techniques of personality development.

Cos Vs POs MAPPING:

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

COURSECONTENTS:

MODULE1	COMMUNICATION AND WRITING SKILLS	12 Hours

Over view of communication skills, Barriers of communication skills, Effective communication skills - Verbal and non – verbal and Pronunciation - Story writing -Email writing: Formal and informal emails, activity-Build your CV– start writing your comprehensive CV including every achievement in your life.

MODULEII	VOCABULARY BUILDING	12 Hours

Technical specific terms related to the field of technology, Phrasal verbs, Idioms, Significant abbreviations and acronyms- Formal business vocabulary, Synonyms and antonyms-Technical vocabulary.

MODULEIII	LISTENING SKILLS	12 Hours

Importance of listening skills, Difference between listening and hearing, Types of listening, Listen to recording and answer questions based on them. Listening and note taking.

MODULEIV	READING AND SPEAKING SKILLS	12 Hours

Reading and comprehension of general and technical articles, Precise writing, Summarizing, Abstracting; Individual and group presentations, Impromptu presentation, Public speaking; Interview skills and Group discussion.

MODULEV	COMPONENTS OF PERSONALITY DEVELOPMENT	12 Hours

Personality development - Self-perception, Self-concept, Self-esteem, Stress management, Time management, Emotional intelligence, Aspirations, Achievements and fulfillment.

PRACTICAL

Listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures. Reading and comprehension of general and technical articles, precise writing, summarizing, abstracting; individual and group presentations. Developing questionnaire to study impact of physique, educational institutions, aspirations on personality; developing questionnaire to study social

prescriptions, gender and family on personality, aspirations and achievements. Collecting data through the questionnaires on small samples. Report writing and presentation.

	TOTAL:60HOURS

TEXT BOOKS:

1. 1. Raman, Meenakshi and Sangeetha Sharma. 2011. Technical Communication: Principles and Practice, Oxford University Press, New Delhi.

  2. Rizvi and Ashraf M. 2005. Effective Technical Communication, Tata McGraw-Hill, New Delhi.

REFERENCES:

1. Regional Institute of English. 2006. English for Engineers, Cambridge University Press, New Delhi.

2. Rutherford and Andrea. 2001. Basic Communication Skills for Technology, Pearson, New Delhi.

3. Viswamohan A. 2008. English for Technical Communication, Tata McGraw-Hill, New Delhi.

2301FLX02	**JAPANESE LANGUAGE**				

COURSE CONTENTS:

Welcome aboard

ABK-AOTS DOSOKAI BENGALURU

JLPT N5 integrated Course covers 120 hours of intensive coaching, in preparation for JLPT exam

+ Revision for JLPT

(certification by Japan Foundation , a world-wide standard)

Course content

1 Japanese Scripts / alphabets :

_Hiragana (native Japanese script)

_Katakana (foreign words)

_Kanji (Chinese derived script)

2. (bunpou)

Grammar 25 lessons

3. (aisatsu) Greetings

4. (kaiwa) conversation through native Japanese enacted videos

5. (choukai) Listening to native Japanese conversion

6. (dokkai) Reading / comprehension

& Revision - simulation (mock) tests

ABK AOTS DOSOKAI

& Revision - simulation (mock) tests

ABK AOTS DOSOKAI

2301TA201	தமிழரும்தொழில்நுட்பமும்/	L	T	P	C
	Tamil and Technology	1	0	0	1

PRE REQUISITE:

The Tamils living in different parts of the World need to keep in touch with the motherland and the mother tongue and be knowledgeable about their heritage in order to preserve their cultural identity and observe their traditional and cultural activities.

Recognizing this fact and for meeting the felt and emerging needs of the Tamil Communities and others interested in Tamil studies

COURSE OBJECTIVES:

Tamil Literature is way of a life. It focuses on the historical significance of ethics, moral culture in the Tamil context.
Tamil Modern literature emphasizes on the modern development of the behavioral, moral and ethical
Technology is the important key for a language and a new sector for the students to voice out for a social cause

COURSE OUTCOMES:

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

CO1:	Develop a spirit of patriotism.
CO2:	Understand the plight of the people living in the society and Biological Struggles.
CO3:	Remember the life style of the Sangam people and To recognize the heroic spirit of the ancient Tamil kings
CO4:	Evaluate the quality and morals of local life through Tamil literature
CO5:	Introducing the various Literary Genres and dramas and enable them to produce innovative ideas in modern literary theories

COURSE CONTENTS:

MODULE I	WEAVING AND CERAMIC TECHNOLOGY	3 Hours

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

அலகு I	நெசவு மற்றும் பானைத் தொழில்நுட்பம்:	3

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

MODULE II	DESIGN AND CONSTRUCTION TECHNOLOGY	3 Hours

Designing and Structural construction House & Designs in house hold 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.

அலகு II	வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்:	3

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு- சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் – சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் 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.

MODULE III	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 – Terra-cotta beads – Shell beads/bone beats – Archeological evidences –Gems tone types described in Silappathikaram.

அலகு III	உற்பத்தித் தொழில் நுட்பம்:	3

கப்பல் கட்டும் கலை – உலோகவியல் – இரும்புத் தொழிற்சாலை – இரும்பை உருக்குதல், எஃகு – வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் – நாணயங்கள் அச்சடித்தல் – மணி உருவாக்கும் தொழிற்சாலைகள் – கல்மணிகள், கண்ணாடி மணிகள் – சுடுமண் மணிகள் – சங்கு மணிகள் – எலும்புத்துண்டுகள் – தொல்லியல் சான்றுகள் – சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

MODULE IV	AGRICULTURE AND IRRIGATION TECHNOLOGY	3 Hours

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

அலகு IV	வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்:	3

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

MODULE V	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.

அலகு V	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.

TOTAL:15HOURS

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.Balakrishnan) (Published by: RMRL) – Reference Book.

2301HS251	ENGINEERING EXPLORATION	L	T	P	C
		0	0	2	1

Prerequisite:

1.	Basic knowledge about Engineering products
2.	Willingness to design and fabricate simple products

COURSE OBJECTIVES:

CO 1:	Build mindsets & foundations essential for designers
CO 2:	Learn about the Human-Centered Design methodology and understand their real-world applications
CO 3:	Use Design Thinking for problem solving methodology for investigating ill defined problems.
CO 4:	Undergo several design challenges and work towards the final design challenge
CO 5:	**Apply Design Thinking on the following Streams to** Mechanical tools, Eco-friendly solutions for waste management, infrastructure, safety, alternative energy sources, Agriculture, Environmental science, Robotics and other fields of Engineering.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Describe class objectives & harness the designer mindset
CO2:	Describe the design thinking methodology
CO3:	Demonstrate about teams & problems through this
CO4:	Demonstrate about empathy
CO5:	Demonstrate about how to brainstorm effectively
CO6:	Design and fabricate effective prototypes
CO7:	Inspect prototypes and ideas through user feedback
CO8:	Prepare final Report and Presentation

COs Vs POs / PSOs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1				2			3	3		2			
CO2	2	1				2			3	3		2			
CO3	2	1				2			3	3		2			
CO4	2	1				2			3	3		2			
CO5	2	1				2			3	3		2			
CO6	3	3	2		2	2			3	3		2			
CO7	3	3	3		2	2			3	3		2			
CO8	2	1			1	2			3	3		2			

COURSE CONTENTS:

HOW TO PURSUE THE PROJECT WORK?

- The first part will be learning-based-masking students to embrace the methodology by exploring all the phases of design thinking through the wallet/ bag challenge and podcasts.
- The second part will be more discussion-based and will focus on building some necessary skills as designers and learning about complementary material for human- centered design.
- The class will then divide into teams and they will be working with one another for about 2 – 3 weeks. These teams and design challenges will be the basis for the final project and final presentation to be presented.
- The teams start with **Design Challenge** and go through all the phases more in depth from coming up with the right question to empathizing to ideating to prototyping and to testing.
- Outside of class, students will also be gathering the requirements, identifying the challenges, usability, importance etc
- At the end, Students are required to submit the final reports, and will be evaluated by the faculty.

TASKS TO BE DONE:

Task 1: Everyone is a Designer

- Understand class objectives & harness the designer mindset

Task 2: The Wallet/Bag Challenge and Podcast

- Gain a quick introduction to the design thinking methodology
- Go through all stages of the methodology through a simple design challenge
- Podcast: Observe, Listen and Engage with the surrounding environment and identify a design challenge.

Task 3: Teams & Problems
- Start Design Challenge and learn about teams & problems through this
- Foster team collaboration, find inspiration from the environment and learn how to identify problems

Task 4: Empathizing
- Continue Design Challenge and learn empathy
- Learn techniques on how to empathize with users
- Go to the field and interview people in their environments
- Submit Activity Card

Task 5: Ideating
- Continue Design Challenge and learn how to brainstorm effectively
- Encourage exploration and foster spaces for brainstorming
- Submit Activity Card

Task 6: Prototyping
- Continue Design Challenge and learn how to create effective prototypes
- Build tangible models and use them as communication tools
- Start giving constructive feedback to classmates and teammates
- Submit Activity Card

Task 7: Testing
- Finish Design Challenge and iterate prototypes and ideas through user feedback
- Evolve ideas and prototypes through user feedback and constructive criticism
- Get peer feedback on individual and group performance
- Submit Activity Card

Task 8:
- Final Report Submission and Presentation
- **Method of Evaluation: Same as Mini project category. Project exhibition may be conducted.**

	TOTAL: 45 HOURS

REFERENCES:

1. Tom Kelly, *The Art of Innovation: Lessons in Creativity From IDEO, America's Leading Design Firm* (Profile Books, 2002)
2. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation (HarperBusiness, 2009)
3. Jeanne Liedtka, Randy Salzman, and Daisy Azer, Design Thinking for the Greater Good: Innovation in the Social Sector (Columbia Business School Publishing, 2017)

OTHER USEFUL DESIGN THINKING FRAMEWORKS AND METHODOLOGIES:

1. Human-Centered Design Toolkit (IDEO); https://www.ideo.com/post/design-kit
2. Design Thinking Boot Camp Bootleg (Stanford D-School); https://dschool.stanford.edu/resources/the-bootcamp-bootleg
3. Collective Action Toolkit (frogdesign); https://www.frogdesign.com/wpcontent/uploads/2016/03/CAT_2.0_English.pdf
4. Design Thinking for Educators (IDEO); https://designthinkingforeducators.com/

2301GE251	CAD Laboratory	L	T	P	C
		0	0	2	1

Prerequisite:
1. Basic Computer knowledge
2. Engineering Graphics

COURSE OBJECTIVES:

CO 1:	To develop in students, Drafting skills for communication of concepts, ideas and design of Engineering products
CO 2:	To expose them to existing national standards related to technical drawings

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Ability to use the software packers for drafting and modeling
CO2:	Learned basic concept to drawing, edit, dimension, hatching etc. to develop 2& 3D Modelling.
CO3:	Able to create front view and top view of simple solids
CO4:	Able to create isometric projection of simple objects.
CO5:	Able to Create 3D models of Simple Objects and obtaining 2-D multi-view drawings from 3-D model

COs Vs POs / PSOs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	3	-	-	-	2	2	2	2	-	-	3
CO2	3	-	-	-	3	-	-	-	2	2	2	2	-	-	3
CO3	3	-	-	-	3	-	-	-	2	2	2	1	-	-	3
CO4	3	-	-	-	3	-	-	-	2	2	2	1	-	-	3
CO5	3	-	-	-	3	-	-	-	2	2	2	1	-	-	3

General:

Study of basics commands of a CAD **(AutoCAD)** software - two-dimensional drawing, editing, layering and dimensioning - coordinate Systems – units – limits

List of Experiments:

1. Construction of Lines, Simple geometries, and Title Block with necessary text and projection symbol.
2. Construction of Ellipse, Parabola, Hyperbola.
3. Construction of cycloids and involutes.
4. Construction of Projection of a straight Line.
5. Draw the orthographic views (front, top, and side views) of simple solids.
6. Draw sectional views of prism, pyramid, cylinder, cone, etc,
7. Creation of 3-D models of simple objects.

	TOTAL: 45 HOURS

REFERENCES:

1. N.D. Bhatt, Machine Drawing, Charotar Publishing House Pvt. Ltd., 2014.
2. P.S. Gill, A Textbook of Machine Drawing, Katson books, 2013.
3. R.K. Dhawan, A Textbook of Machine Drawing, S. Chand,2012.
4. K.C. John, Textbook of Machine Drawing, PHI Learning Pvt. Ltd.,2009.

2301GEX51	COMPUTER PRACTICES LABORATORY	L	T	P	C
		0	0	2	1

PREREQUISITE:

There is no prerequisite for the course

COURSE OBJECTIVES:

1.	To be familiar with Computer Hardware Components and installation of software.
2.	Make use of office package and to be familiar with the use of Office software.
3.	To learn about searching, downloading, and storing contents in the Cloud Network.

COURSE OUTCOMES:

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

CO1	Perform assembling and disassembling of desktop machine with different peripheral and software installation and servicing.
CO2	Simulate data using MS office for Presentation and Visualization.
CO3	Use browsers for searching & accessing/storing the contents to/from cloud.

LIST OF EXPERIMENTS:

1. Familiarization of Computers & Computer Hardware Components
2. Familiarization of major types of storage/memory technology
3. Installing various operating systems including software download/installation, Familiarization of basic software/tools
4. Working with MS-Office: MS Word, MS Excel, MS Powerpoint
5. Familiarization of Computer Shortcut keys
6. **Mini Project-1**: Assemble your computer and install an Operating System
7. Basics of Internet, Web browsers and Content Searching & accessing/storing the contents to/from cloud including DropBox
8. Familiarization of various types of security threats including virus
9. Computer Ethics; Open Source way
10. **Mini Project-2**: Document preparation using MS Word, Data Processing using MS Excel and Presentation using MS Powerpoint

TOTAL: 30 HOURS

COs Vs POs & PSOs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	-	-	-	2	2	-	-	1	1	1	1
CO2	3	3	2	2	2	-	-	-	-	1	-	1	1	1	1
CO3	3	3	2	1	-	-	-	2	-	-	-	1	1	1	1

HARDWARE/SOFTWARE REQUIREMENT

1. Standalone Desktop Computers with Internet Connectivity
2. Office Package
3. Operating System Packages

REFERENCES:

1. Kevin Wilson, "Computer Hardware: The Illustrated Guide to Understanding Computer Hardware", 2021
2. Kumar Bittu, "Mastering MS Office", 2020
3. Ajay Mittal &Anitha Goel, "Computer Fundamentals and Programming in C", 2017
4. https://nptel.ac.in/courses/106103068
5. https://docs.oracle.com/cd/E19121-01/sf.x2100m2/819-6592-13/Chap1.html
6. https://www.linkedin.com/learning/topics/microsoft-office

2301GEX53	FOUNDATION OF ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY (Common to CSE, IT, AIDS, BME, MECH, CIVIL)	L	T	P	C
		0	0	2	1

LIST OF EXPERIMENTS:

1. Verification of Ohm's law and Kirchhoff's laws	**3 Hours**
2. Residential house wiring using fuse, switch, indicator, lamp and energy meter	**3 Hours**
3. V-I characteristics of PN junction diode / Zener diode	**3 Hours**
4. IC 555 and IC 741 based experiments	**3 Hours**
5. Energy conservation demonstration experiment using energy meter	**3 Hours**
6. Waveform generation and calculation of RMS and average values	**3 Hours**
7. Design of 6V regulated power supply	**3 Hours**
8. Verification of Logic gates	**3 Hours**
9. Speed control of DC shunt motor.	**3 Hours**
10. I – V Characteristics of Solar PV cell (Simulation approach)	**3 Hours**
	TOTAL: 30 HOURS

REFERENCES :

1. Edward Hughes, " Electrical Technology,", Pearson Education

2. D.P. Kothari and Nagrath" Basic Electronics", MH Education 2013.

3. Paul Scherz and Simon Monk "Practical Electronics for inventors" Mc Graw Hill Publications 2013.

4. https://nptel.ac.in/courses/122106025/

5. https://em-coep.vlabs.ac.in/exp/speed-control-dc-motor/simulation.html

6. https://de-iitr.vlabs.ac.in/exp/truth-table-gates/simulation.html

7. Dr.T.Suresh Padmanabhan, Dr.M.Vinothkumar and Dr.S.Sivamani, "Foundation of Electrical and Electronics Engineering Laboratory Manual", June 2023.