NPR
COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

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NPR Nagar, Natham - 624 401, Dindigul Dist, Tamil Nadu. Ph: 04544 - 246500, 501, 502.

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

REGULATION - 2023

CHOICE BASED CREDIT SYSTEM (CBCS)

CURRICULUM AND SYLLABUS

Dr.B.MARUTHU KANNAN, ME.,Ph.D.,
Principal
NPR College of Engineering and Technology
Natham, Dindigul(Dt)-624 401

Chairperson-Board of Studies
Department of Electrical and Electronics
Engineering

I SEMESTER

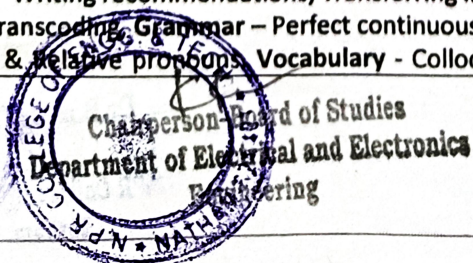**I - Course Name: 23HS101 PROFESSIONAL ENGLISH - I**

Program Name	B.E./B.TECH. – COMMON TO ALL BRANCHES	Sem	Category	L	T	P	C
Prerequisite	NIL	I	HSMC	3	0	0	3

II - Course Objectives

1.	To improve the communicative competence of learners.
2.	To learn to use basic grammatic 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.

III - Course Content

Preamble:
This course is designed to impart required levels of Communication Skills in Reading and Writing and Proficiency in English language in writing necessary for different professional contexts.

Unit – I	INTRODUCTION TO EFFECTIVE COMMUNICATION	9 Hours

Fundamentals of Communication- effective communication- seven C's of effective communication
Reading - Reading brochures (technical context), telephone messages / social media messages relevant to technical contexts and emails. **Writing** - Writing emails / letters. **Grammar** – Simple Tenses (Present / Past /Future); Question types: Wh/ Yes or No/- Question Tags. **Vocabulary** – Synonyms (word -meaning-sentence making); (One word substitution; Abbreviations & Acronyms (as used in technical contexts) –Silent letters

Unit – II	NARRATION AND SUMMATION	9 Hours

Reading - Reading biographies, travelogues, newspaper reports, Excerpts from literature, and travel & technical blogs. **Writing** - Guided writing-- Paragraph writing Short Report on an event (field trip etc.) **Grammar** –Progressive tenses (Present / Past /Future); Subject-Verb Agreement; Prepositions. **Vocabulary** - Wordforms (prefixes& suffixes); Phrasal verbs.

Unit – III	DESCRIPTION OF A PROCESS / PRODUCT	9 Hours

Reading – Reading advertisements, gadget reviews; user manuals. **Writing** - Writing definitions; instructions; and Product /Process description. **Grammar** - Imperatives; Adjectives; Degrees of comparison; Perfect Tenses (Present / Past /Future); **Vocabulary** - Compound Nouns, Homonyms; and Homophones.

Unit – IV	CLASSIFICATION AND RECOMMENDATIONS	9 Hours

Reading – Newspaper articles; Journal reports –and Non-Verbal Communication (tables, pie charts etc,) Note-making. **Writing** –Writing recommendations; Transferring Information from non-verbal (chart, graph etc, to verbal mode), Transcoding. **Grammar** – Perfect continuous tenses (Present / Past /Future); Articles; Pronouns - Possessive & Relative pronouns. **Vocabulary** - Collocations; Fixed / Semi fixed expressions –

Idioms and Phrases		
Unit – V	EXPRESSION	9 Hours
Reading – Reading editorials; and Opinion Blogs; **Writing** – Essay Writing (Descriptive or narrative). **Grammar**– Punctuation; Simple, Compound & Complex Sentences. **Vocabulary** - Cause & Effect Expressions – Content vs Functionwords – British & American vocabulary (spelling and word changes)		

Text Books:	[1] English for Engineers & Technologists Orient Blackswan Private Ltd. Department of English, Anna University, (2023 edition)	
	[2] English for Science & Technology Cambridge University Press, 2021. Authored by Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN.Shoba, and Dr. Lourdes Joevani, Department of English, Anna University.	
Reference Books:	[1] Ashraf Rizvi, "Effective Technical Communication", 2nd Edition, McGraw-Hill India, 2017.	
	[2] A Course Book On Technical English By Lakshminarayanan, Scitech Publications (India) Pvt. Ltd.	
	[3] English For Technical Communication (With CD) By Aysha Viswamohan, Mcgraw HillEducation, 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.	
MOOC/Web Platforms:	https://onlinecourses.nptel.ac.in/noc23_hs115/preview	

IV - Course Outcome

	On completion of the course, the students will be able to	Bloom's Level Mapped
CO1	To use appropriate words in a professional context and communicate in a professional context.	Apply (BL 3)
CO2	To gain understanding of basic grammatic structures and use them in right context.	Understand (BL 2)
CO3	To read and infer the denotative and connotative meanings of technical texts and use technical words in describing products with appropriate definitions.	Apply (BL 3)
CO4	To write definitions, descriptions, narrations and essays on various topics.	Create (BL 6)
CO5	To express their opinions effectively in both oral and written medium of communication.	Create (BL 6)

(Action verb of each CO to be matched with the next mapping table) (For example: if CO-1 uses the High Order Thinking Skills based action verb, then the corresponding PO must be mapped with High Correlation)

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V - Mapping Table Mapping of COs with POs and PSOs

COs/ POs	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1									3	3		2		
CO-2									3	3		2		
CO-3									3	3		2		
CO-4									3	3		2		
CO-5									3	3		2		

Mapping: 1-Low, 2-Medium, 3-High (Mapping value based on usage of Action verbs in each CO)

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I - Course Name: 23MA101 MATRICES AND CALCULUS

Program Name	B.E./B.TECH. COMMON TO ALL BRANCHES	Sem	Category	L	T	P	C
Prerequisite	NIL	I	BSC	3	1	0	4

II - Course Objectives

1.	To develop the use of matrix algebra techniques that is needed by engineers for practical applications.
2.	To familiarize the student with functions of several variables. This is needed in many branches of engineering.
3.	To familiarize the students with integral calculus and various techniques of integration.
4.	To make the students understand the concepts of vector calculus and applications.
5.	To acquaint the student with mathematical tools needed in evaluating ordinary differential equations and their applications.

III - Course Content

Preamble:

This course introduces basic concepts and techniques of multivariable calculus, matrices, and ordinary differential equations and highlights their applications in various field of engineering such as Design Engineering, Electric Circuit Theory, Cryptography, Resistor conversion, Robotics etc

Unit – I	MATRICES	12 Hours

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – Cayley – Hamilton theorem – Diagonalization of matrices by orthogonal transformation – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms

Unit – II	FUNCTIONS OF SEVERAL VARIABLES	12 Hours

Partial differentiation – Homogeneous functions and Euler's theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Applications: Maxima and minima of functions of two variables and Lagrange's method of undetermined multipliers.

Unit – III	INTEGRAL CALCULUS AND MULTIPLE INTEGRALS	12 Hours

Definite integrals – Properties – Problems- Double and Triple integrals – Cartesian, polar coordinates – change of order of integration – Applications: Area between curves, Volume of integrals.

Unit – IV	VECTOR CALCULUS	12 Hours

Gradients - Divergence - Curl – Directional derivative - Irrotational and Solenoidal vector fields– Vector Integration (Line integral, Surface integral, Volume integral, Simple Problems only) – Green's theorem in plane, Gauss divergence theorem and Stoke's Theorem (excluding proof) – Simple applications involving cubes and rectangular parallelopipeds.

Unit – V	ORDINARY DIFFERENTIAL EQUATIONS	12 Hours

Higher order linear differential equations with constant coefficients – Method of variation of parameters. Homogenous equation of Euler's and Legendre's type – System of simultaneous linear differential equations with constant coefficients.

Text Books:	[1] Kreyszig.E, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016. [2] Grewal.B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2018.

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	[3] James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 8th Edition, New Delhi, 2015. [For Units II & IV - Sections 1.1, 2.2, 2.3, 2.5, 2.7 (Tangents problems only), 2.8, 3.1 to 3.6, 3.11, 4.1, 4.3, 5.1 (Area problems only), 5.2, 5.3, 5.4 (excluding net change theorem), 5.5, 7.1 - 7.4 and 7.8].
Reference Books:	[1] Anton. H, Bivens. I and Davis. S, " Calculus ", Wiley, 10th Edition, 2016. [2] Bali. N., Goyal. M. and Watkins. C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009. [3] Jain. R.K. and Iyengar. S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition, 2016. [4] Narayanan. S. and ManicavachagomPillai. T. K.,"Calculus" Volume I and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, 2009. [5] Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2016. [6] Srimantha Pal and Bhunia. S.C, "Engineering Mathematics " Oxford University Press, 2015. [7] Thomas. G. B., Hass. J, and Weir. M.D, "Thomas Calculus", 14th Edition, Pearson India, 2018.
MOOC/Web Platforms:	https://nptel.ac.in/courses/122104018 https://archive.nptel.ac.in/courses/111/106/111106146/

IV - Course Outcome

	On completion of the course, the students will be able to	Bloom's Level Mapped
CO1	Use the matrix algebra methods for solving practical problems.	Apply (BL 3)
CO2	Able to use differential calculus ideas on several variable functions.	Apply (BL 3)
CO3	Apply integral calculus and multiple integral tools in solving various application problems.	Apply (BL 3)
CO4	Understand the concepts of Gradient, divergence and curl of a vector point function and related applications.	Understand (BL 2)
CO5	Apply various techniques in solving ordinary differential equations.	Apply (BL 3)

(Action verb of each CO to be matched with the next mapping table) (For example: if CO-1 uses the High Order Thinking Skills based action verb, then the corresponding PO must be mapped with High Correlation)

V - Mapping Table Mapping of COs with POs and PSOs

COs/POs	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	3	3	1	1	-	-	-	-	2	-	2	3	-	-
CO-2	3	3	1	1	-	-	-	-	2	-	2	3	-	-
CO-3	3	3	1	1	-	-	-	-	2	-	2	3	-	-
CO-4	3	3	1	1	-	-	-	-	2	-	2	3	-	-
CO-5	3	3	-	-	-	-	-	-	2	-	-	2	-	-

Mapping: 1-Low, 2-Medium, 3-High (Mapping value based on usage of Action verbs in each CO)

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I - Course Name: 23PH101 ENGINEERING PHYSICS

Program Name	B.E./B.TECH. COMMON FOR CIVIL, CSE, EEE, MECH, IT AND AI&DS	Sem	Category	L	T	P	C
Prerequisite	NIL	I	BSC	3	0	0	3

II - Course Objectives

1.	To instill the essentials of properties of matter.
2.	To gain knowledge of electromagnetic waves and its applications.
3.	To amplify the information on optical fiber for communication purposes.
4.	To describe the principles of quantum mechanics and their various applications.
5.	To provide the fundamental understanding of crystals and their numerous crystal formations.

III - Course Content

Preamble:

The aim of the Engineering Physics Program is to offer students a solid background in the fundamentals of Physics and to impart that knowledge in engineering disciplines. The program is designed to develop scientific attitudes and enable the students to correlate the concepts of Physics with the core programmes.

Unit – I	PROPERTIES OF MATTER	9 Hours

Elasticity – stress - strain - Hooke 's law- S-S diagram - factors affecting elastic modulus and tensile strength – Torsion pendulum - moment of inertia of a body - young's modulus – cantilever method, uniform and non-uniform bending – I-shaped girders - Poisson's ratio.

Unit – II	ELECTROMAGNETIC FIELD AND WAVES	9 Hours

The Maxwell's equations - wave equation; plane electromagnetic waves in vacuum, conditions on the wave field - properties of electromagnetic waves - energy and momentum in EM waves: intensity, waves from localized sources, momentum and radiation pressure – smart phone reception.

Unit – III	LASER AND FIBER OPTICS	9 Hours

LASER- interaction of light radiation with materials - Einstein's coefficients - Nd:YAG, CO_2, quantum dot laser – LIDAR.

Fiber optics: modes of propagation of light – numerical aperture and acceptance angle - fiber optical communication system - fiber optic displacement sensors.

Unit – IV	QUANTUM PHYSICS	9 Hours

Comparison between classical and quantum theory – Compton scattering:experimental description- uncertainty principle – physical significance of wave function - Schrödinger's wave equation – time dependent and time independent equations – particle in a box - quantum confinement.

Unit – V	CRYSTAL PHYSICS	9 Hours

Crystallography – unit cell, primitive cell - crystal systems, Bravais lattices, Miller indices – inter-planar distances - coordination number and packing factor for SC, BCC, FCC, HCP structures- diamond & NaCl Crystal structure - crystal defect and dislocation. crystal growth techniques; Bridgman method.

Books for study & Reference:	[1] Tipler Mosca, Physics For Scientists and Engineers 6th Edition, 2015 [2] Gaur R.K. and Gupta S.L, Engineering Physics, Dhanpat Rai Publications, 2013. [3] Bhattacharya D.K. & Poonam T., Engineering Physics, Oxford University Press, 2015.

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	[4] S. O. Pillai, Solid State Physics, New Age International Private Limited, 10th edition,2022 5] Marikani A, Engineering Physics, PHI, New Delhi, 2013.
MOOC/Web Platforms:	https://onlinecourses.nptel.ac.in/noc20_mm13/preview https://www.noaa.gov/jetstream/satellites/electromagnetic-waves https://fractory.com/fibre-lasers-explained/ https://www.livescience.com/33816-quantum-mechanics-explanation.html https://archive.nptel.ac.in/courses/115/104/115104109/

IV - Course Outcome

	On completion of the course, the students will be able to	Bloom's Level Mapped
CO1	Choose the correct materials based on their qualities for any intended applications and learn the basics of elasticity and its engineering-related applications.	Apply (BL 3)
CO2	Express their knowledge in electromagnetic waves.	Understand (BL 2)
CO3	Infer the characteristics of laser for various Engineering applications and expand the understanding of optical fibers use in communications.	Understand (BL 2)
CO4	Apply quantum theory's sophisticated physics notions to the matter characterization.	Apply (BL 3)
CO5	Know the fundamentals of crystal formations and growth methods.	Understand (BL 2)

(Action verb of each CO to be matched with the next mapping table) (For example: if CO-1 uses the High Order Thinking Skills based action verb, then the corresponding PO must be mapped with High Correlation)

V - Mapping Table Mapping of COs with POs and PSOs

COs/ Pos	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	3	2	3	3	-	-	2	-	-	-	-	3	-	-
CO-2	3	2	3	2	-	-	2	-	-	-	-	3	-	-
CO-3	3	3	3	3	-	-	-	-	-	-	-	3	-	-
CO-4	3	3	3	2	-	-	3	-	-	-	-	2	-	-
CO-5	3	2	3	3	-	-	-	-	-	-	-	1	-	-

Mapping: 1-Low, 2-Medium, 3-High (Mapping value based on usage of Action verbs in each CO)

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I - Course Name: 23CY101 ENGINEERING CHEMISTRY

Program Name	B.E./B.TECH. COMMON TO ALL BRANCHES	Sem	Category	L	T	P	C
Prerequisite	NIL	I	BSC	3	0	0	3

II - Course Objectives

1.	To inculcate sound understanding of water quality parameters and water treatment techniques.
2.	To impart knowledge on the basic principles and preparatory methods of nanomaterials.
3.	To introduce the basic concepts and applications of polymers and composites.
4.	To facilitate the understanding of different types of fuels, their preparation, properties and combustion characteristics.
5.	To familiarize the students with the operating principles, working processes and applications of energy conversion and storage devices.

III - Course Content

Preamble:

The objective of this course is to bestow the better understanding of basic concepts of chemistry and its applications in Engineering and Technology. This course provides exposure on properties of water and its treatment methods. It also imparts knowledge on properties and application of nano-materials in data storage devices. This course also highlights preparation, properties and applications of polymers and composite materials. It also imparts knowledge on fuel types and applications of energy conversion and storage devices.

Unit – I	WATER AND ITS TREATMENT	9 Hours

Water: sources and impurities, water quality parameters: colour, odour, turbidity, pH, hardness, alkalinity, TDS, COD and BOD, flouride and arsenic. Municipal water treatment: primary treatment and disinfection (UV, Ozonation, break-point chlorination). Desalination of brackish water: reverse osmosis. Boiler troubles: scale and sludge, boiler corrosion, caustic embrittlement, priming & foaming. Treatment of boiler feed water: internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning) and external treatment: ion exchange demineralisation and zeolite process.

Unit – II	NANO CHEMISTRY	9 Hours

Basics: distinction between molecules, nanomaterials and bulk materials; size-dependent properties (optical, electrical, mechanical and magnetic); types of nanomaterials: definition, properties and uses of – nanoparticle, nanocluster, nanorod, nanowire and nanotube. Preparation of nanomaterials: sol-gel, solvothermal, laser ablation, chemical vapour deposition, electrochemical deposition and electro spinning. Applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.

Unit – III	POLYMERS AND COMPOSITES	9 Hours

Introduction: classification of polymers – natural and synthetic; thermoplastic and thermosetting. Functionality – preparation properties and uses of PVC, teflon, nylon 6,6 and epoxy resins. Composites: introduction: definition & need for composites; constitution: matrix materials (Polymer matrix, metal matrix and ceramic matrix) and reinforcement (fiber, particulates, flakes and whiskers). Properties and applications of: metal matrix composites (MMC), ceramic matrix composites and polymer matrix composites. Hybrid composites - definition and examples.

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Unit – IV	FUELS AND COMBUSTION	9 Hours
Fuels: introduction, classification of fuels; coal and coke: analysis of coal (proximate and ultimate), carbonization, manufacture of metallurgical coke (Otto Hoffmann method). Petroleum and diesel: manufacture of synthetic petrol (Bergius process), knocking - octane number, diesel oil - cetane number; power alcohol and biodiesel. Combustion of fuels: introduction: calorific value - higher and lower calorific values, theoretical calculation of calorific value; ignition temperature: spontaneous ignition temperature, explosive range; flue gas analysis - ORSAT Method. CO_2 emission and carbon foot print.		

Unit – V	ENERGY STORAGE DEVICES	9 Hours
Nuclear energy: light water nuclear power plant, breeder reactor. Solar energy conversion: principle, working and applications of solar cells; recent developments in solar cell materials. Wind energy; geothermal energy; batteries: types of batteries, primary battery – dry cell, secondary battery -lead acid storage battery and lithium-ion-battery; electric vehicles-working principles; fuel cells: H_2-O_2 fuel cell, super capacitors		

Text Books:	1] P. C. Jain and Monica Jain, "Engineering Chemistry",Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 17th Edition, 2018. 2] Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 6th Edition 2012. 3] S.S. Dara, "A text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.
Reference Books:	1] B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, "Text book of nanoscience and nanotechnology", Universities Press-IIM Series in Metallurgy and Materials Science, 2018. 2] O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017. 3] Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2nd Edition,2017. 4] Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, 2nd Edition, 2019. 5] 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. 6] Gowariker V.R., Viswanathan N.V. and Jayadev Sreedhar, "Polymer Science", New Age International P (Ltd.,) Chennai, 4thEdition, 2021.
MOOC/Web Platforms:	https://nptel.ac.in/courses

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	Summarize the water related problems in boilers and their treatment techniques.	Remember (BL 1)
CO2	Discuss the applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.	Understand (BL 2)
CO3	Discuss the types, properties and applications of polymers and composites.	Apply (BL 3)

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| CO4 | Summarize the fuels used for engineering processes and applications of fuels. | Understand (BL 2) |
| CO5 | Summarize the principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells. | Apply (BL 3) |

(Action verb of each CO to be matched with the next mapping table) (For example: if CO-1 uses the High Order Thinking Skills based action verb, then the corresponding PO must be mapped with High Correlation)

V - Mapping Table Mapping of COs with POs and PSOs

COs/ POs	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	2	1	1				3					2		
CO-2	2	1	1				3					2		
CO-3	2	1	1				3					2		
CO-4	2	1	1				1					2		
CO-5	3	2	2				3					3		

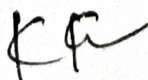Mapping: 1-Low, 2-Medium, 3-High (Mapping value based on usage of Action verbs in each CO)

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I - Course Name: 23GE101   PROBLEM SOLVING AND C PROGRAMMING

Program Name	B.E/B.Tech. – Common to CSE,IT,ECE,EEE	Sem	Category	L	T	P	C
Prerequisite	Computer Basics	I	ESC	3	0	2	4

II - Course Objectives

1.	To make the students understand the fundamentals of problem solving using Algorithm and Flowchart
2.	To teach the basic programming constructs for solving simple problems
3.	To introduce the basic concepts of arrays and strings
4.	To acquaint the students about functions, pointers, structures and their relationship
5.	To impart knowledge on the concepts of file handling

III - Course Content

Preamble: C programmers will always have a scope. There are two aspects, i. C at Application level ii. C at System level. C at application level work is being replaced by Modern Languages. But C at system level is still used very heavily. For system level programs, the programmers should know the platform/processor understanding/knowledge/Assembly, strong data structures and algorithms, hardware understanding, In-Depth OS Knowledge, computer architecture.		
Unit – I	**INTRODUCTION TO ALGORITHM AND C**	10 Hours
Algorithms, building blocks of algorithms, notation, algorithmic problem solving, simple strategies for developing algorithms. Structure of C program - C programming: Data Types - Constants – Enumeration Constants - Keywords – Operators: Precedence and Associativity - Expressions - Input/Output statements, Assignment statements – Decision making statements - Switch statement - Looping statements – Preprocessor directives - Compilation process.		
Unit – II	**UNIT II ARRAYS AND STRINGS**	8 Hours
Introduction to Arrays: Declaration, Initialization – One dimensional array –Two dimensional arrays - String operations: length, compare, concatenate, copy – Selection sort, linear and binary search		
Unit – III	**UNIT III FUNCTIONS AND POINTERS**	9 Hours
Modular programming - Function prototype, function definition, function call, Built-in functions (string functions, math functions) – Recursion, Binary Search using recursive functions –Pointers – Pointer operators – Pointer arithmetic – Arrays and pointers – Array of pointers – Parameter passing: Pass by value, Pass by reference.		
Unit – IV	**UNIT IV STRUCTURES AND UNION**	9 Hours
Structure - Nested structures – Pointer and Structures – Array of structures – Self referential structures – Dynamic memory allocation - Singly linked list – typedef – Union - Storage classes and Visibility.		
Unit – V	**UNIT V FILE PROCESSING**	9 Hours
Files – Types of file processing: Sequential access, Random access – Sequential access file - Random access file - Command line arguments.		

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LIST OF EXPERIMENTS:

Note: The lab instructor is expected to design problems based on the topics listed. The Examination shall not be restricted to the sample experiments designed.

1. I/O statements, operators, expressions
2. decision-making constructs: if-else, goto, switch-case, break-continue
3. Loops: for, while, do-while
4. Arrays: 1D and 2D, Multi-dimensional arrays, traversal
5. Strings: operations
6. Functions: call, return, passing parameters by (value, reference), passing arrays to function.
7. Recursion
8. Pointers: Pointers to functions, Arrays,Strings, Pointers to Pointers, Array of Pointers
9. Structures: Nested Structures, Pointers to Structures, Arrays of Structures and Unions.
10. Files: reading and writing, File pointers, file operations, random access, processor directives.

TOTAL : 30 PERIODS

TOTAL : 45+30=75 PERIODS

Text Books:	1. ReemaThareja, "Programming in C", Oxford University Press, Second Edition, 2016. 2. Kernighan, B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2015.
Reference Books:	1. B. Gottfried, Programming with C, Schaum Outline Series, Fourth Edition, 2018 2. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020. 3. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw- Hill Education, 1996. 4. Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second 5. Edition, Oxford University Press, 2013. 6. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1st Edition, Pearson Education, 2013.
MOOC/Web Platforms:	Introduction to C (w3schools.com) Learn C Programming (programiz.com) C Tutorial - Learn C Programming Language (geeksforgeeks.org)

IV - Course Outcome

		On completion of the course, the students will be able to	Bloom's Level Mapped
	CO1	Understand the basic concepts of C programming tokens, control statements Input/Output statements, and Preprocessor directives	Applying (BL 2)
	CO2	Develop C Programs using basic programming constructs for solving simple problems	Applying (BL 3)
	CO3	Develop C programs for solving computational problems by using arrays and strings	Applying (BL 3)
	CO4	Develop simple real-time applications in C using functions, arrays, and strings	Applying (BL 3)
	CO5	Develop applications for real time problems in C using pointers and structures	Applying (BL 3)

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V - Mapping Table Mapping of COs with POs and PSOs

COs/POs	PO-1	PO-2	PO-3	PO-4	PO-5	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	2	2	-	-	3	-	-	-	-	-	2	-	2	-	-
CO-2	3	3	3	-	-	3	-	-	-	-	-	2	-	2	-	-
CO-3	3	3	2	-	-	3	-	-	-	-	-	2	-	2	-	-
CO-4	3	2	2	-	-	3	-	-	-	-	-	2	-	2	-	-
CO-5	3	3	3	-	-	3	-	-	-	-	-	2	-	2	-	-

Mapping: 1-Low, 2-Medium, 3-High (Mapping value based on usage of Action verbs in each CO)
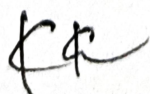
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23GE103   **HERITAGE OF TAMILS**   **L T P C**

1 0 0 1

UNIT I   LANGUAGE AND LITERATURE   3

Language Families in India - Dravidian Languages – Tamil as a Classical Language - ClassicalLiterature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

UNIT II   HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE   3

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNIT III   FOLK AND MARTIAL ARTS   3

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT IV   THINAI CONCEPT OF TAMILS   3

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

UNIT V   CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE   3

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the otherparts of India — Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine — Inscriptions & Manuscripts — Print History of Tamil Books.

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

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

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

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

4. பொருநை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)

5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)

6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: InternationalInstitute of Tamil Studies.

7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).

8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)

9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department ofArchaeology & Tamil Nadu Text Book and Educational Services Corporation,Tamil Nadu)

10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)

11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)

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23GE103   தமிழர் மரபு   L T P C
                                                                1 0 0 1

அலகு I   மொழி மற்றும் இலக்கியம்:   3

இந்திய மொழிக் குடும்பங்கள் – திராவிட மொழிகள் – தமிழ் ஒரு செம்மொழி – தமிழ் செவ்விலக்கியங்கள் – சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை – சங்க இலக்கியத்தில் பகிர்தல் அறம் – திருக்குறளில் மேலாண்மைக் கருத்துக்கள் – தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் – பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் – சிற்றிலக்கியங்கள் – தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி – தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு II   மரபு – பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை – சிற்பக் கலை:   3

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

                                                                3

அலகு III   நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்:   3

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

அலகு IV   தமிழர்களின் திணைக் கோட்பாடுகள்:

தமிழகத்தின் தாவரங்களும், விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் – தமிழர்கள் போற்றிய அறக்கோட்பாடு – சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் – சங்ககால நகரங்களும் துறை முகங்களும் – சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி – கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு V   இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு:   3

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு – இந்தியாவின் பிறபகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் – சுயமரியாதை இயக்கம் – இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு – கல்வெட்டுகள், கையெழுத்துப்படிகள் – தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.

TOTAL : 15 PERIODS

                                                    TEXT-CUM-REFERENCE BOOKS

1.   கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல்

     தமிழக வரலாறு – மக்களும் பண்பாடும் –
2.   மற்றும் கல்வியியல் பணிகள் கழகம்).

3.   கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).

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

5.   பொருநை – ~~தாமிரபரணி~~ நாகரிகம் (தொல்லியல் துறை வெளியீடு)
     Social Life of Tamils (Dr.K.K.Pillay) A Joint publication of TNTB & ESC and RMRL – (in print)
6.   Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu)
     (Published by:International Institute of Tamil Studies.

7.   Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D.
     Thirunavukkarasu)(Published by: International Institute of Tamil
     Studies).

8.   The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published

by: InternationalInstitute of Tamil Studies.)

9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department ofArchaeology & Tamil Nadu Text Book and Educational Services Corporation,Tamil Nadu)

10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)

11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)

12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – ReferenceBook.

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II Semester

I - Course Name: 23HS201 PROFESSIONAL ENGLISH - II

Program Name	B.E./B.TECH. COMMON TO ALL BRANCHES	Sem	Category	L	T	P	C
Prerequisite	Professional English - I	II	HSMC	2	0	0	2

II - Course Objectives

1.	To engage learners in meaningful language activities to improve their reading and writing skills.
2.	To learn various reading strategies and apply in comprehending documents in professionalcontext.
3.	To help learners understand the purpose, audience, contexts of different types of writing.
4.	To develop analytical thinking skills for problem solving in communicative contexts.
5.	To demonstrate an understanding of job applications and interviews for internship and placements.

III - Course Content

Preamble:
This course is designed to impart required levels of Communication Skills in Reading and Writing and Proficiency in English language in writing necessary for different professional contexts.

Unit – I	MAKING COMPARISONS	6 Hours
Reading - Reading advertisements, user manuals, brochures; - Discourse markers (connectives & sequence words), Writing — Compare and Contrast Essay; Grammar – Active & Passive Voice- Impersonal Passive Voice.		
Unit – II	EXPRESSING CAUSAL RELATIONS	6 Hours
Reading - Reading longer technical texts– Cause and Effect Essays, and Formal Letters / emails ofcomplaint, Writing - Writing responses to complaints – Jumbled sentences. Grammar - Infinitive and Gerunds.		
Unit – III	CRITICAL THINKING AND PROBLEM SOLVING	6 Hours
Reading - Case Studies, excerpts from literary texts, news reports etc. Writing – Letter to the Editor, Checklists, Drafting of Circulars, Agenda & Minutes of the meeting, Problem solution essay / Argumentative Essay. Grammar – Error correction; If conditional sentences.		
Unit – IV	REPORTING OF EVENTS	6 Hours
Reading –Newspaper articles; Writing –Accident Report with Recommendations, Survey Report, Grammar – Reported Speech, Modals – Conjunctions- Sentence pattern		
Unit – V	COHESIVE WRITING	6 Hours
Reading – Company profiles, Statement of Purpose, (SOP) an excerpt of interview with professionals; Writing – Job / Internship application – Cover letter & Resume; Grammar – Numerical adjectives, Relative Clauses.		

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Text Books:	[1] English for Engineers & Technologists (2020 edition) Orient Blackswan Private Ltd. Department of English, Anna University.
	[2] English for Science & Technology Cambridge University Press 2021.
	[3] Authored by Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN.Shoba, and Dr. Lourdes Joevani, Department of English, Anna University.
Reference Books:	[1] Ashraf Rizvi, "Effective Technical Communication", 2nd Edition, McGraw-Hill India, 2017.
	[2] Raman. Meenakshi, Sharma. Sangeeta (2019). Professional English. Oxford university press.New Delhi.
	[3] Improve Your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, 2001,New Delhi.
	[4] Learning to Communicate – Dr. V. Chellammal. Allied Publishers, New Delhi, 2003.
	[5] Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, TataMcGraw Hill & Co. Ltd., 2001, New Delhi.
MOOC/Web Platforms:	https://onlinecourses.nptel.ac.in/noc23_hs115/preview

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	To compare and contrast products and ideas in technical texts and write analytical essays.	Apply (BL 2)
CO2	To identify and report cause and effects in events, industrial processes through technical texts and draft a report with suggestions.	Create (BL 6)
CO3	To analyze problems in order to arrive at feasible solutions and communicate them in thewritten format.	Analyze (BL 4)
CO4	To present their ideas and opinions in a planned and logical manner in industrial nature.	Create (BL 6)
CO5	To draft effective resumes in the context of job application.	Create (BL 6)

(Action verb of each CO to be matched with the next mapping table) (For example: if CO-1 uses the High Order Thinking Skills based action verb, then the corresponding PO must be mapped with High Correlation)

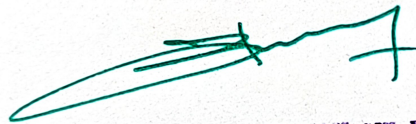Dr. MARUTHU KANNAN, ME., Ph.D.
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V - Mapping Table Mapping of COs with POs and PSOs

COs/ POs	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1									3	3		2		
CO-2									3	3		2		
CO-3									3	3		2		
CO-4									3	3		2		
CO-5									3	3		2		

Mapping: 1-Low, 2-Medium, 3-High (Mapping value based on usage of Action verbs in each CO)

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I - Course Name: 23MA202 TRANSFORMS AND NUMERICAL METHODS

Program Name	B.E. ELECTRICAL AND ELECTRONICS ENGINEERING	Sem	Category	L	T	P	C
Prerequisite	NIL	II	BSC	3	1	0	4

II - Course Objectives

1.	To understand the concept of Laplace transforms can be used for efficiently solving the problems that occur in various branches of engineering disciplines.
2.	To understand the concepts of Dirichlet's conditions and Fourier series.
3.	To Study the application of transform techniques using Fourier Transforms.
4.	To introduce the basic concepts of solving algebraic and transcendental equations.
5.	To understand various techniques and methods of solving ordinary differential equations.

III - Course Content

Preamble:
This course is applied to analyse the ground water, pollutants in civil engineering, *automatic* control systems, *fluid mechanics, gas dynamics, heat and mass transfer, thermodynamics, vibrations,* data communication, data computing, etc

Unit – I	**LAPLACE TRANSFORMS**	12 Hours
Existence conditions – Transforms of elementary functions – Transform of unit step function and unit impulse function – Basic properties – Shifting theorems - Transforms of derivatives and integrals – Initial and final value theorems – Inverse transforms – Convolution theorem(excluding Proof) – Transform of periodic functions – Application to solution of linear second order ordinary differential equations with constant coefficients.		

Unit – II	**FOURIER SERIES**	12 Hours
Dirichlet's conditions – General Fourier series – Half range sine and cosine series – Parseval's identity – Harmonic analysis.		

Unit – III	**FOURIER TRANSFORMS**	12 Hours
Fourier transform pair – Fourier sine and cosine transforms – Properties – Transforms of simple functions – Convolution theorem (excluding proof)– Parseval's identity.		

Unit – IV	**SOLUTION OF EQUATIONS**	12 Hours
Solution of algebraic and transcendental equations - Fixed point iteration method – Newton Raphson method- Solution of linear system of equations –direct method (Gauss elimination method, Gauss Jordan method) – Iterative methods (Gauss Jacobi and Gauss Seidel).		

Unit – V	**NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS**	12 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.		

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Text Books:	[1] Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015. [2] Veerarajan T., "Transforms and Partial Differential Equations", Tata McGraw Hill Education Pvt.Ltd., New Delhi, Second reprint,2012.
Reference Books:	[1] Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016 [2] Erwin Kreyszig, "Advanced Engineering Mathematics", 8th Edition, Wiley India,2007. [3] Gerald. C.F. and Wheatley. P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 7th Edition, 2007. [4] Bali. N.P and Manish Goyal, "A Textbook of Engineering Mathematics", 7th Edition, Laxmi Publications Pvt Ltd,2007. [5] Datta K.B., "Mathematical Methods of Science and Engineering", Cengage Learning India Pvt Ltd, Delhi,2013.
MOOC/Web Platforms:	https://onlinecourses.nptel.ac.in/noc21_ma74/preview

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	To apply Laplacetransform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.	Apply (BL 3)
CO2	To understand general periodic functions and apply in problems of Fourier series, which are sums of sines and cosines.	Understand (BL 2)
CO3	To use the Fourier transform as the tool to connect the time domain and frequency domain in signal processing.	Apply (BL 3)
CO4	Understand the basic concepts and Techniques of solving algebraic and transcendental equations.	Understand (BL 2)
CO5	Solve the ordinary differential equations with initial conditions by using certain techniques with engineering applications.	Analyse (BL 4)

(Action verb of each CO to be matched with the next mapping table) (For example: if CO-1 uses the High Order Thinking Skills based action verb, then the corresponding PO must be mapped with High Correlation)

V - Mapping Table Mapping of COs with POs and PSOs

COs/ POs	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	3	3	1	1	-	-	-	-	2	-	-	3	-	-
CO-2	3	3	1	1	-	-	-	-	2	-	-	3	-	-
CO-3	3	3	1	1	-	-	-	-	2	-	-	3	-	-
CO-4	3	3	1	1	1	-	-	-	2	-	2	3	-	-
CO-5	3	3	1	1	1	-	-	-	2	-	2	3	-	-

Mapping: 1-Low, 2-Medium, 3-High (Mapping value based on usage of Action verbs in each CO)

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I - Course Name: 23PH202 PHYSICS FOR ELECTRICAL ENGINEERING

Program Name	B.E. ELECTRICAL AND ELECTRONICS ENGINEERING	Sem	Category	L	T	P	C
Prerequisite	Engineering Physics	II	BSC	3	0	0	3

II - Course Objectives

1.	To understanding the fundamental physics of conducting materials and magnetic material characteristics.
2.	To impart fundamental knowledge of semiconductor device and electron transport characteristics.
3.	To understand the applications of dielectric materials.
4.	To know how optical materials for optoelectronics work.
5.	To recognize the fundamentals of quantum structures, the characteristics of nanomaterials, and their uses.

III - Course Content

Preamble:
Students who successfully finish this course will have a deeper understanding of conducting, semiconducting, dielectric, superconducting, optical, and nano electronic devices in addition to an appreciation of how several scientific disciplines are connected.

Unit – I	CONDUCTING AND MAGNETIC MATERIALS	9 Hours
Classical free electron theory - electrical and thermal conductivity, expression - quantum free electron theory – Fermi- Dirac statistics – density of energy states – electron in periodic potential – energy bands in solids – Zone Theory - electron effective mass. Dia, para and ferromagnetic effects – paramagnetism in the conduction electrons in metals – exchange interaction and ferromagnetism – quantum interference devices – spintronics devices.		

Unit – II	SEMICONDUCTING MATERIALS	9 Hours
Intrinsic semiconductors - 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 - variation of fermi level with temperature and impurity concentration - carrier transport in semiconductor: random motion, drift, mobility and diffusion - Hall effect and devices - Ohmic contacts - Schottky diode.		

Unit – III	DIELECTRIC MATERIALS	9 Hours
Matter polarization and relative permittivity: definition – dipole moment and polarization vector P - polarization mechanisms: electronic, ionic, orientational, interfacial and total polarization – frequency dependence – local field and Causius-Mossetti equation – dielectric constant and dielectric loss – dielectric strength – dielectric breakdown - piezoelectricity, ferroelectricity and pyroelectricity – quartz oscillators – piezo and pyroelectric crystals.		

Unit – IV	SUPERCONDUCTING AND OPTICAL MATERIALS	9 Hours
Super conductivity - type-I and type-II superconductors – properties – SQUID - MAGLAV. classification of optical materials - carrier generation and recombination processes - photo current in a P-N diode - solar cell - LED - organic LED - optical data storage techniques.		

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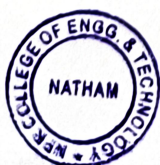Natham, Dindigul(Dt)-624 401

Unit – V	NANOTECHNOLOGY	9 Hours
Introduction - size dependence of fermi energy - quantum confinement - quantum structures - density of states - quantum well, quantum wire and quantum dot - band gap of nanomaterials – tunneling - scanning tunneling microscope - carbon nanotubes: properties and applications.		

Books for study & Reference:	[1] Ben Streetman and Sanjay Banerjee Solid State Electronic Devices, Prentice Hall, 6th Edition, 2005. [2] Donald Neaman, Dhrubes Biswas, Semiconductor Physics and Devices (SIE) 4th Edition, 2017. [3] Salivahanan,S., Rajalakshmi,A., Karthie,S., Rajesh,N.P., "Physics for Electronics Engineering and Information Science", McGraw Hill Education (India) Private Limited, 2018. [3] A. Marikani, Materials Science, PHI Learning Pvt Ltd, 2017 5] Rogers, B., Adams, J. &Pennathur, S., "Nanotechnology: Understanding Small Systems", CRC Press, 2014.
MOOC/Web Platforms:	https://onlinecourses.nptel.ac.in/noc20_ph10/preview https://www.electronics-notes.com/articles/basic_concepts/conductors-semiconductors-insulators/semiconductor-materials-types-groups.php https://www.electrical4u.com/dielectric-materials/ https://nptel.ac.in/courses/115103108 https://onlinecourses.nptel.ac.in/noc22_ee47/preview

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	To understand about the creation of energy band structures, free electron theory, and quantum theory and gain knowledge about magnetic materials and its applications.	Understand (BL 2)
CO2	To evaluate the functions of semiconductors and their uses.	Understand (BL 2)
CO3	To apply the knowledge of dielectric materials, as well as the applications.	Apply (BL 3)
CO4	To understand about the uses of superconducting and Optical properties of materials.	Understand (BL 2)
CO5	To describe the basic principles behind the operation of nano electronic devices.	Understand (BL 2)

(Action verb of each CO to be matched with the next mapping table) (For example: if CO-1 uses the High Order Thinking Skills based action verb, then the corresponding PO must be mapped with High Correlation)

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V - Mapping Table Mapping of COs with POs and PSOs

COs/ POs	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO-2	3	3	-	3	-	-	-	-	-	-	-	-	-	-
CO-3	3	3	2	-	3	-	2	-	-	-	-	2	-	-
CO-4	3	3	3	-	2	-	-	-	-	-	-	2	-	-
CO-5	3	3	3	-	3	1	1	-	-	-	-	3	-	-

Mapping: 1-Low, 2-Medium, 3-High (Mapping value based on usage of Action verbs in each CO)

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Course Name: 23BE203 & BASICS OF CIVIL AND MECHANICAL ENGINEERING

Program Name	B.E. - EEE	Sem	Category	L	T	P	C
Prerequisite	Nil	II	ESC	3	0	0	3

II - Course Objectives

1	To provide the students an illustration of the significance of the Civil and Mechanical Engineering Profession in satisfying the societal needs.
2	To help students acquire knowledge in the basics of surveying and the materials used for construction.
3	To provide an insight to the essentials of components of a building and the infrastructure facilities. impart knowledge on the fundamental of dynamics of particles and rigid bodies.
4	To explain the component of power plant units and detailed explanation to IC engines their working principles
5	To explain the Refrigeration & Air-conditioning system.

III - Course Content

Unit – I		9 Hours

PART A: OVERVIEW OF CIVIL ENGINEERING
Civil Engineering contributions to the welfare of Society - Specialized sub disciplines in Civil Engineering – Structural, Construction, Geotechnical, Environmental, Transportation and Water Resources Engineering – National building code – terminologists: Plinth area, Carpet area, Floor area, Buildup area, Floor space index - Types of buildings: Residential buildings, Industrial buildings.
PART B: OVERVIEW OF MECHANICAL ENGINEERING
Overview of Mechanical Engineering - Mechanical Engineering Contributions to the welfare of Society – Specialized sub disciplines in Mechanical Engineering – Manufacturing, Automation, Automobile and Energy Engineering - Interdisciplinary concepts in Mechanical Engineering.

Unit – II	SURVEYING AND CIVIL ENGINEERING MATERIALS	9 Hours

Surveying: Objects – Classification – Principles – Measurements of Distances and angles – Leveling – Determination of areas– Contours. Civil Engineering Materials: Bricks – Stones – Sand – Cement – Concrete – Steel - Timber - Modern Materials, Thermal and Acoustic Insulating Materials, Decorative Panels, Water Proofing Materials. Modern uses of Gypsum, Pre-fabricated Building component (brief discussion only)

Unit – III	BUILDING COMPONENTS AND INFRASTRUCTURE	9 Hours

Building plans – Setting out of a Building - Foundations: Types of foundations - Bearing capacity and settlement – Brick masonry – Stone Masonry – Beams – Columns – Lintels – Roofing – Flooring - Plastering. Types of Bridges and Dams – Water Supply Network - Rain Water Harvesting – Solid Waste Management - Introduction to Highways and Railways - Introduction to Green Buildings

Unit – IV	INTERNAL COMBUSTION ENGINES AND POWER PLANTS	9 Hours

Classification of Power Plants- Working principle of steam, Gas, Diesel, Hydro -electric and Nuclear Power plants- 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. Working principle of Turbine – Types – Francis, Pelton, Kaplan Turbine.

Unit – V	REFRIGERATION AND AIR CONDITIONING SYSTEM	9 Hours

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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. Properties of air - water mixture, concepts of psychometric and its process.

Text Books:	1. G Shanmugam, M S Palanichamy, Basic Civil and Mechanical Engineering, McGraw Hill Education; First edition, 2018.
Reference Books:	1. Palanikumar, K. Basic Mechanical Engineering, ARS Publications, 2018. 2. Ramamrutham S., "Basic Civil Engineering", Dhanpat Rai Publishing Co.(P) Ltd, 2013. 3. Seetharaman S., "Basic Civil Engineering", Anuradha Agencies, 2005. 4. Shantha Kumar SRJ., "Basic Mechanical Engineering", Hi-tech Publications, Mayiladuthurai, 2000.
MOOC/Web Platforms:	

IV - Course Outcome

	On completion of the course, the students will be able to	Bloom's Level Mapped
CO1	Understanding profession of Civil and Mechanical engineering.	Understanding (BL 2)
CO2	Illustrate the Basics in surveying and material used in construction.	Understanding (BL 2)
CO3	Summaries the planning of building, infrastructure and Building components	Applying (BL 3)
CO4	Illustrate working principles of IC Engine, different types of power plant and turbines.	Applying (BL 3)
CO5	Elaborate the components and working principles of Refrigeration and Air conditioning system.	Applying (BL 3)

(Action verb of each CO to be matched with the next mapping table) (For example: if CO-1 uses the High Order Thinking Skills based action verb, then the corresponding PO must be mapped with High Correlation)

V - Mapping Table Mapping of COs with POs and PSOs

COs/ POs	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	3						1	2						
CO-2	3						1	2						
CO-3	3						1	2						
CO-4	3						1	2						
CO-5	3						1	2						

Mapping: 1-Low, 2-Medium, 3-High (Mapping value based on usage of Action verbs in each CO)

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Course Name: 23GE202 & ENGINEERING GRAPHICS

Program Name	B.E. - EEE	Sem	Category	L	T	P	C
Prerequisite	Nil	II	ESC	2	0	4	4

II - Course Objectives

1	Drawing engineering curves.
2	Drawing freehand sketch of simple objects.
3	Drawing orthographic projection of solids and section of solids.
4	Drawing development of solids.
5	Drawing isometric and perspective projections of simple solids.

III - Course Content

BASICS OF ENGINEERING DRAWING AND CAD
(Not for examination)
Importance of graphics in engineering applications - Use of drafting instruments - BIS conventions and specifications — Size, layout and folding of drawing sheets — Lettering and dimensioning. CAD: Drafting and Editing Commands in CAD

Unit – I	PLANE CURVES	6+12
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.		

Unit – II	PROJECTION OF POINTS, LINES AND PLANE SURFACE	6+12
Orthographic projection – principles - 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.		

Unit – III	PROJECTION OF SOLIDS AND FREEHAND SKETCHING	6+12
Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes and parallel to the other by rotating object method. Visualization concepts and Free Hand sketching: Visualization principles Representation of Three-Dimensional objects — Layout of views- Freehand sketching of multiple views from pictorial views of objects. Practicing three-dimensional modeling of simple objects by CAD Software (Not for examination).		

Unit – IV	SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES	6+12
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. Practicing three-dimensional modeling of simple objects by CAD Software (Not for examination).		

Unit – V	ISOMETRIC AND PERSPECTIVE PROJECTIONS	6+12
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 - Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method. Practicing three-dimensional modeling of isometric projection of simple objects by CAD Software (Not for examination).		

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Text Books:	[1] Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2019. [2] Natrajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.
Reference Books:	[1] Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2008. [2] Parthasarathy N. S. and Vela Murali, "Engineering Graphics", Oxford University, Press, New Delhi, 2015. [3] T.Jeyapoovan, "Engineering Graphics Using AutoCAD", 7th Edition, Vikas Publishing Houses Pvt Ltd, 2015. [4] Basant Agarwal and Agarwal C.M., "Engineering Drawing", McGraw Hill, 2nd Edition, 2019. [5] Shah M.B., and Rana B.C., "Engineering Drawing", Pearson Education India, 2nd Edition, 2009.
MOOC/Web Platforms:	[1] https://nptel.ac.in/courses/112103019 [2] https://archive.nptel.ac.in/courses/112/102/112102304/

IV - Course Outcome

	On completion of the course, the students will be able to	Bloom's Level Mapped
CO1	Construct the conic curves, involutes and cycloid.	Understanding (BL 2)
CO2	Solve practical problems involving projection of lines, points and plane surfaces.	Understanding (BL 2)
CO3	Draw orthographic projection of solids and freehand sketch of simple objects.	Applying (BL 3)
CO4	Draw the sectioning and development of simple solids.	Applying (BL 3)
CO5	Draw isometric and perspective projections of simple solids.	Applying (BL 3)

(Action verb of each CO to be matched with the next mapping table) (For example: if CO-1 uses the High Order Thinking Skills based action verb, then the corresponding PO must be mapped with High Correlation)

V - Mapping Table Mapping of COs with POs and PSOs

COs/ POs	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	3	1	2	-	2	-	-	-	-	3	-	2	3	-
CO-2	3	1	2	-	2	-	-	-	-	3	-	2	3	-
CO-3	3	1	2	-	2	-	-	-	-	3	-	2	3	-
CO-4	3	1	2	-	2	-	-	-	-	3	-	2	3	-
CO-5	3	1	2	-	2	-	-	-	-	3	-	2	3	-

Mapping: 1-Low, 2-Medium, 3-High (Mapping value based on usage of Action verbs in each CO)

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I - Course Name: 23EE201 ANALYSIS OF ELECTRIC CIRCUITS

Program Name	B.E(EEE)	Sem	Category	L	T	P	C
Prerequisite	**Matrices and Calculus**	II	PCC	3	1	0	4

II - Course Objectives

1	To introduce electric circuits and its analysis
2	To provide key concepts to analyze and understand electrical circuits
3	To impart knowledge on solving circuit equations using network theorems
4	To educate on obtaining the transient response of circuits.
5	To introduce the phenomenon of resonance in coupled circuits.
6	To introduce Phasor diagrams and analysis of single &three phase circuits

III - Course Content

Preamble:

Electric circuit theory is the fundamental theory in which all branches of electrical engineering are built. Many areas of electrical engineering, are based on electric circuit theory. Therefore, the basic electric circuit theory course is the most important course for an electrical engineering student. Circuit theory is also valuable to students specializing in other branches of the engineering

Unit – I	**Basic Circuits Analysis**	**12 Hours**

Fundamentals concepts of R, L and C elements-Energy Sources- Ohm's Law -Kirchhoff 's Laws – DC Circuits – Resistors in series and parallel circuits - A.C Circuits – Average and RMS Value – Complex Impedance – Phasor diagram - Real and Reactive Power, Power Factor, Energy -Mesh current and node voltage methods of analysis D.C and A.C Circuits.

Unit – II	**Network Reduction and Theorems For DC and AC Circuits**	**12 Hours**

Network reduction: voltage and current division, source transformation – star delta conversion. Theorems – Superposition, Thevenin's and Norton's Theorem – Maximum power transfer theorem – Reciprocity Theorem – Millman's theorem- Tellegen's Theorem-Statement, application to DC and AC Circuits

Unit – III	**Transient Response Analysis**	**12 Hours**

Introduction – Laplace transforms and Inverse Laplace transforms- standard test signals -Transient response of RL, RC and RLC circuits using Laplace transform for Source free, Step input and Sinusoidal input.

Unit – IV	**Resonance And Coupled Circuits**	**12 Hours**

Series and parallel resonance –frequency response – Quality factor and Bandwidth – Self and mutual inductance – Coefficient of coupling – Dot rule-Analysis of coupled circuits– Single Tuned circuits

Unit – V	**Three Phase Circuits and Two Port Networks**	**12 Hours**

Analysis of three phase 3-wire and 4-wire circuits with star and delta connected loads, balanced and unbalanced – phasor diagram of voltages and currents – power measurement in three phase circuits– Power Factor Calculations. Two port Networks: Characterization of two port networks in terms of Z, Y, ABCD and h parameters.

Text Books:	[1] William H. HaytJr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis", McGraw Hill publishers, 9thedition, New Delhi, 2020.

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	[2] Charles K. Alexander, Mathew N.O. Sadiku, "Fundamentals of Electric Circuits", Second Edition, McGraw Hill, 2019.
Reference Books:	[1] Chakrabarti A, "Circuits Theory (Analysis and synthesis), Dhanpat Rai& Sons, New Delhi, 2020. [2] Joseph A. Edminister, Mahmood Nahvi, "Electric circuits", Schaum's series, McGraw-Hill, First Edition, 2019 [3] M E Van Valkenburg, "Network Analysis", Prentice-Hall of India Pvt Ltd, New Delhi, Revised 3rd edition,2019 [4] Richard C. Dorf and James A. Svoboda, "Introduction to Electric Circuits", 7th Edition, John Wiley Sons, Inc. 2018. [5] Sudhakar A and Shyam Mohan SP, "Circuits and Networks Analysis and Synthesis", McGraHill, 5th edition,2017.
MOOC/Web Platforms:	https://www.mooc-list.com/initiative/coursera

IV - Course Outcome

	On completion of the course, the students will be able to	Bloom's Level Mapped
CO1	Explain circuit's behavior using circuit laws.	BL1
CO2	Apply mesh analysis/ nodal analysis / network theorems to determine behavior of the given DC and AC circuit.	BL2
CO3	Compute the transient response of first order and second order systems to step and sinusoidal input.	BL3
CO4	Compute power, line/ phase voltage and currents of the given three phase circuit.	BL3
CO5	Comprehend the frequency response of series and parallel RLC circuits.	BL2

(Action verb of each CO to be matched with the next mapping table) (For example: if CO-1 uses the High Order Thinking Skills based action verb, then the corresponding PO must be mapped with High Correlation)

V - Mapping Table Mapping of COs with POs and PSOs

COs/ POs	PO-1	PO-2	PO-3	PO-4	PO-5	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	3	3	3	2		2	1				3	2	2	3	
CO-2	3	3	3	3	2		2	1				3	2	2	3	
CO-3	3	3	3	3	2		2	1				3	2	2	3	
CO-4	3	3	3	3	2		2	1				3	2	2	3	
CO-5	3	3	3	3	2		2	1				3	2	2	3	

Mapping: 1-Low, 2-Medium, 3-High (Mapping value based on usage of Action verbs in each CO)

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23GE201   **TAMILS AND TECHNOLOGY**   **L T P C**
                                                                                              1 0 0 1

UNIT I   WEAVING AND CERAMIC TECHNOLOGY   3
Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW)
– Graffiti on Potteries.

UNIT II   DESIGN AND CONSTRUCTION TECHNOLOGY   3
Designing and Structural construction House & Designs in household materials during Sangam Age - Building
materials and Hero stones of Sangam age — Details of Stage Constructions in Silappathikaram - Sculptures and
Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period -
Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic
architecture at Madras during British Period.

UNIT III   MANUFACTURING TECHNOLOGY   3
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 - Terracotta beads -Shell
beads/ bone beats - Archeological evidences - Gem stone types described inSilappathikaram.

UNIT IV   AGRICULTURE AND IRRIGATION TECHNOLOGY   3
Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed
for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries — Pearl - Conche diving - Ancient
Knowledge of Ocean - Knowledge Specific Society.

UNIT V   SCIENTIFIC TAMIL & TAMIL COMPUTING   3
Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development ofTamil
Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai
Project.

                                                                        TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS
1. தமிழக வரலாறு - மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும்
   கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3.
4. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5. பொருநை நதிக்கரை நாகரிகம் ; (தொல்லியல் துறை வெளியீடு)and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of
   Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by:
   International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of
   Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of
   Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The
    Author)

11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and
    Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

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23GE201 தமிழரும் தொழில்நுட்பழும்

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அலகு I   நெசவு மற்றும் பானைத் தொழில்நுட்பம்:   3

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

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.

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.

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.

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.

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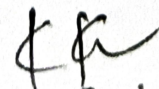
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