E.G.S.PILLAY ENGINEERING COLLEGE
(Autonomous)
NAGAPATTINAM–611002.

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

REGULATIONS -R2023
B.E – BIO MEDICAL ENGINEERING

SECOND SEMESTER CURRICULUM

COURSECODE	COURSENAME	CATEGORY	L	T	P	C	MAX.MARKS		
							CA	ES	TOTAL
TheoryCourses									
2301MA202	Calculus, Ordinary Differential Equations And Complex Variables	BSC	3	1	0	4	40	60	100
2301GEX01	Foundation of Electrical and Electronics Engineering	ESC	3	0	0	3	40	60	100
2301GEX05	Applied Digital Logic and Design	ESC	3	0	0	3	40	60	100
2301GEX02	Engineering Graphics	ESC	2	1	0	3	40	60	100
2301GEX03	Problem Solving using C	ESC	2	0	4	4	50	50	100
	Language Elective	EEC	2	0	0	2	100	0	100
2301TA201	Tamils and Technology/ தமிழரும்தொழில்நுட்பமும்	HSMC	1	0	0	1	100	0	100
Laboratory Courses									
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
2301GEX54	Applied Digital Logic and Design Laboratory	ESC	0	0	2	1	100	0	100
2301LS201	Life Skills–II	-	0	0	0	0	100	0	100
TOTAL			17	1	10	23	770	330	1100

2302MA202	CALCULUS, ORDINARY DIFFERENTIAL EQUATIONS ANDCOMPLEXVARIABLE (Common to ECEand BME)	L	T	P	C
		3	1	0	4

PREREQUISITE:

1.Differentiation
2.Integration

COURSEOBJECTIVES:

1. Todevelop theuseof Laplacetransformisneeded byengineersforpracticalapplications..
2. Tofindthesolutionofordinarydifferentialequationsasmostoftheengineering problemsarecharacterizedinthisform.
3. Tofamiliarizethestudentwithanalyticfunctionsofcomplexvariables.Thisisneededinmany branches ofengineering.
4. To acquaint the student with mathematical tools needed in evaluating complex integrals and theirapplications.

COURSEOUTCOMES:

Onthesuccessfulcompletion ofthecourse,studentswillbeableto

CO1:	ApplyLaplacetransforms tosolvephysicalproblems arising inEngineering.
CO2:	Solveengineeringproblemsbyusingtheconceptsofgradient,divergence,andcurl.
CO3:	Solvethehigherorderdifferentialequationsusingvarioustechniques
CO4:	Makeuseofdifferentiationformulastoconstructanalyticfunctionsrelatedtocomplexvariable

COsVsPOsMAPPING:

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									

COsVsPSOsMAPPING

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

COURSECONTENTS:

MODULEI	LAPLACETRANSFORM	9Hours

Laplacetransform-InverseLaplacetransform-propertiesofLaplacetransforms-Laplacetransformsofunit step function, impulse function and periodic function - Convolution theorem - Solution of ordinary differentialequations with constant coefficients and system of linear differential equations with constant coefficients usingLaplacetransform–Applications toelectricalcircuits.

MODULE II	VECTORCALCULAS	9Hours

Scalar and Vector fields - Vector Differentiation - Level surfaces - Directional derivative - Gradient of a scalarfield - Divergence and Curl of a vector field. Line, surface and volume integrals; Green's theorem in a plane -GaussDivergencetheoremandStoke'stheorem.

MODULE III	ORDINARYDIFFERENTIALEQUATIONS	9Hours

Higherorderlineardifferentialequationswithconstantcoefficients– Cauchy'sandLegendre'slineardifferentialequations-Method ofvariation ofparameters.

MODULEIV	COMPLEXVARIABLE–DIFFERENTIATION	9Hours

Analyticfunctions-Cauchy-Riemannequations(excludingproof)–Propertiesofanalyticfunction– Harmonicconjugate- ConstructionofanalyticfunctionbyMilneThomson method –Bilinear transformation.

MODULEV	COMPLEXVARIABLE–INTEGRATION	9Hours

Cauchy's integral theorem-Cauchy'sintegral formulaforderivatives-Cauchyresiduetheorem- Taylor'sandLaurent'sseries– Contour integralinunitcircleandsemicircle(Excluding polesonrealaxis).

	TOTAL:45+15=60HOURS

REFERENCES:
1.G.B.ThomasandR.L.Finney,CalculusandAnalyticgeometry,9thEdition,Pearson,Reprint,2002.
2.Erwinkreyszig,AdvancedEngineeringMathematics,9th Edition,JohnWiley& Sons,2006.
3.W.E.BoyceandR.C.DiPrima,ElementaryDifferentialEquationsandBoundary ValueProblems,9thEdn., WileyIndia,2009.
4.S.L.Ross,DifferentialEquations,3rdEd.,WileyIndia,1984.
5.J.W. BrownandR.V.Churchill, ComplexVariablesand Applications, 7thEd., McGrawHill,2004.
6. N.P.BaliandManishGoyal,AtextbookofEngineeringMathematics, Laxmi Publications, Reprint,2008.

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

At the end of this 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	1		
CO2			
CO3	1		1
CO4	1	1	1
CO5		1	

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", 2ndEdition,   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.

2301GEX05	APPLIED DIGITAL LOGIC AND DESIGN (Common to B.E-CSE, BME, B. Tech - IT, and AIDS)	L	T	P	C
		3	0	0	3

PREREQUISITE: Basic mathematic skills

COURSE OBJECTIVES:

1. To present the fundamentals of digital circuits and simplification methods.
2. To practice the design of various combinational and sequential digital circuits using logic gates.
3. To introduce semiconductor memories and programmable logic devices.
4. To practice the HDL programming for combinational and sequential circuits.

COURSE OUTCOMES:

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

CO1:	Use Boolean algebra, K-map and tabulation method to simplify Boolean functions.
CO2:	Construct different combinational circuits using logic gates.
CO3:	Develop different equential circuits using logic gates and flip flops.
CO4:	Compare different semiconductor memory devices.
CO5:	Build programmable devices using logic gates.
CO6:	Develop Verilog program for combinational and sequential circuits.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	-	-	-	-	2	1	-	1
CO2	3	2	1	-	-	-	-	-	2	1	-	1
CO3	3	2	1	-	-	-	-	-	2	1	-	1
CO4	3	2	1	-	-	-	-	-	2	1	-	1
CO5	3	2	1	-	-	-	-	-	2	1	-	1
CO6	3	2	1	-	3	-	-	-	2	1	-	1

COs Vs PSOs MAPPING

COs	PSO1	PSO2	PSO2
CO1	1	1	2
CO2	1	1	1
CO3	1	2	1
CO4	1	1	1
CO5	1	1	1
CO6	1	1	1

COURSE CONTENTS:

MODULEI	BOOLEANALGEBRAANDLOGICGATES	9Hours

ReviewofNumbersystem-Booleanexpressionandminimization-LogicGatesanditsimplementation-Simplificationof Boolean Functions using Boolean algebra, Karnaugh Mapand Tabulation Method.

MODULEII	COMBINATIONALLOGIC	9Hours

CombinationalCircuits–AnalysisandDesignProcedures–CircuitsforArithmeticOperations,Code Conversion– Decoders/Encoders–Multiplexers/DEmultiplexers-Paritygenerators/checkers-MagnitudeComparator.

MODULE III	SEQUENTIAL CIRCUITS	9Hours

Sequential logic-Basic latch-Flip-flops (SR, D, JK, T and Master-Slave)-Counters-Ripple counters-BCD and Binary-Synchronous counters, Registers-Shift registers-Registers, Hazards

MODULE IV	MEMORYANDPROGRAMMABLELOGIC	9Hours

Classification of memories(RAM,ROM,PROM,EPROM, EEPROM)-Programmable Logic Devices(PLA,PAL,FPGA)-Implementation of circuits using ROM,PLA, PAL.

MODULE V	VERILOG HDL MODELING	9Hours

3 types of Verilog modeling (gate-level, dataflow, and behavioral)-Verilog programming for combinational and sequential circuits.

	TOTAL: 45 HOURS

REFERENCES:

1. Morris Mano and Michael D. Ciletti, "Digital Design", 5th edition, Prentice Hall of India,2012
2. Samir Palnitkar, "Verilog HDL", 2nd Edition, Pearson Education, 2003
3. https://archive.nptel.ac.in/courses/108/105/108105132/ (Link for NPTEL/SWAYAM/MOOC Courses)
4. https://www.vlab.co.in/broad-area-electronics-and-communications

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:

At the end of this 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.

2301GEX06	PROBLEM SOLVING USING C	L	T	P	C
	(Theory cum Laboratory course)	2	0	4	4

PREREQUISITE:

	1. Need some Mathematical Knowledge

COURSE OBJECTIVES:

1. To understand the constructs of C Language.
2. To develop C programmes using arrays and strings
3. To develop modular applications in C using functions and pointers
4. To develop applications in C using structures and union

COURSE OUTCOMES:

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

CO1:	Demonstrate the knowledge about the techniques used to solve problems in computing.
CO2:	Build programmes using C constructs.
CO3:	Design and implement applications using arrays and strings
CO4:	Develop and implement modular applications in C using functions and pointers.
CO5:	Develop programmes and applications in C using structures, union.

COURSE CONTENTS:

MODULE I	INTRODUCTION TO PROBLEM SOLVING TECHNIQUES	6 Hours

Problem Solving Techniques – Algorithm – Flowchart – Pseudo code - Steps to convert Algorithm to Source code. Data Types – Constants – Keywords – Expressions – Type of Errors.

MODULE II	BASICS OF C PROGRAMMING	6 Hours

Structure of C programme – Pre-processor directives - Compilation process, Execution of source code. Operators and operator's precedence – I/O statements – Sequence statements – Selection statements – Looping statements – Solve Numerical / Logical problems.

MODULE III	ARRAYS AND STRINGS	6 Hours

Introduction to Arrays: Declaration, Initialization – One dimensional array – Two dimensional array
String operations: length, compare, concatenate, copy, upper case, lower case.

MODULE IV	FUNCTIONS AND POINTERS	6 Hours

Function prototypes - function definition, function call – Recursion: Binary search using recursive functions. Pointers – Pointer operators – Pointer arithmetic – Arrays and pointers – Parameter passing: Pass by value, Pass by reference.

MODULE V	STRUCTURES AND UNION	6 Hours

Structure - Nested structures – Pointer and Structures – Array of structures – Dynamic memory allocation – Union - Storage classes and Visibility.

	TOTAL: 30 HOURS

List of Experiments:

1. Prepare programmes in C to implement basic concepts in C language.	6 Hours	
2. Produce C programmes to implement decision making and branching statements.	6 Hours	
3. Use the concept of looping to implement C programmes.	6 Hours	
4. Employ the concept of arrays to develop C programmes.	6 Hours	
5. Experiment the concepts of strings using C.	6 Hours	
6. Develop C programmes to perform code reusability using function.	6 Hours	
7. Model programmes in C to implement pointers.	6 Hours	
8. Build C programme to implement structures.	6 Hours	
9. Build C programme to implement Union.	6 Hours	
10. Mini Project: Using Structures, Functions & Pointers.	6 Hours	

TOTAL: 60 HOURS

Hardware/software requirement
    1. Desktop Systems 60 Nos
    2. C Compiler

TOTAL: 90 HOURS

COs Vs POs / PSOs MAPPING:

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

REFERENCES:

1. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.
2. ReemaThareja, "Programming in C", Oxford University Press, Second Edition, 2016.
3. Kernighan, B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2015.
4. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw-Hill Education, 1996.
5. https://onlinecourses.nptel.ac.in/noc23_cs53/course   (Link for NPTEL/SWAYAM/MOOC Courses)
6. https://cse02-iiith.vlabs.ac.in/exp   (Link for virtual Lab)
7. www.skillrack.com   (Link for modern tool usage)

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

COURSEOBJECTIVES:

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

COURSEOUTCOMES:

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 communicate
CO4:	Implement the soft skills in theoretical and practical ways.
CO5:	Adapt the techniques of personality development.

COsVs POsMAPPING:

	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	L	T	P	C
		2	0	0	2

COURSECONTENTS:

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

2301TA201	தமிழரும்தொழில்நுட்பமும்/ Tamils 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:

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 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

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.

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:

UpAt the end of this 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	L	T	P	C
	(Common to CSE, IT, AIDS, BME, MECH, CIVIL)	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.

2301GEX54	APPLIED DIGITAL LOGIC AND DESIGN LABORATORY Common to B.E-CSE, BME, B. Tech – IT and AIDS	L	T	P	C
		0	0	2	1

PREREQUISITE: Basic mathematic skills

COURSE OBJECTIVES:

1. To present the fundamentals of digital circuits and simplification methods.
2. To practice the design of various combinational and sequential digital circuits using logic gates.
3. To practice the HDL programming for combinational and sequential circuits.

COURSE OUTCOMES:

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

CO1:	Construct differentcombinationalcircuits using logic gates.
CO2:	Develop differentsequentialcircuits using logic gates and flip flops.
CO3:	Build programmable devices using logic gates.
CO4:	Develop Verilog program for combinational and sequential circuits.

COs Vs POs MAPPING:

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

COs Vs PSOs MAPPING

COs	PSO1	PSO2	PSO2
CO1	1	1	2
CO2	1	2	1
CO3	2	2	1
CO4	2	2	2

List of Lab experiments

1. VerificationofBooleanTheoremsusingbasicgates
2. Design and implementation of half adder, half subtractor, full adder and full subtractor
3. Design and implementation of code converters
4. Design and implementation of multiplexer and de-multiplexer
5. Design and implementation parity generator/checker
6. Design and implementation counters
7. Design and implementation shift register
8. Develop and simulation of Verilog program for combinational circuits
9. Develop and simulation of Verilog program for sequential circuits

Hardware/software requirement

1. Digital trainer kit 10 Nos
2. Adequate numbers of IC's
3. XilinxISE (or)Altera Quartus II software

	TOTAL: 30 HOURS

REFERENCES:

1. Morris Mano and Michael D. Ciletti, "Digital Design", 5th edition, Prentice Hall of India,2012
2. Samir Palnitkar, "Verilog HDL", 2nd Edition, Pearson Education, 2003
3. https://archive.nptel.ac.in/courses/108/105/108105132
4. https://www.vlab.co.in/broad-area-electronics-and-communications

2301GEX54	APPLIED DIGITAL LOGIC AND DESIGN LABORATORY Common to B.E-CSE, BME, B. Tech – IT and AIDS	L	T	P	C
		0	0	2	1

PREREQUISITE: Basic mathematic skills

COURSE OBJECTIVES:

4. To present the fundamentals of digital circuits and simplification methods.
5. To practice the design of various combinational and sequential digital circuits using logic gates.
6. To practice the HDL programming for combinational and sequential circuits.

COURSE OUTCOMES:

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

CO1:	Construct differentcombinationalcircuits using logic gates.
CO2:	Develop differentsequentialcircuits using logic gates and flip flops.
CO3:	Build programmable devices using logic gates.
CO4:	Develop Verilog program for combinational and sequential circuits.

COs Vs POs MAPPING:

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

COs Vs PSOs MAPPING

COs	PSO1	PSO2	PSO2
CO1	1	1	2
CO2	1	2	1
CO3	2	2	1
CO4	2	2	2

List of Lab experiments

10. VerificationofBooleanTheoremsusingbasicgates
11. Design and implementation of half adder, half subtractor, full adder and full subtractor
12. Design and implementation of code converters
13. Design and implementation of multiplexer and de-multiplexer
14. Design and implementation parity generator/checker
15. Design and implementation counters
16. Design and implementation shift register
17. Develop and simulation of Verilog program for combinational circuits
18. Develop and simulation of Verilog program for sequential circuits

Hardware/software requirement

4. Digital trainer kit 10 Nos
5. Adequate numbers of IC's
6. XilinxISE (or)AlteraQuartusII software

	TOTAL: 30 HOURS

REFERENCES:

5. Morris Mano and Michael D. Ciletti, "Digital Design", 5th edition, Prentice Hall of India,2012
6. Samir Palnitkar, "Verilog HDL", 2nd Edition, Pearson Education, 2003
7. https://archive.nptel.ac.in/courses/108/105/108105132
8. https://www.vlab.co.in/broad-area-electronics-and-communications