



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. COMPUTER SCIENCE AND ENGINEERING


REGULATION - 2023

CHOICE BASED CREDIT SYSTEM (CBCS)

CURRICULUM AND SYLLABUS




**Chairperson-Board of Studies,
Department of Computer Science
and Engineering.**


**Dr. R. MARUTHU KANNAN, M.E., Ph.D.,
Principal
NPR College of Engineering and Technology
Natham, Dindigul-624 401**

SEMESTER I

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
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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
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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
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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
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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 Function words – 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 Hill Education, ISBN : 0070264244.
	[4] Effective Communication Skill, Kulbhusan Kumar, RS Salaria, Khanna Publishing House
	[5] Learning to Communicate – Dr. V. Chellammal, Allied Publishing House, New Delhi, 2003.
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)



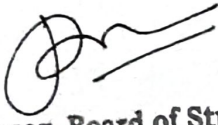
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V - Mapping Table Mapping of COs with POs and PSOs

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	PSO- 3
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 parallelepipeds.		
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.		



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Text Books:	<p>[1] Kreyszig.E, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.</p> <p>[2] Grewal.B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2018.</p> <p>[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].</p>
Reference Books:	<p>[1] Anton. H, Bivens. I and Davis. S, " Calculus ", Wiley, 10th Edition, 2016.</p> <p>[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.</p> <p>[3] Jain. R.K. and Iyengar. S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition, 2016.</p> <p>[4] Narayanan. S. and Manicavachagom Pillai. T. K., "Calculus" Volume I and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, 2009.</p> <p>[5] Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2016.</p> <p>[6] Srimantha Pal and Bhunia. S.C, "Engineering Mathematics " Oxford University Press, 2015.</p> <p>[7] Thomas. G. B., Hass. J, and Weir. M.D, "Thomas Calculus", 14th Edition, Pearson India, 2018.</p>
MOOC/Web Platforms:	<p>https://nptel.ac.in/courses/122104018</p> <p>https://archive.nptel.ac.in/courses/111/106/111106146/</p> <p>https://onlinecourses.nptel.ac.in/noc21_ma16/preview</p> <p>https://digimat.in/nptel/courses/video/111105122/L01.html</p>

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)



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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	PSO-3
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. [4] S. O. Pillai, Solid State Physics, New Age International Private Limited, 10 th 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	PSO-3
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, fluoride 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.		

Unit – IV	FUELS AND COMBUSTION	9 Hours
<p>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.</p> <p>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. CO₂ emission and carbon foot print.</p>		
Unit – V	ENERGY STORAGE DEVICES	9 Hours
<p>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: H₂-O₂ fuel cell, super capacitors</p>		

Text Books:	<p>[1] P. C. Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 17th Edition, 2018.</p> <p>[2] Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 6th Edition 2012.</p> <p>[3] S.S. Dara, "A text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.</p>
Reference Books:	<p>[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.</p> <p>[2] O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.</p> <p>[3] Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2nd Edition, 2017.</p> <p>[4] Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, 2nd Edition, 2019.</p> <p>[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.</p> <p>[6] Gowariker V.R., Viswanathan N.V. and Jayadev Sreedhar, "Polymer Science", New Age International P (Ltd.,) Chennai, 4th Edition, 2021.</p>
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IV - Course Outcome

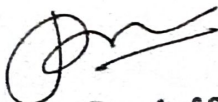
On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	Summarize the water related problems in boilers and their treatment techniques.	Remember (BL 1)
CO2	Discuss the applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.	Understand (BL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

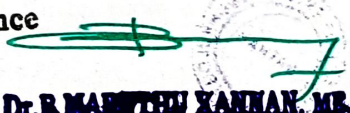
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CO-3	2	1	1	-	-	-	3	-	-	-	-	2	-	-	-
CO-4	2	1	1	-	-	-	1	-	-	-	-	2	-	-	-
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Mapping: 1-Low, 2-Medium, 3-High (Mapping value based on usage of Action verbs in each CO)


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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 Edition, Oxford University Press, 2013. 5. 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	Understand (BL 2)
CO2	Develop C Programs using basic programming constructs for solving simple problems	Apply (BL 3)
CO3	Develop C programs for solving computational problems by using arrays and strings	Apply (BL 3)
CO4	Develop simple real-time applications in C using functions, arrays, and strings	Apply (BL 3)
CO5	Develop applications for real time problems in C using pointers and structures	Apply (BL 3)



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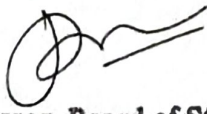
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V - Mapping Table Mapping of COs with POs and PSOs

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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I - Course Name: 23GE103 தமிழர் மரபு /HERITAGE OF TAMILS

Program Name	B.E./B.TECH. COMMON TO ALL BRANCHES	Sem	Category	L	T	P	C
Prerequisite	Nil	I	HSMC	1	0	0	1

II - Course Content

Unit – I	LANGUAGE AND LITERATURE	3 Hours
Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature 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 Hours
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 Hours
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 Hours
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 Hours
Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India - Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.		



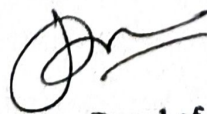
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Text Cum Books:	<p>[1] தமிழகவரலாறுமக்களும்பண்பாடும்கே.கே. பிள்ளை (வெளியீடு-தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்).</p> <p>[2] கணினித்தமிழ்முனைவர்இலசுந்தரம் (விகடன்பிரசுரம்).</p> <p>[3] கீழடி-வைகைநதிக்கரையில்சங்ககாலநகரநாகரிகம் (தொல்லியல்துறைவெளியீடு)</p> <p>[4] பொருநை-ஆற்றங்கரைநாகரிகம். (தொல்லியல்துறைவெளியீடு)</p> <p>[5] Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)</p> <p>[6] Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies).</p>
Reference Books:	<p>[1] Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D.Thirunavukkarasu) (Published by: International Institute of Tamil Studies).</p> <p>[2] The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies)</p> <p>[3] 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)</p> <p>[4] Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)</p> <p>[5] Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)</p> <p>[6] Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.</p>




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SEMESTER II

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 professional context.
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 of complaint , 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 the written 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)



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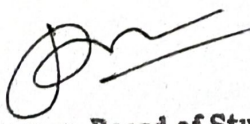
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V - Mapping Table Mapping of COs with POs and PSOs

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	PSO- 3
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: 23MA901 PROBABILITY AND STATISTICS

Program Name	B. E / B. TECH. COMMON FOR CSE & IT	Sem	Category	L	T	P	C
Prerequisite	NIL	II	BSC	3	1	0	4

II - Course Objectives

1.	To provide necessary basic concepts in probability.
2.	To understand the basic concepts of one - dimensional random variable and to introduce some standard distributions applicable to engineering which can describe real life phenomenon.
3.	To understand the basic concepts of two - dimensional random variables.
4.	To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems.
5.	Apply the basic concepts of classifications of design of experiments in the field of agriculture.

III - Course Content

Preamble: This course is enabled to apply drawn inferences to difference machine learning models, exposing to data clustering, data classification, data validation and data fitting.		
Unit – I	PROBABILITY AND RANDOM VARIABLES	12 Hours
Axioms of probability – Conditional probability – Baye's theorem - Discrete and continuous random variables – Mean and variance of random variables - Moments – Moment generating functions.		
Unit – II	PROBABILITY DISTRIBUTIONS	12 Hours
Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions – Transformation of a random variable.		
Unit – III	TWO DIMENSIONAL RANDOM VARIABLES	12 Hours
Joint distributions – Marginal and conditional distributions – Covariance – Correlation and linear regression – Transformation of two random variables		
Unit – IV	TESTING OF HYPOTHESIS	12 Hours
Statistical hypothesis – Large sample tests based on Normal distribution for single mean and difference of means- proportion - small samples Tests based on t for single mean and difference of means - F-distributions for single variance and equality of variances – Chi square test for goodness of fit – Independence of attributes.		
Unit – V	DESIGN OF EXPERIMENTS	12 Hours
Analysis of variance - One way and twoway classifications: Completely randomized design – Randomized block design – Latin square design.		

Text Books:	[1] Johnson. R.A., Miller. I and Freund. J., "Miller and Friends Probability and Statistics for Engineers", Pearson Education, Asia, 9 th Edition, 2016. [2] Milton. J. S. and Arnold. J.C., "Introduction to Probability and Statistics", Tata McGraw Hill, 4 th Edition, 2007. [3] Grewal.B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 44 th Edition, 2018.
Reference Books:	[1] Devore. J.L., "Probability and Statistics for Engineering and the Sciences, Cengage Learning, New Delhi, 8 th Edition, 2014. [2] Papoulis, A. and Unnikrishnapillai, S., "Probability, Random Processes and Statistics for Engineers", Wiley, New York, 2009.



	Processes", McGraw Hill Education India, 4 th Edition, New Delhi, 2010. [3] Ross . S.M., "Introduction to Probability and Statistics for Engineers and Scientists", 5 th Edition, Elsevier, 2014. [4] Spiegel. M.R., Schiller. J. and Srinivasan . R.A., "Schaums Outline of Theory and Problems of Probability and Statistics", Tata McGraw Hill Edition, 4 th Edition, 2012. [5] Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", Pearson Education, Asia, 9 th Edition, 2010.
MOOC/Web Platforms:	https://onlinestatbook.com/2/probability/basic.html https://www.youtube.com/watch?v=b5VUnapu-qs https://www.youtube.com/watch?v=q01b-lV6y5Q https://webpace.maths.qmul.ac.uk/b.bogacka/MS_NotesWeek4.pdf

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	To Understand the fundamental concepts of probability.	Understand (BL 2)
CO2	By applying the knowledge of one-dimensional random variables to standard distributions which can describe real life phenomenon.	Apply (BL 3)
CO3	Understand the basic concepts of two-dimensional random variables and apply in engineering applications.	Understand (BL 2)
CO4	Apply the concept of testing of hypothesis for small and large samples in real life problems.	Apply (BL 3)
CO5	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	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	PSO-3
CO-1	3	3	-	-	-	-	-	-	2	-	-	2	-	-	-
CO-2	3	3	-	-	-	-	-	-	2	-	-	2	-	-	-
CO-3	3	3	-	-	-	-	-	-	2	-	-	2	-	-	-
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: 23PH203 PHYSICS FOR INFORMATION SCIENCE

Program Name	B.E. /B.TECH. COMMON FOR CSE, IT AND AI&DS	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, superconductors, and material characteristics.
2.	To impart fundamental knowledge of semiconductor device and electron transport characteristics.
3.	To get expertise in magnetic materials.
4.	To know how superconducting materials with null resistance and optical materials for optoelectronics work.
5.	To learn how nano electronic devices operate on a fundamental level.

III - Course Content

Preamble: Students who complete this course will have a broader understanding of conducting, semiconducting, magnetic, superconducting, optical, and nanomaterials as well as an understanding of how different fields of knowledge are interconnected.		
Unit – I	CONDUCTING MATERIALS	9 Hours
Classical free electron theory - electrical and thermal conductivity expression - Wiedemann-Franz law - electrons in metals - motion of a particle in a three-dimensional box - Fermi- Dirac statistics - density of energy states - electron in periodic potential - Kronig-Penney Model (Qualitative) - energy bands in solids - electron effective mass.		
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 experiment - Ohmic contacts - Schottky diode.		
Unit – III	MAGNETIC MATERIALS	9 Hours
Magnetic dipole moment - atomic magnetic moments - magnetic permeability and susceptibility - magnetic material classification: diamagnetism - paramagnetism - ferromagnetism - antiferromagnetism - ferrimagnetism - ferromagnetism: origin and exchange interaction - domain theory - M versus H behavior - hard and soft magnetic materials - applications - magnetic principle in computer data storage - magnetic hard disc - GMR sensor.		
Unit – IV	SUPERCONDUCTING AND OPTICAL MATERIALS	9 Hours
Super conductivity - type-I and type-II superconductors - properties and applications - 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 and devices.		



Unit – V	NANO DEVICES	9 Hours
Introduction - size dependence of fermi energy - quantum confinement - quantum structures - density of states in quantum well, quantum wire and quantum dot structure - band gap of nanomaterials - tunneling: single electron phenomena and single electron transistor - quantum dot laser - carbon nanotubes: properties and applications.		

Books for study & Reference:	[1] S.O.Pillai, "Solid State Physics, New Academic Science", 2017. [2] V.Raghavan. Materials Science and Engineering: A First Course, Prentice Hall India Learning Private Limited, 2015. [3] A. Marikani, Materials Science, PHI Learning Pvt Ltd, 2017 [4] D.K.Bhattacharya&PoonamTandon., "Physics for Information Science and Electronics Engineering", Oxford Higher Education",2017. 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://advancedmagnetsource.com/types-magnetic-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 recognize the fundamental ideas behind different free-electron theories and establish the solids' electrical characteristics.	Understand (BL 2)
CO2	To evaluate the functions of semiconductors and their uses.	Apply (BL 3)
CO3	To employing quantum principles to examine the mechanisms at work in magnetic materials.	Apply (BL 3)
CO4	To understand about the uses of superconducting and Optical properties of materials.	Understand (BL 2)
CO5	To show the fundamentals of how micro- and nano-electronic equipment functions.	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	PSO-3
CO-1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO-2	3	3	-	3	-	-	-	-	-	-	-	-	-	-	-
CO-3	3	3	-	3	-	-	-	-	-	-	-	-	-	-	-
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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I - Course Name: 23BE201 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Program Name	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	Sem	Category	L	T	P	C
Prerequisite	Engineering Physics I	II	ESC	3	0	0	3

II - Course Objectives

1.	To introduce the basics of electric circuits and analysis
2.	To impart knowledge in the basics of working principles and application of electrical Machines
3.	To introduce analog devices and their characteristics
4.	To educate on the fundamental concepts of digital electronics
5.	To introduce the functional elements and working of measuring instruments

III - Course Content


Preamble:

It is an introductory course which emphasizes the fundamental concepts and overview of Electrical Engineering. The concepts discussed herein are intended to provide clarification on basic electrical engineering for beginners of all engineering graduates.

Unit – I	ELECTRICAL CIRCUITS	9 Hours
DC Circuits: Circuit Components: Conductor, Resistor, Inductor, Capacitor – Ohm's Law - Kirchhoff's Laws –Independent and Dependent Sources – Simple problems- Nodal Analysis, Mesh analysis with Independent sources only (Steady state) Introduction to AC Circuits and Parameters: Waveforms, Average value, RMS Value, Instantaneous power, real power, reactive power and apparent power, power factor (Simple problems only)		
Unit – II	ELECTRICAL MACHINES (Qualitative Analysis)	9 Hours
Construction and Working principle- DC Separately and Self excited Generators, EMF equation, Types and Applications. Working Principle of DC motors, Torque Equation, Types and Applications. Construction, working principle and Applications of Transformer, Single phase Induction Motor, Working types and Applications		
Unit – III	ANALOG ELECTRONICS (Qualitative Analysis)	9 Hours
Semiconductor Materials: Silicon & Germanium – PN Junction Diodes, Zener Diode –Characteristics Applications – Bipolar Junction Transistor-Biasing (CB Characteristics only) JFET, SCR, MOSFET, IGBT – Types, I-V Characteristics and Applications		
Unit – IV	DIGITAL ELECTRONICS	9 Hours
Review of number systems, binary codes, error detection and correction codes, Combinational logic - representation of logic functions-SOP and POS forms, K-map representations - minimization using K maps (Simple Problems only).		
Unit – V	MEASUREMENTS AND INSTRUMENTATION	9 Hours
Functional elements of an instrument, Standards and calibration, Operating Principle, types -Moving Coil and Moving Iron meters, Measurement of three phase power, Energy Meter, DSO- Block diagrams Data acquisition.		

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Text Books:	[1] Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition, McGraw Hill Education, 2020 [2] S.K.Bhattacharya "Basic Electrical and Electronics Engineering", Pearson Education, Second Edition, 2017.
Reference Books:	[1] Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw Hill Education, 2019. [2] Albert Malvino, David Bates, 'Electronic Principles, McGraw Hill Education; 7th edition, 2017 [3] H.S. Kalsi, 'Electronic Instrumentation and Measurements', Tata McGraw-Hill, New Delhi, 2019
MOOC/Web Platforms:	https://www.classcentral.com/course/swayam-fundamentals-of-electrical-engineering-14074

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	Compute the electric circuit parameters for simple problems	Apply (BL 3)
CO2	Examine the working principle and applications of electrical machines	Understand (BL 2)
CO3	Illustrate the characteristics of analog electronic devices	Understand (BL 2)
CO4	Examine the basic concepts of digital electronics	Analyze (BL 4)
CO5	Apply the concepts of principles of measuring instruments for real time applications	Apply (BL 2)

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	2	2	1	-	-	-	-	1	-	-	-	2	2	-	-	-
CO-2	2	2	1	-	-	-	-	1	-	-	-	2	2	-	-	-
CO-3	2	1	1	-	-	-	-	1	-	-	-	2	2	-	-	-
CO-4	2	2	1	-	-	-	-	1	-	-	-	2	2	-	-	-
CO-5	2	2	1	-	-	-	-	1	-	-	-	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: 23GE901 ENVIRONMENTAL SCIENCES AND SUSTAINABILITY

Program Name	B.E. /B.TECH. COMMON FOR CSE, ECE, AND IT	Sem	Category	L	T	P	C
Prerequisite	NIL	II	BSC	2	0	0	2

II - Course Objectives

1.	To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on biodiversity of India and its conservation.
2.	To impart knowledge on the causes, effects and control or prevention measures of environmental pollution.
3.	To study the dynamic processes and understand the features of the earth's interior and surface.
4.	To facilitate the understanding of global and Indian scenario of renewable and nonrenewable resources, causes of their degradation and measures to preserve them.
5.	To inculcate and embrace sustainability practices and develop a broader understanding on green materials, energy cycles and analyze the role of sustainable urbanization.

III - Course Content

Preamble: The objective of this course is intended to make the students to understand the basic concepts of environment, ecology and pollution of the current environmental issues and to participate in various activities on conserving and protecting the environment.		
Unit – I	ENVIRONMENT AND BIODIVERSITY	6 Hours
Definition, scope and importance of environment – need for public awareness. Eco-system and energy flow – ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: in-situ and ex-situ.		
Unit – II	ENVIRONMENTAL POLLUTION	6 Hours
Causes, effects and preventive measures of water, soil, air and noise pollutions. Solid, hazardous and e-waste management. case studies on occupational health and safety management system (OHASMS). Environmental protection - environmental protection acts.		
Unit – III	SOCIAL ISSUES AND THE ENVIRONMENT	6 Hours
Water conservation, rain water harvesting, watershed management – Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.		
Unit – IV	RENEWABLE SOURCES OF ENERGY	6 Hours
Energy management and conservation, new energy sources: need of new sources. Different types new energy sources. Applications of - hydrogen energy, ocean energy resources, tidal energy conversion. Concept, origin and power plants of geothermal energy.		



Unit – V	SUSTAINABILITY PRACTICES	6 Hours
Zero waste and R concept, circular economy, ISO 14000 series, material life cycle assessment, environmental impact assessment. Sustainable habitat: green buildings, green materials, energy efficiency, Sustainable transports. Sustainable energy: non-conventional sources, energy cycles carbon cycle, emission and sequestration, green engineering: sustainable urbanization - socio economical and technological change.		

Text Books:	1. Anubha Kaushik and C. P. Kaushik's 'Perspectives in Environmental Studies', 6 th Edition, New Age International Publishers, 2018. 2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2017. 3. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2 nd edition, Pearson Education, 2004. 4. Allen, D. T. and Shonnard, D. R., 'Sustainability Engineering: Concepts, Design and Case Studies', Prentice Hall. 5. Bradley. A.S; Adebayo, A.O., Maria, P. 'Engineering applications in sustainable design and development', Cengage learning. 6. Environment Impact Assessment Guidelines, Notification of Government of India, 2006.
Reference Books:	1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media, 2010. 2. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, Third Edition, 2015. 3. Erach Bharucha 'Textbook of Environmental Studies for Under graduate Courses' Orient Blackswan Pvt. Ltd. 2021.
MOOC/Web Platforms:	https://onlinecourses.nptel.ac.in/

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation	Remember (BL 1)
CO2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	Understand (BL 2)
CO3	identify the causes, effects of natural disasters and contribute to the preventive measures in the society.	Apply (BL 3)
CO4	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	Understand (BL 2)
CO5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	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)

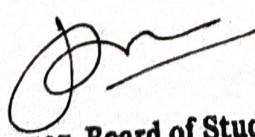



V - Mapping Table Mapping of COs with POs and PSOs

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	PSO- 3
CO-1	2	1	-	-	-	2	3	-	1	-	-	2	-	-	-
CO-2	3	2	-	-	-	3	3	-	1	-	-	2	-	-	-
CO-3	3	1	1	-	-	2	2	-	-	-	-	2	-	-	-
CO-4	3	1	1	1	-	2	2	-	1	-	-	2	-	-	-
CO-5	3	2	1	-	-	2	2	-	1	-	-	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: 23GE201 PYTHON PROGRAMMING

Program Name	B.E/B.Tech. – Common to CSE ,IT & ECE	Sem	Category	L	T	P	C
Prerequisite	C Programming	II	PCC	3	0	0	3

II - Course Objectives

1.	To learn to solve problems using Python conditionals and loops.
2	To define Python functions and use function calls to solve problems
3	To use Python data structures - lists, tuples, dictionaries to represent complex data.
4	To do input/output with files in Python
5	To use python Exceptions and Libraries

III - Course Content

Preamble: Python is an open-sourced programming language that combines the features of C and Java. It has exceptional procedural as well as object-oriented capabilities. Having said this, always remember that everything in Python is an object.		
Unit – I	DATA TYPES, EXPRESSIONS, STATEMENTS	9 Hours
Python interpreter and interactive mode, debugging; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.		
Unit – II	CONTROL FLOW, FUNCTIONS, STRINGS	9 Hours
Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.		
Unit – III	LISTS, TUPLES, DICTIONARIES	9 Hours
Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: simple sorting, histogram, Students marks statement, Retail bill preparation.		
Unit – IV	FILES, MODULES, PACKAGES	9 Hours
Files and exceptions: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file, Voter's age validation, Marks range validation (0-100).		
Unit – V	EXCEPTIONS, LIBRARIES	9 Hours
Exception Handling – Built-in Exceptions – Application Development with Python; Integrated Development Environment, Python Standard Library		

TOTAL : 45 PERIODS



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Text Books:	<ol style="list-style-type: none"> 1. Allen B. Downey, "Think Python: How to Think like a Computer Scientist", 2nd Edition, O'Reilly Publishers, 2016. 2. Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and Programming", 1st Edition, BCS Learning & Development Limited, 2017.
Reference Books:	<ol style="list-style-type: none"> 1. Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021. 2. G Venkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data Scientists", 1st Edition, Notion Press, 2021. 3. John V Guttag, "Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data", Third Edition, MIT Press, 2021 4. Eric Matthes, "Python Crash Course, A Hands - on Project Based Introduction to Programming", 2nd Edition, No Starch Press, 2019. 5. Martin C. Brown, "Python: The Complete Reference", 4th Edition, Mc-Graw Hill, 2018.
MOOC/Web Platforms:	<p>Introduction to C (w3schools.com) https://www.python.org/</p>

IV - Course Outcome

On completion of the course, the students will be able to		Bloom's Level Mapped
CO1	Develop simple python programs for applying the concepts of datatypes, expressions, and python statements	Understand (BL 2)
CO2	Develop Python programs for solving real-time computational problems by using conditionals, looping, functions, and strings.	Apply (BL 3)
CO3	Understand the concepts of compound data using Python lists, tuples, and dictionaries	Apply (BL 3)
CO4	Develop python programs for solving computational problems by using modules, files, and python packages	Understand (BL 2)
CO5	Develop python programs for solving computational problems by using Exceptions and Libraries	Apply (BL 3)

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	PSO-3
CO-1	3	2	2	-	-	-	-	-	-	-	2	-	-	2	3
CO-2	3	3	3	2	2	-	-	-	-	-	2	3	3	-	3
CO-3	3	3	3	2	2	-	-	-	-	-	2	3	3	2	3
CO-4	3	2	2	-	-	-	-	-	-	-	2	-	-	2	3
CO-5	3	3	3	2	3	-	-	-	-	-	2	3	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: 23GE201 - தமிழரும் தொழில்நுட்பமும் / Tamils and Technology

Program Name	B.E./B.TECH. COMMON TO ALL BRANCHES	Sem	Category	L	T	P	C
Perquisite	Nil	II	HSMC	1	0	0	1

II - Course Content

Unit - I	WEAVING AND CERAMIC TECHNOLOGY	3 Hours
Weaving Industry during Sangam Age - Ceramic technology - Black and Red Ware Potteries (BRW) - Graffiti on Potteries.		
Unit - II	DESIGN AND CONSTRUCTION TECHNOLOGY	3 Hours
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 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 - Terracotta beads - Shell beads/ bone beads - Archeological evidences - Gem stone types described in Silappathikaram.		
Unit - IV	AGRICULTURE AND IRRIGATION TECHNOLOGY	3 Hours
Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries - Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.		
Unit - V	SCIENTIFIC TAMIL & TAMIL COMPUTING	3 Hours
Development of Scientific Tamil - Tamil computing - Digitalization of Tamil Books - Development of Tamil Software - Tamil Virtual Academy - Tamil Digital Library - Online Tamil Dictionaries - Sorkuvai Project.		
TOTAL: 15 Periods		
Text Cum Books:	[1] தமிழக வரலாறு மக்களும் பண்பாடும் கே.கே. பிள்ளை (வெளியீடு - தமிழ்நாடுபாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்). [2] கணினித்தமிழ் முனைவர் இலசந்தரம் (விகடன் பிரசுரம்). [3] கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு). [4] பொருளை - 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: International Institute of Tamil Studies.	
Reference Books:	[1] Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D.Thirunavukkarasu) (Published by: International Institute of Tamil Studies). [2] The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies) [3] 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) [4] Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author) [5] Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu) [6] Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) - Reference Book.	

