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

Approved by AICTE, New Delhi

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

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

NAGAPATTINAM – 611002

B.E - Biomedical Engineering

R-2023

CURRICULUM FOR FIRST YEAR

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	C	MAX. MARKS		
							CA	ES	TOTAL
2301IP101	Induction Program	-	0	0	0	0	0	0	0
2301MA102	Engineering Mathematics – I	BSC	3	1	0	4	40	60	100
2301PH101	Physics of Semiconductor and Optoelectronics Devices	BSC	3	0	2	4	50	50	100
2301CH101	Chemistry for Biomedical Engineering	BSC	3	0	2	4	50	50	100
2301GEX04	Problem Solving using Python	ESC	2	0	4	4	50	50	100
2301ENX01	Professional English	HSMC	2	0	2	3	50	50	100
2301TA101	Tamil and Technology	HSMC	1	0	0	1	100	0	100
2301GEX52	Engineering Practices Laboratory	ESC	0	0	4	2	60	40	100
2301LS101	Life Skill Activity – I	-	0	0	0	0	100	0	100
TOTAL			**14**	**1**	**14**	**22**	**500**	**300**	**800**

2301ENX01	PROFESSIONAL ENGLISH Common to B.E /B.Tech Programme (CIVIL,BME,CSE,ECE,EEE,IT,MECH,AIDS)	L	T	P	C
		2	0	2	3

PREREQUISITE:

1. Basic English Knowledge

COURSE OBJECTIVES:

1.	To improve the communicative competence of learners.
2.	To learn to use basic grammatical structures in suitable contexts.
3.	To acquire lexical competence and use them appropriately in a sentence and understand their meaning in a text.
4.	To help learners use language effectively in professional contexts.
5.	To develop learners' ability to read and write complex texts, summaries, articles, blogs, definitions, essays and user manuals.
6.	To use language efficiently in expressing their opinions
7.	To develop various listening strategies to comprehend various types of audio materials like lectures, discussions, videos etc.
8.	To develop talent, facilitate employability enabling the incumbent to excel and sustain in a highly competitive world of business.

COURSE OUTCOMES:

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

CO1:	Use appropriate words in a professional context.
CO2:	Understand the basic grammatical structures and use them in right context.
CO3:	Read and infer the denotative and connotative meanings of technical texts.
CO4:	Read and interpret information presented in tables, charts and other graphic forms.
CO5:	Write definitions, descriptions, narrations and essays on various topics
CO6:	Listen to and comprehend general as well as complex academic and non academic information's
CO7:	Speak fluently and accurately in formal and informal communicative contexts.
CO8:	Understand, analyse develop and exhibit accurate sense of self.

COs Vs POs MAPPING:

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

COs Vs PSOs MAPPING

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

COURSE CONTENTS:		
MODULE I	**FUNDAMENTALS OF COMMUNICATION**	**6 Hours**
Reading - Reading brochures (technical context)/ user manuals/, telephone messages / social media messages relevant to technical contexts and emails. Writing - Professional emails etiquette, emails / letters (seeking permission for Industrial visit& Complain letter) Grammar - Present Tense (simple and progressive); Question types: Why/ Yes or No/ and Tags. Vocabulary - Word forms (prefixes& suffixes); Synonyms and Antonyms, Punctuation.		
MODULE II	**NARRATION AND SUMMATION**	**6 Hours**
Reading - Reading longer technical texts (Reading biographies/travelogues/newspaper reports/ travel & technical blogs). Writing - Paragraph writing Short Report on an event (field trip etc.), emails / letters (Writing responses to complaints). Grammar –Past tense (simple); Subject-Verb Agreement. Vocabulary – Preposition, Pre positional Phrases Phrasal verbs.		
MODULE III	**DESCRIPTION OF A PROCESS / PRODUCT**	**6 Hours**
Reading – Reading advertisements, gadget reviews. Writing – instructions, Checklists, Report Writing (Accident Report & Survey Report (IV)). Grammar –Present & Past Perfect Tenses, Voices (Active, Passive & Impersonal Passive Voice); Vocabulary –Collocations, Homonyms; and Homophones.		
MODULE IV	**CLASSIFICATION AND RECOMMENDATIONS**	**6 Hours**
Reading – Newspaper articles; Journal reports –and Non Verbal Communication (tables, pie charts etc,).; Writing- Job / Internship application – Cover letter & Resume ,recommendations. Grammar – Articles, Adjectives of Comparison, If conditional sentences-Vocabulary –Conjunctions, discourse markers (connectives & sequence words)		
MODULE V	**EXPRESSION**	**6 Hours**
Reading – Company profiles, standard operating procedure (SOP)/ an excerpt of interview with professionals. Writing – Essay Writing (Descriptive or narrative), Grammar – Future Tenses, Numerical adjectives, Relative Clauses. Vocabulary - Cause & Effect Expressions – Content vs Function words.		
		TOTAL: 30 HOURS
Lab Exercises		
Listening : Listening for general information-specific details Audio / video (formal & informal). Listening IELTS/TOFEL/ TED Talks and educational videos. Listening to podcasts, anecdotes / stories / event narration; documentaries and interviews with celebrities. Listening - Listen to product and process descriptions; and advertisements about products. Listening – Listening to debates/ discussions; different viewpoints on an issue; and panel discussions.		
Speaking: Self - Introduction - Role Play Exercises Based on Workplace Contexts- Group Discussion (Discussing advantages and disadvantages/ purposes and reasons)-discussing progress toward goals- discussing past events in life-discussing news stories- describing clothing Discussion (making plans, talking about tasks,, about progress analyze and present concepts and problems from various perspectives)-making telephone calls (politeness strategies- making polite requests, making polite offers, replying to polite requests and offers) Interpreting (Picture, locations in workplaces)- Presenting a product- describing shapes and sizes and weights-talking about quantities(large & small).		
Personality Development: Introduction to life skills -Multiple Intelligences Embracing diversity- emotional intelligence (visualizing and experiencing purpose)-Self-awareness - Time management-Stress management - body awareness-Leadership- teamwork & dealing with ambiguity--interview planning- Mock Interviews-–paralinguistic features- spiritual quotient (ethics)- Self-Concept.		

REFERENCES:
1.Technical Communication – Principles And Practices By Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2016, New Delhi.
2. A Course Book On Technical English By Lakshminarayanan, Scitech Publications (India) Pvt. Ltd.
3. English For Technical Communication (With CD) By AyshaViswamohan, Mcgraw Hill Education, ISBN : 0070264244.
4. Effective Communication Skill, Kulbhusan Kumar, RS Salaria, Khanna Publishing House.
5. Learning to Communicate – Dr. V. Chellammal, Allied Publishing House, New Delhi,2003.
6. Raman. Meenakshi, Sharma. Sangeeta (2019). Professional English. Oxford university press. New Delhi

2301MA102	ENGINEERING MATHEMATICS – I (For ECE AND BME) (LINEAR ALGEBRA,CALCULUS AND PARTIAL DIFFERENTIATION)	L	T	P	C
		3	1	0	4

PREREQUISITE:
1. Matrices
2. Differentiation
3. Integration.

COURSE OBJECTIVES:

1.	To educate Matrix Algebra Technique and curvature theory.
2.	To familiarize the students with differential calculus to apply in solving Modern Engineering Problems.
3.	To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.
4.	To familiarize the student with functions of several variables.

COURSE OUTCOMES:

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

CO1:	Apply Orthogonal Transformation to determine the system of linear equations with matrices.
CO2:	Develop the evolutes and envelopes of given curves u s ing radius and center of curvature.
CO3:	Apply the integration concepts to solve real life problems that arise in the field of engineering
CO4:	Calculate the nature of series using comparison, Ratio, Leibnitz tests.
CO5:	Examine the maxima/minima of multivariable function.

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	MATRICES	9 Hours

Rank of a matrix - Consistency of the system of linear equations - linear dependence and independence of vectors. Eigen values and Eigen vectors of a matrix - Caley-Hamilton theorem and its applications - Reduction to diagonal form - Reduction of a quadratic form to canonical form - orthogonal transformation and congruent transformation.

MODULE II	DIFFERENTIAL CALCULUS	9 Hours

Curvature in Cartesian Co-ordinates – Centre and radius of curvature – Circle of Curvature -Evolutes and involutes.

MODULE III	MULTIPLE INTEGRALS	9 Hours
Double and triple integrals - Computation of surface areas and volumes- Change the order of Integration.		
MODULE IV	SEQUENCE AND SERIES	9 Hours
Convergence of sequence and series, Tests for convergence; Power series, Taylor's series, Series for exponential, Trigonometric and Logarithm functions.		
MODULE V	FUNCTIONS OF SEVERAL VARIABLES	9 Hours
Partial Differentiation - Total Differentiation – Euler's theorem and generalization - Maxima and minima of functions of several variables (two and three variables) – Lagrange's method of Multipliers - Change of variables –Jacobians – simple illustrations.		
	TOTAL:45 + 15 = 60 HOURS	

REFERENCES:
1.Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2018.
2.R. K. Jain and S. R. K. Iyengar, "Advanced Engineering Mathematics", 5th ed, Narosa Publishing House, 2016.
3.G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson,Reprint, 2002.
4.Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley &Sons,2006.
5.Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.
6.D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
7.N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, LaxmiPublications, Reprint, 2008.
8.B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

2301PH101	PHYSICS OF SEMICONDUCTOR AND OPTOELECTRONIC DEVICES (For ECE & BME)	L	T	P	C
		3	0	2	4

PREREQUISITE:
Basic knowledge in physics

COURSE OBJECTIVES:
1.To instill knowledge on physics of semiconductors, determination of charge carriers and device applications
2.To make the students to understand the basics of dielectric materials, electrical properties of materials including free electron theory, applications of quantum mechanics
3.To establish a sound grasp of knowledge on different magnetic & optical properties of materials
4.To make the students to understand the basics of optoelectronic devices, optical displays and applications
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 clearly of semiconductor physics and functioning of semiconductor devices
CO2:	Apply basics of dielectric materials, gain knowledge on the electrical properties of materials and their applications
CO3:	Understand the magnetic, optical properties of materials
CO4:	Demonstrate a strong knowledge in optoelectronic devices and working principles of various optical devices
CO5:	Appreciate the importance of nanotechnology and nanodevices

COs Vs POs MAPPING:

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

COs Vs PSOs MAPPING

COs	PSO1	PSO2	PSO3
CO1			
CO2			
CO3			
CO4			
CO5			

COURSE CONTENTS:

MODULE I	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 II	DIELECTRIC MATERIALS AND ELECTRICAL PROPERTIES	9 Hours

Polarization mechanisms: electronic, ionic, orientational, interfacial and total polarization – frequency dependence – local field and Causius-Mossetti equation – dielectric constant and dielectric loss. Classical free electron theory - Expression for electrical conductivity – Thermal conductivity, expression - Quantum free electron theory - Electron in periodic potential – Energy bands in solids

MODULE III	MAGNETIC & OPTICAL PROPERTIES OF MATERIALS	9 Hours

Magnetic materials: Dia, para and ferromagnetic effects – paramagnetism in the conduction electrons in metals – exchange interaction and ferromagnetism – quantum interference devices – GMR devices.
Classification of optical materials – Optical processes in semiconductors: optical absorption and emission, charge injection and recombination, optical absorption, loss and gain. Optical processes in quantum wells

MODULE IV	OPTOELECTRONIC DEVICES	9 Hours
Optoelectronic devices: light detectors and solar cells – light emitting diode – laser diode – optical processes in organic semiconductor devices –excitonic state – Electro-optics and nonlinear optics: Modulators and switching devices – plasmonics		
MODULE V	NANO DEVICES	9 Hours
Density of states for solids - Significance between Fermi energy and volume of the material – Quantum confinement – Quantum structures – Density of states for quantum wells, wires and dots – Band gap of nanomaterials –Tunneling – Single electron phenomena – Single electron Transistor-Carbon nanotubes: Properties and applications - Spintronic devices and applications – Optics in quantum structures – quantum well laser.		
		TOTAL: 45 HOURS

REFERENCES:

1.S.O. Kasap. Principles of Electronic Materials and Devices, McGraw Hill Education (Indian Edition), 2020.

2. R.F.Pierret. Semiconductor Device Fundamentals. Pearson (Indian Edition), 2006.

3. G.W.Hanson. Fundamentals of Nanoelectronics. Pearson Education (Indian Edition), 2009.

4. Jasprit Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw- Hill Education (Indian Edition), 2019.

5. Charles Kittel, Introduction to Solid State Physics, Wiley India Edition, 2019

6. https://archive.nptel.ac.in/courses/108/108/108108122/

7. https://onlinecourses.nptel.ac.in/noc20_ph24/preview

LIST OF EXPERIMENTS

1. Torsional pendulum - Determination of rigidity modulus of wire and moment of inertia of regular and irregular objects.

2. Simple harmonic oscillations of cantilever.

3. Non-uniform bending - Determination of Young's modulus

4. Uniform bending – Determination of Young's modulus

5. Laser- Determination of the wavelength of the laser using grating

6. Air wedge - Determination of thickness of a thin sheet/wire

7. a) Optical fibre -Determination of Numerical Aperture and acceptance angle b) Compact disc-Determination of width of the groove using laser.

8. Acoustic grating- Determination of velocity of ultrasonic waves in liquids.

9. Ultrasonic interferometer – determination of the velocity of sound and compressibility of liquids

10. Determination of Band gap of a semiconductor.

11. Poiseuille's method for finding viscosity of a liquid

12. Lee's Disc-Thermal conductivity of bad conductor

13. Spectrometer-determination of wavelength using grating

References

1. Practical Physics', R.K. Shukla, AnchalSrivastava, New age international (2011

2. B.Sc. Practical Physics', C.L Arora, S. Chand &Co. (2012)

2301CH101	CHEMISTRY FOR BIOMEDICAL ENGINEERING	L	T	P	C
		3	0	2	4

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:	Estimate the amount of ion present in the water sample.(K3)
CO2:	Determine the molecular weight of the polymer. (K3)
CO3:	Measure the percentage of corrosion using electrochemical principle. (K3)
CO4:	Measure the amount of heavy metals using spectrophotometer. (K3)
CO5:	Estimate the conduction ability of materials. (K3)

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M			L			L	L			
CO2	S	M			L			L	L			
CO3	S	M			L			L	L			
CO4	S	M			L			L	L			
CO5	S	M			L			L	L			

COs Vs PSOs MAPPING

COs	PSO1	PSO2	PSO3
CO1			
CO2			
CO3			
CO4			
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	POLYMER MATERIALS	9 Hours

Polymer -Classification of polymers – Natural and synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerization. Properties of polymers: Molecular weight determination weight average - number average. Biopolymers: Structure and biological functions of Collagen, Elastin and Glycoprotein. Synthetic polymers: synthesis properties and biological applications of Polyurethane and polyethylene terephthalate.

MODULE III	BIOMATERIALS AND CORROSION	9 Hours

Biomaterials: Requirements of Biomaterials, Biological significance of Titanium alloys, Cardio vascular devices, Orthopedic devices. Corrosion: principles of corrosion – PillingBed worth rule –Difference between chemical and electrochemical corrosion – galvanic corrosion – differential aeration corrosion – corrosion control – cathodic protection – sacrificial anodic method.

MODULE IV	PHOTOCHEMISTRY AND DRUG DELIVERY	9 Hours

Photo Chemistry: Laws of photo chemistry, Electronic Excitation, Jablonski Diagram, Photophysical Processes, Photosensitisation, Photochemical reaction- Chemiluminescence – Introduction to drug Delivery Delivery of drugs: Brain Delivery, Ocular Drug Delivery, Gene Delivery Systems, Vascular Delivery to the Lungs.

MODULE V	NANO BIOTECHNOLOGY	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, conductive nanomaterials, Biological applications of polymer nano 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, *A Text book of Engineering Chemistry,* 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, *Applied Chemistry-A Text Book for Engineers and Technologists*, Springer Science Business Media, New York, 2nd Edition, 2013.
5. Alain Nouailhat, "An Introduction to Nanoscience and Nanotechnology", John Wiley, ISBN:978-1848210073
6. Nanoparticle Technology for Drug Delivery. Edited by Ram B. Gupta, Uday B. Kompella, 2006, Taylor & Francis Group, 270 Madison Avenue, New York, NY 10016.
7. https://onlinecourses.nptel.ac.in/noc23_mm01/preview
8. https://onlinecourses.nptel.ac.in/noc23_me46/preview

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

2301GEX04	PROBLEM SOLVING USING PYTHON	L	T	P	C
	(Common to B.E – ECE, EEE, Civil and BME)	2	0	4	4

PREREQUISITE:
1. Problem Solving

COURSE OBJECTIVES:
1. To know the basics of problem solving
2. To learn the basic syntax and semantics of python programming
3. To acquire programming skills in core python
4. To use python data structures and develop a skill of designing applications using modules and packages

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

CO1:	Develop an algorithm to solve various computational problems
CO2:	Use of various python control flow constructs to solve various decision making statements
CO3:	Use list, tuple, set, dictionary to develop python programs
CO4:	Examine read and write operations of data from/to files using Python programs
CO5:	Design an application 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

1. Familiarization with different python IDE
2. Develop simple programs using python syntax and semantics
3. Demonstrate python programs using Arithmetic expressions
4. Illustrate conditional statements with real time problems
5. Basic python applications using list, Tuples.
6. Implement Python program using Dictionaries
7. Implementation of sorting and searching
8. Implement Python program using Strings
9. Write python functions to facilitate code reuse
10. Illustrate file concepts with real time problems
11. Use Exception handling in python applications for error handling
12. Implement simple applications using modules and packages
13. Develop Real Time applications like number guessing, Dice rolling simulator etc.

HARDWARE/SOFTWARE REQUIREMENTS:
1. Standalone Desktop Computer or Server Supporting
2. Python Interpreter Version 3 or above

TOTAL: 60 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										
CO2	3	3	2	2	2										
CO3	3	3	3	2	2										
CO4	3	3	2	2	2										
CO5	3	3	3	2	2										

REFERENCES:

1. Martin C Brown, "Python The Complete Reference", Mc Graw-Hill Education – Europe, 4th Edition, 2021

2. Reema Thareja, "Python Programming: Using Problem Solving Approach", Oxford University Press, 2020.

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 2017.

5. Guido van Rossum, Fred L. Drake Jr., "An Introduction to Python – Revised and Updated for Python 3.2", Network Theory Ltd., 2017.

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.codeacademy.com/learn/learn-python

2301TA101	TAMIL AND TECHNOLOGY	L	T	P	C
		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:

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

COURSE OUTCOMES:

On the successful completion of the 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

Cos Vs Pos MAPPING:

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

Cos Vs PSOs MAPPING

COs	PSO1	PSO2	PSO3
CO1			
CO2			
CO3			
CO4			
CO5			

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

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.

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.

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

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.

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.

2301GEX52	**ENGINEERING PRACTICES LABORATORY** (Common to all B.E. / B.Tech Degree Programmes)	**L**	**T**	**P**	**C**
		0	**0**	**4**	**2**

PREREQUISITE: NIL

COURSE OBJECTIVES:
1. To provide hands on training for fabrication of components using sheet metal and welding equipment / tools.
2. To develop skill for using carpentry and fitting tools to make simple components and metal joints.
3. To provide training for making simple house hold pipe line connections using suitable tools.
4. To develop the skill to make / operate/utilize the simple engineering components.

COURSE OUTCOMES:
On the successful completion of the course, students will be able to
CO1: Fabricate simple components using sheet metal using suitable tools.
CO2: Prepare simple components using suitable fitting tools.
CO3: Fabricate simple components using welding equipments.
CO4: Make simple components / joints using carpentry power tools.
CO5: Make simple house hold pipe line connections using suitable tools.

COs Vs POs & PSOs MAPPING:

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

LIST OF EXPERIMENTS	
1. Forming of simple object in sheet metal using suitable tools.(Example: Dust Pan, Rectangular tray and Cone making)	**6 Hours**
2. Prepare V (or) Half round (or) Square (or) Dovetail joint from the given mild Steel flat.	**5 Hours**
3. Fabrication of a simple component using thin and thick plates using arc welding. (Example: Butt , Lap and T - Joints)	**6 Hours**
4. Making a simple component using carpentry power tools.(Example: Cross Lap, T-Lap, Dove tail joints and Electrical switch box / Tool box / Letter box)	**6 Hours**
5. Construct a household pipe line connections using pipes, Tee joint, four way joint, elbow, union, bend, Gate valve and Taps.	**5 Hours**
6. Study of gas welding equipment and its demonstration.	**2 Hours**
	Total : 30 Hours

References:
1. S. Gowri &T.Jeyapoovan, "Engineering Practices Lab Manual" 5th Edition,Vikas Publishing.
2. Dr. V. Ramesh Babu,"Engineering Practices Laboratory Manual" Revised Edition 2019-20, VRB Publishers Pvt. Ltd.