

**Dr. MAHALINGAM**  
COLLEGE OF ENGINEERING AND TECHNOLOGY

Udumalai Road, Pollachi, Coimbatore District - 642003

Established in 1998 • Approved by AICTE • Affiliated to Anna University

(A DIVISION OF NIA EDUCATIONAL INSTITUTIONS)



NAAC A++ GRADE  
Cycle 3 (2023-2030)  
The Highest Grade

## **Curriculum and Syllabi**

### **B.Tech Artificial Intelligence and Data Science**

#### **Semesters I & II**

#### **Regulations 2023**

<b>Programme: B.Tech Artificial Intelligence and Data Science</b>
<b>Curriculum and Syllabi: Semester I &amp; II</b>
<b>Recommended by Board of Studies on:</b>
<b>Approved by Academic Council on:</b>

<b>Action</b>	<b>Responsibility</b>	<b>Signature of Authorized Signatory</b>
Designed and Developed By	BoS Artificial Intelligence and Data Science	
Compiled By	Office of Controller of Examination	
Approved By	Principal	

**Dr. Mahalingam College of Engineering and Technology, Pollachi 642003.**  
**(An autonomous institution approved by AICTE and affiliated to Anna University)**

## **Department of Artificial Intelligence and Data Science**

### **Vision**

To build quality engineers with diversified knowledge to compete globally with innovations in the domain of Artificial Intelligence and Data Science

### **Mission**

- To impart technical content in latest technologies through industry collaborative curriculum
- To produce young engineers with expert knowledge to hoist industry's growth
- To foster ethical engineers for resolving community issues through automation solutions
- To motivate engineers to employ ethical conduct of research for societal benefits

**Dr. Mahalingam College of Engineering and Technology, Pollachi 642003.**  
**(An autonomous institution approved by AICTE and affiliated to Anna University)**

### **Programme Educational Objectives (PEOs)**

B.TECH. Artificial Intelligence and Data Science graduates will:

**PEO1.Domain Knowledge:** Possess diversified knowledge and expertise in the domain of Artificial Intelligence and Data Science

**PEO2.Problem solving skills and Ethics:** Apply computing skills to identify the challenges and to develop creative ethical solutions

**PEO3.Lifelong Learning and development:** Involve in lifelong learning, research and development to fulfil social needs using latest technology

### **Programme Outcomes (POs) - Regulations 2023**

On successful completion of B.E. Computer Science and Engineering programme, graduating students/graduates will be able to:

**PO1. Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems

**PO2. Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3. 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.

**PO4. 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.

**PO5. 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.

**PO6. 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.

**PO7. 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.

**PO8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO9. Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10. 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.

**PO11. 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

**PO12. 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.

### **Programme Specific Outcomes (PSOs) - Regulations 2023**

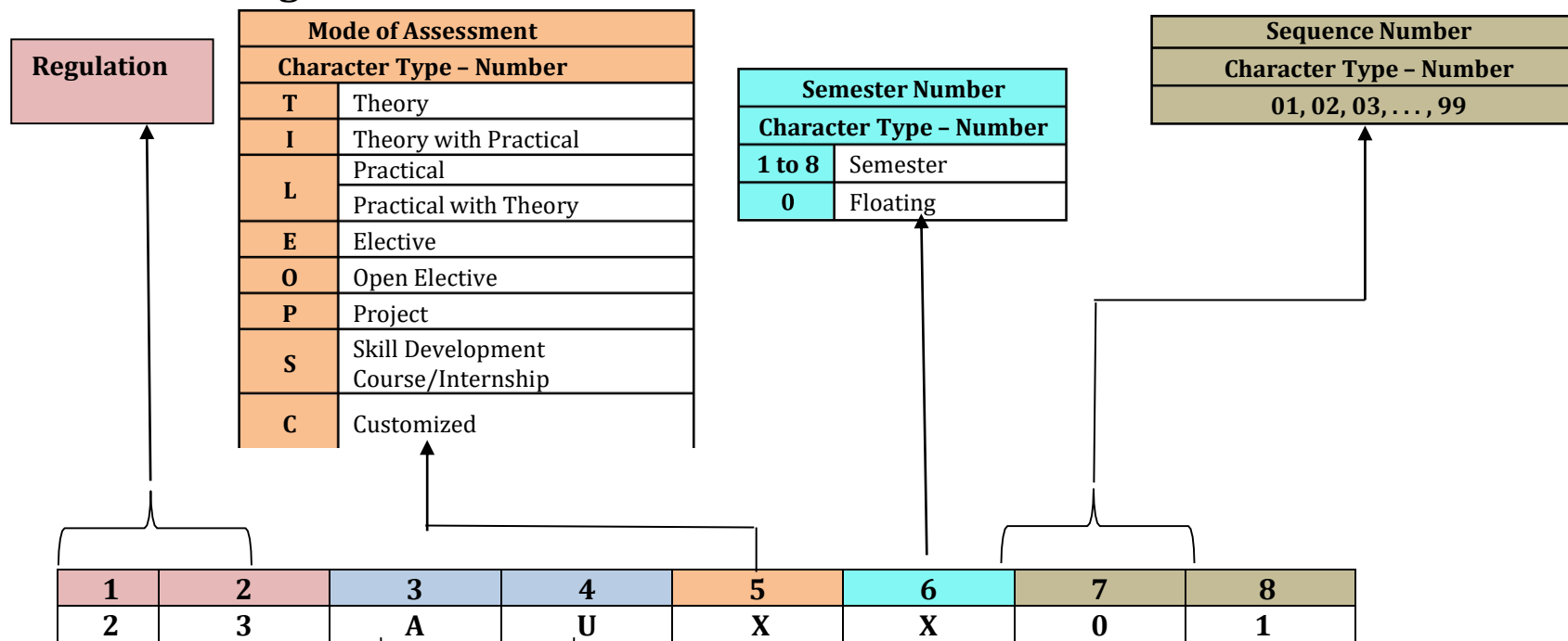
On successful completion of B.TECH. Artificial Intelligence and Data Science programme, graduating students/graduates will be able to:

**PSO1. Software Automation:** Develop customized automation solutions for Engineering and business problems using intelligent techniques.

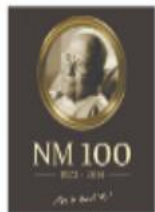
**PSO2. Data Engineering:** Predict significant information and visualize large scale data using latest technologies.

## Dr. Mahalingam College of Technology, Pollachi

### 2023 Regulations - Course Code Generation Procedure for UG Courses



Board/Department/Programme/Course Type			
Character Type - Alphabet			
<b>AD</b>	Artificial Intelligence & Data Science	<b>ME</b>	Mechanical
<b>AM</b>	CSE (Artificial Intelligence & Machine Learning)	<b>SC</b>	CSE (Cyber Security)
<b>AU</b>	Automobile	<b>PH</b>	Physics
<b>CE</b>	Civil	<b>CH</b>	Chemistry
<b>CS</b>	Computer Science	<b>EN</b>	English
<b>EA</b>	Advanced Communication Technology	<b>MA</b>	Mathematics
<b>EC</b>	Electronics and Communication	<b>ES</b>	Employability Skills
<b>EE</b>	Electrical and Electronics	<b>VA</b>	Value Added Course
<b>EV</b>	VLSI Design & Technology	<b>SA</b>	Studio Activities
<b>IT</b>	Information Technology		



# Dr. MAHALINGAM

## COLLEGE OF ENGINEERING AND TECHNOLOGY

Udumalai Road, Pollachi, Coimbatore District - 642003

Established in 1998 ♦ Approved by AICTE ♦ Affiliated to Anna University

(A DIVISION OF NIA EDUCATIONAL INSTITUTIONS)



NAAC A++ GRADE  
Cycle 3 (2023-2030)  
The Highest Grade

### Programme: B.Tech Artificial Intelligence and Data Science 2023 Regulations Curriculum for Semester I & II

Type of Course	Course Code	Course Title	Duration	Credits	Marks
VAC	23VAL101	Induction Program	3 Weeks	-	100

#### Semester I

Type of Course	Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
			L	T	P			
AEC	23ENI101	Communication Skills I	2	0	2	3	100	ALL
Minor	23MAI103	Linear Algebra and Infinite Series	3	0	2	4	100	AD,AM,CS,IT&SC
Minor	23PHT001	Physics for Information Sciences	3	0	0	3	100	AD,AM,CS,IT&SC
Major	23CST101	Problem Solving using C	3	0	0	3	100	AD,AM,CS,IT&SC
Multi disciplinary	23EEI101	Basics of Electrical and Electronics Engineering	3	0	2	4	100	AD,AM,CS,IT&SC
Minor	23PHL001	Physics for Information Sciences Laboratory	0	0	3	1.5	100	AD,AM,CS,IT&SC
SEC	23CSL101	Problem Solving using C Laboratory	0	0	3	1.5	100	AD,AM,CS,IT&SC
VAC	23VAL102	Wellness for Students	0	0	2	1	100	ALL
VAC	23VAT101	தமிழர்மரபு /Heritage of Tamils	1	0	0	1	100	ALL
AEC	23SAL101	Studio Activities	0	0	2	-	-	ALL
<b>Total</b>			<b>15</b>	<b>0</b>	<b>16</b>	<b>22</b>	<b>900</b>	

#### Semester II

Type of Course	Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
			L	T	P			
AEC	23ENI201	Communication Skills II	2	0	2	3	100	ALL
	23FLT201	Foreign Language- Japanese	3	0	0			
	23FLT202	Foreign Language- German	3	0	0			
Minor	23MAI203	Calculus and Transforms	3	0	2	4	100	AD,AM,CS,IT&SC
Major	23ITT201	Data Structures	3	0	0	3	100	AD,AM,CS,IT&SC
Multi disciplinary	23EEI201	Digital System Design	2	0	2	3	100	AD,AM,CS,IT&SC
Multi disciplinary	23MEL001	Engineering Drawing	1	0	3	2.5	100	AD,AM,AU,CS,EA,EC,EE,EV,IT,ME,SC
SEC	23ITL201	Data Structures Laboratory	0	0	3	1.5	100	AD,AM,CS,IT&SC

SEC	23CSL201	IT Practices Laboratory	0	0	4	2	100	AD,AM,CS,IT&SC
SEC	23ESL201	Professional Skills 1: Problem solving skills & Logical Thinking 1	0	0	2	1	100	ALL
VAC	23VAT201	தமிழரும் தொழில் நுட்பமும் / Tamils and Technology	1	0	0	1	100	ALL
Multi disciplinary	23CHT202	Environmental Sciences	1	0	0	-	100	ALL
AEC	23SAL201	Studio Activities	0	0	2	-	-	ALL
<b>Total</b>			<b>13</b>	<b>0</b>	<b>20</b>	<b>21</b>	<b>1000</b>	

**Tentative Curriculum for Semester III to VIII**  
**Semester III**

Type of Course	Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
			L	T	P			
Minor	23MAI306	Probability and Statistics for Data Science	3	0	2	4	100	-
Major	23CSI301	Design and Analysis of Algorithms	3	1	0	4	100	AD & CS
Minor	23CST301	Computer Architecture	3	0	0	3	100	AD & CS
Major	23CSI302	Database Systems	3	0	2	4	100	AD & CS
Major	23ADL301	Internet Programming Tools Laboratory	1	0	3	2.5	100	-
Major	23ADL302	Problem Solving using Java Programming Laboratory	1	0	3	2.5	100	-
SEC	23ESL301	Professional Skills 2: Problem solving skills & Logical Thinking 2	0	0	2	1	100	ALL
VAC	23VAL003	Universal Human Values 2: Understanding Harmony	2	1	0	3	100	ALL
AEC	23SAL301	Studio Activities	0	0	2	-	-	ALL
<b>Total</b>			<b>16</b>	<b>2</b>	<b>14</b>	<b>24</b>	<b>800</b>	

**Semester IV**

Type of Course	Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
			L	T	P			
Minor	23MAI403	Discrete Mathematics for Artificial Intelligence	3	0	2	4	100	-
Major	23ADI401	Data Communication and Networks	3	0	2	4	100	-
Major	23ADT401	Operating System Principles	3	0	0	3	100	-
Major	23ADT402	Data Mining	3	0	0	3	100	-
Major	23ADT403	Artificial Intelligence –I	3	0	0	3	100	-
Major	23ADL401	Intelligent systems - I Laboratory	0	0	4	2	100	-
Major	23ADL402	Problem Solving using Python Laboratory	1	0	3	2.5	100	-
SEC	23ESL401	Professional Skills 3	0	0	2	1	100	-
AEC	23SAL401	Studio Activities	0	0	2	-	-	ALL
<b>Total</b>			<b>16</b>	<b>0</b>	<b>15</b>	<b>22.5</b>	<b>800</b>	



Type of Course	Course Code	Course Title	Duration	Credits	Marks
Internship	23XXXXXX	Internship – 1/Community Internship /Skill Development	2 Weeks	1	100

### Semester V

Type of Course	Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
			L	T	P			
Major	23XXXXX	Exploratory Data Analysis	3	0	0	3	100	-
Major	23XXXXX	Artificial Intelligence –II	3	0	0	3	100	-
Major	23XXXXX	Cyber security	3	0	0	3	100	-
Major	23XXXXX	Professional Elective – I	2	0	2	3	100	-
Major	23XXXXX	Professional Elective – II	3	0	0	3	100	-
Major	23XXXXX	Exploratory Data Analysis Laboratory	0	0	4	2	100	-
SEC	23XXXXX	Professional Skills 4	0	0	2	1	100	-
Project	23XXXXX	Reverse Engineering Project	1	0	4	3	100	-
AEC	23SAL501	Studio Activities	0	0	2	-	-	ALL
<b>Total</b>			<b>15</b>	<b>0</b>	<b>14</b>	<b>21</b>	<b>800</b>	

### Semester VI

Type of Course	Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
			L	T	P			
Major	23XXXXX	Big Data Analytics	3	0	2	4	100	-
Major	23XXXXX	Deep Learning Techniques	3	0	2	4	100	-
Major	23XXXXX	Cloud Computing Laboratory	1	0	4	3	100	-
Major	23XXXXX	Professional Elective – III	2	0	2	3	100	-
Major	23XXXXX	Professional Elective – IV	3	0	0	3	100	-
Minor	23XXXXX	Open Elective – I	3	0	0	3	100	-
SEC	23XXXXX	Professional Skills 5	0	0	2	1	100	-
AEC	23SAL601	Studio Activities	0	0	2	-	-	ALL
<b>Total</b>			<b>15</b>	<b>0</b>	<b>14</b>	<b>21</b>	<b>700</b>	

Type of Course	Course Code	Course Title	Duration	Credits	Marks
Internship	23XXXXXX	Internship – 2/Community Internship /Skill Development	4 Weeks	2	100

### Semester VII

Type of Course	Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
			L	T	P			
Major	23XXXXX	Computational Foundation for Robotics	3	0	2	4	100	-
Major	23XXXXX	Information security	3	0	0	3	100	-
Major	23XXXXX	Business Intelligence and Analytics Laboratory	0	0	4	2	100	-
Major	23XXXXX	Professional Elective – V	2	0	2	3	100	-
Major	23XXXXX	Professional Elective – VI	3	0	0	3	100	-
Minor	23XXXXX	Open Elective – II	3	0	0	3	100	-
Project	23XXXXX	Project Phase-I	0	0	8	4	100	-
<b>Total</b>			<b>13</b>	<b>0</b>	<b>16</b>	<b>22</b>	<b>700</b>	

### Semester VIII

Type of Course	Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
			L	T	P			
Major	23XXXXX	Professional Elective – VII	3	0	0	3	100	-
Major	23XXXXX	Professional Elective – VIII	3	0	0	3	100	-
Project	23XXXXX	Project Phase-II	0	0	12	6	200	-
Internship	23XXXXX	Internship-3 / Skill Development	8 Weeks			4	100	-
<b>Total</b>			<b>6</b>	<b>0</b>	<b>12</b>	<b>16</b>	<b>500</b>	

**Total Credits: 172.5**

# **SEMESTER I**

<b>Course Code:23VAL101</b>		<b>Course Title: Induction Program (Common to all B.E/B.Tech Programmes)</b>	
<b>Course Category: VAC</b>		<b>Course Level: Introductory</b>	
<b>Duration: 3 weeks</b>	<b>Mandatory Non- Credit Course</b>	<b>Max Marks:100</b>	

### **Pre-requisites**

➤ NIL

### **Course Objectives**

The course is intended to:

1. Explain various sources available to meet the needs of self, such as personal items and learning resources
2. Explain various career opportunities, opportunity for growth of self and avenues available in the campus
3. Explain the opportunity available for professional development
4. Build universal human values and bonding amongst all the inmates of the campus and the society.

### **List of Activities:**

1. History of Institution and Management: Overview on NIA Educational Institutions - Growth of MCET - Examination Process - OBE Practices - Code of Conduct - Centre of Excellence.
2. Lectures, interaction sessions and Motivational Talks by Eminent people, Alumni, Employer and Industry Experts
3. Familiarisation of Department / Branch: HoD's & Senior Interaction- Department Association
4. Universal Human Value Modules: Aspirations and concerns, Self-Management, Relations Social and Natural Environment.
5. Orientation on Professional Skills Courses
6. Proficiency Modules : Mathematics, English, Physics and Chemistry
7. Introduction to various Chapters, Cells, Clubs and its events
8. Creative Arts : Painting, Music and Dance
9. Physical Activity : Games, Sports and Yoga
10. Group Visits: Visit to local area and Campus Tour

Course Outcomes		Cognitive Level
At the end of this course, students will be able to:		
CO1	Explain various sources available to meet the needs of self, such as personal items and learning resources through visit to local areas and campus	Understand
CO2	Explain various career opportunities and avenues available in the campus through orientation sessions	Understand
CO3	Explain the opportunity available for professional development through professional skills, curricular, co-curricular and extracurricular activities	Understand
CO4	Build universal human values and bonding amongst all the inmates of the campus and society for having a better life	Apply

### Course Articulation Matrix

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

High : 3, Medium :2, Low: 1

### Text Book(s):

T1. Reading material, Workbook prepared by PS team of the college

### Reference Book(s):

R1. Sean Covey, "Seven habits of highly effective teenagers", Simon & Schuster UK, 2004.

R2. Vethathiri Maharishi Institute For Spiritual and Intuition Education, aliyar, "value education harmonious life (Manavalakalai Yoga)", Vethathri Publications, Erode, 2010.

R3. Dr.R.Nagarathna, Dr.H.R. Nagendra, " Integrated approach of yoga therapy for positive Swami Vivekananda Yoga Prakashana Bangalore, 2008 Ed.

### Web References:

1. [https://youtube.com/playlist?list=PLYwzG2fd7hzc4HerTNkc3pS\\_IvcCfKznV](https://youtube.com/playlist?list=PLYwzG2fd7hzc4HerTNkc3pS_IvcCfKznV)
2. <https://www.youtube.com/watch?v=P4vjfEVk&list=PLWDeKF97v9SO0frdgmpaghDMjkom1>
3. <https://fdp-si.aicte-india.org/download/AboutSIP/About%20SIP.pdf>

<b>Course Code: 23ENI101</b>	<b>Course Title: Communication Skills (Common to all B.E/B.Tech Programmes)</b>		
<b>Course Category: AEC</b>		<b>Course Level: Introductory</b>	
<b>L:T:P(Hours/Week) 2:0:2</b>	<b>Credits: 3</b>	<b>Total Contact Hours:60</b>	<b>Max Marks:100</b>

## Course Objectives

The course is intended to impart formal and informal language effectively and accurately in various real-life contexts on par with B1 level of CEFR Scale.

### Module I

**20 Hours**

**Grammar:** Synonyms & Antonyms -Tense forms - Modals - Passives - Reported Speech - Comparatives and Descriptive adjectives.

**Listening:** Listening for gist and specific information - Listening to past events, experiences and job preferences - Listening to descriptions of monuments- Listening for excuses - Listening to description: transportation systems and public places.

**Speaking:** Introducing oneself - Exchanging personal information - Effective Conversations: Role Play Situations (Describing personality traits - Describing landmarks, monuments and festivals - Making polite requests and excuses - Discussing facts - Asking for and giving information - Expressing wishes - Talking about lifestyle changes - Talking about transportation and its problems - Describing positive and negative features of things and places - Making comparisons)

**Reading:** Skimming and Scanning - Reading Comprehension - Reading and comprehending online posts and emails - Case Studies

**Writing:** Letter writing (Permission letters - Online cover letter for job applications) - Instructions - Recommendations - Write a blog (General) - Report Writing (Industrial Visit Report and Event Reports) - formal and informal emails.

### Module II

**20 Hours**

**Grammar:** Sequence adverbs - Phrasal verbs - Relative clauses - Imperatives - Infinitives - Conditionals.

**Listening:** Listening to review of food items - Listening to results of surveys- Listening to motivational talks & podcasts

**Speaking:** Expressing likes and dislikes - Describing a favourite snack - Giving advices and suggestions - Speculating about past and future Events - Group Discussion

**Reading:** Reading different expository texts - Reading to factual texts - Print and online media- Reading Comprehension.

**Writing:** Process Descriptions - Email Writing (Requesting for information) - Reviewing Movie - Social media feeds/posts (Any Social Media)

**List of Experiments:****20 Hours**

1. Mini Presentation and Picture Prompt Discussion
2. Debate Tournament
3. Listening, Mind Mapping & Summarization
4. Listening to Stories and Providing the Innovative Climax
5. Reading Comprehension
6. Writing - Interpretation of Visuals

<b>Course Outcomes</b>	<b>CognitiveLevel</b>
At the end of this course, students will be able to:	
<b>CO1:</b> Utilize the basic English grammar and vocabulary to acquire professional communication skills.	Apply
<b>CO2:</b> Develop listening and speaking skills through classroom activities based on listening comprehension, recapitulation, interpretation and debate on the same	Apply
<b>CO3:</b> Read and write social media posts and comments	Apply
<b>CO4:</b> Perform as a member of a team and engage in individual presentation	Apply

**Course Articulation Matrix**

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

High-3; Medium-2;Low-1

**Textbook(s):**

- T1. Jack C. Richards, Jonathan Hull, and Susan Proctor, "Interchange - Student's book 2", 5<sup>th</sup>Edition, Cambridge University Press, South Asia Edition, 2022.
- T2. Jack C. Richards, Jonathan Hull, and Susan Proctor, "Interchange - Student's Book 1", 5<sup>th</sup>Edition, Cambridge University Press, South Asia Edition, 2022.

**Reference Book(s):**

- R1. David Bohlke, Jack C. Richards, "Four Corners", 2<sup>nd</sup> Edition, Cambridge University Press,2018.
- R2. Adrian Doff, Craig Thaine, Herbert Puchta, Jeff Stranks, Peter Lewis-Jones, Graham Burton,Empower B1 - Student's Book, Cambridge University Press, 2020.
- R3. Raymond Murphy, "Intermediate English Grammar" 30<sup>th</sup> Edition, Cambridge University Press,2022.

**Web References:**

1. <https://speakandimprove.com/>
2. <https://writeandimprove.com/>
3. <https://www.cambridgeenglish.org/exams-and-tests/linguaskill/>

<b>Course Code: 23MAI103</b>		<b>Course Title: Linear Algebra and Infinite Series (Common to AD, AM, CS, IT &amp; SC)</b>	
<b>Course Category: Minor</b>		<b>Course Level: Introductory</b>	
<b>L:T:P(Hours/Week)3:0:2</b>	<b>Credits: 4</b>	<b>Total Contact Hours: 75</b>	<b>Max Marks: 100</b>

### Course Objectives:

The course is intended to impart knowledge on Linear Algebra, vector spaces, sequences and series in mathematics to have a strong foundation in science and engineering.

### Module I

**23 Hours**

**Solutions to System of Linear Algebraic Equations:** Matrices- Rank of a matrix - Consistency of a system of linear equations- Row echelon form-Row reduced echelon form- Gauss elimination method- Crout's method.

**Basis and Dimension of Vector Spaces:** Vector spaces -Linear Independent and dependent of vectors-Basis, dimension, row space, column space, null space, rank nullity theorem.

**Orthogonality and Inner Product Space:** Inner product of vectors-Inner product spaces-length of a vector, distance between two vectors, orthogonality of vectors-orthogonal projection of a vector-Gram-Schmidt process- orthonormal basis.

### Module II

**22 Hours**

**Eigen Values and Eigen Vectors:** Eigen values and vectors-symmetric, skew symmetric and orthogonal matrices- Diagonalization of matrix through orthogonal transformation- Reduction of quadratic forms to canonical form-rank ,index, signature and nature of quadratic forms-Singular Value decomposition.

**Sequences and Series:** Sequences-definitions and examples- Series-Tests for convergence-comparison test, integral test, Cauchy's root test, Alembert's ratio test- Alternating series -Leibnitz's test.

### List of Experiments:

**30 Hours**

1. Introduction to MATLAB
2. Row Echelon form and Row reduced Echelon form of a matrix.
3. Rank of a matrix and solution of a system of linear equations
4. Dimension of row space, column space and null space.
5. Gram-Schmidt Orthogonalization.
6. Eigenvalues and Eigenvectors of matrices.



Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
<b>CO1:</b> Apply matrix techniques for solving system of linearequations and Apply the process of orthogonalization to find orthogonal vectors.	Apply
<b>CO2:</b> Determine the canonical form of a quadratic form using orthogonal transformation in Science and Engineering problem solving.	Apply
<b>CO3:</b> Apply different tests to find convergence and divergence of series in the problem solving.	Apply
<b>CO4:</b> Demonstrate the understanding of linear algebra concepts through modern tool.	Apply

### Course Articulation Matrix

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

High-3; Medium-2;Low-1

#### Text Book(s):

- T1. Erwin Kreyszig, Advanced Engineering Mathematics, 10<sup>th</sup> edition, John Wiley & sons, 2010.
- T2. David C Lay, Linear Algebra and its Applications, 3<sup>rd</sup> edition, Pearson India, 2011.
- T3. Howard Anton, Chris Rorres, Elementary Linear Algebra Applications version, 11<sup>th</sup> edition, Wiley India edition, 2013.

#### Reference Book(s):

- R1. T. Veerarajan, Engineering Mathematics for first year, 3<sup>rd</sup> edition, Tata McGraw-Hill, 2019.
- R2. V. Krsihnamurthy, V. P. Mainra and J. L. Arora, An introduction to Linear Algebra, Affiliated East-West press, Reprint 2005.
- R3. P. Sivaramakrishna Das , C. Vijayakumari , Engineering Mathematics, Pearson India, 2017.

#### Web References:

- <https://nptel.ac.in/courses/111106051>
- <https://www.classcentral.com/course/matrix-algebra-engineers-11986>

<b>Course Code: 23PHT001</b>		<b>Course Title: Physics for Information Sciences (Common to AD, AM, CS, IT &amp; SC)</b>	
<b>Course Category: Minor</b>		<b>Course Level: Introductory</b>	
<b>L:T:P(Hours/Week)3: 0: 0</b>	<b>Credits: 3</b>	<b>Total Contact Hours: 45</b>	<b>Max Marks: 100</b>

### **Course Objectives:**

The course is intended to impart the knowledge on working mechanism of laser, fiber optics, display devices and introduce the concepts of integrated circuits, nanotechnology and quantum computing

### **Module I**

**22 Hours**

**Laser:** Characteristics of laser light- Einstein's theory of matter and radiation – A & B Coefficients- Stimulated and spontaneous emission of radiation - Population inversion and pumping methods - Types of laser: Nd: YAG laser and Carbon di oxide (CO<sub>2</sub>) molecular gas laser - Semiconductor laser (Homo junction and hetero junction) – Applications: Hologram and Holographic data storage (record/read).

**Fiber Optics:** Optical fibers – Principle of light propagation through optical fibers - Expressions for numerical aperture and acceptance angle - Types of optical fibers based on material, refractive index, and mode of propagation- Fabrication of optical fiber: Double crucible method- Dispersion and attenuation in optical fiber - Photo detectors: PN, PIN & Avalanche photo diodes- Fiber optic communication system and its advantages.

**Nano Technology:** Introduction – Importance of Nanotechnology - Nanomaterials - Nanoparticles - Synthesis of Nanoparticles: High- energy ball milling (top-down approach) - Sol-gel process (bottom-up approach) -Application of Nanomaterials.

### **Module II**

**23 Hours**

**Quantum Computing:** Introduction to Quantum Computing - Uses and Benefits of Quantum Computing - Features of Quantum Computing : Superposition, Entanglement, Decoherence - Limitations of Quantum Computing – Comparison of Quantum Computer with Classical Computer - Quantum Computers In Development : Google, IBM, Microsoft and others.

**Integrated Circuits:** Introduction to semiconductors: Intrinsic and extrinsic Semiconductors- Advantages of Integrated circuits (ICs) over discrete components- IC classification- Construction of bipolar transistor: Silicon Wafer Preparation - Epitaxial growth - Oxidation- Photolithography- Isolation diffusion - Base diffusion - Emitter diffusion - Contact mask- Aluminium metallization – Passivation- Structures of integrated PNP transistor.

**Display Devices:** Human vision - Red, Blue, and Green (RGB) color scheme – Primary and secondary colors- Color addition and subtraction-Optical Emissions: Luminescence, photoluminescence, cathodoluminescence- electroluminescence -Injection electro Luminescence- Displays (Working principles): Plasma display, LED display, Liquid crystal display (LCD) and Numeric display.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
<b>CO1:</b> Apply the basic concepts of laser, fiber optics and nanotechnology to solve different optical parameters.	Apply
<b>CO2:</b> Perform as a member of team in analysing the concepts of laser, fiber optics and nanotechnology involved in engineering applications related to science and technology and make a presentation.	Apply
<b>CO3:</b> Interpret the concepts of nanomaterials, IC fabrication techniques and display devices and apply it for different real-life applications.	Apply
<b>CO4:</b> Perform as a member of team in articulating the modern technologies behind nanotechnology, integrated circuits and display devices.	Apply

### Course Articulation Matrix

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

High-3; Medium-2; Low-1

### Text Book(s):

- T1. M. N. Avadhanulu and P. G. Kshirsagar, "Text Book of Engineering Physics", S. Chand & Company Ltd., New Delhi, 2018.
- T2. David Armitage, "Introduction to Micro displays", John Wiley & Ltd, 2006.
- T3. D.Roy Choudhry, Shail Jain, "Linear Integrated Circuits", New Age International Pvt. Ltd, 3<sup>rd</sup> Edition, 2010

**Reference Book(s):**

- R1. D. Halliday., R. Resnick and J. Walker, "Fundamentals of Physics", Wiley Publications, 10<sup>th</sup> Edition, 2014.
- R2. Ajoy Ghatak, "Optics", Tata McGraw-Hill Education, New Delhi, 5<sup>th</sup> Edition, 2012.
- R3. A. Marikani, "Engineering Physics", PHI Learning, New Delhi, 2<sup>nd</sup> Edition, 2014.

**Web References:**

- 1. [https://onlinecourses.nptel.ac.in/noc22\\_ph32/preview](https://onlinecourses.nptel.ac.in/noc22_ph32/preview)
- 2. <http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html>
- 3. <https://www.investopedia.com/terms/q/quantum-computing.asp>

<b>Course Code: 23CST101</b>		<b>Course Title: Problem Solving using C (Common to AD,AM,CS,IT&amp;SC)</b>	
<b>Course Category: Major</b>		<b>Course Level: Introductory</b>	
<b>L:T:P(Hours/Week)3: 0: 0</b>	<b>Credits: 3</b>	<b>Total Contact Hours: 45</b>	<b>Max Marks: 100</b>

**Course Objectives:** The course is intended to impart knowledge on basic concepts of C.

### **Module I**

**23 Hours**

**C Programming Basics:** General Problem solving strategy - Program development cycle - Problem Solving Techniques : Algorithm, Pseudocode and Flow Chart - Overview of C - Structure of C program – C Character set – keywords - Identifiers – Variables and Constants - Data types - typedef- Type conversion - Operators and Expressions – Managing formatted and unformatted Input & Output operation.

**Control Structures:** Storage classes - Statements: Selection statements - Jump statements - Iteration statements.

**Arrays:** Characteristics of Array - Single-dimensional array - Two-dimensional array - Array Operations - Applications: Linear search, Selection sort, Matrix Operations.

**Functions:** Declaration & Definition - Return statement - Classification of functions - Parameter passing methods: call by value - call by reference - Passing Array to a Function- Returning Array from a function - Recursion.

### **Module II**

**22 Hours**

**Strings:** Declaration and Initialization of string - Display of strings with different formats - String library Functions - String conversion functions.

**Pointers:** Features - Types of Pointers: Null and Void pointer - Operations on pointers - Pointers to an Array.

**Structures:** Declaration & Initialization of Structures - Structure within Structure - Array of Structures – Pointer to Structures.

**Union:** Declaration & Initialization of Union - Enumerations.

**Files:** Introduction to Files - Streams and File Types - File operations (Open, close, read, write) – Command line arguments.

**Preprocessor Directives:** Macro Expansion, File Inclusion, Conditional Compilation.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
<b>CO1:</b> Understand the fundamental concepts of programming, such as variables, data types, control structures, and functions.	Understand
<b>CO2:</b> Design and develop C programs for real-world applications	Apply
<b>CO3:</b> Apply problem-solving skills and knowledge of c programming constructs to solve a given problem	Apply
<b>CO4:</b> Analyze and debug C programs to identify and fix errors.	Analyze
<b>CO5:</b> Apply modular programming techniques to break down complex programs into smaller, manageable modules	Apply

### Course Articulation Matrix

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

High-3; Medium-2;Low-1

### Text Book(s):

- T1. Yashavant P.Kanetkar, "Let Us C", 19<sup>th</sup> Edition, BPB Publications, 2022.
- T2. Ashok N.Kamthane, Amit.N.Kamthane, "Programming in C", 3<sup>rd</sup> Edition, Pearson Education, 2015.

### Reference Book(s):

- R1. Ajay Mittal, "Programming in C - A Practical Approach", 3<sup>rd</sup> Edition, Pearson Education, 2010.
- R2. Brian W.Kernighan and Dennis M.Ritchie,"The C Programming Language" 2<sup>nd</sup> Edition, Pearson Education, 2015.
- R3. Venit S, and Drake E, "Prelude to Programming Concepts and Design", 6<sup>th</sup> Edition, Pearson Education, 2014
- R4. Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", 2<sup>nd</sup> Edition, Oxford University Press, 2013.

### Web References:

1. <http://www.cprogramming.com/>
2. <http://www.c4learn.com/>

<b>Course Code: 23EEI101</b>	<b>Course Title: Basics of Electrical and Electronics Engineering (Common to AD,AM,CS,IT and SC)</b>		
<b>Course Category: Multidisciplinary</b>	<b>Course Level: Introductory</b>		
<b>L:T:P(Hours/Week)3: 0: 2</b>	<b>Credits:4</b>	<b>Total Contact Hours:75</b>	<b>Max Marks:100</b>

**Course Objectives:**

The course is intended to impart knowledge on engineering fundamentals of DC&AC circuits, Electrical machines, Electron devices, Carpentry and plumbing.

**Module I**

**22 Hours**

**Fundamentals of DC Circuits:** Definition, symbol and unit of quantities - Active and Passive elements - Ohm's Law: statement, - Kirchhoff's Laws: statement and illustration - Resistance in series and voltage division rule - Resistance in parallel and current division rule - Star to Delta and Delta to Star transformation- circuit simplification.

**AC Fundamentals:** Magnetic Circuits: Definition of magnetic quantities - Law of electromagnetic induction - Generation of single phase alternating EMF - Terminology - 3 Phase System: 3-Wire and 4 Wire system - Root Mean Square (RMS) - Average value of AC

**DC Machines:** DC Generator and DC Motor: Construction, Working Principle.

**Module II**

**23 Hours**

**AC Machines:** Single phase transformer: Construction, working principle - Single phase induction motor: Capacitor start and run -Three phase induction motor: An introduction.

**Semiconductor Devices:** Theory of Semiconductor: PN junction diode, Forward Bias Conduction, Reverse Bias Conduction, V-I Characteristics - Bipolar Junction Transistor: Operation of NPN and PNP Transistor, Common Emitter Configuration - MOSFET: construction and working principle.

**Opto-Electronic Devices and Transducers:** Opto-Electronic Devices: Working principle of Photoconductive Cell, Photovoltaic Cell-solar cell Transducers: Capacitive and Inductive Transducer, Thermistors, Piezoelectric and Photoelectric Transducer.

## List of Experiments

30 Hours

### Electrical & Electronics:

- 1) Identification of resistor and capacitor values
- 2) Soldering practice of simple circuit and checking the continuity
- 3) Fluorescent tube, staircase and house wiring
- 4) Characteristics of PN Diode

### Civil & Mechanical:

- 1) Make a wooden Tee joint to the required dimension
- 2) Make a tray in sheet metal to the required dimension
- 3) Assemble the pipeline connections with different joining components for the given layout

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Apply the basic laws and simplification techniques of electrical Engineering in DC and AC Circuits.	Apply
CO2: Summarize the construction and working of Motors, Generator and transformer.	Understand
CO3: Analyze the characteristics of diodes and transistors based on its construction and working principle.	Analyze
CO4: Summarize the working of opto-electronic devices and transducers	Understand
CO5: Examine and report the analysis of different resistors, capacitors, house wiring concepts, wooden joints and pipeline connection.	Analyze

### Course Articulation Matrix

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

High-3; Medium-2; Low-1



**Textbooks:**

- T1. R.Muthusubramanian and S.Salivahanan, "Basic Electrical and Electronics Engineering", McGraw Hill India Limited, New Delhi, 2014.
- T2. S. K. Sadhev, "Basic Electrical Engineering and Electronics", Tata Mcgraw Hill, 2017.

**Reference Book(s):**

- R1. B.L Theraja, "Fundamental of Electrical Engineering and Electronics", S.Chand Limited, 2022.
- R2. J.B.Gupta, "Basic Electrical and Electronics Engineering", S.K.Kataria & Sons, 2013.
- R3. Smarajit Ghosh, "Fundamental of Electrical and Electronics Engineering", 2<sup>nd</sup> Edition, PHI Learning Private Limited New Delhi, 2010.

**Web References:**

1. <https://www.nptel.ac.in/courses/108108076>
2. <https://archive.nptel.ac.in/courses/108/105/108105112>
3. <https://archive.nptel.ac.in/courses/108/101/108101091>

<b>Course Code: 23PHL001</b>		<b>Course Title: Physics for Information Sciences Laboratory (Common to AD, AM, CS, IT &amp; SC)</b>	
<b>Course Category: Minor</b>		<b>Course Level: Introductory</b>	
<b>L:T:P (Hours/Week)0:0:3</b>	<b>Credits:1.5</b>	<b>Total Contact Hours: 45</b>	<b>Max Marks: 100</b>

### Course Objectives

The course is intended to expose the students to various experimental skills which are very essential for an Engineering student.

### List of Experiments:

**45 Hours**

1. Determination of wavelength of the Laser using plane transmission grating.
2. Estimation of particle size of fine lycopodium powder using laser.
3. Measurement of acceptance angle and numerical aperture of an optical fiber – Laser diffraction method.
4. Determination of band gap of semiconducting materials – Thermistor (Germanium).
5. Light Illumination characteristics of Light dependent resistor (LDR).
6. Measurement of thickness of thin material - Air wedge method.
7. Determination of wavelength of the spectral lines of mercury spectrum using grating.
8. I-V characteristics of solar cell.
9. I-V characteristics of photo diode.
10. Verification of truth tables of logic gates.
11. Design of logic gates using discrete components.
12. I-V characteristics of LED.

<b>Course Outcomes</b>	<b>Cognitive Level</b>
At the end of this course, students will be able to:	
<b>CO1:</b> Elucidate the basic principles involved in the given experiments	Understand
<b>CO2:</b> Conduct, analyze and interpret the data and results from physics experiment	Evaluate

## Course Articulation Matrix

CO Vs PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	3	-	-	-	-	-	-	-	-	-	-

High-3; Medium-2; Low-1

### Reference Book(s):

- R1. Physics Laboratory Manual Prepared by Faculty of Physics, Dr. Mahalingam College of Engineering and Technology.
- R2. Engineering Physics Laboratory Manual, Dr. R. Jayaraman, V. Umadevi, S. Maruthamuthu, B. Saravanakumar, Pearson India Education Services Pvt. Ltd, 2022.
- R3. B.Sc., Practical Physics, C.L. Arora, S. Chand and Co, 2012.

### Web References:

1. <https://bop-iitk.vlabs.ac.in/List%20of%20experiments.html>
2. <https://vlab.amrita.edu/index.php?sub=1&brch=281>
3. <https://vlab.amrita.edu/index.php?sub=1&brch=189>

<b>Course Code: 23CSL101</b>		<b>Course Title: Problem Solving using C Laboratory (Common to AD,AM,CS,IT&amp;SC)</b>	
<b>Course Category: SEC</b>		<b>Course Level: Introductory</b>	
<b>L:T:P(Hours/Week) 0:0:3</b>	<b>Credits:1.5</b>	<b>Total Contact Hours: 45</b>	<b>Max Marks:100</b>

### Course Objectives:

The course is intended to enable the students for writing simple programs in C.

### List of Experiments:

**45 Hours**

1. Develop Algorithm, Flowchart and Pseudo code for given problem.
2. Develop C programs using data types, I/O statements, Operators and Expressions.
3. Develop C programs using Decision-making constructs.
4. Implement C programs using looping statements.
5. Design C programs to implement the concept of arrays.
6. Design C programs to implement the concept of strings
7. Develop C programs using functions.
8. Develop C programs using pointers.
9. Implement the concept of structures using C.
10. Implement C programs to perform file operations.

<b>Course Outcomes</b>	<b>Cognitive Level</b>
At the end of this course, students will be able to:	
<b>CO1:</b> Demonstrate proficiency in using development environments, compilers, and debugging tools for C programming	Apply
<b>CO2:</b> Apply C programming concepts to practical programming tasks	Apply
<b>CO3:</b> Demonstrate an understanding of the importance of code efficiency and optimization in C programming	Analyze
<b>CO4:</b> Work as a team in a laboratory environment to develop and demonstrate projects with an oral presentation	Apply

### Course Articulation Matrix

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

High-3; Medium-2;Low-1

**Reference Book(s):**

- R1. Ashok N.Kamthane, Amit.N.Kamthane, "Programming in C", 3<sup>rd</sup> Edition, Pearson Education, 2015.
- R2. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", Pearson Education, 2013.
- R3. Yashwant Kanetkar, Let us C, 17<sup>th</sup> Edition, BPB Publications, 2020.
- R4. ReemaThareja, "Programming in C", Oxford University Press, 2<sup>nd</sup> Edition, 2016.

**Web References:**

- 1. <https://electronicsforu.com/resources/15-free-c-programming-ebooks>
- 2. <https://www.fromdev.com/2013/10/c-programming-tutorials.html>
- 3. <https://books.goalkicker.com/CBook/>

<b>Course Code: 23VAL102</b>	<b>Course Title: Wellness for Students (Common to all B.E/B.Tech Programmes)</b>		
<b>Course Category: VAC</b>		<b>Course Level: Introductory</b>	
<b>L:T:P(Hours/Week) 0: 0 :2</b>	<b>Credits:1</b>	<b>Total Contact Hours:30</b>	<b>Max Marks:100</b>

### **Course Objectives:**

The course is intended to impart knowledge on setting SMART goals for academic, career and life, applying time management techniques, articulating the importance of wellness for success in life and understanding the dimensions of wellbeing and relevant practices.

### **Module I**

**15 Hours**

**GOAL SETTING** Understanding Vision and mission statements - Writing personal mission statements – „Focus“ as a way of life of most successful people. Clarifying personal values, interests and orientations – Awareness of opportunities ahead – Personal SWOT analysis - Principles driving goal setting: Principle of response and stimuli, Circle of influence and circle of concern, what you see depends on the role you assume. Potential obstacles to setting and reaching your goals - Five steps to goals setting: SMART goals, Inclusive goals, Positive stretch, Pain vs gain, Gun-point commitment.

**TIME MANAGEMENT - TOOLS AND TECHNIQUES** Importance of planning and working to time. Pareto 80-20 principle of prioritization – Time quadrants as a way to prioritize weekly tasks - The glass jar principle - Handling time wasters - Assertiveness, the art of saying „NO“ - Managing procrastination.

**CONCEPT OF WELLNESS** – impact of absence of wellness - Wellness as important component to achieve success. Wellbeing as per WHO - Dimensions of Wellbeing: Physical, Mental, Social, Spiritual - indicators and assessment methods

### **Module II**

**15 Hours**

**Simplified Physical Exercises.** Fitness as a subset of Wellness – health related physical fitness - skill related physical fitness. Joint movements, Warm up exercises, simple asanas, WCSC simplified exercises.

### **PRACTICES FOR MENTAL WELLNESS**

**Meditation:** Mind and its functions - mind wave frequency - Simple basic meditation - WCSC meditation and introspection tables. Greatness of friendship and social welfare - individual, family and world peace – blessings and benefits.

**Food & sleep for wellness:** balanced diet - good food habits for better health (anatomic therapy) – hazards of junk food - food and the gunas.

## PUTTING INTO PRACTICE

Practicals: Using the weekly journal - Executing and achieving short term goals - Periodic reviews.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
<b>CO 1:</b> Set well-articulated goals for academics, career, and personal aspirations	Apply
<b>CO2:</b> Apply time management techniques to complete planned tasks on time	Apply
<b>CO3:</b> Explain the concept of wellness and its importance to be successful in career and life	Apply
<b>CO4:</b> Explain the dimensions of wellness and practices that can promote wellness	Apply
<b>CO5:</b> Demonstrate the practices that can promote wellness	Valuing

## Course Articulation Matrix

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

High-3; Medium-2;Low-1

## Text Book(s):

T1. Reading material, workbook and journal prepared by PS team of the college

## Reference Book(s):

R1. Stephen R Covey, "First things first", Simon & Schuster UK, Aug 1997

R2. Sean Covey, "Seven habits of highly effective teenagers", Simon & Schuster UK, 2004.

R3. Vethathiri Maharishi Institute for Spiritual and Intuitional Education, Aliyar, "Value education for harmonious life (Manavalakalai Yoga)", Vethathiri Publications, Erode, I Ed. (2010).

R4. Dr. R. Nagarathna, Dr. H.R. Nagendra, "Integrated approach of yoga therapy for positive health", Swami Vivekananda Yoga Prakashana, Bangalore, 2008 Ed.

R5. Tony Buzan, Harper Collins, "The Power of Physical Intelligence English"

<b>Course Code: 23VAT101</b>		<b>Course Title: HERITAGE OF TAMILS (Common to all B.E/B.Tech Programmes)</b>	
<b>Course Category: VAC</b>		<b>Course Level: Introductory</b>	
<b>L:T:P (Hours/Week) 1: 0 :0</b>	<b>Credit: 1</b>	<b>Total Contact Hours: 15</b>	<b>Max Marks:100</b>

### Pre-requisites

➤ NIL

### Course Objectives

மாணவர்கள் இப்பாடத்தை கற்றலின் மூலம்

**CO.1** மொழி மற்றும் இலக்கியம், பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக் கலை , நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள் , திணைக் கோட்பாடுகள் மூலம் தமிழர் மரபை அறிந்து கொள்ள இயலும்.

**CO.2** இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பை அறிந்து கொள்ள இயலும்.

### தமிழர் மரபு

#### அலகு 1 - மொழி மற்றும் இலக்கியம்

3

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

#### அலகு 2 - 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, நாத்தஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

#### அலகு 3 - நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்

3

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



**அலகு 4 - தமிழர்களின் திணைக் கோட்பாடுகள்****3**

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக் கோட்பாடு - சங்க காலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்ககால நகரங்களும் துறைமுகங்களும் - சங்க காலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி.

**அலகு 5 - இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு****3**

இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிற்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுய மரியாதை இயக்கம் - இந்திய மருத்துவத்தில் சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப் படிக்கல்- தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.

**TOTAL : 15 PERIODS**

Course Outcomes		Cognitive Level
மாணவர்கள் இப்பாடத்தை கற்றபின்		
CO.1	மொழி மற்றும் இலக்கியம், பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக் கலை , நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள் , திணைக் கோட்பாடுகள் மூலம் தமிழர் மரபை அறிந்து கொள்வார்கள்.	அறிதல் (Understand)
CO.2	இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பை அறிந்து கொள்வார்கள்.	அறிதல் (Understand)

**Course Articulation Matrix**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-	-	1	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	1	-	-

High-3; Medium-2; Low-1

## TEXT - CUM REFERENCE BOOKS

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே.பிள்ளை  
(வெளியீடு. தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்)
3. கீழடி - வைகை நதிக்கரையில் சங்க கால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருளை - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL  
- (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by:  
International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D.  
Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by:  
International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published  
by:  
Department of Archaeology & Tamil Nadu Text Book and Educational Services  
Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay)  
(Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil  
Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) -  
Reference Book.

<b>Course Code: 23VAT101</b>	<b>Course Title: HERITAGE OF TAMILS (Common to all B.E/B.Tech Programmes)</b>		
<b>Course Category: VAC</b>		<b>Course Level: Introductory</b>	
<b>L:T:P (Hours/Week) 1: 0 :0</b>	<b>Credit: 1</b>	<b>Total Contact Hours: 15</b>	<b>Max Marks:100</b>

### **Pre-requisites**

➤ NIL

### **Course Objectives**

The course is intended to:

1. Understand the Heritage of Tamils in terms of Language and Literature, Rock Art Paintings to Modern Art – Sculpture, Folk and Martial Arts, Thinaï Concept.
2. Understand the Contribution of Tamils to Indian National Movement and Indian Culture.

## **HERITAGE OF TAMILS**

### **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.

### **UNIT II HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE**

**3**

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

**UNIT III FOLK AND MARTIAL ARTS****3**

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

**UNIT IV THINAI CONCEPT OF TAMILS****3**

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

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

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

**TOTAL : 15 PERIODS**

<b>Course Outcomes</b>	<b>Cognitive Level</b>
At the end of this course, students will be able to:	
CO.1 Understand the Heritage of Tamils in terms of Language and Literature, Rock Art Paintings to Modern Art – Sculpture, Folk and Martial Arts, Thinai Concept.	Understand
CO.2 Understand the Contribution of Tamils to Indian National Movement and Indian Culture.	Understand

**Course Articulation Matrix**

<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>	<b>PSO1</b>	<b>PSO2</b>
<b>CO1</b>	-	-	-	-	-	-	-	-	-	-	-	1	-	-
<b>CO2</b>	-	-	-	-	-	-	-	-	-	-	-	1	-	-

High-3; Medium-2; Low-1

## TEXT - CUM REFERENCE BOOKS

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே.பிள்ளை  
(வெளியீடு. தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்)
3. கீழடி - வைகை நதிக்கரையில் சங்க கால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருறை - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL  
- (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by:  
International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D.  
Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by:  
International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published  
by:  
Department of Archaeology & Tamil Nadu Text Book and Educational Services  
Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay)  
(Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil  
Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) -  
Reference Book.

## **SEMESTER II**

<b>Course Code: 23ENI201</b>		<b>Course Title: Communication Skills II (Common to all B.E/B.Tech Programmes)</b>	
<b>Course Category: AEC</b>		<b>Course Level: Introductory</b>	
<b>L:T:P(Hours/Week) 2:0:2</b>	<b>Credits: 3</b>	<b>Total ContactHours:60</b>	<b>Max Marks:100</b>

### Course Objectives

The course is intended to impart effective and accurate language in business correspondence on par with B2 level of CEFR Scale.

**20 Hours**

### Module

**Grammar:** Linking Words - Collocations -Sentence Completion - Articles - Adverbs- Indefinite Pronoun

**Listening:** Listening to short conversations - Listening for gist and summarizing - Listening for detail - Responding to straightforward questions.

**Speaking:** Making statements of facts - Agreeing and disagreeing to opinions - Respond to queries - Group Discussion.

**Reading:** Read and select (phrasal verbs & relative clause)- Cloze Test - Gapped sentences - Multiple- choice gap-fill

**Writing:** Paragraph Writing: Descriptive, narrative, persuasive and argumentative - Emails: Giving information - Making enquiries - Responding to enquiries - Power Point Presentation

### Module II

**20 Hours**

**Grammar:** Expressions of cause and result - Concord - Error Spotting (Parts of Speech & Indian English) - Prepositions.

**Listening:** Listening for identifying main points - Responding to a range of questions about different topics - Listening to identify relevant information

**Speaking:** Empathetic Enunciation - Situation handling - Visual Interpretation - - Short presentations

**Reading:** Intensive Reading: Comprehending business articles, reports and proposals and company websites-- Open gap-fill - Extended reading

**Writing:** Report Writing - Memo - Complaint letter - Business Letters (Seeking permission & Providing Information)

**List of Experiments:****20 Hours**

1. Listening to Monologue and Extended Listening Activity I
2. Listening to Monologue and Extended Listening Activity II
3. Expressing Opinions and Situational based speaking
4. Mini Presentation and Visual Interpretation
5. Reading Comprehension
6. Writing letter, email and report

<b>Course Outcomes</b>	<b>Cognitive Level</b>
At the end of this course, students will be able to:	
<b>CO1:</b> Identify the common errors in written and spoken correspondence.	Apply
<b>CO2:</b> Develop listening, reading and speaking skills through task based activities in listening, reading comprehension, recapitulation, interpretation and discussion.	Apply
<b>CO3:</b> Read business correspondences like memo, Email, letter, proposals and write reports and website entries and product launches.	Apply
<b>CO4:</b> Perform as an individual and member of a team and engage effectively in group discussion and individual presentation.	Apply

**Course Articulation Matrix**

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

High-3; Medium-2;Low-1

**Textbook(s):**

- T1. Guy Brook- Hart, "Business Benchmark Upper Intermediate", 2<sup>nd</sup> Edition, South Asian, Cambridge University Press, 2020.
- T2. Norman Whitby, "Business Benchmark pre-intermediate to Intermediate", 2<sup>nd</sup> Edition, South Asian, Cambridge University Press, 2014.

**Reference Book(s):**

- R1. Hewings Martin - Advanced Grammar in use Upper-intermediate Proficiency, CUP, 3<sup>rd</sup> Edition, 2013.
- R2. Clark David - Essential BULATS (Business Language Testing Service), CUP, 2006.
- R3. Adrian Doff, Craig Thaine, Herbert Puchta, Jeff Stranks, Peter Lewis-Jones, Rachel Godfrey, Gareth Davies, Empower B1+ - Student's Book, Cambridge University Press, 2015.

**Web References:**

1. <https://speakandimprove.com/>
2. <https://writeandimprove.com/>
3. <https://www.cambridgeenglish.org/exams-and-tests/linguaskill/>



<b>Course Code:23FLT201</b>	<b>Course Title: Foreign Language - Japanese (Common to all B.E/B.Tech Programmes)</b>		
<b>Course Category: AES</b>		<b>Course Level: Introductory</b>	
<b>L:T:P (Hours/Week) 3: 0: 0</b>	<b>Credits:3</b>	<b>Total Contact Hours:45</b>	<b>Max. Marks:100</b>

### Course Objectives:

The course objectives intended to:

1. Express a basic exposure on Japanese language and culture
2. Express thoughts and communicate in the beginner level of Japanese with native Japanese speaker
3. Identify the kanji etymology as well as use it in basic vocabulary required for the JLPT/NAT 5 examination level
4. Read and write 100 kanji of the official JLPT N5
5. Choose the appropriate verb forms for learning and practicing the Japanese language

#### **UNIT I Introduction to Japan and greetings 9 Hours**

Japan : Land and culture - Introduction to Japanese language – Greetings – Seasons - Days of the week - Months of the year – Dates of the month - Self introduction – Numbers (Upto 99,999) – Expressing time – Conversation audio and video.

Listening: Listening to Greetings - Listening for Specific Information: Numbers, Time.

Speaking: Self-Introduction

#### **UNIT II Building vocabulary 9 Hours**

Family relationships - Colours - Parts of body - Profession - Directions - Time expressions (today, tomorrow, yesterday, day before, day after) - Japanese housing and living style - Food and transport (vocabulary) - Stationery, fruits and vegetables

Listening: Listening for Specific Information: Directions, Family Members, Parts of body

Speaking: Introducing one's family.

#### **UNIT III Writing systems 9 Hours**

Hiragana Chart 1 - vowels and consonants and related vocabulary – Hiragana Charts 2&3, double consonants, vowel elongation and related vocabulary – Introduction to Kanji – Basic Vocabulary – Basic Conversational Phrases.

Listening: Listening to Japanese Alphabet Pronunciation, Simple Conversation.

Speaking: Pair Activity (Day to day situational conversation)

**UNIT IV Kanji and preposition****9 Hours**

Katakana script and related vocabulary – Basic kanjis: naka, ue, shita, kawa , yama , numbers (1- 10, 100, 1000, 10,000 and yen) , person, man, woman, child, tree , book , hidari, migi, kuchi , 4 directions - Usage of particles wa, no, mo and ka and exercises - Usage of kore, sore, are, kono, sono, ano, arimasu and imasu - Particles – ni (location) and ga , donata and dare - Particles ni (time), kara, made , ne , koko, soko, asoko and doko - Directions : kochira, sochira, achira and dochira , associated vocabulary (mae, ushiro, ue, shita, tonari, soba, etc.)

Listening: Listening to conversation with related particles

**UNIT V Verb forms****9 Hours**

Introduction to Verbs - Verbs –Past tense, negative - i-ending and na-ending adjectives introduction - ~masen ka, mashou - Usage of particles de, e , o, to, ga(but) and exercises - Adjectives (present/past – affirmative and negative) – Counters - ~te form

Listening: Listening to different counters, simple conversations with verbs and adjectives.

Speaking: Pair Activity (Explaining one’s daily routine by using appropriate particles and verbs)

<b>Course Outcomes</b>	<b>Cognitive Level</b>
<b>At the end of this course, students will be able to:</b>	
<b>CO1:</b> Recognize and write Japanese alphabet	Understand
<b>CO2:</b> Comprehend the conversation and give correct meaning	Understand
<b>CO3:</b> Apply appropriate vocabulary needed for simple conversation in Japanese language	Apply
<b>CO4:</b> Apply appropriate grammar to write and speak in Japanese language	Apply
<b>CO5:</b> Speak using words of the Japanese language	Apply

**Course Articulation Matrix**

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

High-3; Medium-2;Low-1

**Text Book(s):**

- T1. Genki 1 Textbook: An Integrated Course in Elementary Japanese by Eri Banno, Yoko Ikeda, Yutaka Ohno, Yoko Sakane, Chikako Shinagawa, Kyoko Tokashiki published by The Japan Times
- T2. Genki 1 Workbook: An Integrated Course in Elementary Japanese by Eri Banno published by The Japan Times

**Reference Book(s):**

- R1. Japanese for Everyone: Elementary Main Textbook1-1, Goyal Publishers and Distributors Pvt. Ltd., Delhi, 2007
- R2. Japanese for Everyone: Elementary Main Textbook1-2, Goyal Publishers and Distributors Pvt. Ltd., Delhi, 2007

**Web References:**

1. [www.japaneselifestyle.com](http://www.japaneselifestyle.com)
2. [www.learn-japanese.info/](http://www.learn-japanese.info/)
3. [www.learn.hiragana-katakana.com/typing-hiragana-characters/](http://www.learn.hiragana-katakana.com/typing-hiragana-characters/)
4. [www.kanjisite.com/](http://www.kanjisite.com/)

<b>Course Code:23FLT202</b>	<b>Course Title: Foreign Language - German (Common to all B.E/B.Tech Programmes)</b>		
<b>Course Category: AEC</b>		<b>Course Level: Introductory</b>	
<b>L:T:P (Hours/Week) 3: 0: 0</b>	<b>Credits:3</b>	<b>Total Contact Hours:45</b>	<b>Max. Marks:100</b>

### **Course Objectives:**

The course is intended to:

1. Listen and understand numbers, names and dialogues of a native speaker on par with A1 level.
2. Speak and introduce self in simple sentences to convey their opinion and ideas on par with A1 level.
3. Read simple passages and given text on par with A1 level.
4. Write letter and simple sentences on par with A1 level.

### **UNIT I Basic Introduction to German Scripts 9 Hours**

Theme and Text (Introduction to German - German script, Deutsche Namen, Daily Greetings and Expressions) – Grammar ('wh' questions, das Alphabet)– Speak Action (Buchstabieren, sich und andere vorstellen nach Namen und Herkunft fragen, internationale Wörter auf Deutsch verstehen, jemanden begrüßen)– pronunciation (Buchstabieren J,V,W,Y, - Long vowels A,E,I,O,U - Pronunciation of Ä,Ü,Ö) – To learn (internationale Wörter in Texten finden, Wörter sortieren)

Theme and Text (Gespräche im café, Getränkerte, Telefon-buch, Namen, Rechnungen) – Grammar (Fragesätze mit wie, woher, wo, was Verben in präsens Singular und Plural, das Verb Sein, Personalpronomen und Verben)– Speak Action (eine Gespräch beginnen sich und andere vorstellen zählen, etwas bestellen und bezahlen Telefonnummern und verstehen)– pronunciation (Wortakzent in Verben und in Zahlen) – To learn (Grammatiktable ergäzen, mit einem Redemittelkasten arbeiten)

### **UNIT II Numbers and Nominative Case 9 Hours**

Theme and Text (Numbers – 1 to 12 (Eins bis Zwölf) – 20, 30, 40, 90 (zwanzig-Neunzig) – All Numbers (1-10000) – German Currency (Euro) – Basic Mathematics (plus, Minus, Malen, Geteilt durch)) – Grammar (Introduction of verbs –Have Verb – To Come, To Speak, To Read, To Drive, To Fly, To write, To Eat, To sleep, To take etc.,)

Theme and Text (Communication in course) – Grammar (Singular and Plural, Artikel: der,das,die/ ein,eine, verneinung: kein, keine, Komposita: das Kursbuch) – Speak Action (Gegenständen fragen/ Gegenstände benennen im kurs:) – pronunciation (word accent Marking, Umlaute ö ä ü hören und sprechen) – To learn (Lernkarten schreiben, Memotipps, eine Regel selbst finden)

Theme and Text (City, Town, Language: Nachbar, Sprachen, Sehenswürdigkeiten in Europa) – Grammar (Past tense for Sein, W-Frage, Aussagesatz und Satzfrage) – Speak Action (about city and siteseeing) – pronunciation (Satzakzent in Frage- und Aussagesätzen) – To learn (eine Regel ergänzen, eine Grammatiktafel erarbeiten, Notizen machen)

### **UNIT III                    Akkusative Case and Prepositions                    9 Hours**

Theme and Text (Menschen und Häuser, Furniture catalogue, E-Mail, House information) – Grammar (possesivartikel im Nominativ, Artikel im Akkusativ, Adjektive im Satz, Graduierung mit zu)– Speak Action (Wohnung beschreiben about persons and things)– pronunciation (consonant - ch) – To learn (Wortschatz systematisch)

Theme and Text (Termine - Appointment and punctuality in Germany) – Grammar (questions with wann?, Preposition (am, um, von... bis), Verneinung mit nicht, trennbare Verben, Präteritum von haben) – Speak Action (Daily plan making, time commitment, excuse for late coming) – pronunciation (consonants- p,b,t,d / k,g) – To learn (Rollenkarten arbeiten)

Theme and Text (orientation in working area, go for work, floor plan city plan, office and computer) – Grammar (preposition: in, neben, unter, auf, vor, hinter, an, zwischen, bei und mit + Dativ)– Speak Action (work place, work, giving appointments)– pronunciation (consonants: f,w und v) – To learn (Making notice in calendar)

### **UNIT IV                    Dativ Case and Prepositions                    9 Hours**

Theme and Text (Holiday and Party, holiday plan, party plan in Germany) – Grammar (regular and irregular verbs) – Speak Action (holiday speak, accident, Ich-Text schreiben) – pronunciation (lange und kurze vokale markieren) – To learn (Text Order)

Theme and Text (organising an Excursion to Berlin through city orientation, Bus plan, City plan, post card, Excursion programme) – Grammar (preposition: in, durch, über + Akkusativ: zu, an... vorbei + Dativ, Modalverb wollen) – Speak Action (Tourism, culture, postcard preparation, travel description) – pronunciation (r and l)– To learn (plaket making)

Theme and Text (Beruf und all Tag, Visiten karten, Wörterbuch) – Grammar – Speak Action (profession, statistic speaking) – pronunciation (n,ng and nk)– To learn (Wörterbuch , text information in tabel)

### **UNIT V                    Adjectives and Pronunciation                    9 Hours**

Theme and Text (Haushaltstipp, Kochrezept, Maße und Gewichte, Mahlzeiten und Gerichte) – Grammar (jeden Tag, manchmal, nie, Question - welche, Comparison – viel, gut, gern) – Speak Action (about eat, drink question and answers) – pronunciation (e,en,el,er) – To learn (Text auswerten und zusammenfassen)

Theme and Text (Clothing , colour, weather) – Grammar (Adjektive im Akkusativ, unbestimmter Artikel) – Speak Action (weather, dress and colour understanding) – pronunciation (e-o- ö and ie-u- ü) – To learn (wetter and Farben interkulturelle)

Theme and Text (in super market,purchase, House Maintenance, Emotion, Sports, Body parts) – Grammar (Modal Verb) – Speak Action (Body parts) – To learn (Rollenkarten arbeiten)

**Total:45 Hours**

<b>Course Outcomes</b>	<b>Cognitive Level</b>
<b>At the end of this course, students will be able to:</b>	
<b>CO1:</b> Recognize and write German alphabet, numbers.	Understand
<b>CO2:</b> Comprehend the conversation and give correct meaning	Understand
<b>CO3:</b> Apply appropriate grammar and vocabulary to write and speak.	Apply
<b>CO4:</b> Apply appropriate cases and texts to listen, write and speak.	Apply
<b>CO5:</b> Speak and read using words of the German language	Apply

**Course Articulation Matrix**

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

High-3; Medium-2;Low-1

**Text Book(s)**

T1. Netzwerk, “Deutsch als Fremdsprache” by Stefanie Dengler, Paul Rusch, Helen

Schmitz published by Goyal Publishers & Distributors Pvt Ltd;

T2. Funk, Kuhn, Demme, “Studio D A1 Deutsch als Fremdsprache” published by Goyal

Publishers & Distributors Pvt Ltd;

**Reference Book(s)**

R1. Hueber, “Fit for Goethe- Zertifikat A1 (Start Deutsch 1)” by GOYAL PUBLISHERS AND DISTRIBUTORS; 2016

<b>Course Code: 23MAI203</b>		<b>Course Title: Calculus and Transforms (Common to AD, AM, CS, IT &amp; SC)</b>	
<b>Course Category: Minor</b>		<b>Course Level: Introductory</b>	
<b>L:T:P(Hours/Week) : 3: 0 :2</b>	<b>Credits: 4</b>	<b>Total Contact Hours: 75</b>	<b>Max Marks: 100</b>

**Course Objectives:**

The course is intended to impart knowledge on differential calculus, vector calculus, ordinary differential equations, Fourier Series and Z transform to devise engineering solutions to solve real world problems.

**Module I**

**23 Hours**

**Differential Calculus:** Curvature-Cartesian and Polar coordinates- radius of curvature-center of curvature- circle of curvature- Evolutes and Involutives.

**Multivariable Calculus:** Partial derivatives-total derivatives-Jacobian- maxima and minima and saddle points- Constrained maxima and minima: Method of Lagrange multipliers-- Gradient- directional derivative- curl and divergence.

**Ordinary Differential Equations of Second and Higher Orders:** Second and higher order linear differential equations with constant coefficients – Second order linear differential equations with variable coefficients (Cauchy - Euler equation, Legendre’s equation) - Method of variation of parameters – Solution of first order simultaneous linear ordinary differential equations.

**Module II**

**22 Hours**

**Fourier Series:** Dirichlet’s condition -Fourier series – Even and odd functions- Half rangesine and cosine series - Parseval’s identity -Harmonic Analysis.

**Z Transforms:** Z transform- region of convergence- properties of z transforms- inverse transform-Solution to homogeneous linear constant difference equations.

**List of Experiments(Using suitable software):**

**30 Hours**

1. Find the radius of curvature of a given curve.
2. Find the extremum value of a given function.
3. Compute second order ordinary differential equation.
4. Find the Fourier series of a periodic function.
5. Compute solution of difference equation using z transform.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
<b>CO1:</b> Apply differential calculus to find curvature of a curve, Jacobian, extremum of functions of several variables and vector quantities to solve problems in Science and Engineering.	Apply
<b>CO2:</b> Solve the second and higher order ordinary differential equations using various techniques.	Apply
<b>CO3:</b> Determine the Fourier series of periodic functions and solve finite difference equations using Z-transforms.	Apply
<b>CO4:</b> Develop programs using calculus and transforms concepts through modern tool.	Apply

### Course Articulation Matrix

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

High-3; Medium-2;Low-1

#### Text Book(s):

- T1. Erwin Kreyszig, Advanced Engineering Mathematics, 10<sup>th</sup> Edition, John Wiley & sons, 2010.
- T2. B.S.Grewal, Higher Engineering Mathematics, 44<sup>th</sup> Edition, Khanna Publishers, 2015.

#### Reference Book(s):

- R1. Veerarajan T., Engineering Mathematics for first year, 3<sup>rd</sup> edition, Tata McGraw-Hill, New Delhi, 2019.
- R2. Srimanta Pal & Subodh C. Bhunia. "Engineering Mathematics", 1<sup>st</sup> Edition, Oxford University Press, 2015.
- R3. P. Sivaramakrishna Das , C. Vijayakumari , Engineering Mathematics, Pearson India, 2017.

#### Web References:

- <https://nptel.ac.in/courses/111104092>
- <https://www.classcentral.com/course/differential-equations-engineers-13258>



<b>Course Code: 23ITT201</b>		<b>Course Title: Data Structures (Common to AD,AM CS,IT &amp;SC)</b>	
<b>Course Category: Major</b>		<b>Course Level: Introductory</b>	
<b>L:T:P(Hours/Week)3: 0: 0</b>	<b>Credits:3</b>	<b>Total Contact Hours:45</b>	<b>Max Marks:100</b>

**Course Objectives:**

The objective of the course is to impart knowledge of fundamental data structures and how they are implemented. Additionally, learn how to apply the right data structures for solving problems.

**Module I**

**22 Hours**

**Linked List:** Introduction- Types of Data Structures- Abstract Data type

**List ADT:** Array Implementation of list - Linked List Implementation list - Doubly Linked List - Circularly Linked List-Applications: Radix sort.

**Stack ADT:** Stack Model – Array and Linked List Implementation of Stack - Applications: Balancing Symbols - Postfix Expressions- Infix to Postfix Conversion

**Queue ADT:** Queue Model – Array and Linked List Implementation of Queue-Double ended Queue- Applications of Queue

**Trees:** Implementation of Trees - Tree Traversals -Binary Trees: Implementation - Expression Trees – Binary Search Tree: Implementation

**Module II**

**23 Hours**

**AVL Trees:** Implementation -Single Rotation - Double Rotation.

**Binary Heap:** Min Heap-Max Heap

**Graphs:** Definitions - Representation of Graphs - Graph Traversals: Breadth First Search - Depth First Search -Topological Sort

**Shortest Path Algorithms:** Unweighted Shortest Paths -Dijkstra’s Algorithm - Critical Path

**All Pairs Shortest Path:** Floyds Algorithm

**Minimum Spanning Tree:** Prim’s Algorithm - Krushkal’s Algorithm.

**Internal Sorting:**-Insertion Short-Shell Sort-Merge Sort-Quick sort

**External sorting:** Simple Algorithm-Multiway Merge

**Hashing:** Hash Functions-Separate Chaining-Open Addressing-Rehashing-Extendible hashing

<b>Course Outcomes</b>	<b>Cognitive Level</b>
At the end of this course, students will be able to:	
<b>CO1:</b> Implement principles of Data Structures that efficiently manage dynamic collections of data in real-world applications.	Apply
<b>CO2:</b> Categorize the linear data structures list, stack and queue to various applications	Analyze
<b>CO3:</b> Relate the nonlinear data structures trees and graph concepts to various applications	Analyze
<b>CO4:</b> Interpret various internal and external sorting techniques to solve real world problems across different domain	Apply
<b>CO5 :</b> Analyze different hash function properties for efficient data storage and retrieval systems	Analyze
<b>CO6:</b> Develop solutions with ethical standards as a team to the practical problems using Data Structures Concepts	Create

### Course Articulation Matrix

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

High-3; Medium-2;Low-1

### Text Book(s):

T1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2<sup>nd</sup> Edition, Pearson Education Asia, New Delhi, 2015.

### Reference Book(s):

R1. Sahni Horowitz , "Fundamentals of Data Structures in C", 2<sup>nd</sup> Edition Tata McGraw-Hill, New Delhi, 2008.

R2. Seymour "Lipschutz, Data Structures with C", McGraw Hill, 2014.

R3. Thomas H Cormen, Charles E Leiserson, Ronald L Revest, Clifford Stein, "Introduction to Algorithms" 3<sup>rd</sup> ed., The MIT Press Cambridge, 2014

### Web References:

1. <https://www.coursera.org/specializations/data-structures-algorithms>
2. <https://archive.nptel.ac.in/courses/106/106/106106127/>
3. <http://freevideolectures.com/Course/2279/Data-Structures-And-Algorithms>

<b>Course Code: 23EEI201</b>		<b>Course Title: Digital System Design (Common to AD,AM,CS,IT and SC)</b>	
<b>Course Category: Multidisciplinary</b>		<b>Course Level: Introductory</b>	
<b>L:T:P(Hours/Week)</b> <b>2: 0: 2</b>	<b>Credits:3</b>	<b>Total Contact Hours:60</b>	<b>Max Marks:100</b>

**Course Objectives:**

The course is intended to impart knowledge on basics of logic gates, number system and different types of implementation of digital circuits with its simplification methods. Also course describes the analysis of synchronous and asynchronous sequential circuit. At the end of the course the basics in design of computer system is discussed.

**Module I**

**15 Hours**

Number System Representation and Conversion - Logic Gates, Universal Gates - Boolean Algebra and Simplification Techniques: SOP – POS and Karnaugh Map Methods for Boolean Expression Simplification. Implementation of Combinational Logic - Arithmetic Circuits: Full Adder- Full Subtraction - Magnitude Comparator - Multiplexer - De-Multiplexer - Encoder and Decoder.

**Module II**

**15 Hours**

Flip-Flop: RS - JK - T and D - Types of Triggering. Analysis of synchronous sequential circuit - Shift Register. Analysis of asynchronous sequential circuit - Hazards - Static, Dynamic and Essential Hazards Computer System – Computer Memory - Random Access Memory - Read Only Memory - Expanding Memory Capacity -Secondary Storage - Input / Output Devices.

**List of Experiments**

**30 Hours**

1. Verification of Boolean theorems using digital logic gates
2. Implementation of combinational circuits using basic gates
3. Logic verification of half adder and full adder
4. Logic verification of Multiplexer / De-Multiplexer
5. Logic verification of 4 bit shift register
6. Logic verification of 3 bit binary counter

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Understand the numbers system representation, operation of logic gates and design of computer system	Understand
CO2: Apply the fundamental concepts of Boolean algebra insimplification of digital circuits	Apply
CO3: Design and implement the arithmetic circuits using combinational logiccircuits.	Create
CO4: Analyze the sequential logic circuit and infer the results.	Analyze
CO5: Analyze and interpret the digital circuits by performing hardware implementations and report the inference as a team or individual.	Evaluate

### Course Articulation Matrix

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

High-3; Medium-2;Low-1

### Text Book(s):

- T1. M. Morris Mano, "Digital Logic and Computer Design", 1<sup>st</sup> Edition, Pearson Publication, New Delhi, 2016.
- T2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Naraig Manjikian, "Computer Organization and Embedded Systems", 6<sup>th</sup> Edition, McGraw-Hill, 2011.

### Reference Book(s):

- R1. Anil K. Maini, "Digital Electronics Principles, Devices and Applications", John Wiley & Sons, 1<sup>st</sup> Edition, 2007.
- R2. Charles H. Roth, Jr. "Fundamentals of Logic Design", 7<sup>th</sup> Edition, Jaico publishing House, New Delhi, 2014.
- R3. S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, Oxford University Press, 5<sup>th</sup> Edition, 2018.
- R4. Leach P Donald, Albert Paul Malvino and Goutam Saha, "Digital Principles and Applications", 7<sup>th</sup> Edition, Mcgraw Hill, 2010.

### Web References:

1. <http://www.nptel.ac.in/courses/108105132>
2. <https://de-iitr.vlabs.ac.in>
3. <https://nptel.ac.in/courses/117105080>

<b>Course Code: 23MEL001</b>		<b>Course Title: Engineering Drawing</b> <b>(Common to AD,AM,AU,CS,EA ,EC,EE,EV,IT,ME, SC)</b>	
<b>Course Category: Multidisciplinary</b>		<b>Course Level: Introductory</b>	
<b>L:T:P(Hours/Week) 1: 0: 3</b>	<b>Credits:2.5</b>	<b>Total Contact Hours: 60</b>	<b>Max Marks:100</b>

**Course Objectives:**

The course is intended to

- To impart knowledge on basic dimensioning. 2D and 3 D drawings such as points, lines, planes and solids on first quadrant.

**Module I**

**8 Hours**

**Basics of Engineering Drawing:** Importance of graphics in engineering applications - Use of drafting instruments - BIS conventions and specifications - Size, layout and folding of drawing sheets - Lettering and dimensioning. Basic Geometrical constructions -Orthographic projection-Free hand Sketching.

**Projection of Points, Lines:** 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 by rotating object method.

**Projection of Solids:** Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by rotating object method. Practicing three dimensional modeling of simple objects by CAD Software (Not for examination).

**Module II**

**7 Hours**

**Sectioned Solids:** Sectioning of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by cutting planes inclined to one reference plane and perpendicular to the other – Orthographic views of sections of simple solids.

**Development of Surfaces:** Development of lateral surfaces of simple and truncated solids - Prisms, pyramids, cylinders using straight line and radial line method.

**Isometric Projection:** Principles of isometric projection – Isometric scale -Isometric projections of simple solids and truncated solids. Practicing three dimensional modeling of isometric projection of simple objects by CAD Software (Not for examination).

## List of Experiments

45 Hours

1. Lettering & Dimensioning
2. Projection of Points & Lines
3. Orthographic projections
4. Projection of Simple Solids
5. Projection of Section of Simple Solids
6. Development of Surfaces
7. Isometric Projections

## Course Outcomes:

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
<b>CO 1:</b> Apply the concepts related to free hand sketching, orthographic and Isometric projection in first quadrant.	Understand
<b>CO2:</b> Apply the concepts and draw projections of points in four different quadrants and lines located first quadrant.	Apply
<b>CO3:</b> Apply the concepts and draw projections and sections of simple solids using rotating object method.	Apply
<b>CO4:</b> Apply the concepts and draw lateral surface of simple solids using straight line and radial line development methods.	Apply
<b>CO5:</b> Apply the concepts and draw isometric view of simple solids and truncated solids using principles of isometric projection.	Apply
<b>CO6:</b> Conduct experiments to demonstrate concepts, implement and analyze the drawing concepts using engineering tool: Using AutoCAD.	Analyze

## Course Articulation Matrix

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

High-3; Medium-2; Low-1

## Textbook:

T1. Cencil Jensen, Jay D.Helsel and Dennis R. Short, " Engineering Drawing and Design", Tata McGraw Hill India, New Delhi, 3<sup>rd</sup> edition, 2019.

**Reference Book(s):**

R1. Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill India, New Delhi, 2<sup>nd</sup> edition, 2014.

R2. Dhananjay A. Jolhe, "Engineering Drawing with an introduction to AutoCAD" Tata McGraw India, New Delhi, 3<sup>rd</sup> edition, 2010.

R3. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, Gujarat, 54<sup>rd</sup> edition, 2023.

**Publications of Bureau of Indian Standards**

1. IS 10711 - 2001: Technical products Documentation - Size and lay out of drawing sheets. IS 9609 (Parts 0 & 1) - 2001: Technical products Documentation - Lettering.
2. IS 10714 (Part 20) - 2001 & SP 46 - 2003: Lines for technical drawings. IS 11669 - 1986 & SP 46 - 2003: Dimensioning of Technical Drawings.
3. IS 15021 (Parts 1 to 4) - 2001: Technical drawings - Projection Methods. The mode of delivery is like practical.

**Web References:**

1. <http://nptel.ac.in/courses/112103019/>
2. <https://www.coursera.org/specializations/autodesk-cad-cam-cae-mechanical-engineering>

<b>Course Code: 23ITL201</b>	<b>Course Title: Data Structures Laboratory (Common to AD,AM,CS,IT &amp; SC)</b>		
<b>Course Category: SEC</b>		<b>Course Level: Introductory</b>	
<b>L:T:P(Hours/Week) 0:0:3</b>	<b>Credits:1.5</b>	<b>Total Contact Hours:45</b>	<b>Max Marks:100</b>

### Course Objectives:

The objective of the course is to improve students' abilities to create and analyze basic linear and nonlinear data structures. It improves students' capacity to pick and use the ideal data

### List of Experiments

**45 Hours**

1. Array based implementation of List ADT
2. Array based implementation of Stack ADT and Queue ADT
3. Linked list implementation of List ADT
4. Linked list implementation of Stack ADT and Queue ADT
5. Implementation of Binary Tree traversals
6. Implementation of Binary Search Tree
7. Implementation of Graph traversals
8. Implementation of Floyd's Algorithms
9. Implementation of insertion sort
10. Implementation of Quick sort

<b>Course Outcomes</b>	<b>CognitiveLevel</b>
At the end of this course, students will be able to:	
<b>CO1:</b> Implement linear data structure operations using C programs	Apply
<b>CO2:</b> Predict the solution using non-linear data structure data structures using C programs	Evaluate
<b>CO3 :</b> Evaluate the efficiency of sorting algorithms using relevant data structures	Evaluate

### Course Articulation Matrix

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

High-3; Medium-2; Low-1



**Reference Book(s):**

- R1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2<sup>nd</sup> Edition, Pearson Education Asia, New Delhi, 2015.
- R2. Sahni Horowitz , "Fundamentals of Data Structures in C", 2<sup>nd</sup> Edition Tata McGraw-Hill, New Delhi, 2008.

**Web References:**

1. <https://www.coursera.org/specializations/data-structures-algorithms>
2. <https://archive.nptel.ac.in/courses/106/106/106106127/>
3. <http://freevideolectures.com/Course/2279/Data-Structures-And-Algorithms>

<b>Course Code:23CSL201</b>		<b>Course Title: IT Practices Laboratory (Common to AD,AM,CS,IT&amp;SC)</b>	
<b>Course Category: SEC</b>		<b>Course Level: Introductory</b>	
<b>L:T:P (Hours/Week) 0:0:4</b>	<b>Credits: 2</b>	<b>Total Contact Hours: 60</b>	<b>Max Marks:100</b>

### Course Objectives:

The course is intended to impart knowledge on developing web and mobile applications.

### List of Experiments:

**60 Hours**

1. Study of Peripheral Devices and PC Hardware.
2. Study of different communication protocols  
USB  
HDMI  
WIFI  
Bluetooth
3. Develop a web page with image, text, links, tables, Menus, Navigations bars, containers and Media.
4. Construct a web page to display resume.
5. Construct a web page to display the products of a company.
6. Create an application using GUI widgets, Layouts, Media and Event handlers.
7. Develop a calculator application to perform all arithmetic operations.
8. Construct an application to calculate BMI.

<b>Course Outcomes</b>	<b>Cognitive Level</b>
At the end of this course, students will be able to:	
CO1: Identify the components of PC hardware.	Understand
CO2: Design and develop websites, mobile applications for the givenscenario using open source tools.	Apply
CO3: Optimize web application performance by considering factors such as page load times, resource usage, and caching mechanisms for ensuring efficient user experiences.	Apply
CO4: Demonstrate the developed web and mobile applications with an oralpresentation.	Apply

### Course Articulation Matrix

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

High-3; Medium-2; Low-1

**Reference(s):**

- R1. Peter Abel, Niyaz Nizamuddin, "IBM PC Assembly Language and Programming", Pearson Education, 2007.
- R2. Harvey M. Deitel, Paul J. Deitel, "Internet and World Wide Web – How to Program", 4<sup>th</sup> Edition, Pearson Education Asia, 2009.
- R3. David Wolber, Hal Abelson, Ellen Spertus, Liz Looney, "App Inventor 2: Create Your Own Android Apps", 2<sup>nd</sup> Edition, O'Reilly Media, 2014.

**Web References:**

1. Open Element Tool: <https://www.openelement.uk/index.htm>
2. MIT App Inventor Tutorials: <https://appinventor.mit.edu/explore/ai2/tutorials>

<b>Course Code: 23ESL201</b>	<b>Course Title: Professional Skills 1:Problem solving skills &amp; Logical Thinking 1 (Common to all B.E/B.Tech Programmes)</b>		
<b>Course Category: SEC</b>		<b>Course Level: Introductory</b>	
<b>L:T:P(Hours/Week)0:0:2</b>	<b>Credits: 1</b>	<b>Total Contact Hours: 30</b>	<b>Max Marks: 100</b>

**Course Objectives:**

- To enhance the students' numerical, analytical and logical reasoning ability.
- To make them prepare for various public and private sector exams and placement drives.

**Module I Quantitative Ability**

**20 Hours**

Number System and LCM & HCF- Percentage- Ratio and Proportion - Average- Progressions- Ages-Partnership- Mixture & Allegation - Profit and loss- Interest calculation- Data interpretation.

**Module II Reasoning Ability**

**10 Hours**

Seating Arrangement- Linear, circular and Complex - Direction Problems- Blood Relation- Puzzles- Crypt arithmetic- Venn diagrams- Statement and conclusion- Statement and argument- Causes and effects- Self-Learning.

<b>Course Outcomes</b>	<b>Cognitive Level</b>
At the end of this course, students will be able to:	
<b>CO 1:</b> Build the competence in numerical, analytical and logical reasoning ability	Apply

**Course Articulation Matrix:**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	3	-	-

High-3; Medium-2; Low-1

**Text Book(s):**

T1: Dr. R. S. Aggarwal. "Quantitative Aptitude for Competitive Examinations" Sultan Chand & Sons Pvt. Ltd, New Delhi, 2018.

T2: Dr. R. S. Aggarwal. "A Modern Approach to Logical Reasoning", Sultan Chand & Sons Pvt. Ltd, New Delhi, 2018

**Reference Book(s):**

R1: R. V. Praveen. "Quantitative Aptitude and Reasoning" 2nd Revised Edition, Prentice-Hall of India Pvt.Ltd, 2013

R2: Arun Sharma. "Quantitative Aptitude for Common Aptitude Test", McGraw Hill Publications, 5th Edition, 2020

R3: Arun Sharma. "Logical Reasoning for Common Aptitude Test", McGraw Hill Publications, 6th Edition, 2021

**Web References:**

1. <https://www.indiabix.com/aptitude/questions-and-answers/>
2. <https://www.geeksforgeeks.org/aptitude-questions-and-answers/>

Course Code: 23VAT201	Course Title: TAMILS AND TECHNOLOGY (Common to all B.E/B.Tech Programmes)		
Course Category: VAC		Course Level: Introductory	
L:T:P (Hours/Week) 1: 0 :0	Credit: 1	Total Contact Hours: 15	Max Marks:100

### Pre-requisites

➤ NIL

### Course Objectives

மாணவர்கள் இப்பாடத்தை கற்றலின் மூலம்

- CO.1 நெசவு மற்றும் பாணைத் தொழில்நுட்பம், வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம், உற்பத்தித் தொழில்நுட்பம், வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்நுட்பம் ஆகியன குறித்து அறிந்து கொள்ள இயலும்.
- CO.2 அறிவியல் தமிழ் மற்றும் கணினித் தமிழ் குறித்து அறிந்து கொள்ள இயலும்.

### தமிழரும் தொழில்நுட்பமும்

#### அலகு 1 - நெசவு மற்றும் பாணைத் தொழில்நுட்பம்

3

சங்க காலத்தில் நெசவுத் தொழில் - பாணைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்

#### அலகு 2 - வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்

3

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் ஷ சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமானப் பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக் கோயில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாட்டு வீடுகள், பிரிட்டிஷ் காலத்தில் சென்னையில் இந்நோ - சாரோசெனிக் கட்டிடக் கலை.

#### அலகு 3 - உற்பத்தித் தொழில்நுட்பம்

3

கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருக்குதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத் துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

**அலகு 4 வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்நுட்பம்****3**

அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குழுவித் தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன் வளம் - முத்து மற்றும் முத்துக் குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்.

**அலகு 5 - அறிவியல் தமிழ் மற்றும் கணினித் தமிழ்****3**

அறிவியல் தமிழின் வளர்ச்சி - கணினித் தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின் புதிப்பு செய்தல் - தமிழ் மென் பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக் கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்.

**TOTAL : 15 PERIODS**

Course Outcomes	Cognitive Level
மாணவர்கள் இப்பாடத்தை கற்றபின்	
<b>CO.1</b> நெசவு மற்றும் பாணைத் தொழில்நுட்பம், வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம், உற்பத்தித் தொழில்நுட்பம், வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்நுட்பம் ஆகியன குறித்து அறிந்து கொள்வார்கள்.	அறிதல் (Understand)
<b>CO.2</b> அறிவியல் தமிழ் மற்றும் கணினித் தமிழ் குறித்து அறிந்து கொள்வார்கள்.	அறிதல் (Understand)

**Course Articulation Matrix**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-	-	1	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	1	-	-

High-3; Medium-2; Low-1

## TEXT - CUM REFERENCE BOOKS

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



<b>Course Code: 23VAT201</b>	<b>Course Title: TAMILS AND TECHNOLOGY (Common to all B.E/B.Tech Programmes)</b>		
<b>Course Category: VAC</b>		<b>Course Level: Introductory</b>	
<b>L:T:P (Hours/Week) 1: 0 :0</b>	<b>Credit: 1</b>	<b>Total Contact Hours: 15</b>	<b>Max Marks:100</b>

### Pre-requisites

➤ NIL

### Course Objectives

The course is intended to:

1. Understand Weaving and Ceramic Technology, Design and Construction Technology, Manufacturing Technology, Agriculture and Irrigation Technology.
2. Understand the Scientific Tamil & Tamil Computing.

## TAMILS AND TECHNOLOGY

### **UNIT I WEAVING AND CERAMIC TECHNOLOGY 3**

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

### **UNIT II DESIGN AND CONSTRUCTION TECHNOLOGY 3**

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

### **UNIT III MANUFACTURING TECHNOLOGY 3**

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.

**UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY****3**

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoombu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.

**UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING****3**

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.

**TOTAL : 15 PERIODS**

<b>Course Outcomes</b>	<b>Cognitive Level</b>
At the end of this course, students will be able to:	
CO.1 Understand Weaving and Ceramic Technology, Design and Construction Technology, Manufacturing Technology, Agriculture and Irrigation Technology.	Understand
CO.2 Understand the Scientific Tamil & Tamil Computing.	Understand

**Course Articulation Matrix**

<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>	<b>PSO1</b>	<b>PSO2</b>
<b>CO1</b>	-	-	-	-	-	-	-	-	-	-	-	1	-	-
<b>CO2</b>	-	-	-	-	-	-	-	-	-	-	-	1	-	-

High-3; Medium-2; Low-1

## TEXT - CUM REFERENCE BOOKS

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே.பிள்ளை  
(வெளியீடு. தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்)
3. கீழடி - வைகை நதிக்கரையில் சங்க கால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருதை - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL  
- (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by:  
International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D.  
Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by:  
International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published  
by: Department of Archaeology & Tamil Nadu Text Book and Educational Services  
Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay)  
(Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil  
Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) -  
Reference Book.

<b>Course Code: 23CHT202</b>	<b>Course Title: Environmental Sciences (Common to all B.E/B.Tech Programmes)</b>		
<b>Course Category: Multidisciplinary</b>		<b>Course Level: Introductory</b>	
<b>L:T:P(Hours/Week)1: 0: 0</b>	<b>Mandatory Non-Credit Course</b>	<b>Total ContactHours: 15</b>	<b>Max Marks:100</b>

**Course Objectives:**

The course is intended to impart knowledge on sustainable utilization of natural resources, prevention of pollution, disaster management and environmental issues & public awareness on ecosystem.

**Module I**

**8 Hours**

**Natural Resources**

Role of individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.

**Environmental Pollution and Disaster Management**

Role of an individual in prevention of pollution; Disaster management : floods, earthquake, cyclone and landslides.

**Environmental Ethics and Legislations**

Environmental ethics : Environment Protection Act; Air Act; Water Act ; Wildlife Protection Act; Forest Conservation Act; Issues involved in enforcement of environmental legislation.

**Module II**

**7 Hours**

**Environmental Issues and Public Awareness**

Public awareness - Environment and human health.

**Environmental Activities**

**(a) Awareness Activities:**

- i. Small group meetings about water management, promotion of recycle use, generation of less waste, avoiding electricity waste.
- ii. Slogan making event.
- iii. Poster making event.

**(b) Actual Activities:**

- i. Plantation.
- ii. Cleanliness drive.
- iii. Drive for segregation of waste.
- iv. To know about the different varieties of plants.
- v. Shutting down the fans and ACs of the campus for an hour or so.

<b>Course Outcomes</b>	<b>Cognitive Level</b>
At the end of this course, students will be able to:	
<b>CO 1:</b> Explain the use of natural resources for a sustainable life as an individual in prevention of pollution.	Understand
<b>CO 2:</b> Apply the environmental ethics and legislations for various environmental issues.	Apply
<b>CO 3:</b> Create the public awareness on environment and human health as an individual or team through various activity based learning.	Apply

### Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	3	3	-	-	-	-
CO3	3	-	-	-	-	3	3	-	3	3	-	-

High-3; Medium-2;Low-1

### Text Book(s):

- T1. Benny Joseph, "Environmental Studies", Tata McGraw Hill, New Delhi, 2006.
- T2. Mackenzie Davis and Susan Masten, "Principles of environmental engineering and science", Mc-Graw Hill, 3<sup>rd</sup> Edition, 2014.

### Reference Book(s):

- R1. Trivedi R.K. "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol.I and II, Enviro Media.
- R2. Cunningham, W.P.Cooper, T.H. Gorhani, "Environmental Encyclopedia", Jaico Publishing House, Mumbai, 2001.

### Web References:

1. [https://onlinecourses.nptel.ac.in/noc23\\_hs155/preview](https://onlinecourses.nptel.ac.in/noc23_hs155/preview).
2. [https://en.wikipedia.org/wiki/Environmental\\_science](https://en.wikipedia.org/wiki/Environmental_science).