

E.G.S. PILLAY ENGINEERING COLLEGE,(Autonomous)

Approved by AICTE, New Delhi

Affiliated to Anna University, Chennai | Accredited by NAAC with 'A++' Grade

Accredited by NBA (B.Tech-IT, B.E-CSE and ECE)(Tier-1)



NAGAPATTINAM – 611002

B.E.–Electrical and Electronics Engineering

R-2023

CURRICULUM FOR FIRST YEAR

SEMESTER - II											
Course Code	Course Name	L	T	P	C	H	Maximum Mark			Category	
							CA	ES	Total		
Theory Courses											
1	2301MA205	Calculus and Computational Methods	3	1	0	4	4	40	60	100	BSC
2	2301CH202	Applied Chemistry	3	0	0	3	3	40	60	100	BSC
3	2301GE204	Basic Civil and Mechanical Engineering	3	0	0	3	3	40	60	100	ESC
4	2302EE201	Electric Circuit Analysis	3	0	0	3	3	40	60	100	PCC
5		Language Elective	2	0	0	2	2	100	0	100	EEC
6	2301TA201	Tamils and Technology/ தமிழ் தொழில் பொருள்	1	0	0	1	1	100	0	100	HSMC
Theory Cum Laboratory Courses											
7	2301GEX04	Problem Solving using Python	2	0	4	4	6	50	50	100	ESC
Laboratory Courses											
8	2301GE252	Mathematics Simulation Laboratory	0	0	2	1	2	100	0	100	ESC
9	2301CHX51	Engineering Chemistry Laboratory	0	0	2	1	2	60	40	100	BSC
10	2301GEX51	Computer Practices Laboratory	0	0	2	1	2	100	0	100	ESC
11	2301LS201	Life Skills - II	0	0	0	0	0	100	0	100	-
Total			17	01	10	23	28	770	330	1100	

2301MA205	CALCULUS AND COMPUTATIONAL METHODS	L	T	P	C
		3	1	0	4

PREREQUISITE:

1. Basic concepts of Probability.
2. Basic concepts of Statistics.

COURSE OBJECTIVES:

1. This course aims at providing the required skill to apply the statistical tools in engineering problems.
2. To introduce the basic concepts of probability, random variables and two dimensional random variables.
3. To introduce the basic concepts of solving algebraic and transcendental equations.
4. To introduce the numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integration this plays an important role in engineering and technology disciplines.

COURSE OUTCOMES:

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

- CO1:** Determine the area and volume of a curve using double and triple integration.
- CO2:** Construct probabilistic models for observed phenomena through discrete and continuous distributions.
- CO3:** Apply measures of central tendency to analyze statistical data .
- CO4:** Correlate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
- CO5:** Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.

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									

COs Vs PSOs MAPPING

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

COURSE CONTENTS:

MODULE I VECTOR CALCULUS **9 Hours**

Gradient, Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration: Greens theorem in a plane, Gauss divergence theorem and Stokes’ theorem (excluding proofs) – Applications of the above theorems to find surface area of a closed region and volume of cube and parallel piped

MODULE II PROBABILITY **9 Hours**

One dimensional Random Variable - Discrete random variable Probability mass function – Discrete distributions - Binomial distribution - Poisson distribution - Continuous Random Variable - Probability density function - Continuous distribution: Uniform distribution - Normal distribution. Joint distributions – Marginal and conditional distributions

MODULE III	STATISTICS	9 Hours
Measures of Central Tendency – Measures of Dispersion - Correlation and linear regression - Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves.		
MODULE IV	SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS	9 Hours
Solution of algebraic and transcendental equations – Newton-Raphson method. Finite differences, Interpolation using Newton’s forward and backward difference formulae. Interpolation with unequal intervals: Lagrange’s formulae. Numerical Differentiation (first two derivatives) Numerical integration: Trapezoidal rule and Simpson’s 1/3rd and 3/8 th rules (single integral)		
MODULE V	NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS	9 Hours
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 = 60 HOURS		
REFERENCES:		
1. Peebles Jr. P.Z., Probability Random Variables and Random Signal Principles, Tata McGraw-Hill Publishers, Fourth Edition, New Delhi, 2016		
2. Gerald. C.F. and Wheatley. P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 7th Edition, 2007.		
3. Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016.		
4. Gupta, S.C., & Kapoor, V.K., Fundamentals of Mathematical Statistics, Sultan Chand & sons, 12th edition , 2020		
5. Veerarajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi, 2010.		
6. Ross, S, "A First Course in Probability, Ninth edition", Pearson Education, Delhi, 2018		
7. http://www.nptelvideos.in/2012/12/probability-random-variables.html (Link for NPTEL/SWAYAM/MOOC Courses)		
8. https://matlabacademy.mathworks.com/details/solving-ordinary-differential-equations-with-matlab/odes (Link for modern tool usage)		

2301CH202	APPLIED CHEMISTRY (EEE)	L	T	P	C
		3	0	0	3

PREREQUISITE:

- Basic knowledge of science up to higher secondary level

COURSE OBJECTIVES:

- To make the students conversant with boiler feed water requirements, related problems and water treatment techniques
- To impart technological aspects of applied chemistry

COURSE OUTCOMES:

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

CO1: Describe the amount of ion present in the water sample.(K2)

CO2: Determine the pH of the solutions. (K2)

CO3: Illustrate corrosion using electrochemical principles. (K2)

CO4: Describe the construction and working of batteries. (K2)

CO5: Summarize nano technology and polymer materials. (K2)

COs Vs POs MAPPING:

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

COs Vs PSOs MAPPING

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

COURSE CONTENTS:

MODULE I | WATER TECHNOLOGY **9 Hours**

Hardness of water – types – expression of hardness – units – estimation of hardness of water by EDTA -Alkalinity- boiler troubles (scale and sludge) – treatment of boiler feed water – Internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning) external treatment – Ion exchange process, zeolite process – desalination of brackish water- Reverse Osmosis.

MODULE II | ELECTROCHEMISTRY **9 Hours**

Cell terminology-Electrochemical cells- Electrolytic cells- Cell reactions- Daniel cell-Difference between electrolytic cells and electrochemical cells. Reversible cells and irreversible cells -types- EMF and its applications - Nernst equation (derivation and problems).Single electrode potential - Hydrogen electrode - Calomel electrode - Glass electrode - pH measurement using glass electrode

MODULE III|CORROSION AND COMPUTER COMPONENTS **9 Hours**

Corrosion – principles of corrosion – Pilling – Bed worth rule – principles of electrochemical corrosion – difference between chemical and electrochemical corrosion – galvanic corrosion – differential aeration corrosion – factors influencing corrosion – corrosion control – cathodic protection – sacrificial anodic method.

MODULE IV ENERGY STORAGE SYSTEMS	9 Hours
Batteries – introduction, Representation of a battery, Types- Alkaline battery, Lead acid, Nickel–Cadmium and Lithium ion batteries–advantages and disadvantages. Fuel Cells – Basic Structure- Hydrogen Fuel Cell, Renewable energy resources: photovoltaic cell, wind energy, Hydro power plant and tidal power generator.	
MODULE V NANOTECHNOLOGY AND POLYMER MATERIALS	9 Hours
Nanotechnology: Basics - distinction between molecules, nanoparticles and bulk materials; size-dependent properties. Nano particles: nano cluster, nano rod, nanotube(CNT) and nanowire. Synthetic methods: chemical vapour deposition, laser ablation; synthesis of metal oxide nano particles Polymer -functionality –degree of polymerisation- molecular weight determination (weight average and number average)-Thermoplastic & Thermo setting- Nanoparticles embedded polymer composites.	
TOTAL: 45 HOURS	
REFERENCES:	
1.Sashi Chawla, A Text book of Engineering Chemistry, Dhanpat Rai Publishing Co., Pvt. Ltd., Educational and Technical Publishers, New Delhi, 3rd Edition, 2015.	
2.S. S. Dara, <i>A Text book of Engineering Chemistry</i> , S. Chand & Co Ltd., New Delhi, 20th Edition, 2013.	
3.P.C. Jain and Monica Jain, A Textbook of Engineering Chemistry, DhanpatRai publications, New Delhi, 16th edition, 2015.	
4.O.V. Roussak and H.D. Gesser, <i>Applied Chemistry-A Text Book for Engineers and Technologists</i> , Springer Science Business Media, New York, 2nd Edition, 2013.	
5.Alain Nouailhat, “An Introduction to Nanoscience and Nanotechnology”, John Wiley, ISBN:978-1848210073	
https://onlinecourses.nptel.ac.in/noc23_bt31/preview	
https://onlinecourses.nptel.ac.in/noc23_me46/preview	

2301GE204	BASIC CIVIL AND MECHANICAL ENGINEERING											L	T	P	C	
												3	0	0	3	
COURSE OBJECTIVE																
1.	To get more knowledge in building structure with proper selection of construction material															
2.	To understand the power plants, IC engine and refrigeration system															
COURSE OUTCOME																
On the successful completion of the course, students will be able to																
CO1	Explain the usage of construction material and proper selection of it.															
CO2	Design building structure															
CO3	Explain about various power plants and its operation															
CO4	Describe the operation of internal combustion engine															
CO5	Discuss about Refrigeration And Air Conditioning System															
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							0	1	2	1	2	3
	CO2	3	3	2									1	3		
	CO3	2	1			3								3		2
	CO4	3	3	2		3								3		2
	CO5	2	1			3							1	3		2
COURSE CONTENT																
MODULE I	SURVEYING AND CIVIL ENGINEERING MATERIALS											9 Hours				
Surveying: Objects – types – classification – principles – measurements of distances – angles – leveling – determination of areas – illustrative examples.																
Civil Engineering Materials: Bricks – stones – sand – cement – concrete – steel sections.																
MODULE II	BUILDING COMPONENTS AND STRUCTURES											9 Hours				
Foundations: Types, Bearing capacity – Requirement of good foundations.																
Superstructure: Brick masonry – stone masonry – beams – columns – lintels – roofing – flooring – plastering – Mechanics – Internal and external forces – stress – strain – elasticity – Types of Bridges and Dams – Basics of Interior Design and Landscaping.																
MECHANICAL ENGINEERING																
MODULE III	POWER PLANT ENGINEERING											9 Hours				
Introduction, Classification of Power Plants – Working principle of steam, Gas, Diesel, Hydro-electric and Nuclear																
Power plants – Merits and Demerits – Pumps and turbines – working principle of Reciprocating pumps (single acting and double acting) – Centrifugal Pump.																
MODULE IV	IC ENGINES											9 Hours				
Internal combustion engines as automobile power plant – Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Boiler as power plant.																
MODULE V	REFRIGERATION AND AIR CONDITIONING SYSTEM											9 Hours				
Terminology of Refrigeration and Air Conditioning – Principle of vapour compression and absorption system – Layout of typical domestic refrigerator – Window and Split type room Air conditioner.																

TOTAL:45 HOURS

REFERENCES:

1. RamamruthamS.,“BasicCivilEngineering”,DhanpatRaiPublishingCo.(P)Ltd. 1999.
2. SeetharamanS.,“BasicCivilEngineering”,AnuradhaAgencies,2005.
3. VenugopalK.andPrahurajaV.,“BasicMechanicalEngineering”,AnuradhaPublishers,Kumbakonam,2000.
4. ShanthaKumarSRJ.,“BasicMechanicalEngineering”,Hi-techPublications,Mayiladuthurai,2000.
5. ShanmugamG andPalanichamyMS,“BasicCivilandMechanicalEngineering”,Tata McGrawHillPublishing Co., New Delhi, 1996.

2302EE201	ELECTRIC CIRCUIT ANALYSIS	L	T	P	C
		3	0	0	3
PREREQUISITE:					
1. Physics					
COURSE OBJECTIVES:					
1.To introduce electric circuits and its analysis 2. To impart knowledge on solving circuit equations using network theorems 3. To educate on obtaining the transient response of circuits 4. To introduce the phenomenon of resonance in RLC circuits.					
COURSE OUTCOMES:					
On the successful completion of the course, students will be able to					
CO1:	Compute the unknown current and voltages in DC circuits using mesh and node methods				
CO2:	Calculate the unknown circuit parameters of AC circuits and power measurement in three phase systems				
CO3:	Verify network theorems in DC and AC circuits				
CO4:	Compute the transient response of RLC circuits using step and sinusoidal inputs				
CO5:	Discuss about resonance circuits and coupled circuits				
COURSE CONTENTS:					
MODULE I	DC CIRCUITS				9 Hours
DC Circuits- R, L and C elements, Resistors in series and parallel; Ohm’s Law, Kirchhoff ‘s Laws; Source transformation, voltage and current division, Mesh current and node voltage methods of analysis					
MODULE II	AC CIRCUITS				9 Hours
A.C Circuits- Average and RMS Value, Complex Impedance, Real and Reactive Power, Power Factor, Phasor diagram, Mesh current and node voltage methods of analysis Three phase system- balanced, unbalanced system/load, star/ delta conversion, power measurement using two wattmeter method					
MODULE III	NETWORK THEOREMS				9 Hours
Theorems- Superposition, Thevenin’s and Norton’s Theorem, Maximum power transfer theorems, Application to DC and AC Circuits.					
MODULE IV	TRANSIENT ANALYSIS				9 Hours
Introduction to Laplace transforms and inverse Laplace transforms, Transient response analysis of RL, RC and RLC circuits - Source free, Step input and Sinusoidal input.					
MODULE V	RESONANCE AND COUPLED CIRCUITS				9 Hours
Resonance: Series and parallel RL, RC and RLC circuits, frequency response, quality factor and bandwidth. Coupled circuits: Self-inductance, mutual inductance, dot rule, coupling coefficient, conductively coupled circuits					
TOTAL: 45 HOURS					

COs Vs POs & PSOs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	3	3	2									1	3		
CO 2	3	3	2									1	3		
CO 3	2	1			3								3		2
CO 4	3	3	2		3								3		2
CO 5	2	1			3							1	3		2

REFERENCES:

1. W. H. Hayt and J. E. Kemmerly, “Engineering Circuit Analysis”, McGraw Hill Education,
2. M. E. Van Valkenburg, “Network Analysis”, Prentice Hall, 2006.
3. A. A. Nimje and D. P. Kothari, “Electrical Circuit Analysis and synthesis”, New Age
4. D.P. Kothari and I.J. Nagrath, “Theory and Problems of Basic Electrical Engineering”,
5. C. K. Alexander and M. N. O. Sadiku, “Electric Circuits”, McGraw Hill Education, 2004.
6. K. S. Suresh Kumar, “Electric Circuit Analysis”, Pearson Publications, 2013.
7. <https://archive.org/details/2018DcElectricalCircuitsWorkbook/page/n19/mode/2up?ref=ol>
8. <https://open.umn.edu/opentextbooks/textbooks/ac-circuits>
9. <https://archive.org/details/2017ACCircuits/page/n1/mode/2up?ref=ol&view=theater>
10. <https://archive.nptel.ac.in/courses/108/105/108105159/#>
11. <https://asnm-iitkgp.vlabs.ac.in/exp/verification-norton-theorem/>(Link for Virtual Labs)
12. <https://asnm-iitkgp.vlabs.ac.in/exp/verification-thevenin-theorem/>(Link for Virtual Labs)
9. <https://asnm-iitkgp.vlabs.ac.in/exp/verification-superposition-theorem/> (Link for Virtual
10. <https://asnm-iitkgp.vlabs.ac.in/exp/rlc-circuit-analysis/>(Link for Virtual Labs)

2304LEX0X	ADVANCED ENGLISH COMMUNICATION											L	T	P	C
												2	0	0	2
COURSE OBJECTIVES:															
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 organisation															
CO2: Develop their inter personal skills and problem-solving skills.															
CO3: Understand the role of body language in effective communication															
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	-	-			
COURSE CONTENTS:															
MODULE I	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.															
MODULE II	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.															
MODULE III	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.															
MODULE IV	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.															
MODULE V	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.

2301TA201	தமிழரும் தொழில்நுட்பமும்/ Tamils and Technology	L	T	P	C
		1	0	0	1
PRE REQUISITE:					
<p>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.</p> <p>Recognizing this fact and for meeting the felt and emerging needs of the Tamil Communities and others interested in Tamil studies</p>					
COURSE OBJECTIVES:					
<p>Tamil Literature is way of a life. It focuses on the historical significance of ethics, moral culture in the Tamil context.</p> <p>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</p>					
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			
<p>Weaving Industry during Sangam Age–Ceramic technology–Black and Red Ware Potteries (BRW) Graffition Potteries.</p> <p>அலகு I நெசவு மற்றும் பானைத் தொழில்நுட்பம்: 3 சங்க காலத்தில் நெசவுத் தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.</p>					
MODULE II	DESIGN AND CONSTRUCTION TECHNOLOGY	3 Hours			
<p>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.</p>					

அலகு II வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்: 3		3
<p>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.</p>		
MODULE III	MANUFACTURING TECHNOLOGY	3 Hours
<p>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 beads – Archeological evidences – Gems tone types described in Silappathikaram.</p>		
அலகு III உற்பத்தித் தொழில் நுட்பம்: 3		3
<p>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.</p>		
MODULE IV	AGRICULTURE AND IRRIGATION TECHNOLOGY	3 Hours
<p>Dam, Tank, ponds, Sluice, Significance of KumizhiThoompu 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</p>		
அலகு IV வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்: 3		3
<p>அணை, ஏரி, குளங்கள், மதகு – சோழர்காலக் குழுழித் தூம்பின் முக்கியத்துவம் – கால்நடை பராமரிப்பு – கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் – கடல்சார் அறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்குளித்தல் – பெருங்கடல் குறித்த பண்டைய அறிவு – அறிவுசார் சமூகம்.</p>		
MODULE V	SCIENTIFIC TAMIL & TAMIL COMPUTING	3 Hours
<p>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.</p>		
அலகு V அறிவியல் தமிழ் மற்றும் கணித்தமிழ்: 3		3
<p>அறிவியல் தமிழின் வளர்ச்சி –கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் – தமிழ் மென்பொருட்கள் உருவாக்கம் – தமிழ் இணையக் கல்விக்கழகம் – தமிழ் மின் நூலகம் – இணையத்தில் தமிழ் அகராதிகள் – சொற்குவைத் திட்டம்.</p>		
		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.

2301GEX04	PROBLEM SOLVING USING PYTHON	L	T	P	C
		2	0	4	4
PREREQUISITE:					
The course assumes no prior skill or background in design, art or engineering. It is open to all undergraduates and graduate students with an interest in programming.					
COURSE OBJECTIVES:					
<ol style="list-style-type: none"> To know the basics of problem solving To learn the basic syntax and semantics of python programming To acquire programming skills in core python To use python data structures and develop a skill of designing applications using modules and packages 					
COURSE CONTENTS:					
MODULE I	PROBLEM SOLVING AND PYTHON INTRODUCTION	6 Hours			
Problem Solving: Fundamentals of computing-Algorithms-Building blocks of an algorithm-Pseudocodes and flowcharts. Introduction: Python Interpreter and Interactive mode- Variables and Identifiers- Data Types- Operators-Operator Precedence-Expressions.					
MODULE II	DECISION MAKING	5 Hours			
Control Flow: If Statement-Elseif Statements-Nested If-else -Loop structure-While Loop-Nested While Loop-For Loop-Nested for Loop- Break and continue statements.					
MODULE III	DATA STRUCTURES IN PYTHON	7 Hours			
Introduction- Lists: List Operations-List Slicing-List methods- List Loop-Cloning lists- Mutability- Aliasing- Tuples: Tuple Assignment- Tuple as return value- Nested tuples- Basic tuple operations-Advanced list processing- List comprehension -Sets and Dictionaries: Operations and Methods-Arrays.					
MODULE IV	STRINGS AND FUNCTIONS	6 Hours			
Strings: Introduction, Indexing, Traversing, Concatenating, Appending, Multiplying, Formatting, Slicing, Comparing, Iterating – Basic Built-In String Functions – Functions: Parameters-Return Values-Local and Global Scope-Recursion- Lambda functions.					
MODULE V	FILES, EXCEPTIONS, MODULES AND PACKAGES	6 Hours			
Files and Exception: Text Files-Reading and writing files-Format operator-command line arguments- errors and exceptions- Handling exceptions – Multiple Exceptions. Modules>Loading and execution-Packages-Python standard Libraries.					
LIST OF EXPERIMENTS:					
30 Hours					
<ol style="list-style-type: none"> Familiarization with different python IDE Develop simple programs using python syntax and semantics Demonstrate python programs using Arithmetic expressions Illustrate conditional statements with real time problems Basic python applications using list, Tuples. Implement Python program using Dictionaries Implementation of sorting and searching Implement Python program using Strings Write python functions to facilitate code reuse Illustrate file concepts with real time problems Use Exception handling in python applications for error handling Implement simple applications using modules and packages Develop Real Time applications like number guessing, Dice rolling simulator etc. 					
TOTAL: 60 HOURS					

COs Vs POs & PSOs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	3	3	2	2	2										
CO 2	3	3	2	2	2										
CO 3	3	3	3	2	2										
CO 4	3	3	2	2	2										
CO 5	3	3	3	2	2										

REFERENCES:

1. Martin C Brown, “Python The Complete Reference”, Mc Graw-Hill Education – Europe, 4th Edition, 2018
2. Reema Thareja, “Python Programming: Using Problem Solving Approach”, Oxford University Press, 2017.
3. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist”, Second Edition, Shroff/O’Reilly Publishers, 2016. (<http://greenteapress.com/wp/thinkpython/>).
4. Ben Stephenson, “The Python workbook A brief introduction with exercises and solutions”, Springer International publishing, Switzerland 2014.
5. Guido van Rossum, Fred L. Drake Jr., “An Introduction to Python – Revised and Updated for Python 3.2”, Network Theory Ltd., 2011.
6. Charles Dierbach, “Introduction to Computer Science using Python”, Wiley India Edition, 2016.
7. Timothy A. Budd, “Exploring Python”, Mc-Graw Hill Education (India) Private Ltd., 2015.
8. <https://nptel.ac.in/courses/106106182>
9. <https://www.learnpython.org/>
10. <https://www.codecademy.com/learn/learn-python>

REQUIREMENTS: (A batch of 30 students)

Hardware Requirements: Standalone Desktop Computer or Server Supporting
Software Requirements: Python Interpreter Version 3

2301GE252	MATHEMATICS SIMULATION LABORATORY	L	T	P	C
		0	0	3	2
PREREQUISITE:					
1. Mathematics					
COURSE OBJECTIVES:					
The purpose of this course is to provide a thorough introduction to MATLAB with an in depth study of various arithmetic, logical and mathematical operations with plots. Application of MATLAB to basic engineering techniques					
COURSE OUTCOMES:					
On the successful completion of the course, students will be able to					
CO 1 : Analyze, design and begin to control rigorous mathematical models in continuous and discrete approaches					
CO 2 : Apply the fundamental analytical techniques and simulation methods used to develop insight into system behavior.					
CO 3 : Develop the mathematical model to reflect corrections, improvements and enhancements					
COURSE CONTENTS:					
1. MATLAB basics					
<ul style="list-style-type: none"> • The MATLAB environment • Basic computer programming • Variables and constants, operators and simple calculations • Formulas and functions • MATLAB toolboxes 					
2. Variables and Expressions in MATLAB					
<ul style="list-style-type: none"> • Variables, Arithmetic operators, Relational operators, Logical operators, and functions • Hierarchy of operations • built in functions • Assignment operators 					
3. Vectors in MATLAB					
<ul style="list-style-type: none"> • Scalar and vectors • Assigning data to vector/scalar • Vector product, vector transpose • creation of evenly spaced row vectors 					
4. Matrix in MATLAB					
<ul style="list-style-type: none"> • Entering data in matrices, matrix subscripts • sub matrices/sub arrays, multi dimension matrices • Matrix Operations - Addition, Multiplication, Transpose, Inverse • generation of special matrices 					
5. Arrays in MATLAB					
<ul style="list-style-type: none"> • Introduction of array • Arithmetic operations on arrays • Function with array inputs • Logical operators • Relational operators, cell arrays 					

6. Polynomials in MATLAB <ul style="list-style-type: none">• Entering a polynomial, polynomial evaluation• roots of polynomial, polynomial arithmetic• characteristics of polynomial of a metrics• polynomial integration, polynomial differentiation• polynomial curve fitting
7. Partial Differential Equations with MATLAB <ul style="list-style-type: none">• Linear PDEs• The Principle of Superposition• Solve PDE with Discontinuity• Separation of Variables for Linear, Homogeneous PDEs• Eigen value Problems
8. Numerical Integration and Differential Equations <ul style="list-style-type: none">• Ordinary Differential Equations• Boundary Value Problems• Delay Differential Equations• 1-D Partial Differential Equations• Numerical Integration and Differentiation
9. Linear algebra and calculus <ul style="list-style-type: none">• Eigen values and Eigen vectors of Higher Order Matrices• Solving first order ordinary differential equations.• Solving second order ordinary differential equations.• Determining Maxima and Minima of a function of one variable.• Determining Maxima and Minima of a function of two variables.
10. Numerical simulations <ul style="list-style-type: none">• Numerical methods and simulations• Random number generation• Montecarlo methods
11. Integral Transforms - Fourier Series <ul style="list-style-type: none">• Properties of Sine and Cosine• The Fourier Series• Fourier Sine and Cosine Transforms• The Fourier Transform
<ul style="list-style-type: none">• Calculus in MATLAB Evaluating double integral with constant and variable limits.• Area as double integral• Evaluating gradient, divergence and curl• Evaluating line integrals
12. Laplace Transforms in MATLAB <ul style="list-style-type: none">• Evaluating Laplace transforms and inverse Laplace transforms of functions including impulse• Applying the technique of Laplace transform to solve differential equations

13. Computer programming

- Algorithms and structures
- MATLAB scripts and functions (m-files)
- Simple sequential algorithms
- Control structures (if...then, loops)

14. MATLAB programming

- Reading and writing data, file handling
- Personalized functions
- Toolbox structure
- MATLAB graphic functions

45 Hours

COs Vs POs & PSOs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	3	3	2	2	2						1	1	3		2
CO 2	3	3	2	2	2						1	1	3		2
CO 3	2	1	2	2	3						1	2	3		2

REFERENCES:

1. Mathematical Modeling and Simulation: Introduction for Scientists and Engineers, Kai Veltn, Wiley 2009.
2. Introduction to Simulink ® with Engineering Applications, Steven T. Karris, Orchard Publications, 2006.
3. Simulation Modeling and Analysis with Expert fit Software, Averill Law, McGraw-Hill Science, 2007.
4. A Concrete Approach to Mathematical Modelling, M. M. Gibbons, Wiley-Inter science, 2007.
5. Rudra Pratap“ Getting started with Matlab 7”, Oxford publication.
6. Stephen J. Chapman “MATLAB Programming for Engineers” Cengage Learning
7. Bruce L Littlefield, Duane C Hanselman “Mastering Matlab 7” Pearson Publication
8. Agam Kr. Tyagi “MATLAB and Simulink for Engineers” Oxford Publication

2301CHX51	ENGINEERING CHEMISTRY LABORATORY											L	T	P	C
COMMON TO ALL BRANCHES												0	0	2	1
PREREQUISITE:															
<ul style="list-style-type: none"> Basic knowledge of science up to higher secondary level 															
COURSE OBJECTIVES:															
<ul style="list-style-type: none"> To make the students conversant with boiler feed water requirements, related problems and water treatment techniques To impart technological aspects of applied chemistry 															
COURSE OUTCOMES:															
On the successful completion of the course, students will be able to															
CO1:	Estimate the amount of ion present in the water sample.														
CO2:	Determine the pH of the solutions.														
CO3:	Estimate the corrosion behavior of metals.														
CO4:	Determine the acid content using electrochemical principles.														
CO5:	Determine the molecular weight of the polymer.														
COs Vs POs MAPPING:															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12			
CO1	3	2			1			1	1						
CO2	3	2			1			1	1						
CO3	3	2			1			1	1						
CO4	3	2			1			1	1						
CO5	3	2			1			1	1						
COs Vs PSOs MAPPING															
	Cos	PSO1	PSO2	PSO3											
	CO1	1													
	CO2	1													
	CO3		1												
	CO4														
	CO5														
LIST OF EXPERIMENTS															
1. Determination of total, temporary & permanent hardness of water by EDTA method															
2. Comparison of alkalinities of the given water samples															
3. Estimation of iron content of the given solution using potentiometer															
4. Corrosion experiment – weight loss method															
5. Conductometric titration of strong acid Vs strong Base															
6. Determination of molecular weight of a polymer by viscometry method															
7. Determination of percentage of copper in alloy															
8. Determination of ferrous iron by Spectrophotometry method															
9. Estimation of calcium present in cement.															
10. Determination of strength of given hydrochloric acid using pH meter															
11. Estimation of sodium ion present in water by flame photometer.															

12. Estimation of dissolved oxygen in a water sample/sewage by Winklers method.

13. Synthesis of metal oxide nanoparticles by chemical method.

REFERENCES:

1.Experimental organic chemistry, Daniel R. Palleros, John Wiley & Sons, Inc., New Yor (2001)

2.Engineering Chemistry”, Jain & Jain, 15th edition, Dhanpat Rai Publishing company, New Delhi

3.Vogel’s Textbook of practical organic chemistry, Furniss B.S. Hannaford A.J, Smith P.W.G and Tatchel A.R LBS Singapore (1994)

4.LBS Singapore (1994). Kolthoff I.M., Sandell E.B. et al Mcmillan, Madras 1980

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	PO 1	PO2	PO3	PO 4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	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															

