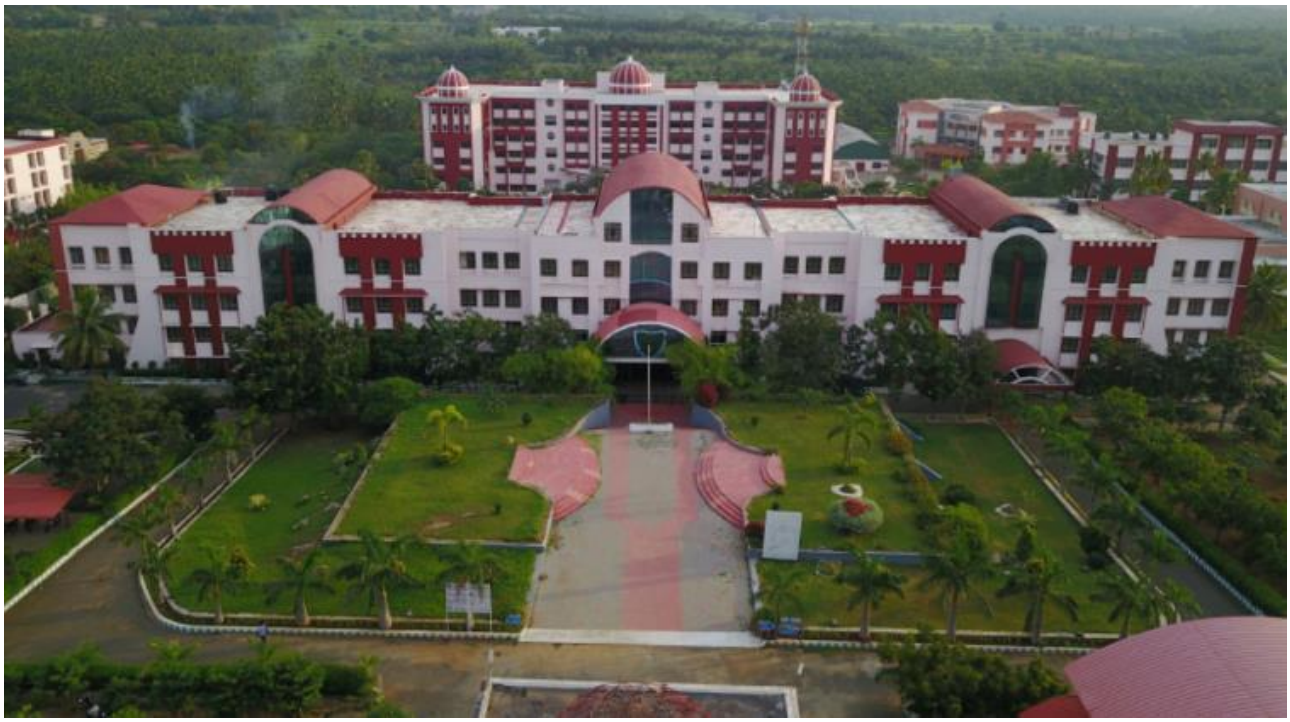
NEHRU INSTITUTE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

An ISO 9001 : 2015 and 14001:2015 Certified Institution, Affiliated to Anna University, Chennai
(Approved by AICTE, New Delhi and Recognized by UGC with Section 2(f) and 12(B)
Re-Accredited by NAAC "A+", NBA Accredited UG Courses : AERO & CSE
Nehru Gardens, Thirumalayampalayam, Coimbatore-641 105

DEPARTMENT OF MECHANICAL ENGINEERING



CURRICULUM

B. E. – Mechanical Engineering

REGULATION – 2023 (Revised)

DEPARTMENT OF MECHANICAL ENGINEERING

VISION AND MISSION OF THE INSTITUTION

VISION

Our Vision is to mould the youngsters to acquire sound knowledge in technical and scientific fields to face the future challenges by continuous upgradation of all resources and processes for the benefit of humanity as envisaged by our great leader Pandit Jawaharlal Nehru.

MISSION

- To build a strong centre of learning and research in engineering and technology.
- To facilitate the youth to learn and imbibe discipline, culture and spirituality.
- To produce quality engineers, dedicated scientists and leaders.
- To encourage entrepreneurship.
- To face the challenging needs of the global industries.

VISION AND MISSION OF THE DEPARTMENT

VISION

- To mould the Mechanical Engineering aspirants into Employable Engineers and Successful Entrepreneurs

MISSION

- To be centre of excellence in Mechanical Engineering in providing Quality Education
- To upgrade infrastructure and faculty competency for Continuous Development
- To inculcate a work culture that yields Socio-Economical Engineers and Intellectual Leaders
- To instill leadership qualities to pursue a Professional Career and Entrepreneurship

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- To excel in career applying knowledge in mathematics, science and engineering fundamentals essential to create, solve and analyze Mechanical Engineering related problems.
- To design, analyze and implement cost-effective solutions to engineering problems encountered in the field that are beneficial to the society.
- To establish careers in industry by exhibiting professionalism that meets the needs of national and multinational companies with adequate technical learning and communication skills.

PROGRAM OUTCOMES (POs)

1. **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem Analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern Tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6. **The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one ‘s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-Long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

- To synthesize technical data and concepts of Machine Design and Thermal Engineering to function effectively in the areas of research and development using software tools

- To design and fabricate Special Purpose Machine tools using the concepts of Unconventional Machining to enhance the efficiency of modern Manufacturing systems

- To design, analyse and develop automated systems in combination of mechanical, hydraulic, pneumatic, electrical, electronic devices, and computers

SCHEME OF EXAMINATION

B. E. - MECHANICAL ENGINEERING

Regulation 2023 (Revised) - Choice Based Credit System

(Applicable to students admitted from the year 2023 -2024 onwards)

SEMESTER	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIOD/ WEEK	EXAMINATION MARKS			CREDITS
					CIA	ESE	TOTAL	
I	U23IP100	Induction Programme /Bridge Course	-	-	-	-	-	0
THEORY INTEGRATED LAB								
I	U23EN101	English for Engineers	HSMC	4	50	50	100	3
I	U23GE102	Problem Solving Using C	ESC	4	50	50	100	3
THEORY								
I	U23MA103	Engineering Mathematics-I	BSC	4	40	60	100	4
I	U23PH104	Engineering Physics	BSC	3	40	60	100	3
I	U23CY105	Engineering Chemistry	BSC	3	40	60	100	3
I	U23GE106	Heritage of Tamils	HSMC	1	40	60	100	1
I	U23GE107	Biology for Engineers	BSC	2	40	60	100	2
PRACTICAL								
I	U23BS118	Physics and Chemistry Laboratory	BSC	4	60	40	100	2
			TOTAL	25	-	-	-	21

SEMESTER	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIOD/ WEEK	EXAMINATION MARKS			CREDITS
					CIA	ESE	TOTAL	
THEORY								
II	U23MA201	Engineering Mathematics-II	BSC	4	40	60	100	4
II	U23MS202	Materials Science	BSC	3	40	60	100	3
II	U23GE203	Tamils and Technology	HSMC	1	40	60	100	1
II	U23ME204	Engineering Graphics	ESC	3	40	60	100	3
II	U23GE205	Basic Electrical and Electronics Engineering	ESC	3	40	60	100	3
THEORY WITH INTEGRATED LAB								
II	U23EN206	Proficiency in English	HSMC	4	50	50	100	3
II	U23GE207	Problem Solving using Python	ESC	4	50	50	100	3
PRACTICAL								
II	U23GE218	Engineering Practices Laboratory	ESC	2	60	40	100	1
ENHANCEMENT COURSES								
II		Skill Enhancement Course – I	SEC	2	100	-	100	1
II		Value Enhancement Course – I	VEC	2	100	-	100	1
			TOTAL	28	-	-	-	23

CURRICULUM & SYLLABUS

B. E. - MECHANICAL ENGINEERING

Regulation 2023 (Revised) - Choice Based Credit System

Semester – I

S. No.	Course Code	Course Title	Category	L	T	P	Contact Period	C
1	U23IP100	Induction Programme/Bridge Course	-	-	-	-	-	0
THEORY WITH INTEGRATED LAB								
2	U23EN101	English for Engineers	HSMC	2	0	2	4	3
3	U23GE102	Problem Solving using C	ESC	2	0	2	4	3
THEORY								
4	U23MA103	Engineering Mathematics - I	BSC	3	1	0	4	4
5	U23PH104	Engineering Physics	BSC	3	0	0	3	3
6	U23CY105	Engineering Chemistry	BSC	3	0	0	3	3
7	U23GE106	Heritage of Tamils	HSMC	1	0	0	1	1
8	U23GE107	Biology for Engineers	ESC	2	0	0	2	2
PRACTICAL								
9	U23BS118	Physics and Chemistry Laboratory	BSC	0	0	4	4	2
			TOTAL	**16**	**1**	**8**	**25**	**21**

Course Code	Title			
U23IP100	Induction Programme/Bridge Course			
Semester: I	L	T	P	Credits
	-	-	-	0

Course Content

	Description
	This is a mandatory 2 week programme to be conducted as soon as the students enter the institution. Normal classes start only after the induction program is over. The induction programme has been introduced by AICTE with the following objective: "Engineering colleges were established to train graduates well in the branch/department of admission, have a holistic outlook, and have a desire to work for national needs and beyond. The graduating student must have knowledge and skills in the area of his/her study. However, he/she must also have broad understanding of society and relationships. Character needs to be nurtured as an essential quality by which he/she would understand and fulfill his/her responsibility as an engineer, a citizen and a human being. Besides the above, several meta-skills and underlying values are needed." "One will have to work closely with the newly joined students in making them feel comfortable, allow them to explore their academic interests and activities, reduce competition and make them work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and build character. "Hence, the purpose of this programme is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature. The following are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program. (i) Physical Activity This would involve a daily routine of physical activity with games and sports, yoga, gardening, etc. (ii) Creative Arts Every student would choose one skill related to the arts whether visual arts or performing arts. Examples are painting, sculpture, pottery, music, dance etc. The student would pursue it everyday for the duration of the program. These would allow for creative expression. It would develop a sense of aesthetics and also enhance creativity which would, hopefully, grow into engineering design later. (iii) Universal Human Values This is the anchoring activity of the Induction Programme. It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, take decisions with courage, be aware of relationships with colleagues and supporting stay in the hostel and department, be sensitive to others, etc. A module in Universal Human Values provides the base. Methodology of teaching this content is extremely important. It must not be through do's and dont's, but get students to explore and think by engaging them in a dialogue. It is best taught through group discussions and real life activities

rather than lecturing.
Discussions would be conducted in small groups of about 20 students with a faculty 3 mentor each.
It would be effective that the faculty mentor assigned is also the faculty advisor for the student for the full duration of the UG programme.

(iv) Literary Activity
Literary activity would encompass reading, writing and possibly, debating, enacting a play etc.

(v) Proficiency Modules
This would address some lacunas that students might have, for example, English, computer familiarity etc.

(vi) Lectures by Eminent People
Motivational lectures by eminent people from all walks of life should be arranged to give the students exposure to people who are socially active or in public life.

(vii) Visits to Local Area
A couple of visits to the landmarks of the city, or a hospital or orphanage could be organized. This would familiarize them with the area as well as expose them to the under privileged.

(viii) Familiarization to Dept./Branch & Innovations
They should be told about what getting into a branch or department means what role it plays in society, through its technology. They should also be shown the laboratories, workshops & other facilities.

(ix) Department Specific Activities
About a week can be spent in introducing activities (games, quizzes, social interactions, small experiments, design thinking etc.) that are relevant to the particular branch of Engineering/Technology/Architecture that can serve as a motivation and kindle interest in building things (become a maker) in that particular field. This can be conducted in the form of a workshop. For example, CSE and IT students may be introduced to activities that kindle computational thinking, and get them to build simple games. ECE students may be introduced to building simple circuits as an extension of their knowledge in Science, and so on. Students may be asked to build stuff using their knowledge of science.

Induction Programme is totally an activity based programme and therefore there shall be no tests / assessments during this programme.

References: Guide to Induction program from AICTE

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
D. Edison, AP/S&H Name and Department of the Faculty Member	Dr. P. T. Hemamalini Head of the Department Department of Science & Humanities Institute of Engineering & Technology Nehru Gardens. Thampalayam, Coimbatore - 641 105 Name and Seal of the Chairperson-BoS

Course Code	Title					
U23EN101	ENGLISH FOR ENGINEERS					
Semester: I	L	T	P	Credits	CIA: 50 Marks	ESE: 50 Marks
	2	0	2	3		
Course pre-requisites	Basic Grammar & Communication Strategies					

Course Objectives	
1	To enable learners of engineering and technology to develop their basic communication skills in English.
2	To acquire, command in both the respective skills (listening and reading) and the productive skills (writing and speaking) of the English language.
3	To understand the key concepts of values, life skills and business communication, motivate students to look within and create a better version of themselves.
4	To focus on developing basic fluency in English, using vocabulary in the technical field, and strengthening reading and official written communication skills.
5	To use language efficiently in expressing their opinions via various media.

Course Category	Humanities, Social Science and Management Course (HSMC)
Development Needs	Global / National

Course Description: To focus on developing basic fluency in English, using vocabulary in the technical field, and strengthening reading and official written communication skills.

Course Content

Unit	Description	
I	**INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION:** **Reading -** Reading brochures (technical context), telephone messages / social media messages relevant to technical contexts. **Writing -** Writing oneself, Writing Definition; Jumbled sentence. **Grammar** – Simple present tense, Present continuous, Present perfect, Present perfect continuous; Question types: Wh/ Yes or No/ and Tags; Word formation, One-word substitution.	
	Contact Periods	**06**
II	**NARRATION AND SUMMATION:** **Reading:** biographies, travelogues, newspaper reports. **Writing -** Guided writing- Paragraph writing, Short Report on an event (field trip, etc.), **Grammar** – Simple past tense, Past continuous, Past perfect, Past perfect continuous Subject-Verb Agreement; Prepositions, Word forms (prefixes & suffixes); Error Correction.	
	Contact Periods	**06**
III	**DESCRIPTION OF PROCESS/PRODUCT:** **Reading –** Reading advertisements, and gadget reviews; finding key information from a given text. **Writing -** Instructions; Process description. **Grammar -** Simple future tense, Future continuous, Future perfect, Future perfect continuous; Imperatives; Adjectives; Degrees of comparison; Compound Words.	
	Contact Periods	**06**

IV	**CLASSIFICATION AND RECOMMENDATIONS:** **Reading** – Journal reports, predicting content of reading habits, Reading articles (Activity). **Writing** –Memos to colleagues or friends; Opinion Blogs. **Grammar** – Articles; Pronouns - Possessive & Relative pronouns, Cause and Effect.
	Contact Periods 06
V	**EXPRESSION:** **Reading** – Reading editorials; Poster making (Activity). **Writing** – Creative Writing, Checklist. **Grammar** –Punctuation; Compound Nouns, Homonyms; and Homophones, Simple, Compound & Complex Sentences.
	Contact Periods 06
	Total Periods 30

LIST OF EXPERIMENTS

1. Listen to one's activities and asking question.
2. Self-Introduction, Peer group activities.
3. Listening to mock interview questions and answering.
4. Listening to documentaries video and responding.
5. Likes and dislikes, experiences.
6. Listen to product and process descriptions.
7. Talk about a Product, work place experiences.
8. Listening to TED Talks.
9. Talk about any great Personalities or Celebrities.
10. Listening to Debates & Discussing.

Contact Periods	30
Total Periods	60

Course Outcomes

Upon successful completion of the course, students will be able to:

CO 1	Listen and comprehend complex academic texts.	K2
CO 2	Understand the denotative and connotative meanings of technical texts.	K3
CO 3	Identify definitions, descriptions, narrations and essays on various topics.	K4
CO 4	Apply different methods of integration in solving practical problems.	K3
CO 5	Express their opinions effectively in both oral and written medium of communication.	K6

K1: Remembering; K2: Understanding; K3: Applying; K4: Analyzing; K5: Evaluating; K6: Creating

Text Books	1. English for Engineers & Technologists Orient Blackswan Private Ltd. Department of English, Anna University, (2020 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. Technical Communication – Principles and Practices by Meenakshi Raman & SangeetaSharma, Oxford Univ. Press, 2016, New Delhi. 2. A Course Book on Technical English by Lakshmi Narayanan, 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, R S Salaria, Khanna Publishing House.
5. Learning to Communicate – Dr. V. Chellammal, Allied Publishing House, New
Delhi, 2003.
6. Practical English Usage, 2016 published by Oxford by Michael Swan.

Tools for Assessment – Theory

CIA I	CIA II	CIA III	Assignment/ Seminar/ Case Study	Attendance	Total
10	10	10	5	5	40

Tools for Assessment – Practical

Model Exam I	Model Exam II	Total
50	50	100

Mapping

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

3-High; 2-Medium; 1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	-	-	2
CO2	-	-	2
CO3	-	-	2
CO4	-	-	2
CO5	-	-	2

Course designed by	Verified by
R.Hrs Signature of the Faculty Member	P. T. Hemamalini Signature of the Chairperson-BoS
Dr. R. Deepa Asp- S&H. Name and Department of the Faculty Member	Dr. P. T. HEMAMALINI Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105. Name and Seal of the Chairperson-BoS

Course Code	Title					
U24GE102	PROBLEM SOLVING USING C					
Semester: I	L	T	P	Credits	CIA: 50 Marks	ESE: 50 Marks
	2	0	2	3		

Course pre-requisites	Basic Knowledge of Programming Knowledge

Course Objectives

1	To understand the constructs of C Language.
2	To apply C programs using basic programming constructs.
3	To analyse C programs using arrays and strings.
4	To apply modular applications in C using functions.
5	To create applications in C using pointers and structures.

Course Category	Engineering Sciences Course (ESC)
Development Needs	Global

Course Description: Study the constructs of C Language.

Course Content

Unit	Description	
I	**PROBLEM SOLVING:** Problem Solving: Introduction to computer-based problem solving, Program design and implementation issues, Algorithms for problem solving: Simple problems based on numerical methods, Operations on ordered set of elements, Solving quadratic equations, Operations on matrices.	
	Contact Periods	06
II	**OVERVIEW OF C**: Basic Data types, Modifying the Basic Datatypes, Identifier-Names, Variables, Type Qualifiers, Constants, Operators, Expressions, Selection, Iteration and Jump Statements. Introduction to Arrays: Declaration, Initialization – One dimensional array –Two dimensional arrays - String operations: length, compare, concatenate, copy – Selection sort, linear and binary search.	
	Contact Periods	06
III	**FUNCTIONS AND POINTERS:** 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.	
	Contact Periods	06
IV	**STRUCTURES AND UNIONS:** Structure - Nested structures – Pointer and Structures – Array of structures – Self-referential structures – Dynamic memory allocation - Singly linked list – typedef – Union - Storage classes and Visibility.	
	Contact Periods	06
V	**FILE PROCESSING:** Files – Types of file processing: Sequential access, Random access – Sequential access file - Random access file - Command line arguments.	
	Contact Periods	06
	Total Periods	30

LIST OF EXPERIMENTS

1. Decision-making constructs: if-else, goto, switch-case, break-continue
2. Loops: for, while, do-while
3. Arrays: 1D and 2D, Multi-dimensional arrays, traversal, Sorting and Searching
4. Strings: operations
5. Functions: call, return, passing parameters by (value, reference), passing arrays to function.
6. Recursion
7. Pointers: Pointers to functions, Arrays, Strings, Pointers to Pointers, Array of Pointers
8. Structures: Nested Structures, Pointers to Structures, Arrays of Structures and Unions.
9. Files: reading and writing, File pointers, file operations, random access, processor directives.
10. C Program for Gauss Elimination Method
11. C Program for Sum of Taylor Series Program
12. C Program for Trapezoidal Method
13. C Program for Gauss-Jordan Method
14. C Program for Simpson 1/3 Rule
15. C program for operations on Matrices
16. Mini Project

Contact Periods	**30**
Total Periods	**60**

Course Outcomes
Upon successful completion of the course, Students will be able to:

CO 1	Understand basic Problem-solving methodologies.	K2
CO 2	Apply applications using arrays and strings.	K3
CO 3	Analyze modular applications in C using functions with pointers.	K4
CO 4	Apply applications in C using structures and Unions.	K3
CO 5	Understand the concepts of sequential and random-access file processing.	K2

K1:Remembering; K2:Understanding; K3:Applying; K4:Analyzing; K5:Evaluating; K6:Creating

Text Books

1. Yashwant Kanetkar, Let Us C: Authentic guide to C programming language - 19th Edition Paperback – 15 December 2022.
2. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.

Reference Books

1 Paul Deitel and Harvey Deitel, "C How to Program with an Introduction to C++", Eighth edition, Pearson Education, 2018.
2 HarshaPriya, R. Ranjeet, Programming and Problem Solving Through "C" Language, 1st Edition, Fire Wall Media, 2015.
3 Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2013.
4. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1st Edition, Pearson Education, 2013.
5. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw-Hill Education, 1996.

Tools for Assessment-Theory

CIA I	CIA II	CIA III	Assignment / Seminar	Attendance	Total
10	10	10	5	5	40

Tools for Assessment-Practical		
Model Exam I	Model Exam II	Total
50	50	100

Mapping

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

3 – High, 2-Medium, 1-Low.

CO\ PSO	PSO1	PSO2	PSO3
CO1	2	1	1
CO2	2	2	1
CO3	2	2	1
CO4	2	2	1
CO5	2	1	1

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
JEEVANANTHAM G, AP(SG) Computer Science & Engineering	Dr. S. SUBASREE, M.Tech. Ph.D Professor and Head, Computer Science and Engineering Nehru Institute of Engineering and Technology Coimbatore, TN, India
Name and Department of the Faculty Member	Name and Seal of the Chairperson-BoS

Course Code	Title					
U23MA103	ENGINEERING MATHEMATICS-I					
Semester: I	L	T	P	Credits	CIA: 40 Marks	ESE: 60 Marks
	3	1	0	4		
Course pre-requisites	Higher Secondary Level, Bridge Course					

Course Objectives

1	To familiarize the students to solve the first order linear differential equations using numerical methods.
2	To familiarize the students to solve the second order linear differential equations using numerical methods.
3	To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.
4	To introduce the numerical techniques of interpolation in various intervals which plays an important role in engineering and technology disciplines
5	To understand types of matrices and their properties, concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.

Course Category	Basic Science Course (BSC)
Development Needs	Global / National

Course Description: The course helps the students to develop the fundamentals and basic concepts in linear ODE's by numerical solutions. Students will be able to solve problems related to engineering applications by using these techniques.

Course Content

Unit	Description	
I	**ORDINARY DIFFERENTIAL EQUATION:** First-order linear ordinary differential equations-application to solve simple engineering and scientific problems. Numerical solution of first-order and linear ordinary differential equations: Errors and approximations, order of convergence, Modified Euler's method, and Runge - Kutta fourth order method to solve simple engineering and scientific problems.	
	Contact Periods	**12**
II	**SECOND-ORDER LINEAR ODE'S:** Second-order linear ODE's with constant coefficients – Solution by Inverse differential operator, Application to Oscillations of a mass spring system and L-C-R circuit. Numerical Solution of second order linear ODE: Runge-Kutta method and Milnes Predictor Corrector method to solve problems on oscillations of a mass spring system and L-C-R circuits.	
	Contact Periods	**12**
III	**MULTIPLE INTEGRALS**: Introduction of integrals – Evaluation of double and triple integrals – Region of integration - changing into polar coordinates. Application to find Area, Volume and total mass by double integral.	
	Contact Periods	**12**
IV	**INTERPOLATION TECHNIQUES**: Interpolation, Lagrange's interpolation formula, Newton's divided difference interpolation formula. Newton-Gregory forward and backward interpolation formula, Newton's Forward and Backward differences.	
	Contact Periods	**12**

V	**MATRIX ALGEBRA:** Solution to the system of linear equations. Elementary row transformation of a matrix, RREF, Rank of a matrix. Gauss-Elimination method. Approximate solution by Gauss-Seidel method. Solution of system of Ordinary Differential equations by Matrix method.
	Contact Periods 12
	Total Periods 60

Course Outcomes **Upon successful completion of the course, students will be able to:**		**Knowledge Level**
CO 1	Apply the numerical techniques to the first order ordinary differential equations.	K3
CO 2	Understand the numerical techniques to the second order ordinary differential equations.	K2
CO 3	Apply multiple integral ideas in solving areas, volumes and other practical problems	K3
CO 4	Apply the numerical techniques of interpolation in various intervals.	K3
CO 5	Understand the matrix representation of a set of linear equations and to analyse the solution of the System of equations.	K2

K1: Remembering; K2: Understanding; K3: Applying; K4: Analyzing; K5: Evaluating; K6: Creating

Text Books	1. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley, 10th Edition, 2020. 2. Glyn James, Advanced Modern Engineering Mathematics, Pearson Education, 4th Edition, 2010. 3. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Editon, 2016.
Reference Books	1. Grewal.B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2018. 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 Manicavachagom Pillai. 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.

Tools for Assessment (40 Marks)

CIA I	CIA II	CIA III	Assignment/ Seminar/ Case Study	Attendance	Total
10	10	10	5	5	40

Mapping

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

3-High; 2-Medium; 1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	1	1	1
CO3	1	1	1
CO4	1	1	1
CO5	1	1	1

Course designed by	Verified by
K-Ramesh Signature of the Faculty Member	P. T. Hemamalini Signature of the Chairperson-BoS
Dr. K. RAMESH ASP - Mathematics S&H Name and Department of the Faculty Member	Dr. P. T. HEMAMALINI. Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105 Name and Seal of the Chairperson-BoS

Course Code	Title					
U23PH104	ENGINEERING PHYSICS					
Semester: I	L	T	P	Credits	CIA: 40 Marks	ESE: 60 Marks
	3	0	0	3		
Course pre-requisites	Higher Secondary Level					

Course Objectives

1	To grasp the fundamentals of Matter Properties and their practical implications across diverse Engineering fields.
2	To explore the applications of Lasers and Fiber optics in Engineering contexts.
3	To apply principles of Ultrasonics and Thermal Physics to Engineering challenges.
4	To understand Quantum Physics concepts and their applications.
5	To analyse the structure of crystals and explore their significance.

Course Category	Basic Science Course (BSC)
Development Needs	Global / National

Course Description: Engineering physics provides students with a broad exposure to the basic physical theories underlying engineering. students will complete certain concept in Physics intended to provide a good exposure in various directions in both theoretical and applied Physics.

Course Content

Unit	Description	
I	**PROPERTIES OF MATTER:** Introduction - Elasticity - Stress-strain diagram and its uses - Factors affecting elastic modulus - Torsional stress and deformations - Torsional pendulum: theory and experiment - Bending of beams - Bending moment - Cantilever: theory and experiment - Uniform and non-uniform bending: theory and experiment - I-shaped girders - Applications.	
	Contact Periods	**09**
II	**LASER AND FIBER OPTICS:** Introduction – Spontaneous and stimulated emission. Population inversion, pumping methods- Einstein's A and B coefficients: derivation. Types of lasers - Nd-YAG, CO_2 - Industrial Applications of Lasers -Fiber Optics: Principle and propagation of light - Numerical aperture and Acceptance angle - Types of optical fibres (material, refractive index, mode) - Temperature and displacement sensors.	
	Contact Periods	**09**
III	**ULTRASONICS AND THERMAL PHYSICS**: Introduction - Piezoelectric effect - piezoelectric generator - Velocity measurement - Acoustic grating - Medical applications. Introduction to heat - Transfer of heat energy: Thermal conduction, convection, and radiation - Thermal conductivity - Forbe's and Lee's disc method: theory and experiment - Applications: heat exchangers, refrigerators, ovens, and solar water heaters.	
	Contact Periods	**09**
IV	**QUANTUM PHYSICS:** Introduction - Black body radiation - Planck's theory - Deduction of Wien's displacement law and Rayleigh-Jeans' Law from Planck's theory - Compton effect: Theory and experimental verification - Matter waves - Physical significance of wave function - Schrödinger's wave equation: Time independent and time dependent equations - Particle in a one-dimensional box- Microscope: Scanning Tunnelling microscope.	
	Contact Periods	**09**
V	**CRYSTAL PHYSICS:** Introduction - Lattice - Unit cell - Bravais lattice - Lattice planes -Miller indices - 'd' spacing in cubic lattice - Calculation of number of atoms per unit cell - Atomic radius - Coordination number - Packing factor for SC, BCC, FCC, and HCP structures - Diamond	

	and graphite structures - Polymorphism and allotropy - Crystal defects - Point, line, and surface defects.
Contact Periods	**09**
Total Periods	**45**

Course Outcomes

Upon successful completion of the course, students will be able to:

CO 1	Understand the basics of properties of matter and its applications.	K2
CO 2	Remember the concepts of LASER and optical devices and their applications in fiber optics.	K1
CO 3	Understand the basic concepts of ultrasonics & thermal properties of materials and their applications in expansion joints and heat exchangers,	K2
CO 4	Apply knowledge an advanced physics concepts of quantum theory and its applications in tunneling microscopes.	K3
CO 5	Understand the basics of crystals, their structures and different crystal growth techniques.	K2

K1: Remembering; K2: Understanding; K3: Applying; K4: Analyzing; K5: Evaluating; K6: Creating

Text Books

1. Bhattacharya, D.K. & Poonam, T. "Engineering Physics". Oxford University Press, 2015.
2. Gaur, R.K. & Gupta, S.L. "Engineering Physics". Dhanpat Rai Publishers, 2012.
3. Pandey, B.K. & Chaturvedi, S. "Engineering Physics". Cengage Learning India, 2012.
4. Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, Concepts of Modern Physics, McGraw-Hill (Indian Edition), 2020.

Reference Books

1. Halliday, D., Resnick, R. & Walker, J. "Principles of Physics." Wiley, 2015.
2. Serway, R.A. & Jewett, J.W. "Physics for Scientists and Engineers." Cengage Learning, 2010.
3. Palanisamy P.K. "Engineering Physics." SCITECH Publications, 2011.
4. Kittle, C, "Introduction to solid state Physics," Wiley, 2005.
5. Mani P. "Engineering Physics I." Dhanam Publications, 2011.
6. Senthilkumar G. "Engineering Physics I." VRB Publishers, 2011.

Tools for Assessment (40 Marks)

CIA I	CIA II	CIA III	Assignment/ Seminar/Case Study	Attendance	Total
10	10	10	5	5	40

Mapping

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

3-High; 2-Medium; 1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	1	1	1
CO3	1	1	1
CO4	1	1	1
CO5	1	1	1

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
Dr. P. Periasamy Dept. of Science and Humanities Name and Department of the Faculty Member	Dr. P.T. HEMAMALINI. Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105 Name and Seal of the Chairperson-BoS

Course Code	Title					
U23CY105	ENGINEERING CHEMISTRY					
Semester: I	L	T	P	Credits	CIA: 40 Marks	ESE: 60 Marks
	3	0	0	3		
Course pre-requisites	Higher Secondary Level					

Course Objectives

1	To inculcate a sound understanding of water treatment techniques.
2	To understand the basic concepts of electrochemistry and its applications.
3	To introduce the basic concepts of corrosion and its control methods.
4	To facilitate the understanding of different types of fuels, their preparation, properties, and combustion characteristics.
5	To familiarize the students with the properties and applications of different types of advanced engineering materials.

Course Category	Basic Science Course (BSC)
Development Needs	Global / National

Course Description: Chemistry is required to solve global problems and issues for future engineering.

Course Content

Unit	Description
I	**WATER TECHNOLOGY:** Introduction - Sources of water - Impurities in water - Types of water - Water Quality Standards - Hardness of water - Expression of hardness - Units of hardness - Estimation of hardness of water by EDTA method - Disadvantages of using hard water - Boiler troubles - Scale and sludge. Softening of water - External treatment method - Demineralization process - Internal treatment method - Sodium Aluminate, Phosphate and Calgon conditioning - Desalination of Brackish water by reverse osmosis method.
	Contact Periods 09
II	**ELECTROCHEMISTRY:** Introduction - Cells - Representation of a galvanic cell - Reversible and irreversible cells - Electrode potential - Nernst equation - Reference electrode - Standard hydrogen electrode - Glass electrode - Electrochemical series and its applications. **Battery**: Introduction, Types of batteries - Primary Battery: alkaline battery, Secondary Battery : lead storage battery and lithium ion battery, Flow Battery : H_2-O_2 fuel cell - Super Capacitors, E-Vehicle.
	Contact Periods 09
III	**CORROSION AND ITS CONTROL:** Corrosion: Introduction - Types of corrosion: Chemical and Electrochemical - Factors influencing rate of corrosion. Corrosion control - material selection and design aspects - Electrochemical protection - sacrificial anode method and impressed current cathodic method. Paints- constituents and function. Electroplating of Copper and electroless plating of nickel.
	Contact Periods 09
IV	**FUELS AND COMBUSTION:** Fuels: Introduction - Requirements of a good fuel - Classification of fuels - Solid fuels - Coal - Proximate analysis of coal - Manufacture of Metallurgical coke - Otto-Hoffman byproduct oven - Liquid fuel - Manufacture of synthetic

	petrol by Bergius method. Knocking - Octane number - Cetane number - Power alcohol and biodiesel - Gaseous fuel - LPG, CNG. **Combustion** - Principle of combustion - Calorific value - Gross and net calorific values - Explosive range - Spontaneous ignition temperature – Flue gas analysis-ORSAT method.	
	Contact Periods	**09**
V	**ADVANCED ENGINEERING MATERIALS**: Introduction to Polymers - Thermoplastic and Thermosetting. Properties of polymers: Tg, Tacticity, & Molecular weight. Composites - Fibre-reinforced composites and its applications. Abrasives - Moh's scale of hardness - types - natural [Diamond] - synthetic [SiC]; Refractories - characteristics - classifications [Acidic, basic and neutral refractories] - properties - refractoriness - RUL - porosity - thermal spalling; Lubricants - definition - function - characteristics - properties - viscosity index, flash and fire points, cloud and pour points, oiliness; Nano materials - CNT- synthesis [laser evaporation] - applications.	
	Contact Periods	**09**
	Total Periods	**45**

Course Outcomes
Upon successful completion of the course, students will be able to:

CO 1	Infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K1
CO 2	Understand the basic concept of Electrochemistry for its applications in different engineering sectors.	K2
CO 3	Reduce corrosion problems by applying appropriate control methods.	K3
CO 4	Recommend suitable fuels for engineering processes and applications.	K3
CO 5	Recognize different types of engineering materials and apply them for suitable applications in energy sectors.	K4

K1: Remembering; K2: Understanding; K3: Applying; K4: Analyzing; K5: Evaluating; K6: Creating

Text Books	1. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018. 2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008. 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, "Textbook 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, 2014. 4. Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second 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. 5. Gowariker V.R., Viswanathan N.V., and Jayadev Sreedhar, "Polymer Science", New Age International P (Ltd.,), Chennai, 2022.

Tools for Assessment (40 Marks)				
CIA I	CIA II	CIA III	Assignment/Seminar/ Case study	Attendance	Total
10	10	10	5	5	40

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1	-	-	-	1	-	-	-	-	1
CO2	3	1	1	-	-	-	1	-	-	-	-	1
CO3	3	1	1	-	-	-	1	-	-	-	-	1
CO4	3	1	1	-	-	-	1	-	-	-	-	1
CO5	3	1	1	-	-	-	1	-	-	-	-	1

3-High; 2-Medium; 1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	1	-	1
CO2	1	-	1
CO3	1	-	1
CO4	1	-	1
CO5	1	-	1

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
A. Lakshmi Priya / AP, Chemistry S&H Name and Department of the Faculty Member	Dr. P. T. HEMAMALINI. Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105 Name and Seal of the Chairperson-BoS

Course Code	Title					
U23GE106	HERITAGE OF TAMILS					
Semester:I	L	T	P	Credits	CIA:40 Marks	ESE: 60 Marks
	1	0	0	1		
Course pre-requisites	Higher Secondary Level					

Course Objectives	
1	To learn the extensive literature of classical tamil.
2	To review the fine arts heritage of Tamil culture.
3	To realize the contribution in Indian freedom struggle.
4	To understand the role of Temple in Sangam cities/ports, Chola conquest.
5	To examine Tamil cultural influence in India.

Course Category	Humanities, Social Science and Management Course (HSMC)
Development Needs	Global/National

Course Description: Used to explores the rich culture, linguistic and historical aspects of the Tamil community.

Course Content

Unit	Description	
I	**LANGUAGE AND LITERATURE**: 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.	
	Contact Periods	**03**
II	**HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE:** 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.	
	Contact Periods	**03**
III	**FOLK AND MARTIAL ARTS:** Therukoothu, Karakattam, VilluPattu, KaniyanKoothu, Oyillattam, Leather Puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.	
	Contact Periods	**03**
IV	**THINAI CONCEPT OF TAMILS:** Flora and Fauna of Tamils & Agam 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.	
	Contact Periods	**03**

V	**CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE:** 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.	
	Contact Periods	**03**
	Total Periods	**15**
Course Outcomes **Upon successful completion of the course, students will be able to:**		
CO 1	Remember the extensive literature of tamil and its classical nature, musical instruments, Folk, thinai concept, Indian Freedom Struggle & Aham, Puram and Aram Concept	K1
CO 2	Remember the principles in Thirukural, Bhakti Literature Azhwars and Nayanmars , heritage of sculpture, painting and musical instruments of ancient people, victory of chozha dynasty	K1
CO 3	Understand on folk and martial arts of tamil people, Justice in Sangam Literature, Development of Modern literature in Tamil, Making of musical instru ments	K2
CO 4	Understand the role of Temples in Social and Economic Life of Tamils, Ancient Cities and Ports of Sangam Age, Conquest of Cholas	K2
CO 5	Understand the Cultural Influence of Tamils over the other parts of India, contribution of tamils self-esteem movement and siddha medicine, Print History of Tamil Books	K2
K1: Remembering;K2: Understanding;K3: Applying;K4: Analyzing;K5: Evaluating; K6: Creating		
Text Books	1. தமிழகவரலாறு – மக்களும் பண்பாடும் – .கே. கேபிள்ளை: தமிழ்நாடு பாட நூல் மற்றும் கல்வியியல் பணிகள் கழகம், பதிப்பு-16, ஆண்டு-2020. 2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம் . (விகடன்பிரசுரம்)பதிப்பு-1, ஆண்டு-2016. 3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகரநாகரிகம் (தொல்லியல்துறை(வெளியீடு).பதிப்பு-1, ஆண்டு-2016.	
Reference Books	1. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print) 2016. 2. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies) 2010. 3. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies).1995 4. 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).Edition: 1 Year 2016. 5. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu). 2022. 6. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book..Edition: 1 Year 2016.	

Tools for Assessment (40 Marks)					
CIAI	CIAII	CIAIII	Assignment/Seminar/ Case Study	Attendance	Total
10	10	10	5	5	40

Mapping												
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	1	2	2	-	2	-	1
CO2	1	-	-	-	-	1	2	2	-	2	-	1
CO3	1	-	-	-	-	1	2	2	-	2	-	1
CO4	1	-	-	-	-	1	2	2	-	2	-	1
CO5	1	-	-	-	-	1	2	2	-	2	-	1

3-High;2-Medium;1-Low

CO \PSO	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	1	1	1
CO3	1	1	1
CO4	1	1	1
CO5	1	1	1

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
Dr. DEEPAK. A. S&H Dept. Name and Department of the Faculty Member	Dr. P.T. HEMAMALINI. Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105 Name and Seal of the Chairperson-BoS

Course Code	Title					
U23BS118	PHYSICS AND CHEMISTRY LABORATORY					
Semester: I	L	T	P	Credits	CIA: 60 Marks	ESE: 40 Marks
	0	0	4	2		
Course pre-requisites	Higher Secondary Level, Physical measurements, Volumetric analysis					

Course Objectives

1	To learn the proper use of various kinds of physics laboratory equipment.
2	To learn problem solving skills related to physics principles and interpretation of experimental data.
3	To determine error in physics experimental measurements and techniques used to minimize such error.
4	To induce the students to familiarize with electro analytical techniques such as, pH metry, and potentiometry in the determination of impurities in aqueous solutions.
5	To estimate the amount of mineral acid in the given sample by conductometric method.

Course Category	Basic Science Course (BSC)
Development Needs	Global / National

Course Description: In depth understanding of Physics and chemistry is needed for the engineer for the more beneficial solutions.

Course Content

PHYSICS LABORATORY

LIST OF EXPERIMENTS (Any Five)

1. Determination of rigidity modulus - Torsional pendulum.
2. Determination of Young's modulus - Non uniform bending method.
3. Determination of Young's modulus - Uniform bending method
4. Determination of thickness of a thin wire - Air wedge method
5. Determination of the wavelength of the laser using grating
6. Determination of Numerical Aperture and acceptance angle using Optical fibre.
7. Determination of velocity of sound and compressibility of liquid - Ultrasonic interferometer.
8. Determination of thermal conductivity of a bad conductor - Lee's Disc method.
9. Melde's string experiment.
10. Determination of Band gap of a semiconductor.
11. Photoelectric effect.
12. Michelson Interferometer.

Contact Periods	**15**

CHEMISTRY LABORATORY

LIST OF EXPERIMENTS (Any Five)

1. Preparation of Na_2CO_3 as a primary standard and estimation of acidity of a water sample using the primary standard.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler's method.
4. Determination of chloride content of water sample by Argentometric method.
5. Determination of strength of given hydrochloric acid using pH meter.
6. Determination of strength of acids in a mixture of acids using conductivity meter.
7. Estimation of iron content of the given solution using potentiometer.

Contact Periods	**15**
Total Periods	**30**

Course Outcomes

Upon successful completion of the course, students will be able to:

CO 1	Understand the proper use of various kinds of physics laboratory equipment.	K2
CO 2	Develop the problem solving skills related to physics principles and interpretation of experimental data.	K4
CO 3	Determine error in physics experimental measurements and techniques used to minimize such error.	K3
CO 4	Develop a strong foundation on water hardness, alkalinity, dissolved oxygen and its measurement, enabling them to effectively access and manage water quality in various settings.	K4
CO 5	Acquire the necessary knowledge, skills, and attitudes related to the pH, potentiometric and conductometric experiments.	K2

K1: Remembering; K2: Understanding; K3: Applying; K4: Analyzing; K5: Evaluating; K6: Creating

Tools for Assessment (40 Marks)

Preparation	Conduct of Experiments	Calculations & Result	Viva-Voce	Total
20	30	40	10	100

Tools for Assessment (20 Marks)

Model Exam I	Model Exam II	Total
50	50	100

Mapping

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

3-High; 2-Medium; 1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	1	1	1
CO3	1	1	1
CO4	1	1	1
CO5	1	1	1

Course designed by	Verified by
1. 2. Signature of the Faculty Member	Signature of the Chairperson-BoS
1. Dr. P. Periasamy / Physics 2. A. Lakshmi priya, AP/Chem S&H Name and Department of the Faculty Member	Dr. P. T. HEMAMALINI. Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105 Name and Seal of the Chairperson-BoS

B. E. - MECHANICAL ENGINEERING

Regulation 2023 (Revised) - Choice Based Credit System

Semester – I

S. No.	Course Code	Course Title	Category	L	T	P	Contact Period	C
1	U23IP100	Induction Programme/Bridge Course	-	-	-	-	-	0
THEORY WITH INTEGRATED LAB								
2	U23EN101	English for Engineers	HSMC	2	0	2	4	3
3	U23GE102	Problem Solving using C	ESC	2	0	2	4	3
THEORY								
4	U23MA103	Engineering Mathematics - I	BSC	3	1	0	4	4
5	U23PH104	Engineering Physics	BSC	3	0	0	3	3
6	U23CY105	Engineering Chemistry	BSC	3	0	0	3	3
7	U23GE106	Heritage of Tamils	HSMC	1	0	0	1	1
8	U23GE107	Biology for Engineers	ESC	2	0	0	2	2
PRACTICAL								
9	U23BS118	Physics and Chemistry Laboratory	BSC	0	0	4	4	2
			TOTAL	**16**	**1**	**8**	**25**	**21**

Course Code	Title			
U23IP100	Induction Programme/Bridge Course			
Semester: I	L	T	P	Credits
	-	-	-	0

Course Content

	Description
	This is a mandatory 2 week programme to be conducted as soon as the students enter the institution. Normal classes start only after the induction program is over. The induction programme has been introduced by AICTE with the following objective: "Engineering colleges were established to train graduates well in the branch/department of admission, have a holistic outlook, and have a desire to work for national needs and beyond. The graduating student must have knowledge and skills in the area of his/her study. However, he/she must also have broad understanding of society and relationships. Character needs to be nurtured as an essential quality by which he/she would understand and fulfill his/her responsibility as an engineer, a citizen and a human being. Besides the above, several meta-skills and underlying values are needed." "One will have to work closely with the newly joined students in making them feel comfortable, allow them to explore their academic interests and activities, reduce competition and make them work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and build character. "Hence, the purpose of this programme is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature. The following are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program. (i) Physical Activity This would involve a daily routine of physical activity with games and sports, yoga, gardening, etc. (ii) Creative Arts Every student would choose one skill related to the arts whether visual arts or performing arts. Examples are painting, sculpture, pottery, music, dance etc. The student would pursue it everyday for the duration of the program. These would allow for creative expression. It would develop a sense of aesthetics and also enhance creativity which would, hopefully, grow into engineering design later. (iii) Universal Human Values This is the anchoring activity of the Induction Programme. It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, take decisions with courage, be aware of relationships with colleagues and supporting stay in the hostel and department, be sensitive to others, etc. A module in Universal Human Values provides the base. Methodology of teaching this content is extremely important. It must not be through do's and dont's, but get students to explore and think by engaging them in a dialogue. It is best taught through group discussions and real life activities

rather than lecturing.
Discussions would be conducted in small groups of about 20 students with a faculty 3 mentor each.
It would be effective that the faculty mentor assigned is also the faculty advisor for the student for the full duration of the UG programme.

(iv) Literary Activity
Literary activity would encompass reading, writing and possibly, debating, enacting a play etc.

(v) Proficiency Modules
This would address some lacunas that students might have, for example, English, computer familiarity etc.

(vi) Lectures by Eminent People
Motivational lectures by eminent people from all walks of life should be arranged to give the students exposure to people who are socially active or in public life.

(vii) Visits to Local Area
A couple of visits to the landmarks of the city, or a hospital or orphanage could be organized. This would familiarize them with the area as well as expose them to the under privileged.

(viii) Familiarization to Dept./Branch & Innovations
They should be told about what getting into a branch or department means what role it plays in society, through its technology. They should also be shown the laboratories, workshops & other facilities.

(ix) Department Specific Activities
About a week can be spent in introducing activities (games, quizzes, social interactions, small experiments, design thinking etc.) that are relevant to the particular branch of Engineering/Technology/Architecture that can serve as a motivation and kindle interest in building things (become a maker) in that particular field. This can be conducted in the form of a workshop. For example, CSE and IT students may be introduced to activities that kindle computational thinking, and get them to build simple games. ECE students may be introduced to building simple circuits as an extension of their knowledge in Science, and so on. Students may be asked to build stuff using their knowledge of science.

Induction Programme is totally an activity based programme and therefore there shall be no tests / assessments during this programme.

References: Guide to Induction program from AICTE

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
D. Edison, AP/S&H Name and Department of the Faculty Member	Dr. P.T. HEMAMALINI. Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105 Name and Seal of the Chairperson-BoS

Course Code	Title					
U23EN101	ENGLISH FOR ENGINEERS					
Semester: I	L	T	P	Credits	CIA: 50 Marks	ESE: 50 Marks
	2	0	2	3		
Course pre-requisites	Basic Grammar & Communication Strategies					

Course Objectives

1	To enable learners of engineering and technology to develop their basic communication skills in English.
2	To acquire, command in both the respective skills (listening and reading) and the productive skills (writing and speaking) of the English language.
3	To understand the key concepts of values, life skills and business communication, motivate students to look within and create a better version of themselves.
4	To focus on developing basic fluency in English, using vocabulary in the technical field, and strengthening reading and official written communication skills.
5	To use language efficiently in expressing their opinions via various media.

Course Category	Humanities, Social Science and Management Course (HSMC)
Development Needs	Global / National

Course Description: To focus on developing basic fluency in English, using vocabulary in the technical field, and strengthening reading and official written communication skills.

Course Content

Unit	Description	
I	**INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION:** **Reading -** Reading brochures (technical context), telephone messages / social media messages relevant to technical contexts. **Writing -** Writing oneself, Writing Definition; Jumbled sentence. **Grammar** – Simple present tense, Present continuous, Present perfect, Present perfect continuous; Question types: Wh/ Yes or No/ and Tags; Word formation, One-word substitution.	
	Contact Periods	**06**
II	**NARRATION AND SUMMATION:** **Reading:** biographies, travelogues, newspaper reports. **Writing -** Guided writing- Paragraph writing, Short Report on an event (field trip, etc.), **Grammar** – Simple past tense, Past continuous, Past perfect, Past perfect continuous Subject-Verb Agreement; Prepositions, Word forms (prefixes & suffixes); Error Correction.	
	Contact Periods	**06**
III	**DESCRIPTION OF PROCESS/PRODUCT:** **Reading –** Reading advertisements, and gadget reviews; finding key information from a given text. **Writing -** Instructions; Process description. **Grammar -** Simple future tense, Future continuous, Future perfect, Future perfect continuous; Imperatives; Adjectives; Degrees of comparison; Compound Words.	
	Contact Periods	**06**

IV	**CLASSIFICATION AND RECOMMENDATIONS:** **Reading** – Journal reports, predicting content of reading habits, Reading articles (Activity). **Writing** –Memos to colleagues or friends; Opinion Blogs. **Grammar** – Articles; Pronouns - Possessive & Relative pronouns, Cause and Effect.
	Contact Periods 06
V	**EXPRESSION:** **Reading** – Reading editorials; Poster making (Activity). **Writing** – Creative Writing, Checklist. **Grammar** –Punctuation; Compound Nouns, Homonyms; and Homophones, Simple, Compound & Complex Sentences.
	Contact Periods 06
	Total Periods 30

LIST OF EXPERIMENTS

1. Listen to one's activities and asking question.
2. Self-Introduction, Peer group activities.
3. Listening to mock interview questions and answering.
4. Listening to documentaries video and responding.
5. Likes and dislikes, experiences.
6. Listen to product and process descriptions.
7. Talk about a Product, work place experiences.
8. Listening to TED Talks.
9. Talk about any great Personalities or Celebrities.
10. Listening to Debates & Discussing.

Contact Periods	30
Total Periods	60

Course Outcomes

Upon successful completion of the course, students will be able to:

CO 1	Listen and comprehend complex academic texts.	K2
CO 2	Understand the denotative and connotative meanings of technical texts.	K3
CO 3	Identify definitions, descriptions, narrations and essays on various topics.	K4
CO 4	Apply different methods of integration in solving practical problems.	K3
CO 5	Express their opinions effectively in both oral and written medium of communication.	K6

K1: Remembering; K2: Understanding; K3: Applying; K4: Analyzing; K5: Evaluating; K6: Creating

Text Books	1. English for Engineers & Technologists Orient Blackswan Private Ltd. Department of English, Anna University, (2020 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. Technical Communication – Principles and Practices by Meenakshi Raman & SangeetaSharma, Oxford Univ. Press, 2016, New Delhi. 2. A Course Book on Technical English by Lakshmi Narayanan, 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, R S Salaria, Khanna Publishing House.
5. Learning to Communicate – Dr. V. Chellammal, Allied Publishing House, New
Delhi, 2003.
6. Practical English Usage, 2016 published by Oxford by Michael Swan.

Tools for Assessment – Theory

CIA I	CIA II	CIA III	Assignment/ Seminar/ Case Study	Attendance	Total
10	10	10	5	5	40

Tools for Assessment – Practical

Model Exam I	Model Exam II	Total
50	50	100

Mapping

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

3-High; 2-Medium; 1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	-	-	2
CO2	-	-	2
CO3	-	-	2
CO4	-	-	2
CO5	-	-	2

Course designed by	Verified by
R.Hg	P. T. Hemamalini
Signature of the Faculty Member	Signature of the Chairperson-BoS
Dr. R. Deepa Asp- SEH	Dr. P. T. HEMAMALINI Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105
Name and Department of the Faculty Member	Name and Seal of the Chairperson-BoS

Course Code	Title					
U24GE102	PROBLEM SOLVING USING C					
Semester: I	L	T	P	Credits	CIA: 50 Marks	ESE: 50 Marks
	2	0	2	3		

Course pre-requisites	Basic Knowledge of Programming Knowledge

Course Objectives

1	To understand the constructs of C Language.
2	To apply C programs using basic programming constructs.
3	To analyse C programs using arrays and strings.
4	To apply modular applications in C using functions.
5	To create applications in C using pointers and structures.

Course Category	Engineering Sciences Course (ESC)
Development Needs	Global

Course Description: Study the constructs of C Language.

Course Content

Unit	Description	
I	**PROBLEM SOLVING:** Problem Solving: Introduction to computer-based problem solving, Program design and implementation issues, Algorithms for problem solving: Simple problems based on numerical methods, Operations on ordered set of elements, Solving quadratic equations, Operations on matrices.	
	Contact Periods	06
II	**OVERVIEW OF C:** Basic Data types, Modifying the Basic Datatypes, Identifier-Names, Variables, Type Qualifiers, Constants, Operators, Expressions, Selection, Iteration and Jump Statements. Introduction to Arrays: Declaration, Initialization – One dimensional array –Two dimensional arrays - String operations: length, compare, concatenate, copy – Selection sort, linear and binary search.	
	Contact Periods	06
III	**FUNCTIONS AND POINTERS:** 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.	
	Contact Periods	06
IV	**STRUCTURES AND UNIONS:** Structure - Nested structures – Pointer and Structures – Array of structures – Self-referential structures – Dynamic memory allocation - Singly linked list – typedef – Union - Storage classes and Visibility.	
	Contact Periods	06
V	**FILE PROCESSING:** Files – Types of file processing: Sequential access, Random access – Sequential access file - Random access file - Command line arguments.	
	Contact Periods	06
	Total Periods	30

LIST OF EXPERIMENTS

1. Decision-making constructs: if-else, goto, switch-case, break-continue
2. Loops: for, while, do-while
3. Arrays: 1D and 2D, Multi-dimensional arrays, traversal, Sorting and Searching
4. Strings: operations
5. Functions: call, return, passing parameters by (value, reference), passing arrays to function.
6. Recursion
7. Pointers: Pointers to functions, Arrays, Strings, Pointers to Pointers, Array of Pointers
8. Structures: Nested Structures, Pointers to Structures, Arrays of Structures and Unions.
9. Files: reading and writing, File pointers, file operations, random access, processor directives.
10. C Program for Gauss Elimination Method
11. C Program for Sum of Taylor Series Program
12. C Program for Trapezoidal Method
13. C Program for Gauss-Jordan Method
14. C Program for Simpson 1/3 Rule
15. C program for operations on Matrices
16. Mini Project

Contact Periods	**30**
Total Periods	**60**

Course Outcomes

Upon successful completion of the course, Students will be able to:

CO 1	Understand basic Problem-solving methodologies.	K2
CO 2	Apply applications using arrays and strings.	K3
CO 3	Analyze modular applications in C using functions with pointers.	K4
CO 4	Apply applications in C using structures and Unions.	K3
CO 5	Understand the concepts of sequential and random-access file processing.	K2

K1:Remembering; K2:Understanding; K3:Applying; K4:Analyzing; K5:Evaluating; K6:Creating

Text Books

1. Yashwant Kanetkar, Let Us C: Authentic guide to C programming language - 19th Edition Paperback – 15 December 2022.
2. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.

Reference Books

1 Paul Deitel and Harvey Deitel, "C How to Program with an Introduction to C++", Eighth edition, Pearson Education, 2018.
2 HarshaPriya, R. Ranjeet, Programming and Problem Solving Through "C" Language, 1st Edition, Fire Wall Media, 2015.
3 Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2013.
4. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1st Edition, Pearson Education, 2013.
5. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw-Hill Education, 1996.

Tools for Assessment-Theory

CIA I	CIA II	CIA III	Assignment / Seminar	Attendance	Total
10	10	10	5	5	40

Tools for Assessment-Practical		
Model Exam I	Model Exam II	Total
50	50	100

Mapping

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

3 – High, 2-Medium, 1-Low.

CO\ PSO	PSO1	PSO2	PSO3
CO1	2	1	1
CO2	2	2	1
CO3	2	2	1
CO4	2	2	1
CO5	2	1	1

Course designed by	Verified by
G. Jeevanantham Signature of the Faculty Member	S. Subasree Signature of the Chairperson-BoS
JEEVANANTHAM G, AP(SG) Computer Science & Engineering Name and Department of the Faculty Member	Dr. S. SUBASREE, M.Tech., Ph.D Professor and Head, Computer Science and Engineering Nehru Institute of Engineering and Technology Coimbatore-641 105 Name and Seal of the Chairperson-BoS

V	**MATRIX ALGEBRA:** Solution to the system of linear equations. Elementary row transformation of a matrix, RREF, Rank of a matrix. Gauss-Elimination method. Approximate solution by Gauss-Seidel method. Solution of system of Ordinary Differential equations by Matrix method.
Contact Periods	**12**
Total Periods	**60**

Course Outcomes **Upon successful completion of the course, students will be able to:**		**Knowledge Level**
CO 1	Apply the numerical techniques to the first order ordinary differential equations.	K3
CO 2	Understand the numerical techniques to the second order ordinary differential equations.	K2
CO 3	Apply multiple integral ideas in solving areas, volumes and other practical problems	K3
CO 4	Apply the numerical techniques of interpolation in various intervals.	K3
CO 5	Understand the matrix representation of a set of linear equations and to analyse the solution of the System of equations.	K2

K1: Remembering; K2: Understanding; K3: Applying; K4: Analyzing; K5: Evaluating; K6: Creating

Text Books	1. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley, 10th Edition, 2020. 2. Glyn James, Advanced Modern Engineering Mathematics, Pearson Education, 4th Edition, 2010. 3. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Editon, 2016.
Reference Books	1. Grewal.B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2018. 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 Manicavachagom Pillai. 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.

Tools for Assessment (40 Marks)

CIA I	CIA II	CIA III	Assignment/ Seminar/ Case Study	Attendance	Total
10	10	10	5	5	40

Course Code	Title					
U23MA103	ENGINEERING MATHEMATICS-I					
Semester: I	L	T	P	Credits	CIA: 40 Marks	ESE: 60 Marks
	3	1	0	4		
Course pre-requisites	Higher Secondary Level, Bridge Course					

Course Objectives

1	To familiarize the students to solve the first order linear differential equations using numerical methods.
2	To familiarize the students to solve the second order linear differential equations using numerical methods.
3	To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.
4	To introduce the numerical techniques of interpolation in various intervals which plays an important role in engineering and technology disciplines
5	To understand types of matrices and their properties, concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.

Course Category	Basic Science Course (BSC)
Development Needs	Global / National

Course Description: The course helps the students to develop the fundamentals and basic concepts in linear ODE's by numerical solutions. Students will be able to solve problems related to engineering applications by using these techniques.

Course Content

Unit	Description	
I	**ORDINARY DIFFERENTIAL EQUATION:** First-order linear ordinary differential equations-application to solve simple engineering and scientific problems. Numerical solution of first-order and linear ordinary differential equations: Errors and approximations, order of convergence, Modified Euler's method, and Runge - Kutta fourth order method to solve simple engineering and scientific problems.	
	Contact Periods	**12**
II	**SECOND-ORDER LINEAR ODE'S:** Second-order linear ODE's with constant coefficients – Solution by Inverse differential operator, Application to Oscillations of a mass spring system and L-C-R circuit. Numerical Solution of second order linear ODE: Runge-Kutta method and Milnes Predictor Corrector method to solve problems on oscillations of a mass spring system and L-C-R circuits.	
	Contact Periods	**12**
III	**MULTIPLE INTEGRALS**: Introduction of integrals – Evaluation of double and triple integrals – Region of integration - changing into polar coordinates. Application to find Area, Volume and total mass by double integral.	
	Contact Periods	**12**
IV	**INTERPOLATION TECHNIQUES**: Interpolation, Lagrange's interpolation formula, Newton's divided difference interpolation formula. Newton-Gregory forward and backward interpolation formula, Newton's Forward and Backward differences.	
	Contact Periods	**12**

Mapping

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

3-High; 2-Medium; 1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	1	1	1
CO3	1	1	1
CO4	1	1	1
CO5	1	1	1

Course designed by	Verified by
K. Ramesh Signature of the Faculty Member	Signature of the Chairperson-BoS
Dr. K. RAMESH ASP-Mathematics S&H Name and Department of the Faculty Member	Dr. P. T. HEMAMALINI. Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105 Name and Seal of the Chairperson-BoS

Course Code	Title					
U23PH104	ENGINEERING PHYSICS					
Semester: I	L	T	P	Credits	CIA: 40 Marks	ESE: 60 Marks
	3	0	0	3		
Course pre-requisites	Higher Secondary Level					

Course Objectives

1	To grasp the fundamentals of Matter Properties and their practical implications across diverse Engineering fields.
2	To explore the applications of Lasers and Fiber optics in Engineering contexts.
3	To apply principles of Ultrasonics and Thermal Physics to Engineering challenges.
4	To understand Quantum Physics concepts and their applications.
5	To analyse the structure of crystals and explore their significance.

Course Category	Basic Science Course (BSC)
Development Needs	Global / National

Course Description: Engineering physics provides students with a broad exposure to the basic physical theories underlying engineering. students will complete certain concept in Physics intended to provide a good exposure in various directions in both theoretical and applied Physics.

Course Content

Unit	Description	
I	**PROPERTIES OF MATTER:** Introduction - Elasticity - Stress-strain diagram and its uses - Factors affecting elastic modulus - Torsional stress and deformations - Torsional pendulum: theory and experiment - Bending of beams - Bending moment - Cantilever: theory and experiment - Uniform and non-uniform bending: theory and experiment - I-shaped girders - Applications.	
	Contact Periods	**09**
II	**LASER AND FIBER OPTICS:** Introduction – Spontaneous and stimulated emission. Population inversion, pumping methods- Einstein's A and B coefficients: derivation. Types of lasers - Nd-YAG, CO_2 - Industrial Applications of Lasers -Fiber Optics: Principle and propagation of light - Numerical aperture and Acceptance angle - Types of optical fibres (material, refractive index, mode) - Temperature and displacement sensors.	
	Contact Periods	**09**
III	**ULTRASONICS AND THERMAL PHYSICS**: Introduction - Piezoelectric effect - piezoelectric generator - Velocity measurement - Acoustic grating - Medical applications. Introduction to heat - Transfer of heat energy: Thermal conduction, convection, and radiation - Thermal conductivity - Forbe's and Lee's disc method: theory and experiment - Applications: heat exchangers, refrigerators, ovens, and solar water heaters.	
	Contact Periods	**09**
IV	**QUANTUM PHYSICS:** Introduction - Black body radiation - Planck's theory - Deduction of Wien's displacement law and Rayleigh-Jeans' Law from Planck's theory - Compton effect: Theory and experimental verification - Matter waves - Physical significance of wave function - Schrödinger's wave equation: Time independent and time dependent equations - Particle in a one-dimensional box- Microscope: Scanning Tunnelling microscope.	
	Contact Periods	**09**
V	**CRYSTAL PHYSICS:** Introduction - Lattice - Unit cell - Bravais lattice - Lattice planes -Miller indices - 'd' spacing in cubic lattice - Calculation of number of atoms per unit cell - Atomic radius - Coordination number - Packing factor for SC, BCC, FCC, and HCP structures - Diamond	

	and graphite structures - Polymorphism and allotropy - Crystal defects - Point, line, and surface defects.
Contact Periods	**09**
Total Periods	**45**

Course Outcomes

Upon successful completion of the course, students will be able to:

CO 1	Understand the basics of properties of matter and its applications.	K2
CO 2	Remember the concepts of LASER and optical devices and their applications in fiber optics.	K1
CO 3	Understand the basic concepts of ultrasonics & thermal properties of materials and their applications in expansion joints and heat exchangers,	K2
CO 4	Apply knowledge an advanced physics concepts of quantum theory and its applications in tunneling microscopes.	K3
CO 5	Understand the basics of crystals, their structures and different crystal growth techniques.	K2

K1: Remembering; K2: Understanding; K3: Applying; K4: Analyzing; K5: Evaluating; K6: Creating

Text Books

1. Bhattacharya, D.K. & Poonam, T. "Engineering Physics". Oxford University Press, 2015.
2. Gaur, R.K. & Gupta, S.L. "Engineering Physics". Dhanpat Rai Publishers, 2012.
3. Pandey, B.K. & Chaturvedi, S. "Engineering Physics". Cengage Learning India, 2012.
4. Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, Concepts of Modern Physics, McGraw-Hill (Indian Edition), 2020.

Reference Books

1. Halliday, D., Resnick, R. & Walker, J. "Principles of Physics." Wiley, 2015.
2. Serway, R.A. & Jewett, J.W. "Physics for Scientists and Engineers." Cengage Learning, 2010.
3. Palanisamy P.K. "Engineering Physics." SCITECH Publications, 2011.
4. Kittle, C, "Introduction to solid state Physics," Wiley, 2005.
5. Mani P. "Engineering Physics I." Dhanam Publications, 2011.
6. Senthilkumar G. "Engineering Physics I." VRB Publishers, 2011.

Tools for Assessment (40 Marks)

CIA I	CIA II	CIA III	Assignment/ Seminar/Case Study	Attendance	Total
10	10	10	5	5	40

Mapping

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

3-High; 2-Medium; 1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	1	1	1
CO3	1	1	1
CO4	1	1	1
CO5	1	1	1

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
Dr. P. Periasamy Dept. of Science and Humanities Name and Department of the Faculty Member	Dr. P. T. HEMAMALINI. Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105. Name and Seal of the Chairperson-BoS

Course Code	Title					
U23CY105	ENGINEERING CHEMISTRY					
Semester: I	L	T	P	Credits	CIA: 40 Marks	ESE: 60 Marks
	3	0	0	3		
Course pre-requisites	Higher Secondary Level					

Course Objectives	
1	To inculcate a sound understanding of water treatment techniques.
2	To understand the basic concepts of electrochemistry and its applications.
3	To introduce the basic concepts of corrosion and its control methods.
4	To facilitate the understanding of different types of fuels, their preparation, properties, and combustion characteristics.
5	To familiarize the students with the properties and applications of different types of advanced engineering materials.

Course Category	Basic Science Course (BSC)
Development Needs	Global / National

Course Description: Chemistry is required to solve global problems and issues for future engineering.

Course Content

Unit	Description
I	**WATER TECHNOLOGY:** Introduction - Sources of water - Impurities in water - Types of water - Water Quality Standards - Hardness of water - Expression of hardness - Units of hardness - Estimation of hardness of water by EDTA method - Disadvantages of using hard water - Boiler troubles - Scale and sludge. Softening of water - External treatment method - Demineralization process - Internal treatment method - Sodium Aluminate, Phosphate and Calgon conditioning - Desalination of Brackish water by reverse osmosis method.
	Contact Periods 09
II	**ELECTROCHEMISTRY:** Introduction - Cells - Representation of a galvanic cell - Reversible and irreversible cells - Electrode potential - Nernst equation - Reference electrode - Standard hydrogen electrode - Glass electrode - Electrochemical series and its applications. **Battery**: Introduction, Types of batteries - Primary Battery: alkaline battery, Secondary Battery : lead storage battery and lithium ion battery, Flow Battery : H_2-O_2 fuel cell - Super Capacitors, E-Vehicle.
	Contact Periods 09
III	**CORROSION AND ITS CONTROL:** Corrosion: Introduction - Types of corrosion: Chemical and Electrochemical - Factors influencing rate of corrosion. Corrosion control - material selection and design aspects - Electrochemical protection - sacrificial anode method and impressed current cathodic method. Paints- constituents and function. Electroplating of Copper and electroless plating of nickel.
	Contact Periods 09
IV	**FUELS AND COMBUSTION:** Fuels: Introduction - Requirements of a good fuel - Classification of fuels - Solid fuels - Coal - Proximate analysis of coal - Manufacture of Metallurgical coke - Otto-Hoffman byproduct oven - Liquid fuel - Manufacture of synthetic

	petrol by Bergius method. Knocking - Octane number - Cetane number - Power alcohol and biodiesel - Gaseous fuel - LPG, CNG. **Combustion** - Principle of combustion - Calorific value - Gross and net calorific values - Explosive range - Spontaneous ignition temperature – Flue gas analysis-ORSAT method.	
	Contact Periods	**09**
V	**ADVANCED ENGINEERING MATERIALS**: Introduction to Polymers - Thermoplastic and Thermosetting. Properties of polymers: Tg, Tacticity, & Molecular weight. Composites - Fibre-reinforced composites and its applications. Abrasives - Moh's scale of hardness - types - natural [Diamond] - synthetic [SiC]; Refractories - characteristics - classifications [Acidic, basic and neutral refractories] - properties - refractoriness - RUL - porosity - thermal spalling; Lubricants - definition - function - characteristics - properties - viscosity index, flash and fire points, cloud and pour points, oiliness; Nano materials - CNT- synthesis [laser evaporation] - applications.	
	Contact Periods	**09**
	Total Periods	**45**

Course Outcomes
Upon successful completion of the course, students will be able to:

CO 1	Infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K1
CO 2	Understand the basic concept of Electrochemistry for its applications in different engineering sectors.	K2
CO 3	Reduce corrosion problems by applying appropriate control methods.	K3
CO 4	Recommend suitable fuels for engineering processes and applications.	K3
CO 5	Recognize different types of engineering materials and apply them for suitable applications in energy sectors.	K4

K1: Remembering; K2: Understanding; K3: Applying; K4: Analyzing; K5: Evaluating; K6: Creating

Text Books	1. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018. 2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008. 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, "Textbook 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, 2014. 4. Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second 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. 5. Gowariker V.R., Viswanathan N.V., and Jayadev Sreedhar, "Polymer Science", New Age International P (Ltd.,), Chennai, 2022.

Tools for Assessment (40 Marks)				
CIA I	CIA II	CIA III	Assignment/Seminar/ Case study	Attendance	Total
10	10	10	5	5	40

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1	-	-	-	1	-	-	-	-	1
CO2	3	1	1	-	-	-	1	-	-	-	-	1
CO3	3	1	1	-	-	-	1	-	-	-	-	1
CO4	3	1	1	-	-	-	1	-	-	-	-	1
CO5	3	1	1	-	-	-	1	-	-	-	-	1

3-High; 2-Medium; 1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	1	-	1
CO2	1	-	1
CO3	1	-	1
CO4	1	-	1
CO5	1	-	1

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
A. Lakshmi Priya/AP, Chemistry S&H Name and Department of the Faculty Member	Dr. P. T. HEMAMALINI Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105 Name and Seal of the Chairperson-BoS

Course Code	Title					
U23GE106	HERITAGE OF TAMILS					
Semester:I	L	T	P	Credits	CIA:40 Marks	ESE: 60 Marks
	1	0	0	1		
Course pre-requisites	Higher Secondary Level					

Course Objectives

1	To learn the extensive literature of classical tamil.
2	To review the fine arts heritage of Tamil culture.
3	To realize the contribution in Indian freedom struggle.
4	To understand the role of Temple in Sangam cities/ports, Chola conquest.
5	To examine Tamil cultural influence in India.

Course Category	Humanities, Social Science and Management Course (HSMC)
Development Needs	Global/National

Course Description: Used to explores the rich culture, linguistic and historical aspects of the Tamil community.

Course Content

Unit	Description	
I	**LANGUAGE AND LITERATURE**: 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.	
	Contact Periods	**03**
II	**HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE:** 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.	
	Contact Periods	**03**
III	**FOLK AND MARTIAL ARTS:** Therukoothu, Karakattam, VilluPattu, KaniyanKoothu, Oyillattam, Leather Puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.	
	Contact Periods	**03**
IV	**THINAI CONCEPT OF TAMILS:** Flora and Fauna of Tamils & Agam 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.	
	Contact Periods	**03**

V	**CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE:** 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.	
	Contact Periods	**03**
	Total Periods	**15**
Course Outcomes **Upon successful completion of the course, students will be able to:**		
CO 1	Remember the extensive literature of tamil and its classical nature, musical instruments, Folk, thinai concept, Indian Freedom Struggle & Aham, Puram and Aram Concept	K1
CO 2	Remember the principles in Thirukural, Bhakti Literature Azhwars and Nayanmars , heritage of sculpture, painting and musical instruments of ancient people, victory of chozha dynasty	K1
CO 3	Understand on folk and martial arts of tamil people, Justice in Sangam Literature, Development of Modern literature in Tamil, Making of musical instru ments	K2
CO 4	Understand the role of Temples in Social and Economic Life of Tamils, Ancient Cities and Ports of Sangam Age, Conquest of Cholas	K2
CO 5	Understand the Cultural Influence of Tamils over the other parts of India, contribution of tamils self-esteem movement and siddha medicine, Print History of Tamil Books	K2
K1: Remembering;K2: Understanding;K3: Applying;K4: Analyzing;K5: Evaluating; K6: Creating		
Text Books	1. தமிழகவரலாறு – மக்களும் பண்பாடும் – .கே. கேபிள்ளை: தமிழ்நாடு பாட நூல் மற்றும் கல்வியியல் பணிகள் கழகம், பதிப்பு-16, ஆண்டு-2020. 2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம் . (விகடன்பிரசுரம்)பதிப்பு-1, ஆண்டு-2016. 3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகரநாகரிகம் (தொல்லியல்துறை(வெளியீடு).பதிப்பு-1, ஆண்டு-2016.	
Reference Books	1. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print) 2016. 2. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies) 2010. 3. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies).1995 4. 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).Edition: 1 Year 2016. 5. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu). 2022. 6. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book..Edition: 1 Year 2016.	

Tools for Assessment (40 Marks)					
CIAI	CIAII	CIAIII	Assignment/Seminar/ Case Study	Attendance	Total
10	10	10	5	5	40

Mapping												
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	1	2	2	-	2	-	1
CO2	1	-	-	-	-	1	2	2	-	2	-	1
CO3	1	-	-	-	-	1	2	2	-	2	-	1
CO4	1	-	-	-	-	1	2	2	-	2	-	1
CO5	1	-	-	-	-	1	2	2	-	2	-	1

3-High;2-Medium;1-Low

CO \PSO	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	1	1	1
CO3	1	1	1
CO4	1	1	1
CO5	1	1	1

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
Dr. DEEPAK. A, S&H Dept.	Dr. P.T. HEMAMALINI, Head of the Department, Department of Science & Humanities, Nehru Institute of Engineering & Technology, Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105
Name and Department of the Faculty Member	Name and Seal of the Chairperson-BoS

Course Code	Title					
U23BS118	PHYSICS AND CHEMISTRY LABORATORY					
Semester: I	L	T	P	Credits	CIA: 60 Marks	ESE: 40 Marks
	0	0	4	2		
Course pre-requisites	Higher Secondary Level, Physical measurements, Volumetric analysis					

Course Objectives

1	To learn the proper use of various kinds of physics laboratory equipment.
2	To learn problem solving skills related to physics principles and interpretation of experimental data.
3	To determine error in physics experimental measurements and techniques used to minimize such error.
4	To induce the students to familiarize with electro analytical techniques such as, pH metry, and potentiometry in the determination of impurities in aqueous solutions.
5	To estimate the amount of mineral acid in the given sample by conductometric method.

Course Category	Basic Science Course (BSC)
Development Needs	Global / National

Course Description: In depth understanding of Physics and chemistry is needed for the engineer for the more beneficial solutions.

Course Content

PHYSICS LABORATORY

LIST OF EXPERIMENTS (Any Five)

1. Determination of rigidity modulus - Torsional pendulum.
2. Determination of Young's modulus - Non uniform bending method.
3. Determination of Young's modulus - Uniform bending method
4. Determination of thickness of a thin wire - Air wedge method
5. Determination of the wavelength of the laser using grating
6. Determination of Numerical Aperture and acceptance angle using Optical fibre.
7. Determination of velocity of sound and compressibility of liquid - Ultrasonic interferometer.
8. Determination of thermal conductivity of a bad conductor - Lee's Disc method.
9. Melde's string experiment.
10. Determination of Band gap of a semiconductor.
11. Photoelectric effect.
12. Michelson Interferometer.

Contact Periods	**15**

CHEMISTRY LABORATORY

LIST OF EXPERIMENTS (Any Five)

1. Preparation of Na_2CO_3 as a primary standard and estimation of acidity of a water sample using the primary standard.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler's method.
4. Determination of chloride content of water sample by Argentometric method.
5. Determination of strength of given hydrochloric acid using pH meter.
6. Determination of strength of acids in a mixture of acids using conductivity meter.
7. Estimation of iron content of the given solution using potentiometer.

Contact Periods	**15**
Total Periods	**30**

Course Outcomes

Upon successful completion of the course, students will be able to:

CO 1	Understand the proper use of various kinds of physics laboratory equipment.	K2
CO 2	Develop the problem solving skills related to physics principles and interpretation of experimental data.	K4
CO 3	Determine error in physics experimental measurements and techniques used to minimize such error.	K3
CO 4	Develop a strong foundation on water hardness, alkalinity, dissolved oxygen and its measurement, enabling them to effectively access and manage water quality in various settings.	K4
CO 5	Acquire the necessary knowledge, skills, and attitudes related to the pH, potentiometric and conductometric experiments.	K2

K1: Remembering; K2: Understanding; K3: Applying; K4: Analyzing; K5: Evaluating; K6: Creating

Tools for Assessment (40 Marks)

Preparation	Conduct of Experiments	Calculations & Result	Viva-Voce	Total
20	30	40	10	100

Tools for Assessment (20 Marks)

Model Exam I	Model Exam II	Total
50	50	100

Mapping

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

3-High; 2-Medium; 1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	1	1	1
CO3	1	1	1
CO4	1	1	1
CO5	1	1	1

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
Dr P. Periyasamy Dept. of Science and Humanities Name and Department of the Faculty Member	Dr. P. T. HEMAMALINI. Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105 Name and Seal of the Chairperson-BoS

Semester – II

S. No.	Course Code	Course Title	Category	L	T	P	Contact Period	C
THEORY								
1	U23MA201	Engineering Mathematics - II	BSC	3	1	0	4	4
2	U23MS202	Materials Science	BSC	3	0	0	3	3
3	U23GE203	Tamils and Technology	HSMC	1	0	0	1	1
4	U23ME204	Engineering Graphics	ESC	2	1	0	3	3
5	U23GE205	Basic Electrical and Electronics Engineering	ESC	3	0	0	3	3
THEORY WITH INTEGRATED LAB								
6	U23EN206	Proficiency in English	HSMC	2	0	2	4	3
7	U23GE207	Problem Solving using Python	ESC	2	0	2	4	3
PRACTICAL								
8	U23GE218	Engineering Practices Laboratory	ESC	0	0	2	2	1
ENHANCEMENT COURSES								
9		Skill Enhancement Course – I	SEC	0	0	2	2	1
10		Value Enhancement Course - I	VEC	0	0	2	2	1
			TOTAL	**16**	**2**	**10**	**28**	**23**

NCC / NSS / YRC / RRC / Sports Credit Course level 1 is offered for students. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.

Course Code	Title					
U23MA201	ENGINEERING MATHEMATICS - II					
Semester: II	L	T	P	Credits	CIA: 40 Marks	ESE: 60 Marks
	3	1	0	4		
Course pre-requisites	Higher Secondary Level, Bridge Course, Engineering Mathematics-I					

Course Objectives

1	To interpret the concept of probability axioms.
2	To introduce the numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines
3	To familiarize the student with functions of several variables. This is needed in many branches of engineering.
4	To introduce Fourier series analysis this is central to many applications in engineering apart from its use in solving boundary value problems.
5	To introduce the basic concepts of PDE for solving standard partial differential equations.

Course Category	Basic Science Course (BSC)
Development Needs	Global / National

Course Description: The course helps the students to develop the fundamentals and basic concepts probability axioms, Fourier series and the numerical methods are techniques by which mathematical problems are formulated so that they can be solved with arithmetic operations.

Course Content

Unit	Description	
I	**BASICS OF PROBABILITY**: Probability axioms, conditional probability, partitions and law of total probability, Bayes theorem, independence, random variables.	
	Contact Periods	**12**
II	**NUMERICAL METHODS - NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION:** Derivatives using Newton- Gregory forward and backward interpolation formula, Newton-Cotes quadrature formula, Trapezoidal and Simpson's $1/3^{rd}$ rules (single and double integrals).	
	Contact Periods	**12**
III	**FUNCTIONS OF SEVERAL VARIABLES**: Functions of two variables – Partial derivatives – Total derivative – Taylor's series for functions of two variables – Jacobian's – Applications: Maxima and minima of functions of two variables and Lagrange's method of undetermined multipliers.	
	Contact Periods	**12**
IV	**FOURIER SERIES**: Existence of Fourier Series, Periodic functions, Dirichlet's conditions – General Fourier series– Odd and even functions – Half range sine series and cosine series.	
	Contact Periods	**12**
V	**PARTIAL DIFFERENTIAL EQUATIONS:** Classification of PDE – Fourier series solutions of one-dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two- dimensional equation of heat conduction.	
	Contact Periods	**12**
	Total Periods	**60**

Course Outcomes Upon successful completion of the course, students will be able to:		Knowledge Level
CO 1	Understand the fundamental knowledge of the concepts of probability.	K2
CO 2	Understand the various techniques and methods for solving first and second order ordinary differential equations.	K2
CO 3	Utilize differential calculus ideas on several variable functions.	K1
CO 4	Apply the concept of differential equations using Fourier series analysis which plays a vital role in engineering applications.	K3
CO 5	Understand how to solve the given standard partial differential equations.	K2
K1: Remembering; K2: Understanding; K3: Applying; K4: Analyzing; K5: Evaluating; K6: Creating		
Text Books	1. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley, 10th Edition, 2020. 2. Yates. R.D. and Goodman. D.J., "Probability and Stochastic Processes", 2nd Edition, Wiley India Pvt. Ltd., Bangalore, 2012. 3. Tolimieri R, Algorithms for Discrete Fourier Transform and Convolution, Springer publicatiosns.	
Reference Books	1. Jay L. Devore, Probability and Statistics for Engineering and the Sciences, 9th Edition, 2020. 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 Manicavachagom Pillai. T. K., Calculus, Volume I and II, S.Viswanathan Publishers Pvt. Ltd., Chennai, 2009. 5. Srimantha Pal and Bhunia. S.C, Engineering Mathematics, Oxford University Press, 2015.	

Tools for Assessment (40 Marks)

CIA I	CIA II	CIA III	Assignment/ Seminar/ Case Study	Attendance	Total
10	10	10	5	5	40

Mapping

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

3-High; 2-Medium; 1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	1	1	1
CO3	1	1	1
CO4	1	1	1
CO5	1	1	1

Course designed by	Verified by
K. Ramesh Signature of the Faculty Member	P. T. Hemamalini Signature of the Chairperson-BoS
Dr. K. Ramesh Asp - Mathematics S&H Name and Department of the Faculty Member	Dr. P. T. HEMAMALINI Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105 Name and Seal of the Chairperson-BoS

Course Code	Title					
U23MS202	MATERIALS SCIENCE					
Semester: II	L	T	P	Credits	CIA: 40 Marks	ESE: 60 Marks
	3	0	0	3		
Course pre-requisites	Basics of Engineering Physics and Properties of Materials					

Course Objectives

1	To equip the students to have a knowledge on different types of electron theory, basics of quantum mechanics and about energy bands.
2	To introduce the physics of semiconducting materials and applications of semiconductors in device fabrication.
3	To make the students to learn the origin of magnetism in magnetic materials and their classification; to learn the physics of superconductivity and various properties exhibited by superconductors.
4	To establish a sound grasp of knowledge on different optical properties of materials, optical displays, and applications.
5	To make the students familiarize in the modern engineering materials and its applications.

Course Category	Basic Science Course (BSC)
Development Needs	Global / National

Course Description: The course explores the fundamental principles of materials science, focusing on the relationships between the structure, properties, processing, and performance of materials.

Course Content

Unit	Description	
I	**ELECTRICAL PROPERTIES OF MATERIALS:** Classical free electron theory - Expression for electrical conductivity - Thermal conductivity, expression - Wiedemann- Franz law - Merits and demerits - Quantum free electron theory electrons in metals - Particle in a three-dimensional box - degenerate states - Fermi- Dirac statistics - Density of energy states.	
	Contact Periods	**09**
II	**SEMICONDUCTOR PHYSICS:** Fundamental of Semiconductors - Carrier concentration in intrinsic semiconductors - extrinsic semiconductors - Derivation of carrier concentration in n-type and p-type semiconductor - variation of Fermi level with temperature and impurity concentration - Hall effect - Determination of Hall coefficient – Applications - Ohmic contacts - Schottky diode.	
	Contact Periods	**09**
III	**MAGNETISM AND SUPERCONDUCTIVITY:** Fundamental of magnetic materials -classification of magnetic materials: diamagnetism, paramagnetism, ferromagnetism, antiferromagnetism and ferrimagnetism – Ferromagnetism - Domain theory - M versus H behavior - soft and hard magnetic materials - Superconductivity: properties - Type I and Type II superconductors - High Tc superconductors - Applications of superconductors - SQUID and magnetic levitation.	
	Contact Periods	**09**
IV	**OPTICAL PROPERTIES OF MATERIALS:** Classification of optical materials - Optical processes in semiconductors: optical absorption and emission, charge injection and recombination, optical absorption, loss and gain. Optoelectronic devices: light detectors - solar cells - light emitting diode - laser diode - organic LED.	
	Contact Periods	**09**

V	**MODERN ENGINEERING MATERIALS:** Metallic glasses - Shape memory alloys: Ni-Ti alloy, applications – Ceramics - Composites: classification- role of matrix and reinforcement, processing of fibre reinforced plastics– Nanomaterials: preparation methods - synthesis: Pulsed Laser Deposition (PLD), Ball Milling, Chemical vapour deposition - Properties and applications.	
	Contact Periods	**09**
	Total Periods	**45**

Course Outcomes

Upon successful completion of the course, students will be able to:

CO 1	Apply knowledge on classical and quantum electron theories, and energy band structures.	K3
CO 2	Understand clearly of semiconductor physics and functioning of semiconductor devices.	K2
CO 3	Analyze to get knowledge on classification of magnetic materials, theory and applications of ferromagnetic materials and superconductors.	K4
CO 4	Understand the optical properties of materials and working principles of various optical devices.	K2
CO 5	Understand the knowledge on modern engineering materials and their applications.	K2

K1: Remembering; K2: Understanding; K3: Applying; K4: Analyzing; K5: Evaluating; K6: Creating

Text Books

1. V.Raghavan. Materials Science and Engineering: A First Course, Prentice Hall India Learning Private Limited, 2015.
2. S.O. Kasap, Principles of Electronic Materials and Devices, Mc-Graw Hill, 2018.
3. Jasprit Singh, Semiconductor Devices: Basic Principles, Wiley (India), 2007.
4. Jasprit Singh, Semiconductor Optoelectronics: Physics and Technology, Mc-Graw Hill India (2019)
5. G.W.Hanson. Fundamentals of Nanoelectronics. Pearson Education (Indian Edition), 2009.

Reference Books

1. R.Balasubramaniam, Callister's Materials Science and Engineering. Wiley (Indian Edition), 2014.
2. Wendelin Wright and Donald Askeland, Essentials of Materials Science and Engineering, CL Engineering, 2013.
3. Robert F.Pierret, Semiconductor Device Fundamentals, Pearson, 2006
4. Pallab Bhattacharya, Semiconductor Optoelectronic Devices, Pearson, 2017
5. Ben Rogers, Jesse Adams and Sumita Pennathur, Nanotechnology: Understanding Small Systems, CRC Press, 2017.

Tools for Assessment (40 Marks)

CIA I	CIA II	CIA III	Assignment/ Seminar/Case study	Attendance	Total
10	10	10	5	5	40

Mapping

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

3-High; 2-Medium; 1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	2	1	1
CO2	2	1	1
CO3	2	1	1
CO4	2	1	1
CO5	2	1	1

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
Dr. P. Periasamy Dept. of Science and Humanities Name and Department of the Faculty Member	Dr. P. T. HEMAMALINI Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105 Name and Seal of the Chairperson-BoS

Course Code	Title					
U23GE203	TAMILS AND TECHNOLOGY					
Semester:II	L	T	P	Credits	CIA:40 Marks	ESE: 60 Marks
	1	0	0	1		
Course pre-requisites	Higher Secondary Level					

Course Objectives

1	To explore the historical development of technology in the Tamil region.
2	To examine how traditional Tamil practices and knowledge systems have influenced technological advancements.
3	To promote inclusivity and diversity in the technology sector, encouraging the participation of Tamils in various technological fields.
4	To provide a global perspective on Tamil contributions to technology and the role of Tamils in the global technology landscape.
5	To explore the role of the Tamil language in technology, including the development of software, language processing, and digital content in Tamil.

Course Category	Humanities, Social Science and Management Course (HSMC)
Development Needs	Global/National

Course Description:

A course on Tamils and Technology might cover the historical and contemporary contributions of Tamils to the field, exploring advancements, notable figures, and the intersection of Tamil culture with technological developments. Topics could include language technology, computing, and digital innovations, providing a holistic understanding of the Tamils have had on the Technology landscape.

Course Content

Unit	Description	
I	**WEAVING AND CERAMIC TECHNOLOGY:** Weaving Industry during Sangam Age - Ceramic technology - Black and Red Ware Potteries (BRW) - Graffiti on Potteries.	
	Contact Periods	**03**
II	**DESIGN AND CONSTRUCTION TECHNOLOGY:** 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 Silapathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- ThirumalaiNayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.	
	Contact Periods	**03**
III	**MANUFACTURING TECHNOLOGY:** 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 in Silapathikaram- keezhadi.	
	Contact Periods	**03**
IV	**AGRICULTURE AND IRRIGATION TECHNOLOGY:** Dam, Tank, ponds, Sluice, Significance of KumizhiThoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.	
	Contact Periods	**03**

V	**SCIENTIFIC TAMIL & TAMIL COMPUTING:** 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.	
	Contact Periods	**03**
	Total Periods	**15**

Course Outcomes

Upon successful completion of the course, students will be able to:

CO 1	Understand the extensive literature of Tamil and its classical nature.	K2
CO 2	Understand the heritage of sculpture, painting and musical instruments of ancient people.	K2
CO 3	Review on folk and martial arts of Tamil people.	K1
CO 4	Realise Thinai concepts, trade and victory of chozha dynasty.	K1
CO 5	Understand the contribution of Tamils in Indian freedom struggle, self-esteem movement and siddha medicine.	K2

K1: Remembering; K2: Understanding; K3: Applying; K4: Analyzing; K5: Evaluating; K6: Creating

Text Books

1. தமிழகவரலாறு – மக்களும்பண்பாடும்– .கே.கேபிள்ளை. (வெளியீடு): தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்.
2. கணினித்தமிழ் – முனைவர்இல. சுந்தரம் . (விகடன்பிரசுரம்).பதிப்பு-1, ஆண்டு-2016.
3. கீழடி – வைகைநதிக்கரையில்சங்ககாலநகரநாகரிகம். (தொல்லியல்துறை(வெளியீடு). பதிப்பு-1, ஆண்டு-2016.
4. பொருநை- ஆற்றங்கரைநாகரீகம். (தொல்லியல்துறை (வெளியீடு)ஆண்டு 2022.

Reference Books

1. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print) 2016.
2. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies) 2010.
3. National The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: Intel Institute of Tamil Studies)1995.
4. 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..Edition: 1 Year 2016.
5. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu) 2022.
6. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book...Edition: 1 Year 2016.

Tools for Assessment (40 Marks)

CIAI	CIAII	CIAIII	Assignment/Seminar/ Case Study	Attendance	Total
10	10	10	5	5	40

Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	1	-	-	1	2	2	-	2	-	1
CO2	2	-	1	-	-	1	2	2	-	2	-	1
CO3	2	-	1	-	-	1	2	2	-	2	-	1
CO4	2	-	1	-	-	1	2	2	-	2	-	1
CO5	2	-	1	-	-	1	2	2	-	2	-	1

3-High;2-Medium;1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	1	1	1
CO3	1	1	1
CO4	1	1	1
CO5	1	1	1

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
Dr. Deepali.A. S&H Dept. Name and Department of the Faculty Member	Dr. P. T. HEMAMALINI Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105 Name and Seal of BoS Chairperson

Course Code	Title					
U23ME204	ENGINEERING GRAPHICS					
Semester: II	L	T	P	Credits	CIA: 40 Marks	ESE: 60 Marks
	2	1	0	3		
Course pre-requisites	Geometry, Basic Mathematics					

Course Objectives

1	To draw engineering curves.
2	To project points, lines and plane surface.
3	To sketch the simple objects in freehand and orthographic projection of solids and section of solids.
4	To represent the development of solids
5	To draw isometric and perspective projections of simple solids.

Course Category	Engineering Science Course (ESC)
Development Needs	Global / National

Course Description: Using a combination of lines, symbols, and signs, engineering graphics and design blends cognitive and manipulative skills to communicate graphically and create systems, processes, goods, and services that improve quality of life and promote economic progress.

Course Content

Unit	Description	
I	**CONCEPTS AND CONVENTIONS (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. **PLANE CURVES:** 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.	
	Contact Periods	05+07
II	**PROJECTION OF POINTS, LINES AND PLANE SURFACE:** 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	
	Contact Periods	05+07
III	**PROJECTION OF SOLIDS AND FREEHAND SKETCHING:** 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)	
	Contact Periods	05+07

IV	**PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES:** 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)	
	Contact Periods	**05+07**
V	**ISOMETRIC AND PERSPECTIVE PROJECTIONS:** 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)	
	Contact Periods	**05+07**
	Total Periods	**60**

Course Outcomes
Upon successful completion of the course, students will be able to:

CO 1	Use BIS conventions and specifications for engineering drawing.	K1
CO 2	Construct the conic curves, involutes and cycloid.	K3
CO 3	Solve practical problems involving projection of lines.	K3
CO 4	Draw the orthographic, isometric and perspective projections of simple solids.	K2
CO 5	Draw the development of simple solids.	K2

K1:Remembering; K2:Understanding; K3:Applying; K4:Analyzing; K5:Evaluating; K6:Creating

Text Books	1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 54th Edition, 2023. 2. Natrajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018. 3. Parthasarathy, N. S. and Vela Murali, "Engineering Drawing", Oxford University Press, 2015
Reference Books	1. Basant Agarwal and Agarwal C.M., "Engineering Drawing", McGraw Hill, 2nd Edition, 2019. 2. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Publications, Bangalore,27th Edition, 2017. 3. Luzzader, Warren.J. and Duff, John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2012. 4. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson Education India, 2nd Edition, 2009. 5. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 11th Edition, 2011.

Tools for Assessment (40 Marks)				
CIA I	CIA II	CIA III	Assignment/ Seminar / Case Study	Attendance	Total
10	10	10	5	5	40

Mapping

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

3-High; 2-Medium; 1-Low

CO / PSO	PSO1	PSO2	PSO3
CO 1	2	2	1
CO 2	2	2	1
CO 3	2	2	1
CO 4	2	2	1
CO 5	3	3	1

Special points applicable to End Semester Examinations on Engineering Graphics:

1. There will be five either or type questions, each of covering all the units in the syllabus.
2. Each question will carry 20 marks, making a total of 100.
3. The given answer paper will be A3 size. The students should use appropriate scale to fit the answers.
4. The examination will be conducted in FN/AN sessions on the same day.

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson – BoS
A.S. RAJAN AP(SG) MECHANICAL ENGINEERING Name and Department of the Faculty Member	Dr. M. SANTHOSH Professor and Head Department of Mechanical Engineering Nehru Institute of Engineering and Technology Coimbatore - 641 105, Tamilnadu, India. Name and Seal of the Chairperson - BoS

Course Code	Title					
U23GE205	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING					
Semester: II	L	T	P	Credits	CIA: 40 Marks	ESE: 60 Marks
	3	0	0	3		

Course pre-requisites	Matrices and Calculus, Engineering Physics

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.

Course Category	Engineering Sciences Course (ESC)
Development Needs	Global / National

Course Description: The course helps the students to develop the fundamentals and basic concepts in Electric circuit analysis, Working Principles of Electrical Machines, Analog/Digital Electronics and functional elements of Measuring. Students will be able to solve problems related to electric circuits' analysis by using Mesh and Nodal analysis.

Course Content

Unit	Description	
I	**ELECTRICAL CIRCUITS:** 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	
	Contact Periods	**9**
II	**ELECTRICAL MACHINES:** Construction and Working principle- DC Generators, EMF equation, Types and Applications. Working Principle of DC motors, Torque Equation, Types and Applications. Construction, working principle and Applications of Transformer, Induction Motor, Synchronous motor and Alternator.	
	Contact Periods	**9**
III	**ANALOG ELECTRONICS :** Resistor, Inductor and Capacitor in Electronic Circuits-Semiconductor Materials: Silicon &Germanium – PN Junction Diodes, Zener Diode – Characteristics Applications – Bipolar Junction Transistor-Biasing, JFET, SCR, MOSFET, IGBT – Types, I-V Characteristics and Applications, Rectifier and Inverters.	
	Contact Periods	**9**
IV	**DIGITAL ELECTRONICS**: 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).	
	Contact Periods	**9**

V	**MEASUREMENTS AND INSTRUMENTATION:** Functional elements of an instrument, Standards and calibration, Operating Principle, types -PMMC and Moving Iron meters, Measurement of three phase power, Energy Meter, Instrument Transformers-CT and PT.	
	Contact Periods	**9**
	Total Periods	**45**

Course Outcomes
Upon successful completion of the course, students will be able to:

CO 1	Compute the electric circuit parameters for simple problems.	K3
CO 2	Explain the working principle and applications of electrical machines.	K2
CO 3	Analyze the characteristics of analog electronic devices.	K4
CO 4	Explain the basic concepts of digital electronics.	K2
CO 5	Explain the operating principles of measuring instruments.	K2

K1:Remembering; K2:Understanding; K3:Applying; K4:Analyzing; K5: Evaluating; K6: Creating

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. 3. Sedha R.S., "A textbook book of Applied Electronics", S. Chand & Co., 2008 4. James A .Svoboda, Richard C. Dorf, "Dorf's Introduction to Electric Circuits", Wiley, 2018. 5. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2015.
Reference Books	1. Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw Hill Education, 2019. 2. Thomas L. Floyd, 'Digital Fundamentals', 11th Edition, Pearson Education, 2017. 3. Albert Malvino, David Bates, 'Electronic Principles, McGraw Hill Education; 7th edition, 2017. 4. Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, 2002. 5. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010

Tools for Assessment (40 Marks)					
CIA I	CIA II	CIA III	Assignment/ Seminar/ Case Study	Attendance	Total
10	10	10	5	5	40

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	-	-	-	-	-	1	-	-	2
CO2	2	2	1	-	-	-	-	-	1	-	-	2
CO3	2	2	1	-	-	-	-	-	1	-	-	2
CO4	2	2	1	-	-	-	-	-	1	-	-	2
CO5	2	2	1	-	-	-	-	-	1	-	-	2

3-High; 2-Medium; 1-Low

CO / PSO	PSO 1	PSO 2	PSO 3
CO1	2	1	1
CO2	2	1	1
CO3	2	1	1
CO4	2	1	1
CO5	2	1	1

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
Dr. K. Edison prabhu AP/EEE Name and Department of the Faculty Member	Dr.R.KANNAN PROFESSOR & HEAD Department of Electrical & Electronics Engineering Coimbatore - 641 105. Name and Seal of the Chairperson-BoS

Course Code	Title					
U23EN206	PROFICIENCY IN ENGLISH					
Semester: II	L	T	P	Credits	CIA: 50 Marks	ESE: 50 Marks
	2	0	2	3		
Course pre-requisites	Basic Grammer & Communication Strategies					

Course Objectives

1	To engage learners in meaningful language activities to improve their LSRW skills.
2	To identify personality traits and evolve as a better team player.
3	To develop analytical thinking skills for problem solving in communicative contexts.
4	To demonstrate an understanding of job applications and interviews for internship and placements.
5	To identify varied group discussion skills and apply them to take part in effective discussions in a professional context.

Course Category	Humanities, Social Science and Management Course (HSMC)
Development Needs	Global / National

Course Description: The course emphasis the learners to develop their skills in technical writing and also develop their communication skills.

Course Content

Unit	Description	
I	**MAKING COMPARISONS:** **Reading** – Reading advertisements, Extensive Reading (Activity). **Writing** – Reading Comprehension, Writing a review/ summary of story/article. **Grammar** – Active voice & Passive voice, Prepositional phrases.	
		Contact Periods 06
II	**EXPRESSING CAUSAL RELATIONS IN SPEAKING AND WRITING:** **Reading** – Reading longer technical texts, Reading a short story. **Writing** – Personal letter (Inviting your friend), Congratulating letter, Writing responses to complaints and adjustment letter. **Grammar** – Infinitive and Gerunds, Modals.	
		Contact Periods 06
III	**PROBLEM SOLVING:** **Reading** – Case Studies, news reports, reading passages with time limit. **Writing** – Letter to the Editor, Short report on an event (field trip). **Grammar** — If conditional sentence, Phrasal Verbs.	
		Contact Periods 06
IV	**REPORTING OF EVENTS AND RESEARCH:** **Reading** – Newspaper articles; Reading the job advertisements and the profile of the company. **Writing** – Essay writing and its types (Compare & Contrast, Cause & Effect, Problem & Solution). **Grammar** – Reported Speech, Conjunctions.	
		Contact Periods 06
V	**THE ABILITY TO PUT IDEAS OR INFORMATION COGENTLY:** **Reading** – Note making skills – making notes from books. **Writing** – Email Writing, Biographical sketches of famous personalities. **Grammar** – Relative Clauses, Collocation, Fixed & Semi-fixed expressions.	

Contact Periods	**06**
Total Periods	**30**

LIST OF EXPERIMENTS

1. Listen to friends conversations, responding.
2. Role play, talk about past events.
3. Listen to speech of great leader.
4. Talk about travel problems & experience.
5. Listen to movie scenes and responding.
6. Welcome address and vote of thanks.
7. Listening a passage and answering.
8. Talk about present, past situations.
9. Listening to Presentations.
10. Talking about everyday experiences.

Contact Periods	**30**
Total Periods	**60**

Course Outcomes

Upon successful completion of the course, students will be able to:

CO 1	Identify cause and effects in events, industrial processes through technical text.	K2
CO 2	Understand and use tools of structured written communication.	K3
CO 3	Identify individual personality types and role in a team.	K3
CO 4	Understand the basics concepts of morality and diversity.	K1
CO 5	Present their opinion in a planned and logical manner, and draft effective resumes in context of job search.	K6

K1: Remembering; K2: Understanding; K3: Applying; K4: Analyzing; K5: Evaluating; K6: Creating

Text Books	1. English for Engineers & Technologists, Orient Blackswan Private Ltd. Department of English, Anna University, 2020. 2. Barun.K.Mithra, Personality Development and Soft Skills, OUP India, 2019.
Reference Books	1. Jack C. Richards, "Interchange, Student's Book", 4th Edition, Cambridge University Press, New York, 2017. 2. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi. 3. Muralikrishna & Sunitha Mishra, Communication Skills for Engineers and Scientists, PH Learning, New Delhi, 2009. 4. Developing Communication Skills by Krishna Mohan, Meera Bannerji- Macmillan India Ltd.1990, Delhi. 5. Shalini Varma, "Development of Life Skills and Professional Practice", 1st Edition, Vikas Publishing House Pvt. Ltd., 2014.

Tools for Assessment – Theory					
CIA I	CIA II	CIA III	Assignment/ Seminar / Case Study	Attendance	Total
10	10	10	5	5	40

Tools for Assessment – Practical		
Model Exam I	Model Exam II	Total
50	50	100

Mapping

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

3-High; 2-Medium; 1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	-	-	2
CO2	-	-	2
CO3	-	-	2
CO4	-	-	2
CO5	-	-	2

Course designed by	Verified by
R.Thg Signature of the Faculty Member	Signature of the Chairperson-BoS
Dr. R. Deepa Asp- S&H. Name and Department of the Faculty Member	Dr. P.T. HEMAMALINI Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105 Name and Seal of the Chairperson-BoS

Course Code	Title					
U24GE207	PROBLEM SOLVING USING PYTHON					
Semester: II	L	T	P	Credits	CIA: 50 Marks	ESE: 50 Marks
	2	0	2	3		

Course pre-requisites	Basic Knowledge of Python Programming Knowledge

Course Objective

1	To understand and develop programs using Python.
2	To apply the concepts of strings, control flow, data types in python programs.
3	To apply programs using list, tuples, dictionaries, and files concept in Python.
4	To analyse image processing, networking and object-oriented programming in Python.
5	To create new ideas for problems in real world application using python.

Course Category	Engineering Sciences Course (ESC)
Development Needs	Global

Course Description: Study the constructs of Python Language

Course Content

Unit	Description	
I	**INTRODUCTION TO PYTHON PROGRAMMING:** Introduction to Python Programming- Python Interpreter and Interactive Mode -Variables- Numerical types- Arithmetic operators and Expressions- Psuedo Code - Values and types: int, float, Boolean - Variables, Expressions, Statements -Illustrative Problems.	
	Contact Periods	**06**
II	**DATA TYPES, CONTROL FLOW, STRINGS:** Control Flow -conditional (if), Alternative (if-else), Chained conditional (if-elif-else)- Iteration: state, while, for, break, continue, pass - Strings: string slices, immutability, string functions and methods, string module, Regular expression, Pattern matching. - Illustrative Problems.	
	Contact Periods	**06**
III	**LISTS, TUPLES DICTIONARIES AND FUNCTIONS:** 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. Functions and User Defined Functions: Simple and Mathematical Built–in Functions, Recursion -Illustrative Problems	
	Contact Periods	**06**
IV	**FILES AND OOPS CONCEPT IN PYTHON:** Files, Text files, reading and writing files-format operator; Files and exception handling -Introduction to Object Oriented Programming – Basic principles of Object-Oriented Programming in Python – Class Definition-Object Creation - Inheritance, Composition, Operator Overloading.	
	Contact Periods	**06**
V	**IMAGE PROCESSING & NETWORKING WITH PYTHON AND APPLICATIONS:** Basics of Image processing- Image File Formats – Introduction to Classic Image Processing Algorithm- Image Processing Tools-Fundamentals of Networking- Introduction to Python Sockets- Simple Client/Server Programming- Python Applications.	
	Contact Periods	**06**

Total Periods	**30**

LIST OF EXPERIMENTS

1. Simple programs to execute the concept of python for editing, saving and handling error message.
2. Python program using Statements and Expressions (exchange the values of two variables, circulate the values of n variables, distance between two points).
3. Scientific problems using Conditionals and Iterative loops (Number series, Number patterns, pyramid pattern).
4. Programs for functions using python (Factorial, larger number in a list).
5. Implementing programs using regular expressions.
6. Program for implementing strings (reverse, palindrome).
7. Implementing real time application using List, Tuples (Items present in library, operations of list and tuples).
8. Python programs for real time using file handling (Coping from one file to another, word count, longest word)

Contact Periods	**30**
Total Periods	**60**

Course Outcomes
Upon successful completion of the course, Students will be able to:

CO 1	Understand the concepts of Python.	K2
CO 2	Apply appropriate constructs to represent data.	K3
CO 3	Apply programs using different constructs in Python.	K3
CO 4	Analyse a real-world application in image processing and networking.	K4
CO 5	Analyse various simple programs for real world application using python.	K4

K1: Remembering; K2: Understanding; K3: Applying; K4: Analysing; K5: Evaluating; K6: Creating

Text Books	1. Kit Jackson, "Python Programming for Beginners: Skyrocket Your Code and Master Python in Less than a Week. Discover the Foolproof, Practical Route to Uncover Insider Hacks, Unlock New Opportunities, and Revolution", 31 May 2023. 2. Bill Lubanovic, "Introducing Python", 2nd Edition, O'Reilly Media, Inc., 2019.
Reference Books	1. Narry Prince, "Python Programming for Beginners", ISBN-13-979-8870875248, 2023. 2. McKinney, "Python Programming", ISBN-13-979-8870534817, 2023. 3. Robert Oliver, "Python Quick Start Guide: The Simplified Beginner's Guide to Python Programming Using Hands-On Projects and Real-World Applications", ISBN-13-978-163610037, 2023. 4. Eric Chou, "Mastering Python Networking: Utilize Python packages and frameworks for network automation, monitoring, cloud, and management", 2023.

Tools for Assessment - Theory

CIA I	CIA II	CIA III	Assignment / Seminar	Attendance	Total
10	10	10	5	5	40

Tools for Assessment– Practical

Model Exam I	Model Exam II	Total
50	50	100

Mapping												
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	1	-	-	-	-	-	1	1	-	3
CO2	2	-	1	-	-	-	-	-	1	1	-	3
CO3	2	-	1	-	-	-	-	-	1	1	-	3
CO4	2	3	1	-	3	-	-	1	1	1	3	3
CO5	2	3	1	1	3	-	-	1	3	1	3	3

3 – High 2-Medium 1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	2	2	1
CO2	2	2	1
CO3	2	2	1
CO4	2	2	1
CO5	2	2	1

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
JEEVANANTHAM G, AP(SG) Computer Science & Engineering Name and Department of the Faculty Member	Dr. S. SUBASREE, M Tech. Ph.D Professor and Head, Computer Science and Engineering Nehru Institute of Engineering and Technology Coimbatore TN India Name and Seal of the Chairperson-BoS

Course Code	Title					
U23GE218	ENGINEERING PRACTICES LABORATORY					
Semester: II	L	T	P	Credits	CIA: 60 Marks	ESE: 40 Marks
	0	0	2	1		
Course pre-requisites	Basics of Measurements, Basics of simple drawings					

Course Objectives

1	To draw pipe line plan; laying and connecting various pipe fittings used in common household plumbing work; Sawing; planning; making joints in wood materials used in common household wood work.
2	To wire various electrical joints in common household electrical wire work.
3	To weld various joints in steel plates using arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipments; Making a tray out of metal sheet using sheet metal work
4	To solder and test simple electronic circuits
5	To assemble and test simple electronic components on PCB.

Course Category	Engineering Science Course (ESC)
Development Needs	Global / National

Course Description: Engineering practices encompass a range of activities such as problem identification, solution design, model construction, technology utilization, testing and evaluation of solutions, and solution communication.

Course Content

S. No.	List of Experiments
	GROUP A (CIVIL & ELECTRICAL)
Part I	**CIVIL & ELECTRICAL ENGINEERING PRACTICES:**

PLUMBING WORK:

a) Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in household.
b) Laying pipe connection to the suction side and delivery side of a pump
c) Connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances.

WOOD WORK:

a) Sawing and Planing
b) Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint.

ELECTRICAL ENGINEERING WORKS

a) Introduction to switches, fuses, indicators and lamps - Basic switch board wiring with lamp, fan and three pin socket
b) Fluorescent Lamp wiring with introduction to CFL and LED types.
c) Energy meter wiring and related calculations/ calibration
d) Study of Iron Box wiring and assembly
e) Study of Fan Regulator (Resistor type and Electronic type using Diac /Triac /Quadrac)
f) Study of emergency lamp wiring/Water heater

Contact Periods	**15**

	GROUP – B (MECHANICAL AND ELECTRONICS)
Part II	**MECHANICAL ENGINEERING PRACTICES:** WELDING WORK: a) Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding. b) Practicing gas welding. BASIC MACHINING WORK: a) (Simple) Turning, Drilling and Tapping ASSEMBLY WORK: a) Assembling a centrifugal pump. b) Assembling a household mixer. c) Assembling an air conditioner. SHEET METAL WORK: a) Making of a square tray FOUNDRY WORK: a) Demonstrating basic foundry operations. **ELECTRONIC ENGINEERING PRACTICES:** SOLDERING WORK: a) Soldering simple electronic circuits and checking continuity. ELECTRONIC ASSEMBLY AND TESTING WORK: a) Assembling and testing electronic components on a small PCB. ELECTRONIC EQUIPMENT STUDY: a) Study elements of smart phone. b) Assembly and dismantle of LED TV. c) Assembly and dismantle of computer/ laptop
	Contact Periods **15**
	Total Periods **30**

Course Outcomes
Upon successful completion of the course, students will be able to:

CO 1	Understand the basics of Plumbing and carpentry works	K1
CO 2	Comprehend the basic fabrication process like welding and sheet metal operations	K3
CO 3	Understand the machining operations-Turning/Facing/Step turning, Chamfering & Knurling	K1
CO 4	Differentiate the various types of Electrical wiring and analyze basic parameters of Electrical circuits	K2
CO 5	Demonstrate the basic electronic components and equipment's and acquire knowledge in PCB fabrication and Soldering.	K3

K1:Remembering; K2:Understanding; K3:Applying; K4:Analyzing; K5:Evaluating; K6:Creating

Tools for Assessment (40 Marks)				
Preparation	Conduct of Experiments	Calculations & Result	Viva-Voce	Total
20	30	40	10	100

Tools for Assessment (20 Marks)		
Model Exam 1	Model Exam 2	Total
50	50	100

Mapping

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

3-High; 2-Medium; 1-Low

CO / PSO	PSO1	PSO2	PSO3
CO 1	2	1	1
CO 2	2	1	1
CO 3	2	1	1
CO 4	2	1	1
CO 5	3	1	1

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
A. S. RAJAN AP(SG) MECHANICAL ENGINEERING Name and Department of the Faculty Member	Dr. M. SANTHOSH Professor and Head Department of Mechanical Engineering Nehru Institute of Engineering and Technology Coimbatore - 641 105, Tamilnadu, India. Name and Seal of the Chairperson-BoS

Course Code	Title					
U23MA201	ENGINEERING MATHEMATICS - II					
Semester: II	L	T	P	Credits	CIA: 40 Marks	ESE: 60 Marks
	3	1	0	4		
Course pre-requisites	Higher Secondary Level, Bridge Course, Engineering Mathematics-I					

Course Objectives	
1	To interpret the concept of probability axioms.
2	To introduce the numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines
3	To familiarize the student with functions of several variables. This is needed in many branches of engineering.
4	To introduce Fourier series analysis this is central to many applications in engineering apart from its use in solving boundary value problems.
5	To introduce the basic concepts of PDE for solving standard partial differential equations.

Course Category	Basic Science Course (BSC)
Development Needs	Global / National

Course Description: The course helps the students to develop the fundamentals and basic concepts probability axioms, Fourier series and the numerical methods are techniques by which mathematical problems are formulated so that they can be solved with arithmetic operations.

Course Content		
Unit	Description	
I	**BASICS OF PROBABILITY**: Probability axioms, conditional probability, partitions and law of total probability, Bayes theorem, independence, random variables.	
	Contact Periods	**12**
II	**NUMERICAL METHODS - NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION:** Derivatives using Newton- Gregory forward and backward interpolation formula, Newton-Cotes quadrature formula, Trapezoidal and Simpson's $1/3^{rd}$ rules (single and double integrals).	
	Contact Periods	**12**
III	**FUNCTIONS OF SEVERAL VARIABLES**: Functions of two variables – Partial derivatives – Total derivative – Taylor's series for functions of two variables – Jacobian's – Applications: Maxima and minima of functions of two variables and Lagrange's method of undetermined multipliers.	
	Contact Periods	**12**
IV	**FOURIER SERIES**: Existence of Fourier Series, Periodic functions, Dirichlet's conditions – General Fourier series– Odd and even functions – Half range sine series and cosine series.	
	Contact Periods	**12**
V	**PARTIAL DIFFERENTIAL EQUATIONS:** Classification of PDE – Fourier series solutions of one-dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two- dimensional equation of heat conduction.	
	Contact Periods	**12**
	Total Periods	**60**

Course Outcomes Upon successful completion of the course, students will be able to:		Knowledge Level
CO 1	Understand the fundamental knowledge of the concepts of probability.	K2
CO 2	Understand the various techniques and methods for solving first and second order ordinary differential equations.	K2
CO 3	Utilize differential calculus ideas on several variable functions.	K1
CO 4	Apply the concept of differential equations using Fourier series analysis which plays a vital role in engineering applications.	K3
CO 5	Understand how to solve the given standard partial differential equations.	K2
K1: Remembering; K2: Understanding; K3: Applying; K4: Analyzing; K5: Evaluating; K6: Creating		
Text Books	1. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley, 10th Edition, 2020. 2. Yates. R.D. and Goodman. D.J., "Probability and Stochastic Processes", 2nd Edition, Wiley India Pvt. Ltd., Bangalore, 2012. 3. Tolimieri R, Algorithms for Discrete Fourier Transform and Convolution, Springer publicatiosns.	
Reference Books	1. Jay L. Devore, Probability and Statistics for Engineering and the Sciences, 9th Edition, 2020. 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 Manicavachagom Pillai. T. K., Calculus, Volume I and II, S.Viswanathan Publishers Pvt. Ltd., Chennai, 2009. 5. Srimantha Pal and Bhunia. S.C, Engineering Mathematics, Oxford University Press, 2015.	

Tools for Assessment (40 Marks)

CIA I	CIA II	CIA III	Assignment/ Seminar/ Case Study	Attendance	Total
10	10	10	5	5	40

Mapping

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

3-High; 2-Medium; 1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	1	1	1
CO3	1	1	1
CO4	1	1	1
CO5	1	1	1

Course designed by	Verified by
K. Ramesh Signature of the Faculty Member	P. T. Hemamalini Signature of the Chairperson-BoS
Dr. K. RAMESH ASP-Mathematics SCH Name and Department of the Faculty Member	Dr. P. T. HEMAMALINI Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105 Name and Seal of the Chairperson-BoS

Course Code	Title					
U23MS202	MATERIALS SCIENCE					
Semester: II	L	T	P	Credits	CIA: 40 Marks	ESE: 60 Marks
	3	0	0	3		
Course pre-requisites	Basics of Engineering Physics and Properties of Materials					

Course Objectives

1	To equip the students to have a knowledge on different types of electron theory, basics of quantum mechanics and about energy bands.
2	To introduce the physics of semiconducting materials and applications of semiconductors in device fabrication.
3	To make the students to learn the origin of magnetism in magnetic materials and their classification; to learn the physics of superconductivity and various properties exhibited by superconductors.
4	To establish a sound grasp of knowledge on different optical properties of materials, optical displays, and applications.
5	To make the students familiarize in the modern engineering materials and its applications.

Course Category	Basic Science Course (BSC)
Development Needs	Global / National

Course Description: The course explores the fundamental principles of materials science, focusing on the relationships between the structure, properties, processing, and performance of materials.

Course Content

Unit	Description	
I	**ELECTRICAL PROPERTIES OF MATERIALS:** Classical free electron theory - Expression for electrical conductivity - Thermal conductivity, expression - Wiedemann- Franz law - Merits and demerits - Quantum free electron theory electrons in metals - Particle in a three-dimensional box - degenerate states - Fermi- Dirac statistics - Density of energy states.	
	Contact Periods	09
II	**SEMICONDUCTOR PHYSICS:** Fundamental of Semiconductors - Carrier concentration in intrinsic semiconductors - extrinsic semiconductors - Derivation of carrier concentration in n-type and p-type semiconductor - variation of Fermi level with temperature and impurity concentration - Hall effect - Determination of Hall coefficient – Applications - Ohmic contacts - Schottky diode.	
	Contact Periods	09
III	**MAGNETISM AND SUPERCONDUCTIVITY:** Fundamental of magnetic materials -classification of magnetic materials: diamagnetism, paramagnetism, ferromagnetism, antiferromagnetism and ferrimagnetism – Ferromagnetism - Domain theory - M versus H behavior - soft and hard magnetic materials - Superconductivity: properties - Type I and Type II superconductors - High Tc superconductors - Applications of superconductors - SQUID and magnetic levitation.	
	Contact Periods	09
IV	**OPTICAL PROPERTIES OF MATERIALS:** Classification of optical materials - Optical processes in semiconductors: optical absorption and emission, charge injection and recombination, optical absorption, loss and gain. Optoelectronic devices: light detectors - solar cells - light emitting diode - laser diode - organic LED.	
	Contact Periods	09

V	**MODERN ENGINEERING MATERIALS:** Metallic glasses - Shape memory alloys: Ni-Ti alloy, applications – Ceramics - Composites: classification- role of matrix and reinforcement, processing of fibre reinforced plastics– Nanomaterials: preparation methods - synthesis: Pulsed Laser Deposition (PLD), Ball Milling, Chemical vapour deposition - Properties and applications.	
	Contact Periods	**09**
	Total Periods	**45**

Course Outcomes

Upon successful completion of the course, students will be able to:

CO 1	Apply knowledge on classical and quantum electron theories, and energy band structures.	K3
CO 2	Understand clearly of semiconductor physics and functioning of semiconductor devices.	K2
CO 3	Analyze to get knowledge on classification of magnetic materials, theory and applications of ferromagnetic materials and superconductors.	K4
CO 4	Understand the optical properties of materials and working principles of various optical devices.	K2
CO 5	Understand the knowledge on modern engineering materials and their applications.	K2

K1: Remembering; K2: Understanding; K3: Applying; K4: Analyzing; K5: Evaluating; K6: Creating

Text Books	1. V.Raghavan. Materials Science and Engineering: A First Course, Prentice Hall India Learning Private Limited, 2015. 2. S.O. Kasap, Principles of Electronic Materials and Devices, Mc-Graw Hill, 2018. 3. Jasprit Singh, Semiconductor Devices: Basic Principles, Wiley (India), 2007. 4. Jasprit Singh, Semiconductor Optoelectronics: Physics and Technology, Mc-Graw Hill India (2019) 5. G.W.Hanson. Fundamentals of Nanoelectronics. Pearson Education (Indian Edition), 2009.
Reference Books	1. R.Balasubramaniam, Callister's Materials Science and Engineering. Wiley (Indian Edition), 2014. 2. Wendelin Wright and Donald Askeland, Essentials of Materials Science and Engineering, CL Engineering, 2013. 3. Robert F.Pierret, Semiconductor Device Fundamentals, Pearson, 2006 4. Pallab Bhattacharya, Semiconductor Optoelectronic Devices, Pearson, 2017 5. Ben Rogers, Jesse Adams and Sumita Pennathur, Nanotechnology: Understanding Small Systems, CRC Press, 2017.

Tools for Assessment (40 Marks)

CIA I	CIA II	CIA III	Assignment/ Seminar/Case study	Attendance	Total
10	10	10	5	5	40

Mapping

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

3-High; 2-Medium; 1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	2	1	1
CO2	2	1	1
CO3	2	1	1
CO4	2	1	1
CO5	2	1	1

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
Dr. P. Periasamy Dept. of Science and Humanities Name and Department of the Faculty Member	Dr. P. T. HEMAMALINI Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105 Name and Seal of the Chairperson-BoS

Course Code	Title					
U23GE203	TAMILS AND TECHNOLOGY					
Semester:II	L	T	P	Credits	CIA:40 Marks	ESE: 60 Marks
	1	0	0	1		
Course pre-requisites	Higher Secondary Level					

Course Objectives	
1	To explore the historical development of technology in the Tamil region.
2	To examine how traditional Tamil practices and knowledge systems have influenced technological advancements.
3	To promote inclusivity and diversity in the technology sector, encouraging the participation of Tamils in various technological fields.
4	To provide a global perspective on Tamil contributions to technology and the role of Tamils in the global technology landscape.
5	To explore the role of the Tamil language in technology, including the development of software, language processing, and digital content in Tamil.

Course Category	Humanities, Social Science and Management Course (HSMC)
Development Needs	Global/National

Course Description:

A course on Tamils and Technology might cover the historical and contemporary contributions of Tamils to the field, exploring advancements, notable figures, and the intersection of Tamil culture with technological developments. Topics could include language technology, computing, and digital innovations, providing a holistic understanding of the Tamils have had on the Technology landscape.

Course Content

Unit	Description	
I	**WEAVING AND CERAMIC TECHNOLOGY:** Weaving Industry during Sangam Age - Ceramic technology - Black and Red Ware Potteries (BRW) - Graffiti on Potteries.	
	Contact Periods	**03**
II	**DESIGN AND CONSTRUCTION TECHNOLOGY:** 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 Silapathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- ThirumalaiNayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.	
	Contact Periods	**03**
III	**MANUFACTURING TECHNOLOGY:** 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 in Silapathikaram- keezhadi.	
	Contact Periods	**03**
IV	**AGRICULTURE AND IRRIGATION TECHNOLOGY:** Dam, Tank, ponds, Sluice, Significance of KumizhiThoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.	
	Contact Periods	**03**

V	**SCIENTIFIC TAMIL & TAMIL COMPUTING:** 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.	
	Contact Periods	**03**
	Total Periods	**15**

Course Outcomes

Upon successful completion of the course, students will be able to:

CO 1	Understand the extensive literature of Tamil and its classical nature.	K2
CO 2	Understand the heritage of sculpture, painting and musical instruments of ancient people.	K2
CO 3	Review on folk and martial arts of Tamil people.	K1
CO 4	Realise Thinai concepts, trade and victory of chozha dynasty.	K1
CO 5	Understand the contribution of Tamils in Indian freedom struggle, self-esteem movement and siddha medicine.	K2

K1: Remembering; K2: Understanding; K3: Applying; K4: Analyzing; K5: Evaluating; K6: Creating

Text Books

1. தமிழகவரலாறு – மக்களும்பண்பாடும்– .கே.கேபிள்ளை. (வெளியீடு): தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்.
2. கணினித்தமிழ் – முனைவர்இல. சுந்தரம் . (விகடன்பிரசுரம்).பதிப்பு-1, ஆண்டு-2016.
3. கீழடி – வைகைநதிக்கரையில்சங்ககாலநகரநாகரிகம். (தொல்லியல்துறை(வெளியீடு). பதிப்பு-1, ஆண்டு-2016.
4. பொருநை- ஆற்றங்கரைநாகரீகம். (தொல்லியல்துறை (வெளியீடு)ஆண்டு 2022.

Reference Books

1. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print) 2016.
2. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies) 2010.
3. National The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: Intel Institute of Tamil Studies)1995.
4. 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..Edition: 1 Year 2016.
5. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu) 2022.
6. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book...Edition: 1 Year 2016.

Tools for Assessment (40 Marks)

CIAI	CIAII	CIAIII	Assignment/Seminar/ Case Study	Attendance	Total
10	10	10	5	5	40

Semester – II

S. No.	Course Code	Course Title	Category	L	T	P	Contact Period	C
THEORY								
1	U23MA201	Engineering Mathematics - II	BSC	3	1	0	4	4
2	U23MS202	Materials Science	BSC	3	0	0	3	3
3	U23GE203	Tamils and Technology	HSMC	1	0	0	1	1
4	U23ME204	Engineering Graphics	ESC	2	1	0	3	3
5	U23GE205	Basic Electrical and Electronics Engineering	ESC	3	0	0	3	3
THEORY WITH INTEGRATED LAB								
6	U23EN206	Proficiency in English	HSMC	2	0	2	4	3
7	U23GE207	Problem Solving using Python	ESC	2	0	2	4	3
PRACTICAL								
8	U23GE218	Engineering Practices Laboratory	ESC	0	0	2	2	1
ENHANCEMENT COURSES								
9		Skill Enhancement Course – I	SEC	0	0	2	2	1
10		Value Enhancement Course - I	VEC	0	0	2	2	1
			TOTAL	**16**	**2**	**10**	**28**	**23**

NCC / NSS / YRC / RRC / Sports Credit Course level 1 is offered for students. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.

Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	1	-	-	1	2	2	-	2	-	1
CO2	2	-	1	-	-	1	2	2	-	2	-	1
CO3	2	-	1	-	-	1	2	2	-	2	-	1
CO4	2	-	1	-	-	1	2	2	-	2	-	1
CO5	2	-	1	-	-	1	2	2	-	2	-	1

3-High;2-Medium;1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	1	1	1
CO3	1	1	1
CO4	1	1	1
CO5	1	1	1

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
Dr. Deepak. A. S&H Dept.	Dr. P. T. HEMAMALINI Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore-641105
Name and Department of the Faculty Member	Name and Seal of BoS Chairperson

Course Code	Title					
U23ME204	ENGINEERING GRAPHICS					
Semester: II	L	T	P	Credits	CIA: 40 Marks	ESE: 60 Marks
	2	1	0	3		
Course pre-requisites	Geometry, Basic Mathematics					

Course Objectives	
1	To draw engineering curves.
2	To project points, lines and plane surface.
3	To sketch the simple objects in freehand and orthographic projection of solids and section of solids.
4	To represent the development of solids
5	To draw isometric and perspective projections of simple solids.

Course Category	Engineering Science Course (ESC)
Development Needs	Global / National

Course Description: Using a combination of lines, symbols, and signs, engineering graphics and design blends cognitive and manipulative skills to communicate graphically and create systems, processes, goods, and services that improve quality of life and promote economic progress.

Course Content

Unit	Description
I	**CONCEPTS AND CONVENTIONS (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. **PLANE CURVES:** 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.
	Contact Periods 05+07
II	**PROJECTION OF POINTS, LINES AND PLANE SURFACE:** 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
	Contact Periods 05+07
III	**PROJECTION OF SOLIDS AND FREEHAND SKETCHING:** 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)
	Contact Periods 05+07

IV	**PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES:** 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)	
	Contact Periods	**05+07**
V	**ISOMETRIC AND PERSPECTIVE PROJECTIONS:** 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)	
	Contact Periods	**05+07**
	Total Periods	**60**

Course Outcomes
Upon successful completion of the course, students will be able to:

CO 1	Use BIS conventions and specifications for engineering drawing.	K1
CO 2	Construct the conic curves, involutes and cycloid.	K3
CO 3	Solve practical problems involving projection of lines.	K3
CO 4	Draw the orthographic, isometric and perspective projections of simple solids.	K2
CO 5	Draw the development of simple solids.	K2

K1:Remembering; K2:Understanding; K3:Applying; K4:Analyzing; K5:Evaluating; K6:Creating

Text Books

1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 54th Edition, 2023.
2. Natrajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.
3. Parthasarathy, N. S. and Vela Murali, "Engineering Drawing", Oxford University Press, 2015

Reference Books

1. Basant Agarwal and Agarwal C.M., "Engineering Drawing", McGraw Hill, 2nd Edition, 2019.
2. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Publications, Bangalore,27th Edition, 2017.
3. Luzzader, Warren.J. and Duff, John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2012.
4. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson Education India, 2nd Edition, 2009.
5. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 11th Edition, 2011.

Tools for Assessment (40 Marks)												
CIA I		CIA II		CIA III		Assignment/ Seminar / Case Study			Attendance		Total	
10		10		10		5			5		40	
Mapping												
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	-	2	-	-	-	-	3	-	2
CO2	3	1	2	-	2	-	-	-	-	3	-	2
CO3	3	1	2	-	2	-	-	-	-	3	-	2
CO4	3	1	2	-	2	-	-	-	-	3	-	2
CO5	3	1	2	-	2	-	-	-	-	3	-	2

3-High; 2-Medium; 1-Low

CO / PSO	PSO1	PSO2	PSO3
CO 1	2	2	1
CO 2	2	2	1
CO 3	2	2	1
CO 4	2	2	1
CO 5	3	3	1

Special points applicable to End Semester Examinations on Engineering Graphics:

1. There will be five either or type questions, each of covering all the units in the syllabus.
2. Each question will carry 20 marks, making a total of 100.
3. The given answer paper will be A3 size. The students should use appropriate scale to fit the answers.
4. The examination will be conducted in FN/AN sessions on the same day.

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson – BoS
A. S. RAJAN AP(SG) MECHANICAL ENGINEERING Name and Department of the Faculty Member	Dr. M. SANTHOSH Professor and Head Department of Mechanical Engineering Nehru Institute of Engineering and Technology Coimbatore - 641 105, Tamilnadu, India. Name and Seal of the Chairperson - BoS

Course Code	Title					
U23GE205	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING					
Semester: II	L	T	P	Credits	CIA: 40 Marks	ESE: 60 Marks
	3	0	0	3		

Course pre-requisites	Matrices and Calculus, Engineering Physics

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.

Course Category	Engineering Sciences Course (ESC)
Development Needs	Global / National

Course Description: The course helps the students to develop the fundamentals and basic concepts in Electric circuit analysis, Working Principles of Electrical Machines, Analog/Digital Electronics and functional elements of Measuring. Students will be able to solve problems related to electric circuits' analysis by using Mesh and Nodal analysis.

Course Content

Unit	Description	
I	**ELECTRICAL CIRCUITS:** 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	
	Contact Periods	**9**
II	**ELECTRICAL MACHINES:** Construction and Working principle- DC Generators, EMF equation, Types and Applications. Working Principle of DC motors, Torque Equation, Types and Applications. Construction, working principle and Applications of Transformer, Induction Motor, Synchronous motor and Alternator.	
	Contact Periods	**9**
III	**ANALOG ELECTRONICS :** Resistor, Inductor and Capacitor in Electronic Circuits-Semiconductor Materials: Silicon &Germanium – PN Junction Diodes, Zener Diode – Characteristics Applications – Bipolar Junction Transistor-Biasing, JFET, SCR, MOSFET, IGBT – Types, I-V Characteristics and Applications, Rectifier and Inverters.	
	Contact Periods	**9**
IV	**DIGITAL ELECTRONICS**: 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).	
	Contact Periods	**9**

V	**MEASUREMENTS AND INSTRUMENTATION:** Functional elements of an instrument, Standards and calibration, Operating Principle, types -PMMC and Moving Iron meters, Measurement of three phase power, Energy Meter, Instrument Transformers-CT and PT.	
	Contact Periods	**9**
	Total Periods	**45**

Course Outcomes
Upon successful completion of the course, students will be able to:

CO 1	Compute the electric circuit parameters for simple problems.	K3
CO 2	Explain the working principle and applications of electrical machines.	K2
CO 3	Analyze the characteristics of analog electronic devices.	K4
CO 4	Explain the basic concepts of digital electronics.	K2
CO 5	Explain the operating principles of measuring instruments.	K2

K1:Remembering; K2:Understanding; K3:Applying; K4:Analyzing; K5: Evaluating; K6: Creating

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.
3. Sedha R.S., "A textbook book of Applied Electronics", S. Chand & Co., 2008
4. James A .Svoboda, Richard C. Dorf, "Dorf's Introduction to Electric Circuits", Wiley, 2018.
5. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2015.

Reference Books

1. Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw Hill Education, 2019.
2. Thomas L. Floyd, 'Digital Fundamentals', 11th Edition, Pearson Education, 2017.
3. Albert Malvino, David Bates, 'Electronic Principles, McGraw Hill Education; 7th edition, 2017.
4. Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, 2002.
5. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010

Tools for Assessment (40 Marks)					
CIA I	CIA II	CIA III	Assignment/ Seminar/ Case Study	Attendance	Total
10	10	10	5	5	40

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	-	-	-	-	-	1	-	-	2
CO2	2	2	1	-	-	-	-	-	1	-	-	2
CO3	2	2	1	-	-	-	-	-	1	-	-	2
CO4	2	2	1	-	-	-	-	-	1	-	-	2
CO5	2	2	1	-	-	-	-	-	1	-	-	2

3-High; 2-Medium; 1-Low

CO / PSO	PSO 1	PSO 2	PSO 3
CO1	2	1	1
CO2	2	1	1
CO3	2	1	1
CO4	2	1	1
CO5	2	1	1

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
Dr. k. Edison prabhu AP/EEE Name and Department of the Faculty Member	Dr.R.KANNAN PROFESSOR & HEAD Department of Electrical & Electronics Engineering Nehru Institute of Engineering Coimbatore - 641 105. Name and Seal of the Chairperson-BoS

Course Code	Title					
U23EN206	PROFICIENCY IN ENGLISH					
Semester: II	L	T	P	Credits	CIA: 50 Marks	ESE: 50 Marks
	2	0	2	3		
Course pre-requisites	Basic Grammer & Communication Strategies					

Course Objectives

1	To engage learners in meaningful language activities to improve their LSRW skills.
2	To identify personality traits and evolve as a better team player.
3	To develop analytical thinking skills for problem solving in communicative contexts.
4	To demonstrate an understanding of job applications and interviews for internship and placements.
5	To identify varied group discussion skills and apply them to take part in effective discussions in a professional context.

Course Category	Humanities, Social Science and Management Course (HSMC)
Development Needs	Global / National

Course Description: The course emphasis the learners to develop their skills in technical writing and also develop their communication skills.

Course Content

Unit	Description	
I	**MAKING COMPARISONS:** **Reading** – Reading advertisements, Extensive Reading (Activity). **Writing** – Reading Comprehension, Writing a review/ summary of story/article. **Grammar** – Active voice & Passive voice, Prepositional phrases.	
		Contact Periods 06
II	**EXPRESSING CAUSAL RELATIONS IN SPEAKING AND WRITING:** **Reading** – Reading longer technical texts, Reading a short story. **Writing** – Personal letter (Inviting your friend), Congratulating letter, Writing responses to complaints and adjustment letter. **Grammar** – Infinitive and Gerunds, Modals.	
		Contact Periods 06
III	**PROBLEM SOLVING:** **Reading** – Case Studies, news reports, reading passages with time limit. **Writing** – Letter to the Editor, Short report on an event (field trip). **Grammar** — If conditional sentence, Phrasal Verbs.	
		Contact Periods 06
IV	**REPORTING OF EVENTS AND RESEARCH:** **Reading** – Newspaper articles; Reading the job advertisements and the profile of the company. **Writing** – Essay writing and its types (Compare & Contrast, Cause & Effect, Problem & Solution). **Grammar** – Reported Speech, Conjunctions.	
		Contact Periods 06
V	**THE ABILITY TO PUT IDEAS OR INFORMATION COGENTLY:** **Reading** – Note making skills – making notes from books. **Writing** – Email Writing, Biographical sketches of famous personalities. **Grammar** – Relative Clauses, Collocation, Fixed & Semi-fixed expressions.	

Contact Periods	**06**
Total Periods	**30**

LIST OF EXPERIMENTS

1. Listen to friends conversations, responding.
2. Role play, talk about past events.
3. Listen to speech of great leader.
4. Talk about travel problems & experience.
5. Listen to movie scenes and responding.
6. Welcome address and vote of thanks.
7. Listening a passage and answering.
8. Talk about present, past situations.
9. Listening to Presentations.
10. Talking about everyday experiences.

Contact Periods	**30**
Total Periods	**60**

Course Outcomes

Upon successful completion of the course, students will be able to:

CO 1	Identify cause and effects in events, industrial processes through technical text.	K2
CO 2	Understand and use tools of structured written communication.	K3
CO 3	Identify individual personality types and role in a team.	K3
CO 4	Understand the basics concepts of morality and diversity.	K1
CO 5	Present their opinion in a planned and logical manner, and draft effective resumes in context of job search.	K6

K1: Remembering; K2: Understanding; K3: Applying; K4: Analyzing; K5: Evaluating; K6: Creating

Text Books	1. English for Engineers & Technologists, Orient Blackswan Private Ltd. Department of English, Anna University, 2020. 2. Barun.K.Mithra, Personality Development and Soft Skills, OUP India, 2019.
Reference Books	1. Jack C. Richards, "Interchange, Student's Book", 4th Edition, Cambridge University Press, New York, 2017. 2. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi. 3. Muralikrishna & Sunitha Mishra, Communication Skills for Engineers and Scientists, PH Learning, New Delhi, 2009. 4. Developing Communication Skills by Krishna Mohan, Meera Bannerji- Macmillan India Ltd.1990, Delhi. 5. Shalini Varma, "Development of Life Skills and Professional Practice", 1st Edition, Vikas Publishing House Pvt. Ltd., 2014.

Tools for Assessment – Theory					
CIA I	CIA II	CIA III	Assignment/ Seminar / Case Study	Attendance	Total
10	10	10	5	5	40

Tools for Assessment – Practical		
Model Exam I	Model Exam II	Total
50	50	100

Mapping

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

3-High; 2-Medium; 1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	-	-	2
CO2	-	-	2
CO3	-	-	2
CO4	-	-	2
CO5	-	-	2

Course designed by	Verified by
R.Hy Signature of the Faculty Member	Signature of the Chairperson-BoS Dr. P. T. HEMAMALINI Head of the Department Department of Science & Humanities Nehru Institute of Engineering & Technology Nehru Gardens, Thirumalayampalayam, Coimbatore-641 105
Dr. R. Deepa Asp. S&H. Name and Department of the Faculty Member	Name and Signature of the Chairperson-BoS

Course Code	Title					
U24GE207	PROBLEM SOLVING USING PYTHON					
Semester: II	L	T	P	Credits	CIA: 50 Marks	ESE: 50 Marks
	2	0	2	3		

Course pre-requisites	Basic Knowledge of Python Programming Knowledge

Course Objective

1	To understand and develop programs using Python.
2	To apply the concepts of strings, control flow, data types in python programs.
3	To apply programs using list, tuples, dictionaries, and files concept in Python.
4	To analyse image processing, networking and object-oriented programming in Python.
5	To create new ideas for problems in real world application using python.

Course Category	Engineering Sciences Course (ESC)
Development Needs	Global

Course Description: Study the constructs of Python Language

Course Content

Unit	Description	
I	**INTRODUCTION TO PYTHON PROGRAMMING:** Introduction to Python Programming- Python Interpreter and Interactive Mode -Variables- Numerical types- Arithmetic operators and Expressions- Psuedo Code - Values and types: int, float, Boolean - Variables, Expressions, Statements -Illustrative Problems.	
		Contact Periods 06
II	**DATA TYPES, CONTROL FLOW, STRINGS:** Control Flow -conditional (if), Alternative (if-else), Chained conditional (if-elif-else)- Iteration: state, while, for, break, continue, pass - Strings: string slices, immutability, string functions and methods, string module, Regular expression, Pattern matching. - Illustrative Problems.	
		Contact Periods 06
III	**LISTS, TUPLES DICTIONARIES AND FUNCTIONS:** 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. Functions and User Defined Functions: Simple and Mathematical Built–in Functions, Recursion -Illustrative Problems	
		Contact Periods 06
IV	**FILES AND OOPS CONCEPT IN PYTHON:** Files, Text files, reading and writing files-format operator; Files and exception handling -Introduction to Object Oriented Programming – Basic principles of Object-Oriented Programming in Python – Class Definition-Object Creation - Inheritance, Composition, Operator Overloading.	
		Contact Periods 06
V	**IMAGE PROCESSING & NETWORKING WITH PYTHON AND APPLICATIONS:** Basics of Image processing- Image File Formats – Introduction to Classic Image Processing Algorithm- Image Processing Tools-Fundamentals of Networking- Introduction to Python Sockets- Simple Client/Server Programming- Python Applications.	
		Contact Periods 06

Total Periods	**30**

LIST OF EXPERIMENTS

1. Simple programs to execute the concept of python for editing, saving and handling error message.
2. Python program using Statements and Expressions (exchange the values of two variables, circulate the values of n variables, distance between two points).
3. Scientific problems using Conditionals and Iterative loops (Number series, Number patterns, pyramid pattern).
4. Programs for functions using python (Factorial, larger number in a list).
5. Implementing programs using regular expressions.
6. Program for implementing strings (reverse, palindrome).
7. Implementing real time application using List, Tuples (Items present in library, operations of list and tuples).
8. Python programs for real time using file handling (Coping from one file to another, word count, longest word)

Contact Periods	**30**
Total Periods	**60**

Course Outcomes

Upon successful completion of the course, Students will be able to:

CO 1	Understand the concepts of Python.	K2
CO 2	Apply appropriate constructs to represent data.	K3
CO 3	Apply programs using different constructs in Python.	K3
CO 4	Analyse a real-world application in image processing and networking.	K4
CO 5	Analyse various simple programs for real world application using python.	K4

K1: Remembering; K2: Understanding; K3: Applying; K4: Analysing; K5: Evaluating; K6: Creating

Text Books	1. Kit Jackson, "Python Programming for Beginners: Skyrocket Your Code and Master Python in Less than a Week. Discover the Foolproof, Practical Route to Uncover Insider Hacks, Unlock New Opportunities, and Revolution", 31 May 2023. 2. Bill Lubanovic, "Introducing Python", 2nd Edition, O'Reilly Media, Inc., 2019.
Reference Books	1. Narry Prince, "Python Programming for Beginners", ISBN-13-979-8870875248, 2023. 2. McKinney, "Python Programming", ISBN-13-979-8870534817, 2023. 3. Robert Oliver, "Python Quick Start Guide: The Simplified Beginner's Guide to Python Programming Using Hands-On Projects and Real-World Applications", ISBN-13-978-163610037, 2023. 4. Eric Chou, "Mastering Python Networking: Utilize Python packages and frameworks for network automation, monitoring, cloud, and management", 2023.

Tools for Assessment - Theory

CIA I	CIA II	CIA III	Assignment / Seminar	Attendance	Total
10	10	10	5	5	40

Tools for Assessment– Practical

Model Exam I	Model Exam II	Total
50	50	100

Mapping												
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	1	-	-	-	-	-	1	1	-	3
CO2	2	-	1	-	-	-	-	-	1	1	-	3
CO3	2	-	1	-	-	-	-	-	1	1	-	3
CO4	2	3	1	-	3	-	-	1	1	1	3	3
CO5	2	3	1	1	3	-	-	1	3	1	3	3

3 – High 2-Medium 1-Low

CO \ PSO	PSO1	PSO2	PSO3
CO1	2	2	1
CO2	2	2	1
CO3	2	2	1
CO4	2	2	1
CO5	2	2	1

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
JEEVANANTHAM G, AP(CSE) Computer Science & Engineering Name and Department of the Faculty Member	Dr. S. SUBASREE, M.Tech., Ph.D. Professor and Head, Computer Science and Engineering Nehru Institute of Engineering and Technology Coimbatore TN India Name and Seal of the Chairperson-BoS

Course Code	Title					
U23GE218	ENGINEERING PRACTICES LABORATORY					
Semester: II	L	T	P	Credits	CIA: 60 Marks	ESE: 40 Marks
	0	0	2	1		
Course pre-requisites	Basics of Measurements, Basics of simple drawings					

Course Objectives

1	To draw pipe line plan; laying and connecting various pipe fittings used in common household plumbing work; Sawing; planning; making joints in wood materials used in common household wood work.
2	To wire various electrical joints in common household electrical wire work.
3	To weld various joints in steel plates using arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipments; Making a tray out of metal sheet using sheet metal work
4	To solder and test simple electronic circuits
5	To assemble and test simple electronic components on PCB.

Course Category	Engineering Science Course (ESC)
Development Needs	Global / National

Course Description: Engineering practices encompass a range of activities such as problem identification, solution design, model construction, technology utilization, testing and evaluation of solutions, and solution communication.

Course Content

S. No.	List of Experiments
	GROUP A (CIVIL & ELECTRICAL)
Part I	**CIVIL & ELECTRICAL ENGINEERING PRACTICES:**

PLUMBING WORK:

a) Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in household.
b) Laying pipe connection to the suction side and delivery side of a pump
c) Connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances.

WOOD WORK:

a) Sawing and Planing
b) Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint.

ELECTRICAL ENGINEERING WORKS

a) Introduction to switches, fuses, indicators and lamps - Basic switch board wiring with lamp, fan and three pin socket
b) Fluorescent Lamp wiring with introduction to CFL and LED types.
c) Energy meter wiring and related calculations/ calibration
d) Study of Iron Box wiring and assembly
e) Study of Fan Regulator (Resistor type and Electronic type using Diac /Triac /Quadrac)
f) Study of emergency lamp wiring/Water heater

Contact Periods	**15**

	GROUP – B (MECHANICAL AND ELECTRONICS)	
Part II	**MECHANICAL ENGINEERING PRACTICES:** WELDING WORK: a) Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding. b) Practicing gas welding. BASIC MACHINING WORK: a) (Simple) Turning, Drilling and Tapping ASSEMBLY WORK: a) Assembling a centrifugal pump. b) Assembling a household mixer. c) Assembling an air conditioner. SHEET METAL WORK: a) Making of a square tray FOUNDRY WORK: a) Demonstrating basic foundry operations. **ELECTRONIC ENGINEERING PRACTICES:** SOLDERING WORK: a) Soldering simple electronic circuits and checking continuity. ELECTRONIC ASSEMBLY AND TESTING WORK: a) Assembling and testing electronic components on a small PCB. ELECTRONIC EQUIPMENT STUDY: a) Study elements of smart phone. b) Assembly and dismantle of LED TV. c) Assembly and dismantle of computer/ laptop	
	Contact Periods	**15**
	Total Periods	**30**

Course Outcomes
Upon successful completion of the course, students will be able to:

CO 1	Understand the basics of Plumbing and carpentry works	K1
CO 2	Comprehend the basic fabrication process like welding and sheet metal operations	K3
CO 3	Understand the machining operations-Turning/Facing/Step turning, Chamfering & Knurling	K1
CO 4	Differentiate the various types of Electrical wiring and analyze basic parameters of Electrical circuits	K2
CO 5	Demonstrate the basic electronic components and equipment's and acquire knowledge in PCB fabrication and Soldering.	K3

K1:Remembering; K2:Understanding; K3:Applying; K4:Analyzing; K5:Evaluating; K6:Creating

Tools for Assessment (40 Marks)				
Preparation	Conduct of Experiments	Calculations & Result	Viva-Voce	Total
20	30	40	10	100

Tools for Assessment (20 Marks)		
Model Exam 1	Model Exam 2	Total
50	50	100

Mapping

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

3-High; 2-Medium; 1-Low

CO / PSO	PSO1	PSO2	PSO3
CO 1	2	1	1
CO 2	2	1	1
CO 3	2	1	1
CO 4	2	1	1
CO 5	3	1	1

Course designed by	Verified by
Signature of the Faculty Member	Signature of the Chairperson-BoS
A.S. RAJAN AP(SG) MECHANICAL ENGINEERING Name and Department of the Faculty Member	Dr. M. SANTHOSH Professor and Head Department of Mechanical Engineering Nehru Institute of Engineering and Technology Coimbatore - 641 105, Tamilnadu, India. Name and Seal of the Chairperson-BoS