

MOHAMED SATHAK A J COLLEGE OF ENGINEERING
Chennai – 603103

REGULATIONS 2024
(CHOICE BASED CREDIT SYSTEM)

B.E – COMPUTER SCIENCE AND ENGINEERING

I. PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Technical Proficiency and Innovation

Graduates will possess strong technical knowledge and skills in **Computer Science Engineering**, enabling them to solve complex problems, design and implement, innovative and sustainable solutions for Industry and Society.

PEO2: Professional and Ethical Leadership

Graduates will achieve successful careers and contribute towards technological advancements in terms of leadership, ethical responsibility, effective communication, and teamwork.

PEO3: Lifelong Learning and Societal Contribution

Graduates will engage in lifelong learning to be updated with cutting edge technology and apply their skills to address global challenges thus promoting socio economic development.

II. PROGRAM OUTCOMES (POs)

- i. **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- ii. **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.
- iii. **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.
- iv. **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 for complex problems
- v. **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.
- vi. **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.
- vii. **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.

- viii. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- ix. **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
- x. **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.
- xi. **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.
- xii. **Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

III. PROGRAM SPECIFIC OUTCOMES (PSOs)

Graduates will be able to

PSO1: Design and implement sustainable solutions in **Computer Science Engineering** domain by using innovation, technical knowledge acquired, modern hardware and software tools.

PSO2: Adapt and excel in **Computer Science Engineering** domain through continual learning, higher education, research and use of new technology for societal and industry needs.

PSO3: Contribute in leadership roles to create new opportunities and ensuring adherence of economic, environmental and ethical standards.

PEO	PO												PSO		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO4
1	3	3	3	3	3						2	1	3	3	2
2						2	2	3	3	3	3	1	3	1	3
3						3	3		1			3	2	2	2

1 - Low, 2 - Medium, 3 - High, '-' - No correlation

Department of Computer Science and Engineering
Curriculum for the students Admitted from 2024 - 2025 onwards

Semester - I

S.No	Subject Code	Subject	L	T	P	Credit	Conduct Periods	Category
	24IP101	Induction Program : (Universal Human Value - I) - 3 Weeks						
Theory Course								
1	24TA101	Heritage of Tamils / தமிழர் மரபு	1	0	0	1	1	HSMC
2	24EN101	Technical Communication - I	3	0	0	3	3	HSMC
3	24MA101	Matrices and Calculus	3	1	0	4	4	BSC
4	24CS111	Programming in C	2	0	4	4	6	ESC
5	24CS112	Computational Thinking	1	0	2	2	3	ESC
6	24EE111	Basic Electrical and Electronics Engineering	3	0	2	4	5	ESC
7	24GE101	Basic Civil and Mechanical Engineering	3	0	0	3	3	ESC
Laboratory Course								
8	24EN121	English for Enhancing Self Competence	0	0	2	1	2	EEC
9	24IT121	IT Essential Skills	0	0	2	1	2	ESC
10	24GE124	Electrical and Electronics Workshop Practice	0	0	2	1	2	ESC
11	24GE122	Product Tinkering Laboratory	0	0	2	1	2	ESC
			16	1	16	25	33	

HERITAGE OF TAMILS

(Common to all branches)

Course Code	24TA101	Course Type	Theory
Teaching Periods/Week (L: T:P)	1:0:0	Credits	1
Total Teaching Periods	15	IAT + ESE Marks	40 + 60
Teaching Department	Tamil		

Course Objectives:

1. To familiarize about the importance of Tamil Language and its literature
2. To teach about the heritage of Tamil from art and sculpture
3. To teach about the culture of Tamil from Folk music and martial arts
4. To impart knowledge on thinai concepts
5. To provide insight on the contribution of Tamil in freedom struggle and Indian culture

Unit: I LANGUAGE AND LITERATURE

3

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.

Teaching-Learning Process Pedagogy: Lecture, PPT
RBT Level: L1, L2, L3

Unit: II HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE

3

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

Teaching-Learning Process Pedagogy: Lecture, PPT
RBT Level: L1, L2, L3

Unit: III FOLK AND MARTIAL ARTS

3

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

Teaching-Learning Process Pedagogy: Lecture, PPT
RBT Level: L1, L2, L3

Unit: IV THINAI CONCEPT OF TAMILS

3

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

Teaching-Learning Process Pedagogy: Lecture, PPT
RBT Level: L1, L2, L3

Unit: V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE

3

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

Teaching-Learning Process Pedagogy: Lecture, PPT

RBT Level: L1, L2, L3

Total

15

Pedagogical Methods:

- | |
|---|
| Unit 1: Sol Vilayattu |
| Unit 2: Drawing |
| Unit 3: Theme based activities (Folk and Dance) |
| Unit 4: Essay & Poetry Writing (Thinai) |
| Unit 5: Try to learn about basic Siddha Vaithiyam |

Course Outcomes:

After successful completion of this course, the students will be able to

- | |
|---|
| CO1: Explain the salient features of Tamil language and its literature. |
| CO2: Discuss about the heritage of Tamil exhibited by various forms of art and sculpture. |
| CO3: Describe Tamil heritage displayed by folk music and martial arts |
| CO4: Discuss and describe the features of five Thinais in Tamil. |
| CO5: Describe the contribution of Tamil in freedom struggle and Indian culture. |

Text Books:

- | |
|--|
| T1: Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print) |
| T2: Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies. ISBN 9788185693343. |

References

- | |
|---|
| R1: Dr.K.K.Pillay “Social Life of Tamils A joint publication of TNTB & ESC and RMRL – (in print) |
| R2: Social Life of the Tamils - The Classical Period (Published by: International Institute of Tamil Studies |
| R3: Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).ISBN 9788185329567. |
| R4: The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.) |
| R5: 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) |
| R6: Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author) ISBN 8170260548. |
| R7: Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu) |
| R8: Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) |

Web links and Video Lectures (e-Resources):

1. https://onlinecourses.nptel.ac.in/noc24_cs36/preview - Unit IV
2. <https://digimat.in/nptel/courses/video/113106106/L01.html> - Unit I

CO-PO & PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-
2	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-
3	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-
4	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-
5	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-
AVG	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-

'1' – Low, '2' – Medium, '3' - High, '-' – No correlations

தமிழர் மரபு
(Common to all branches)

Course Code	24TA101	Course Type	Theory
Teaching Periods/Week (L: T:P)	1:0:0	Credits	1
Total Teaching Periods	15	IAT + ESE Marks	40 + 60
Teaching Department	Tamil		

Course Objectives:

1. தாய்மொழியின் நிகரற்ற தொன்மையை விளக்குவது
2. பழம் தமிழரின் துறை சார்ந்த ஓவியங்கள் மற்றும் சிற்பங்கள் நவீன கலைகள் குறித்து விளக்குவது
3. வியக்க வைக்கும் பழந்தமிழரின் கலைகள், இசை மற்றும் வீரவிளையாட்டுகள் பற்றி தெரியப்படுத்துவது
4. தமிழர்களின் திணைக் கோட்பாடுகளை பற்றி விளக்குவது
5. தமிழரின் தன்னிகரற்ற ஈடுபாடு - சித்த மருத்துவம் மற்றும் விடுதலைப் போராட்டம் பற்றி விளக்குவது

அலகு - I மொழி மற்றும் இலக்கியம்

3

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

Teaching-Learning Process Pedagogy: Lecture, PPT
RBT Level: L1, L2, L3

அலகு - II மரபு பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை சிற்பக் கலை

3

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

Teaching-Learning Process Pedagogy: Lecture, PPT
RBT Level: L1, L2, L3

அலகு - III நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்

3

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

Teaching-Learning Process Pedagogy: Lecture, PPT
RBT Level: L1, L2, L3

அலகு - IV தமிழர்களின் திணைக் கோட்பாடுகள்

3

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

Teaching-Learning Process Pedagogy: Lecture, PPT**RBT Level:** L1, L2, L3**அலகு - V இந்திய தேசிய இயக்கம் மற்றும் இந்திய**

3

பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - ச்யமரியாதை இயக்கம் இந்திய மருத்துவத்தில் சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிக்கல்கள்-தமிழ்ப் புத்தகங்களின் அச்ச வரலாறு

Teaching-Learning Process Pedagogy: Lecture, PPT**RBT Level:** L1, L2, L3**Total****15****Pedagogical Methods:**

- Unit 1: Sol Vilayattu
- Unit 2: Drawing
- Unit 3: Theme based activities (Folk and Dance)
- Unit 4: Essay & Poetry Writing (Thinai)
- Unit 5: Try to learn about basic Siddha Vaithiyam

Course Outcomes:

After successful completion of this course, the students should be able to

- CO1: தமிழ் மொழி மற்றும் அதன் இலக்கியத்தின் முக்கிய அம்சங்களை விளக்குவார்கள்.
- CO2: கலை மற்றும் சிற்பத்தின் பல்வேறு வடிவங்களால் காட்சிப்படுத்தப்பட்ட தமிழின் பாரம்பரியத்தைப் பற்றி விவாதிப்பார்கள்
- CO3: நாட்டுப்புற இசை மற்றும் தற்காப்பு கலைகளால் காட்டப்படும் தமிழ் பாரம்பரியத்தை விளக்குவார்கள்
- CO4: தமிழில் ஐந்து திணைகளின் அம்சங்களைப் பற்றி விளக்குவார்கள்.
- CO5: சுதந்திரப் போராட்டத்திலும் இந்திய கலாச்சாரத்திலும் தமிழின் பங்களிப்பை விவரிப்பார்கள்.

Text Books:

- T1: தமிழக வரலாறு - மக்களும் பண்பாடும் - கே. கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்.)
- T2: கணினித் தமிழ் - முனைவர் இல.சுந்தரம் (விகடன் பிரசுரம்)

References

- R1: Dr.K.K.Pillay “Social Life of Tamils A joint publication of TNTB & ESC and RMRL – (in print)
- R2: Social Life of the Tamils - The Classical Period (Published by: International Institute of Tamil Studies)
- R3: Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).ISBN 9788185329567.
- R4: The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
- R5: 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)
- R6: Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author) ISBN 8170260548.
- R7: Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
- R8: Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL)

Web links and Video Lectures (e-Resources):

3. https://onlinecourses.nptel.ac.in/noc24_cs36/preview - Unit IV
1. <https://digimat.in/nptel/courses/video/113106106/L01.html> - Unit I

CO-PO & PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-
2	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-
3	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-
4	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-
5	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-
AVG	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-

‘1’ – Low , ‘2’ – Medium , ‘3’- High, ‘-’ – No correlations

TECHNICAL COMMUNICATION -I

(Common to all branches)

Course Code	24EN101	Course Type	Theory
Teaching Periods/Week (L: T:P)	3:0:0	Credits	3
Total Teaching Periods	45	IAT + ESE Marks	40 + 60
Teaching Department	English		

Course Objectives:

1. To facilitate students to develop their comprehension skills.
2. To equip the students to improve their receptive skills.
3. To equip learners with better vocabulary and enhance their writing skills.
4. To aid students to speak effectively in all kinds of communicative contexts.
5. To improve the learners' basic proficiency in workplace communication.

Unit: I DEVELOPING COMPREHENSION SKILLS 9

Listening: Introduction to Informational listening **Reading:** Short Narratives and Skimming Passages. **Speaking** Introducing Oneself, Narrating a Story / Incident. **Writing:** Sequential Writing (Jumbled Sentences), Process/Product Description **Grammar:** Parts of Speech -Verbs – Main & Auxiliary-Pronouns **Vocabulary:** Misleading words- Spell check - Homonyms & homophones.

Teaching-Learning Process **Pedagogy:** Lecture Method, PPT
RBT Level: L1, L2, L3

Unit: II LISTENING AND EXTENDED READING 9

Listening: Listening for Comprehension-Gap Filling **Reading:** News reading-Scanning Passages – Reading Longer Texts- Cloze Reading **Speaking:** Importance of speaking skill - Short Conversation-Public Speaking Do's & Don'ts **Writing:** Note Making, Note Taking - Paragraph Writing - Types of Paragraph - Compare and Contrast **Grammar:** Tenses – Form, Function and Meaning - Basic Sentence structure-Articles **Vocabulary:** One-Word Substitutes, Phrasal Verbs – Cause and Effect expressions

Teaching-Learning Process **Pedagogy:** Lecture Method, PPT
RBT Level: L1, L2, L3

Unit: III INTRODUCTION TO FORMAL WRITING 9

Listening: Listening to Lectures and Taking Notes **Reading:** Reading on Visual Content **Speaking:** One-Minute Talk **Writing:** Informal Letter Writing , Email Writing, Data Interpretation-Pie chart, Bar chart **Grammar:** Tenses, Active Voice, Passive Voice, Impersonal-Preposition **Vocabulary:** Guessing the meaning from context, Cloze Exercise - Word power.

Teaching-Learning Process **Pedagogy:** Lecture Method, PPT
RBT Level: L1, L2, L3

Unit: IV ENHANCING SPEAKING ABILITY 9

Listening: Listening to Speeches **Reading:** Speed Reading **Speaking:** Just a Minute **Writing:** Instructions, Formal letter writing, Data Interpretation-Flow chart, Table **Grammar:** 'Wh' Questions / Yes or No Questions, Question Tag, Imperatives **Vocabulary:** Synonyms, Antonyms, Different forms of same words.

Teaching-Learning Process **Pedagogy:** Lecture Method, PPT
RBT Level: L1, L2, L3

Unit: V EXTENSIVE LANGUAGES FOR WORKPLACE**9**

Listening: Extensive Listening -Audio scripts – Listening to Conversation **Reading:** Extensive reading (Jigsaw Reading, Short Stories, Novels) - Introduction to Technical Article **Speaking:** Short Presentations on Technical Topics -Tips for Doing Presentation **Writing:** Recommendations, Essay Writing **Grammar:** Collocation, Concord -Compound words **Vocabulary:** Informal Vocabulary and Formal Substitutes

Teaching-Learning Process **Pedagogy:** Lecture Method, PPT

RBT Level: L1, L2, L3

Total**45****Pedagogical Methods:**

Unit 1: Speaking task
Unit 2: Reading task
Unit 3: Speaking task
Unit 4: Reading task
Unit 5: Speaking task

Course Outcomes:

After successful completion of this course, the students will be able to

CO1: Apply comprehension skills and interpret different contents.
CO2: Read and comprehend various texts and audiovisual contents
CO3: Infer data from graphs and charts and communicate it in varied contexts.
CO4: Participate in diverse speaking situations.
CO5: Present, discuss and coordinate with peers in workplace using language skills.

Text Books:

T1: Anna University English Department, “English for Engineers and Technologists”, Orient Black Swan, ISBN-978-93-5442-067-2, Edition 2022 –Vol-I.
T2: Ashraf Rizvi. M, “Effective Technical Communication”, McGraw Hill Education, Second edition (2017)- ISBN-9352605780, 978-9352605781 2 nd Edition.
T3: Sylvan Barnet, Hugo Bedau, and John O’Hara, “Critical Thinking Reading and Writing”, Bedford/St. Martin’s: 11th Edition, ISBN-13 : 978-1319332051 (16 December 2022)

References

R1: Addison Wesley Longman, “Technical English”, Pearson, ISBN:978-1292042862, 8 th Edition 2013.
R2: Norman Lewis, “Word Power Made Easy”, Goyal Saab; Latest edition (1 January 2020), ebook ISBN-978-0-307-81749-5
R3: Pinnacle , “SSC 60 Days English Vocabulary book” 3rd edition, English and Hindi, 20,000+ words, , ISBN-715791456, 3rd Edition - 19 September 2023

Web links and Video Lectures (e-Resources):

1. <https://leverageedu.com/blog/internship-request-letter/> - Unit - IV
2. <https://www.englishgrammar.org/> - All Units Grammar
3. <https://www.indeed.com/career-advice/career-development/letter-of-introduction> - Unit III

CO-PO & PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	-	-	-	-	-	-	1	3	-	2	1	1	1
2	-	-	-	-	-	-	-	-	1	3	-	2	1	1	1
3	-	-	-	-	-	-	-	-	1	3	-	2	1	1	1
4	-	-	-	-	-	-	-	-	1	3	-	3	1	1	1
5	-	-	-	-	-	-	-	-	1	3	-	3	1	1	1
AVG	-	-	-	-	-	-	-	-	1	3	-	2.4	1	1	1

'1' – Low, '2' – Medium, '3' - High, '-' – No correlations

MATRICES AND CALCULUS

(Common to All Branches)

Course Code	24MA101	Course Type	Theory
Teaching Periods/Week (L: T:P)	3:1:0	Credits	4
Total Teaching Periods	60	IAT + ESE Marks	40 + 60
Teaching Department	Mathematics		

Course Objectives:

1. To impart knowledge on the concepts of matrix algebra techniques needed for practical applications.
2. To familiarize the students with differential calculus.
3. To familiarize students with single integrals and multiple integrals.
4. To illustrate the simple applications of vector calculus.
5. To make the students to understand the concept of analytic function.
6. To introduce the basic concepts of complex integration.

Unit: I MATRICES

12

Eigenvalues and Eigenvectors of a real matrix – Properties of Eigenvalues and Eigenvectors – Statement and applications of Cayley-Hamilton Theorem – Diagonalization of matrices by orthogonal transformation – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

Teaching-Learning Process Pedagogy: Lecture, NPTEL Videos
RBT Level: L1 - L3

Unit: II DIFFERENTIAL CALCULUS

12

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules (sum, product, quotient, chain rules) - Implicit differentiation - Logarithmic differentiation - Applications: Maxima and Minima of functions of one variable.

Teaching-Learning Process Pedagogy: Lecture, NPTEL Videos
RBT Level: L1 - L3

Unit: III INTEGRAL CALCULUS & MULTIPLE INTEGRAL

12

Definite and Indefinite integrals - Substitution rule - Techniques of Integration: Integration by parts - Double integrals - Double integral in polar coordinates - Area-enclosed by plane curves – Triple integrals – Volume of solids.

Teaching-Learning Process Pedagogy: Lecture, PPT
RBT Level: L1 - L3

Unit: IV VECTOR CALCULUS

12

Gradient and directional derivative – Divergence and curl - Vector identities – Irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface integral - Area of a curved surface - Volume integral - Green's, Gauss divergence and Stoke's theorems.

Teaching-Learning Process Pedagogy: Lecture, NPTEL Videos
RBT Level: L1 - L3

Unit: V ANALYTIC FUNCTIONS AND COMPLEX INTEGRATION**12**

Analytic functions –Necessary and sufficient conditions for analyticity -Construction of analytic function -Conformal mapping – Mapping by functions $w=z+c$, cz , $1/z$ -Bilinear Transformation, Line integral - Cauchy's integral theorem – Cauchy's integral formula – Taylor's and Laurent's series

Teaching-Learning Process Pedagogy: Lecture, PPT**RBT Level:** L1 - L3**Total****60****Pedagogical Methods:**

- | |
|---|
| Unit 1: To Explore the applications of matrices in real-world scenarios. |
| Unit 2: Use differential equations to model the rate of change of pollutant concentration over time and space. |
| Unit 3: Apply integral calculus to optimize production levels, pricing strategies, and economic decision- making. |
| Unit 4: Apply concepts of gradient, divergence, and curl in various coordinate systems to analyze vector fields. |
| Unit 5: Use Python to visualize complex functions in the complex plane., Example: $w= 1/z^2$ |

Course Outcomes:

After successful completion of this course, the students will be able to

- | |
|--|
| CO1: Use the matrix algebra methods to diagonalize a given matrix and identify the special properties of matrices. |
| CO2: Demonstrate different differentiation techniques and find maxima and minima of a given function. |
| CO3: Find area enclosed by plane curves and volume of solids using integration techniques. |
| CO4: Apply the concepts of gradient, curl and divergence across various disciplines. |
| CO5: Utilize the concepts of analytic functions and construct analytic functions. |
| CO6: Apply the basic concepts of complex integration to solve complex integrals. Expand a given function into Taylor's Series and Laurent's Series |

Text Books:

- | |
|---|
| T1: Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.ISBN : 9788126567880 |
| T2: B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 45th Edition, 2016.ISBN : 9789382332300 |

References

- | |
|--|
| R1: M. K. Venkataraman, "Engineering Mathematics", Volume I, 4th Edition, The National Publication Company, Chennai, 2003. ISBN : 9788183311261 |
| R2: Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7th Edition, 2015. ISBN : 9789385509183 |
| R3: S.S. Sastry, "Engineering Mathematics", Vol. I & II, PHI Learning Private Limited, 4th Edition, New Delhi, 2014 ISBN : 9788120350039 |
| R4: Wylie, R.C. and Barrett, L.C., "Advanced Engineering Mathematics "Tata McGraw Hill Education Pvt. Ltd, 6th Edition, New Delhi, 2012.ISBN : 9781259064917 |

Web links and Video Lectures (e-Resources):

1. <https://archive.nptel.ac.in/courses/111/108/111108157/> - Unit I
2. <https://archive.nptel.ac.in/courses/111/106/111106146/> - Unit II
3. <https://archive.nptel.ac.in/courses/111/105/111105122/> - Unit III
4. <https://archive.nptel.ac.in/courses/111/105/111105122/> - Unit IV
5. <https://archive.nptel.ac.in/courses/111/103/111103070/> - Unit V

CO-PO & PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	-	-	-	-	-	-	-	-	1	1	1	-
2	3	2	2	-	-	-	-	-	-	-	-	1	1	1	-
3	3	2	2	-	-	-	-	-	-	-	-	1	1	1	-
4	3	2	2	-	-	-	-	-	-	-	-	1	1	1	-
5	3	2	2	-	-	-	-	-	-	-	-	1	1	1	-
AVG	3	2	2	-	-	-	-	-	-	-	-	1	1	1	-

'1' – Low, '2' – Medium, '3' - High, '-' – No correlations

PROGRAMMING IN C

(Common to CSE / IT / AIDS / CSBS / CSCS / AIML / EEE / ECE)

Course Code	24CS111	Course Type	Integrated
Teaching Periods/Week (L:T:P)	2:0:4	Credits	4
Total Teaching Periods	90	IAT + ESE Marks	50 + 50
Teaching Department	Computer Science and Engineering		

Course Objectives: To equip the students with the knowledge in

1. C programs using fundamental programming structures.
2. C programs utilizing arrays and strings.
3. Applications of C using functions and pointers.
4. Advanced features of the C programming language, including structures and unions.
5. File operations in C

Unit: I INTRODUCTION AND BASICS OF C PROGRAMMING 6

Introduction - Structured programming - Problem solving techniques: Algorithms, Flowcharts, Pseudo code - Structure of a C program - Compiling and executing a C program - Data types and Variables – operators and expressions – Input and output functions -Control Structures: decision making and looping statements

Teaching-Learning Process Pedagogy: Chalk and Talk
RBT Level: L1, L2, L3, L4

Unit: II ARRAYS AND STRINGS 6

Arrays: One dimensional array: declaration, initialization and operations - Two & Multi-dimensional arrays. Strings: Strings vs Character arrays - String operations – String Functions – Arrays of Strings

Teaching-Learning Process Pedagogy: Chalk and Talk, PPT
RBT Level: L1, L2, L3, L4

Unit: III FUNCTIONS AND POINTERS 6

Need for Modular programming - Functions: declaration and definition – Function call - Call by value - Call by reference - Recursive functions - Pointers: Introduction - Pointers to primitive data types – Arrays and pointers - Array of pointers - Storage classes - Dynamic Memory Allocation

Teaching-Learning Process Pedagogy: Chalk and Talk, PPT
RBT Level: L1, L2, L3, L4

Unit: IV STRUCTURES AND UNIONS 6

Structures: Need, declaration, Accessing Structure elements – Nested structures - Arrays of structures – Self-referential structures – Pointers to structures - Unions: declaration and accessing

Teaching-Learning Process Pedagogy: Chalk and Talk, PPT
RBT Level: L1, L2, L3, L4

Files: Introduction, Types of file processing – Sequential and Random Access - Read /Write of binary and text files. - Preprocessor directives – Command line arguments

Teaching-Learning Process Pedagogy: Chalk and Talk, PPT

RBT Level: L1, L2, L3, L4

Total

30

Pedagogical Methods:

- Unit 1: To draw a flowchart and a write algorithm for the following problems
i) sum of two numbers ii) largest among three numbers
- Unit 2: Perform basic operations on arrays
i) Find the largest element in the array ii) Calculate the sum of all elements in the matrix
- Unit 3: Program for swapping two integers using call by value and call by reference
- Unit 4: Create a student information system,
i) Declare a structure Student with members: name, age and Roll number.
ii) To calculate the GPA and CGPA from the student's marks
- Unit 5: Programs for file operations

Practical Exercises:**60**

1. Programs for demonstrating the use of different types of operators like arithmetic, logical, relational, and ternary operators (Sequential structures)
 - a) To find the area of a triangle
 - b) To Convert temperatures from Celsius to Fahrenheit or vice versa using the appropriate formula
2. Write a C program to demonstrate the use of “scanf” and “printf” statements to “read” and “print” values of variables of different data types.
3. Programs using decision making statements like ‘if’, ‘else if’, ‘switch’, conditional and unconditional ‘goto’ (Selective structures)
 - a) To find the Largest among three numbers
 - b) To print day of the week by giving a integer using switch Statement
 - c) To find Roman number of a given number
4. Programs for demonstrating repetitive control statements like ‘for’, ‘while’, and ‘do-while’ (Iterative structures):
 - a) Check whether the given number is Armstrong or not.
 - b) To find the Sum of squares of first n numbers.
 - c) To Check the given number is prime or not.
 - d) To print the Multiplication table
 - e) To convert the Octal number to decimal number.
5. Implement the following programs in C using one-dimensional array
 - a) To Calculate the sum and average of elements
 - b) To Find the min and max values of the given set of numbers
 - c) To Reverse the elements
 - d) To arrange the given set of number by using Bubble sort
 - e) To find the given number from the list of elements by using Linear Search.
6. Write a C program using two-dimensional arrays for a) Matric Addition b) Matrix Multiplication

7. Programs to demonstrate modular programming concepts using user-defined functions
 - a) Swapping two integers using call by value and call by reference
 - b) Create a recursive function to calculate the factorial of a number and for binary search
8. Implement various character and string operations with and without using built-in functions in C.
 - a) Find length of a string
 - b) String Concatenation
 - c) To Check whether the given string is Palindrome or not
9. Write a C program using pointers for the following:
 - a) Swapping two numbers
 - b) Greatest and the smallest among three numbers
 - c) Reverse of a string
 - d) Linear searching in array
10. Programs to illustrate the use of user-defined data types using Structures:
 - a) Employee Payroll
 - b) Student information system
11. Write a C program to implement various file operations listed below:
 - a) Copy the contents from one file to another file
 - b) Merging two files
12. Programs to demonstrate the use of pre-processor directives and command line arguments for the following:
 - a) Finding area of circle and area of a square using #define
 - b) Simple arithmetic operations using #include
 - c) Program that accepts two file names as command-line arguments and copy the contents from one file to another file.

System requirement

Sl. No.	Description of Equipment	Required numbers for batch of 30 students
1.	INTEL based desktop PC with min. 4GB RAM and 500 GB HDD, 17" or higher TFT Monitor, Keyboard and mouse	30
2.	Windows 8 or higher operating system / Linux Ubuntu 20 or higher	30
3.	Systems with Linux Operating System with GNU Compiler / Windows with Turbo C compiler	30

Course Outcomes:

After successful completion of this course, the students will be able to

- CO1: Develop simple applications in C using basic constructs
- CO2: Design and implement applications using arrays and strings
- CO3: Create applications in C using functions and pointers
- CO4: Utilize advanced features of the C programming with structures and unions
- CO5: Develop applications using file operations in C

Text Books:

- T1: E. Balaguruswamy, “Programming in ANSI in C”, Tata McGraw Hill, Eight Edition, 2019
 T2: Reema Thareja, “Programming in C”, Oxford University Press, Second Edition, 2016
 T3: Pradip Dey, Manas Ghosh, “Programming in C”, First Edition, Oxford University Press, 2018

References

- R1: R G Dromey, “How to Solve it using Computer”, Pearson,2006
 R2: Kernighan, B.W and Ritchie, D.M, “The C Programming language”, Second Edition Pearson Education,2015
 R3: Yashavant P. Kanetkar. “Let Us C”, BPB Publications, 2011
 R4: Byron S Gottfried, “Programming with C”, Schaum’s Outlines, Third Edition, Tata McGraw Hill, 2010

Web links and Video Lectures (e-Resources):

1. <https://www.udemy.com/course/c-programming-for-beginners/> - All Units
2. https://en.wikibooks.org/wiki/C_Programming - Unit 1, 2 & 3
3. <https://www.coursera.org/specializations/c-programming> - Unit 2 & 3
4. https://onlinecourses.nptel.ac.in/noc22_cs40/preview - All units

CO-PO & PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2	2	-	-	-	-	-	-	3	2	1	1
2	3	2	2	2	2	-	-	-	-	-	-	3	2	1	1
3	3	2	2	2	2	-	-	-	-	-	-	3	2	1	1
4	3	2	2	2	2	-	-	-	-	-	-	3	2	1	1
5	3	2	2	2	2	-	-	-	-	-	-	3	2	1	1
AVG	3	2	2	2	2	-	-	-	-	-	-	3	2	1	1

‘1’ – Low, ‘2’ – Medium, ‘3’- High, ‘-’ – No correlations

COMPUTATIONAL THINKING

(Common to CSE / IT / AIDS / CSBS / CSCS / AIML / EEE / ECE)

Course Code	24CS112	Course Type	Integrated
Teaching Periods/Week (L: T:P)	1:0:2	Credits	2
Total Teaching Periods	45	IAT + ESE Marks	50 + 50
Teaching Department	Computer Science and Engineering		

Course Objectives: To Equip the students with the Knowledge in

1. Problems in a way that enables a computer to solve them.
2. Organising and analysing data using logical approaches.
3. Developing solutions through algorithmic thinking.
4. Identifying, analysing, and implementing possible solutions to achieve the most efficient and effective combination of steps and resources.
5. Generalising and transferring the problem-solving process to a wide variety of problems.

Unit: I INTRODUCTION TO COMPUTATIONAL THINKING 1+4

Understanding the concepts: Decomposition, pattern recognition/data representation, generalization, abstraction, and algorithms, Representation, automation, Analysis, visualization. Logical thinking - reasoning

Teaching-Learning Process Pedagogy: Chalk and Talk

RBT Level: L1, L2, L3, L4

Unit: II UNDERSTANDING DATA 2+6

Performing analytics on numeric data using any spreadsheet software and representing the data using charts, histograms, scatter plots, graphs etc. Understanding patterns in data sequences, puzzles, and nonograms. Data Encryption – ciphering sentences and Compression.

Teaching-Learning Process Pedagogy: Chalk and Talk, PPT

RBT Level: L1, L2, L3, L4

Unit: III DECOMPOSITION AND PATTERN RECOGNITION 3+8

The divide and Conquer, pattern recognition, Algorithmic thinking - creating oral algorithms for everyday tasks – visualizing algorithms through sequence of steps, pseudocode, flow charts, selection, iteration, functions, procedures and parameters.

Teaching-Learning Process Pedagogy: Chalk and Talk, PPT

RBT Level: L1, L2, L3, L4

Unit: IV ABSTRACTIONS AND SCRATCH 3+6

Understanding Abstraction Object Description, Abstraction and Modeling, Objects and Objects based modeling -Repair, Reuse, Recycle, Scratch / equivalent - Motion, events, control

Teaching-Learning Process Pedagogy: Chalk and Talk, PPT

RBT Level: L1, L2, L3, L4

Unit: V FILES AND PREPROCESSOR UNDERSTANDING COMPLEXITY 6+6

Understanding complexity, sorting algorithms, search algorithms, AI and Turing Test, FSA (Finite State Automata), Debugging, Enhancing the clarity of a program - documentation, style, idioms, Automation and Simulation, generalizing a solution.

Teaching-Learning Process Pedagogy: Chalk and Talk, PPT

RBT Level: L1, L2, L3, L4

Total 45

Pedagogical Methods:

Unit 1:	Explore algorithm design by creating oral algorithms.
Unit 2:	Decompose a complex problem into discrete steps and Design a simple algorithm for solving the problem
Unit 3:	Programming implementation
Unit 4:	Develop algorithms for sorting and determine the complexity of the algorithm and how it scales as the number of items to sort increases
Unit 5:	External Learning: Study the best practices of documentation, style, idioms, etc that are used to ensure the code can be understood and maintained over a long period.

Practical Exercises:

MODULE I:	Algorithmic thinking - creating oral algorithms for everyday tasks - Data abstraction and representation - Abstraction and translation of everyday data for use on a computer.
MODULE II:	Decomposing a complex problem - Strategies for decomposition and algorithm design - Divide and conquer - Simple program implementations.
MODULE III:	Overall data representation, abstraction, analysis and algorithm design. Program implementations.
MODULE IV:	Measuring the complexity of an algorithm - sorting algorithms - the notion of unsolvable problems. Programming illustrations.
MODULE V:	Enhancing the clarity of a program - documentation, style, idioms.

System requirement

Sl. No.	Description of Equipment	Required numbers for batch of 30 students
1.	INTEL based desktop PC with min. 4GB RAM and 500 GB HDD, 17" or higher TFT Monitor, Keyboard and mouse	30
2.	Windows 8 or higher operating system / Linux Ubuntu 20 or higher	30

Course Outcomes:

After successful completion of this course, the students will be able to

CO1:	Formulate problems for effective computer-based solutions.
CO2:	Systematically organize and analyse data.
CO3:	Develop solutions using algorithmic approaches.
CO4:	Identify, evaluate, and implement optimal solutions by efficiently utilizing steps and resources.
CO5:	Apply and adapt the problem-solving process across diverse scenarios.

Text Books:

- T1: Karl Beecher, Computational Thinking - A Beginner's Guide to Problem-Solving and Programming, BCS Learning, 2017.
- T2: Venkatesh G, Madhavan Mukund, Computational Thinking, Notion Press, 1st Edition, 2021.
- T3: Hunt, Kenny A. _ Riley, David D, Computational Thinking for the Modern Problem Solver, CRC Press, 2015

References

- R1: David Clark, Computational and Algorithmic Thinking Book 2, AMT Publishing, 2016.
- R2: Paul Curzon, “Computing Without Computers: A Gentle Introduction to Computer Programming, Data Structures, and Algorithms”, 2014.
<https://teachinglondoncomputing.files.wordpress.com/2014/02/booklet-cwc-feb2014.pdf>
- R3: Wang Paul S, From computing to computational thinking, CRC Press, 2016.
- R4: Peter J. Denning, Matti Tedre, Computational Thinking, MIT Press, 2019.
- R5: Paolo Ferragina, Fabrizio Luccio, Computational Thinking_ First Algorithms, Then Code, Springer International Publishing, 2018.
- R6: Aman Yadav, Ulf Berthelsen, Computational Thinking in Education_ A Pedagogical Perspective, Routledge, 2021.
- R7: Zhiwei Xu, Jialin Zhang, Computational Thinking_ A Perspective on Computer Science, Springer, 2021
- R8: Exploring Computational Thinking.<https://edu.google.com/resources/programs/exploring-computational-thinking/>.

Web links and Video Lectures (e-Resources):

1. <https://teachinglondoncomputing.org> – Unit 1_
2. <https://classic.csunplugged.org> Unit 3 & Unit 5
3. http://Study.iitm.ac.in/D's/course_pages/bcs1001.html - Unit 3
4. <http://Learning.com/blog/defining-computationalthinking> - Unit 1
5. <https://centre-for-humanities-computing.github.io> – Unit 1
6. <http://Nptel.ac.in/course/115106121> - All units

CO-PO & PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	1	1	-	-	-	-	-	1	3	2	1
CO2	3	3	3	2	1	1	-	-	-	-	-	1	3	2	1
CO3	3	3	3	2	1	1	-	-	-	-	-	1	3	2	1
CO4	3	3	3	2	1	1	-	-	-	-	-	1	3	2	1
CO5	3	3	3	2	1	1	-	-	-	-	-	1	3	2	1
AVG	3	3	3	2	1	1	-	-	-	-	-	1	3	2	1

‘1’ – Low, ‘2’ – Medium, ‘3’- High, ‘-’ – No correlations

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to CSE / IT / CSBS / AIDS / AIML / CSCS)

Course Code:	24EE111	Course Type:	Integrated
Teaching Periods/Week (L: T:P):	3:0:2	Credits:	4
Total Teaching Periods:	75	IAT + ESE Marks:	50 + 50
Teaching Department:	Electrical and Electronics Engineering		

Course Objectives:

1. To introduce the basics of electric circuits and its analysis
2. To impart knowledge in the working principles and application of electrical machines
3. To familiarize various types of semiconductor devices and its characteristics
4. To introduce the functional blocks of instruments and working principle of sensors
5. To introduce the working of Biomedical Instruments

UNIT I ELECTRICAL CIRCUITS 9

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 –Measurement of power by two wattmeter method

Teaching-Learning Process Pedagogy: Lectures, PPT, NPTEL
RBT Level: L1, L2, L3, L4

UNIT II ELECTRICAL MACHINES 9

Construction, Working principle and characteristics - DC Separately and Self Excited Generators, EMF equation, Types and Applications. Working Principle of DC motors, Torque Equation, Types and Applications. Construction, working principle and Applications of Transformer, Three phase Alternator, Synchronous motor and Three Phase Induction Motor.

Teaching-Learning Process Pedagogy: Lectures, PPT, NPTEL
RBT Level: L1, L2, L3, L4

UNIT III BASICS OF ELECTRONICS 9

Semiconductor materials – Types- Intrinsic and Extrinsic Semiconductor - P-N Junction Diode - Zener Diode – BJT - MOSFET - Principle of operation and VI Characteristics - Display devices – LED - Solar Cell

Teaching-Learning Process Pedagogy: Lectures, PPT, NPTEL
RBT Level: L1, L2, L3, L4

UNIT IV SENSORS AND TRANSDUCERS 9

Functional elements of an instrument – Standards and Calibration - Measurement of Pressure – Torque – Displacement – Velocity – Vibration – Acceleration – Temperature – Flow -- Measurement of Liquid Level – Humidity - Sound.

Teaching-Learning Process Pedagogy: Lectures & PPT
RBT Level: L1, L2, L3, L4

UNIT V BIOMEDICAL INSTRUMENTATION**9**

Cardio Vascular system – Pressure pulses in Cardiac Chamber – ECG – Interpretation of ECG - EEG – EMG – Blood Pressure Measurement – Pathological test – CT scan – MRI Scan.

Teaching-Learning Process Pedagogy: Lectures, PPT, NPTEL

RBT Level: L1, L2, L3, L4

Total**45****Pedagogical Methods:**

Unit 1: Tutorials on Kirchhoff's Law
Unit 2: Recent development in dc machines
Unit 3: Measure the resistance, inductance, and capacitance using a multi-meter.
Unit 4: Review on electronic sensors
Unit 5: Review on interpretation of ECG

Practical Exercises:**30**

- 1) Verification Kirchhoff's Law.
- 2) Study of RL, RC and RLC circuits.
- 3) Measurements of nonelectrical Parameters-Pressure, Displacement, Temperature and Flow.
- 4) Characteristics of PN junction Diode and Zener Diode
- 5) Characteristics of BJT.
- 6) Measurement of Power by two wattmeter method.
- 7) Series Resonant circuit.
- 8) Energy Audit.
- 9) Study of components and Equipment.
- 10) Study of biomedical instruments.

Equipment required

Sl. No.	Description of Equipment	Required numbers (for batch of 30 students)
1	Regulated Power Supply: 0 – 15 V D.C	10 nos
2	Function Generator (1 MHz)	10 nos
3	Oscilloscope (20 MHz)	10 nos
4	Digital Storage Oscilloscope (20 MHz)	1 no
5	AC/DC - Voltmeters	10 nos.
6	Ammeters	10 nos.
7	Multi-meters	5 nos.
8	UPF Watt meters	5 nos.
9	Decade Resistance Box, Decade Inductance Box, Decade Capacitance Box	6 nos each
10	Circuit Connection Boards	10 nos.
11	Pressure, Displacement, Temperature and Flow measurement kit	2 nos each
12	Necessary quantities of PN Junction diode, Zener diode and BJT	Adequate quantity
13	Necessary Quantities of connecting wires, Resistors, Inductors, Capacitors of various capacities.	Adequate quantity
14	Necessary quantities of biomedical sensors	Adequate quantity

Course Outcomes:

After successful completion of this course, the students will be able to

- CO1: Compute the electrical parameters of simple electric circuits with AC and DC Supply
- CO2: Explain the working principle of DC and AC Machines
- CO3: Describe the working and characteristics of semiconductor devices
- CO4: Discuss the working principle of various sensors and transducers
- CO5: Summarise the instruments used for measuring biomedical parameters

Text Books:

- T1: Kothari DP and I.J Nagrath, “Basic Electrical and Electronics Engineering”, Second Edition, McGraw Hill Education, 2020
- T2: S.K. Bhattacharya “Basic Electrical and Electronics Engineering”, Pearson Education, Second Edition, 2017.
- T3: Sedha R.S., “A text book of Applied Electronics”, S. Chand & Co., 2008
- T4: James A. Svoboda, Richard C. Dorf, “Dorf’s Introduction to Electric Circuits”, Wiley, 2018.
- T5: A.K. Sawhney, Puneet Sawhney ‘A Course in Electrical & Electronic Measurements & Instrumentation’, Dhanpat Rai and Co, 2015.

References

- R1: Kothari DP and I.J Nagrath, “Basic Electrical Engineering”, Fourth Edition, McGraw Hill Education, 2019.
- R2: Thomas L. Floyd, ‘Digital Fundamentals’, 11th Edition, Pearson Education, 2017.
- R3: Albert Malvino, David Bates, ‘Electronic Principles, McGraw Hill Education; 7th edition, 2017.
- R4: Mahmood Nahvi and Joseph A. Edminister, “Electric Circuits”, Schaum’ Outline Series, McGraw Hill, 2002.
- R5: H.S. Kalsi, ‘Electronic Instrumentation’, Tata McGraw-Hill, New Delhi, 2010.

Web links and Video Lectures (e-Resources):

1. <https://archive.nptel.ac.in/courses/108/102/108102185/>- Unit 1
2. https://onlinecourses.nptel.ac.in/noc20_ee60/preview -Unit 2
3. <https://archive.nptel.ac.in/courses/108/105/108105188/> -Unit 3
4. <https://archive.nptel.ac.in/courses/108/105/108105153/> - Unit 4
5. https://www.youtube.com/watch?v=iK6q4nnmtA&list=PLVsrfTSlZ_42OoOyhzWoDgZrL9iineZxQ&index=1 – Unit 5
6. https://www.youtube.com/watch?v=1K4ASqq0Rhk&list=PLVsrfTSlZ_42OoOyhzWoDgZrL9iineZxQ&index=4 – Unit 5

CO-PO & PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	2	1	-	-	-	-	-	-	1	2	1	-
2	3	2	1	-	1	-	-	-	-	-	-	1	2	1	-
3	3	2	1	2	1	-	-	-	-	-	-	1	2	1	-
4	3	2	1	2	1	-	-	-	-	-	-	1	2	1	1
5	3	2	1	-	1	-	-	1	-	-	-	1	2	1	1
AVG	3	2	1	2	1	-	-	1	-	-	-	1	2	1	1

‘1’ – Low , ‘2’ – Medium , ‘3’- High, ‘-’ – No correlations

BASIC CIVIL AND MECHANICAL ENGINEERING

(Common to CSE, IT, AIDS, CSBS, AIML, CSE-CYS, ECE, ACT, VLSI and EEE)

Course Code	24GE101	Course Type	Theory
Teaching Periods/Week (L: T:P)	3:0:0	Credits	3
Total Teaching Periods	45	IAT + ESE Marks	40+60
Teaching Department	Civil Engineering and Mechanical Engineering		

Course Objectives: To Equip the students with the knowledge in

1. Types of civil structures, civil engineering materials, and civil construction.
2. Different types of building plans, foundations, and infrastructures.
3. Parts of IC engines, pumps, and their working principles.
4. Components of the power plant and a detailed explanation of their working principles.
5. Parts of the Refrigeration & Air-conditioning system and their working principles and applications.
6. Additive manufacturing processes and their applications.

Unit: I INTRODUCTION OF CIVIL ENGINEERING AND CONSTRUCTION MATERIALS

9

Civil Engineering – Specialized sub-disciplines in Civil Engineering – Structural, Construction, Geotechnical, Environmental, Transportation, and Water Resources Engineering Types of buildings: Residential buildings, Industrial buildings.

Civil Engineering Materials: Bricks – Stones – Sand – Cement – Concrete – Steel – Timber – Modern Materials, Thermal and Acoustic Insulating Materials, Decorative Panels, Water Proofing Materials. Modern uses of Gypsum, Pre-fabricated Building components (brief discussion only)

Teaching-Learning Process Pedagogy: Lecture, PPT

RBT Level: L1, L2, L3

Unit: II BUILDING COMPONENTS AND INFRASTRUCTURE

9

Building plans – Setting out of a Building – Foundations: Types of foundations – Brick masonry – Stone Masonry – Beams – Columns – Lintels – Roofing – Flooring – Plastering. Types of Bridges and Dams – Water Supply Network – Introduction to Highways and Railways – Introduction to Green Buildings - Stress prediction by AIML.

Teaching-Learning Process Pedagogy: Lecture, PPT

RBT Level: L1, L2, L3

Unit: III INTERNAL COMBUSTION ENGINES

9

Internal combustion engines as an automobile power plant – Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two-stroke engines - Concept of hybrid engines - Electric Vehicles – Components, Accessories, and working of electric vehicles.

Teaching-Learning Process Pedagogy: Lecture, PPT, Youtube Videos

RBT Level: L1, L2, L3

Unit: IV POWER PLANTS, REFRIGERATION AND AIR CONDITIONING SYSTEM 9

Classification of Power Plants- Working principle of steam, Gas, Diesel, Hydroelectric, and Nuclear Power plants- Internal combustion engines as automobile power plants. Principle of vapour compression and absorption system – Layout of typical domestic refrigerator–Window and Split type room Air conditioner.

Teaching-Learning Process Pedagogy: Lecture, PPT, YouTube Videos

RBT Level: L1, L2, L3

Unit: V ADDITIVE MANUFACTURING 9

Additive Manufacturing Overview – VAT Photopolymerisation - Material Jetting - Binder Jetting - Material Extrusion - Powder Bed Fusion - Sheet Lamination - Directed Energy Deposition – Merits Demerits and its Applications.

Teaching-Learning Process Pedagogy: Lecture, PPT, YouTube Videos

RBT Level: L1, L2, L3

Total 45

Pedagogical Methods:

- | |
|---|
| Unit 1: Poster presentation - Civil Engineering Materials |
| Unit 2: Seminar – Types of Bridges and Dams |
| Unit 3: Seminar on Components of IC Engines |
| Unit 4: Role Play – Vapour Compression Refrigeration System |
| Unit 5: Model Making |

Course Outcomes:

After successful completion of this course, the students will be able to

- | |
|--|
| CO1: Explain the types of civil structures, civil engineering materials, civil construction. |
| CO2: Discuss about the different types of building plans, foundations, and infrastructures. |
| CO3: Explain the components of IC engines, pumps, and their working principles. |
| CO4: Describe the parts of the power plant and a detailed explanation of their working principles. |
| CO5: Summarize the parts and working principle of refrigeration & air-conditioning system |
| CO5: Discuss the additive manufacturing processes and their applications |

Text Books:

- | |
|--|
| T1: G Shanmugam, M S Palanichamy, Basic Civil and Mechanical Engineering, McGraw Hill Education; First edition, 2018. ISBN - 9789387572317 |
|--|

References

- | |
|---|
| R1: Ramamrutham S., “Basic Civil Engineering”, Dhanpat Rai Publishing Co.(P) Ltd, 2022. ISBN - 9788187433545 |
| R2: Basic Mechanical Engineering, Pearson Education, 2018, ISBN: 978-9386873293 |
| R3: Seetharaman S., “Basic Civil Engineering”, Anuradha Agencies, 2005. |
| R4: S.Shiva. Anuj K Shukla, “Additive Manufacturing Technologies” – Wiley Publications, 2024, ISBN - 9789357462419 |
| R5: Basic Civil Engineering by Sateesh Gopi, Pearson Education, 2023, 978-8131729885 |
| R6: Basic Mechanical Engineering, Basant Agrawal, and C.M. Agrawal, Wiley India pvt ltd, 2008 ISBN: 978-81-265-1878-4 |

Web links and Video Lectures (e-Resources):

1. <https://www.youtube.com/watch?v=m4m2AVqQtmk> – Unit 1
2. <https://www.youtube.com/watch?v=amxCBv2-5b4> – Unit 2
3. <https://www.youtube.com/watch?v=8dAbcbAJRw8> – Unit 3
4. <https://www.youtube.com/watch?v=IdPTuwKEfmA> – Unit 4
5. <https://archive.nptel.ac.in/courses/112/103/112103306/> - Unit 5

CO-PO & PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	-	-	-	-	-	-	-	-	-	-	-	1	-	-
2	2	-	-	-	-	-	-	-	-	-	-	-	1	-	-
3	2	-	-	-	-	-	1	-	-	-	-	-	1	1	-
4	2	-	-	-	-	-	1	-	-	-	-	-	1	1	-
5	2	-	-	-	-	-	1	-	-	-	-	-	1	1	-
6	2	-	-	-	-	-	-	-	-	-	-	-	1	-	-
AVG	2	-	-	-	-	-	1	-	-	-	-	-	1	1	-

“1” – Low, “2” – Medium, “3”- High, “-” – No correlations

ENGLISH FOR ENHANCING SELF COMPETENCE

(Common to all branches)

Course Code:	24EN121	Course Type:	Practical
Teaching Periods/Week (L:T:P):	0:0:2	Credits:	1
Total Teaching Periods:	30	IAT + ESE:	60 + 40
Teaching Department:	English		

Course Objectives:

1. To articulate and learn various social behaviors and etiquette.
2. To develop writing and speaking skills for professional requirements.
3. To acquire techniques of fundamental communication skills.

Unit: I PERSONALITY TRAITS 6

Self-Introduction, Ways to Identify Self (SWOT Analysis- Johari Window), Concepts of Self-Management and Self-Motivation, Self-Assessment.

Teaching-Learning Process Pedagogy: Lecture Method, PPT, YouTube videos

RBT Level: L1, L2, L3

Unit: II COMMUNICATION SKILLS 6

Effective Communication Skills, Interpersonal & Social Skills

Teaching-Learning Process Pedagogy: PPT, YouTube videos

RBT Level: L1, L2, L3

Unit: III SOCIAL BEHAVIOUR 6

Time Management, Personal Grooming, Making Small Talk, Inter-Cross-Cultural Communication, Professional Presentation Techniques.

Teaching-Learning Process Pedagogy: Lecture Method, PPT, YouTube videos

RBT Level: L1, L2, L3

Unit: IV CULTURAL ETIQUETTE 6

Formal Presentation, Sensitivity towards multi-cultural work spaces, Presentation skills –Formal Presentation - Just a minute

Teaching-Learning Process Pedagogy: PPT, YouTube videos

RBT Level: L1, L2, L3

Unit: V JOB-RELATED COMMUNICATION 6

Resume & Cover Letter, Formal E-mails, Framing Requests, Greetings, Salutations, Close, Interview-Types-Interview Questions-Techniques, Introduction to Interviews-FAQ's

Teaching-Learning Process Pedagogy: Lecture Method, PPT, YouTube videos

RBT Level: L1, L2, L3

Total 30

System requirement

Sl. No.	Description of Equipment	Required numbers for batch of 30 students
1.	INTEL based desktop PC with min. 4GB RAM and 500 GB HDD, 17" or higher TFT Monitor, Keyboard and mouse	30
2.	Windows 8 or higher operating system	30
3.	Hot Potatoes / Globalina	30

Course Outcomes:

After successful completion of this course, the students will be able to

CO1: To listen to and comprehend general as well as complex academic information

CO2: To speak fluently and accurately in formal and informal communicative contexts

CO3: To express their opinions effectively in both formal and informal discussions.

CO-PO & PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	-	-	-	-	-	-	2	3	-	2	1	1	1
2	-	-	-	-	-	-	-	-	2	3	-	3	1	1	1
3	-	-	-	-	-	-	-	-	2	3	-	2	1	1	1
AVG	-	-	-	-	-	-	-	-	2	3	-	2.3	1	1	1

'1' – Low, '2' – Medium, '3' - High, '-' – No correlation

IT ESSENTIAL SKILLS (Common to all branches)

Course Code	24IT121	Course Type	Practical
Teaching Periods/Week (L: T:P)	0:0:2	Credits	1
Total Teaching Periods	30	IAT + ESE Marks	60 + 40
Teaching Department	Information Technology		

Course Objectives: To equip students with the knowledge in:

1. PC components, diagnose and resolve common issues to maintain optimal performance.
2. PowerPoint and Word for crafting compelling presentations and professional documents with advanced formatting, multimedia integration, and design techniques.
3. Spreadsheets for the creation, management, and analysis of data across various tasks.
4. Use of ChatGPT for prompt engineering, creative writing, and language translation to enhance communication and content creation.
5. HTML and CSS to design and build well-structured, visually appealing, and interactive web pages.

Practical Exercises **30**

PC Hardware & Software Installation **6**

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot (VMWare) with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Task 5: Every student should install BOSS on the computer. The system should be configured as dual boot (VMWare) with both Windows and BOSS. Lab instructors should verify the installation and follow it up with a Viva

WORD **6**

Word Orientation: The mentor needs to give an overview of Microsoft (MS) office or equivalent (FOSS) tool word: Importance of MS office or equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in each, using word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 1: Using Word to create a project certificate. Features to be covered: - Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word.

Task 2: Creating project abstract Features to be covered: -Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 3: Creating a Newsletter: Features to be covered: - Table of Content, Newspaper columns, Images from files and clipart, drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXCEL

6

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2: Calculating GPA -. Features to be covered: - Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"

Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."

Ex: Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

POWER POINT

4

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc.), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS –Chat GPT

4

Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.

Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas.

Task 3: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output to see how accurate and fluent the translations are.

Ex: Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

HTML & CSS Orientation: The mentor needs to tell the importance of HTML tags as a design tool, give the details of the three tasks and features that would be covered in each. Using HTML – Formatting, List, Header, Table, insert image Using help and resources.

Task 1: Create a simple webpage with a title, header, paragraph, and footer for institution.

Task 2: Create a form with fields for name, email, password, and a submit button Include radio buttons, checkboxes, and a dropdown menu.

Task 3: Create and Apply an External CSS to an HTML Document for your profile.

System Requirement

Sl. No.	Description of Equipment	Required numbers (for batch of 30 students)
1.	INTEL based desktop PC with min. 4GB RAM and 500 GB HDD, 17” or higher TFT Monitor, Keyboard and mouse	30
2.	Office tools – Word processor, Spread sheet, Presentation tool	30
3.	AI TOOLS: Chat GPT	30
4.	Mozilla Firefox / Chrome / Microsoft Edge, Notepad ++	30

Course Outcomes:

After successful completion of this course, the students will be able to

CO1: Identify the components of a PC and troubleshoot PC malfunctions.
CO2: Develop essential skills in PowerPoint and Word to create engaging presentations and professional documents with advanced formatting, multimedia integration, and layout techniques.
CO3: Acquire the ability to create, manage, and analyze data using spreadsheets for various tasks.
CO4: Attain knowledge in using Chat GPT for prompt engineering, creative writing, and language translation, enhancing interaction and content generation capabilities.
CO5: Build foundational skills in HTML and CSS to create structured, styled, and interactive web pages

References

R1: Kate J. Chase , PC Hardware - A Handbook, , PHI (Microsoft)
R2: David Anfinson and Ken Quamme, IT Essentials PC Hardware and Software Companion Guide, CISCO Press, Pearson Education, 3rd edition
R3: Patrick Regan, IT Essentials PC Hardware and Software Labs and Study Guide, CISCO Press, Pearson Education, 3rd edition
R4: Vikas Gupta, Comdex Information Technology course tool kit, WILEY Dream tech, 2003
R5: Cheryl A Schmidt, The Complete Computer upgrade and repair book, WILEY Dream tech, 2013, 3rd edition
R6: Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, 2012, 2nd edition
R7: Prashant Joshi Introduction to IT Systems, Khanna Book Publishing Co.(P) Limited, New Delhi, 2021 First Edition

CO-PO & PSO Mapping:															
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2	2	-	-	-	-	-	-	-	2	-	-
2	3	2	2	2	2	-	-	-	-	-	-	-	2	-	-
3	3	2	2	2	2	-	-	-	-	-	-	-	2	-	-
4	3	2	2	2	2	-	-	-	-	-	-	-	2	-	-
5	3	2	2	2	2	-	-	-	-	-	-	-	2	-	-
AVG	3	2	2	2	2	-	-	-	-	-	-	-	2	-	-
‘1’ – Low, ‘2’ – Medium, ‘3’- High, ‘-‘ – No correlations															

ELECTRICAL AND ELECTRONICS WORKSHOP PRACTICE

(Common to all branches)

Course Code	24GE221	Course Type	Practical
Teaching Periods/Week (L:T:P)	0:0:2	Credits	1
Total Teaching Periods	30	IAT + ESE Marks	60 +40
Teaching Department	Electrical and Electronics Engineering		

Course Objectives:

1. To equip students with a comprehensive understanding of electronic equipment and practical soldering skills.
2. To develop students' proficiency in making electrical wiring connections using appropriate techniques and perform energy audit.
3. To provide students with practical exposure in installation and maintenance of household electrical appliances.

PRACTICAL

30

1. Study of components - R, L, C, Diode, Transistor and IC's.
2. Study of equipment's – RPS, Function Generator, CRO, Multimeter, Ammeter, Voltmeter, Wattmeter and Energy meter.
3. Measurement of voltage, current, frequency, time period for sine, square and triangular waves.
4. Soldering practice and breadboard practice.
5. Study of wires and cables.
6. Basic switchboard wiring with lamp, fan and three pin socket.
7. Fluorescent Lamp Wiring and Staircase Wiring.
8. Residential House wiring using Switches, Fuse, Indicator, Lamp and Energy meter.
9. Measurement of Energy and Earth Resistance.
10. Energy Audit.
11. Installation and Maintenance of Electrical Appliances –I Iron box, Emergency Lamp, Fan regulator.
12. Installation and Maintenance of Electrical Appliances –II Water heater, Stabilizer and UPS.

List of Equipment:

S.No	Name of the Equipment	Quantity
1	Single phase house wiring setup (Fuse, Lamp, Socket, Switch, PVC Pipe, Lamp Holder, Energy Meter)	2
2	Staircase wiring setup (Lamp, Two-way Switch, Socket, Switch, PVC Pipe, Lamp Holder)	2
3	Fluorescent lamp wiring setup (Fluorescent Lamp, Socket, Switch, PVC Pipe, Fluorescent Lamp Holder, Choke, Starter)	2
4	Water heater (1500W, 230V)	2
5	Stabilizer (500W, 160 – 290V)	2
6	UPS (600 VA)	2
7	Fan regulator	2
8	Iron box setup	2
9	Emergency lamp setup	2
10	Soldering Iron, Lead	15
11	Multi meter (0-600V, 10A)	15

12	Continuity tester	2
13	Resistors	Adequate Number
14	Capacitors	Adequate Number
15	Diodes	Adequate Number
16	Transistors	Adequate Number
17	Inductors	Adequate Number
18	IC's	Adequate Number
19	RPS (0-30V)	5
20	Function Generator (0-1MHz)	5
21	CRO (20MHz)	5
22	Ammeter (0-10A) MI	10
23	Voltmeter (0-300V) MI	10
24	Wattmeter (300V,10A, UPF)	5
25	Energy meter (single phase, two wire, (5-30A)/240V, 50Hz)	5
26	Wires, Cables	Adequate Number
27	Clamp meter (0-1000A), (0-750V)	2
28	Megger (500V, 100Mohms)	1

Course Outcomes:

After successful completion of this course, the students will be able to

- CO1:** Identify various electronic components and assemble simple electronic circuits using soldering.
CO2: Make wiring connections for household and conduct energy audit.
CO3: Install and maintain household electrical appliances.

CO-PO & PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	2	1	1	1	-	-	-	-	1	2	1	1
2	3	2	1	2	1	1	1	-	-	-	-	1	2	1	1
3	3	2	1	2	1	1	1	-	-	-	-	1	2	1	1
AVG	3	2	1	2	1	1	1	-	-	-	-	1	2	1	1

1 – „Low“, 2 – „Medium“, 3- „High“, „-“, – No correlations

PRODUCT TINKERING LAB
(Common to all)

Course Code	24GE122	Course Type	Practical
Teaching Periods/Week (L: T:P)	0:0:2	Credits	1
Total Teaching Periods	30	IAT + ESE Marks	60 + 40
Teaching Department	Civil Engineering and Mechanical Engineering		

Course Objectives: To equip the students with

1. Hands-on experience in Mechanical Equipments.
2. Design of simple components using computer-aided design.
3. Basic concept of 3D Printing.
4. Hands-on training on basic plumbing works

Practical Exercises

30

1. Exercise on the usage of a hand-drilling machine
2. Demonstration of Centrifugal pumps.
3. Demonstration of two-wheeler and four-wheeler maintenance and repairs,
4. 3D Modelling of a single component.
5. Exercise on CAD Data Exchange and Generation of .stl files.
6. Identification of a product for Additive Manufacturing and its AM process plan
7. Printing of identified product on an available AM machine.
8. Demonstration on how to change the Tap fittings.
9. Preparing plumbing line sketches.
10. Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows, and other components that are commonly used in households.
11. Laying pipe connection to the suction and delivery side of a pump
12. Connecting pipes of different materials: Metal, plastic, and flexible pipes used in household appliances.

Equipment required

Sl. No.	Description of Equipment	Required numbers for batch of 30 students
1.	Hand Drilling Machine	5 nos.
2.	Centrifugal pump Assembly	1 no.
3.	Two-Wheeler (Four Stroke Petrol Engine)	1 no.
4.	Four-Wheeler (Four Stroke Diesel Engine)	1 no.
5.	Pipe Vice	5 nos.
6.	Die Holder with Die set	5 nos.
7	Valves, Taps, Coupling, Unions, Reducers, and Elbows (Metal and Plastics)	5 nos. each
8	INTEL based desktop PC with min. 4GB RAM and 500 GB HDD, 17" or higher TFT Monitor, Keyboard and mouse	5 Nos
9	3D Printer	2 Nos

Course Outcomes:

After successful completion of this course, the students will be able to

CO1:	Perform the basic maintenance and servicing of mechanical equipments.
CO2:	Design simple components using computer-aided design.
CO3:	Develop a 3D component using additive manufacturing.
CO4:	Sketch and perform the plumping for the house's different connections.

CO-PO & PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	-	-	-	2	-	-	-	-	-	-	1	2	-	1
2	2	-	-	-	3	-	-	-	-	-	-	1	2	-	1
3	2	-	-	-	3	-	-	-	-	-	-	1	2	1	1
4	2	-	-	-	2	-	-	-	-	-	-	1	2	-	1
AVG	2	-	-	-	2.5	-	-	-	-	-	-	1	2	1	1
'1' – Low , '2' – Medium , '3'- High, '-' – No correlations															