GOVERNMENT COLLEGE OF TECHNOLOGY

(An Autonomous Institution Affiliated to Anna University)

Coimbatore - 641 013

Curriculum For

B. E. Computer Science and Engineering
(Artificial Intelligence and Machine Learning)
(Full Time)

2022
Regulations

OFFICE OF THE CONTROLLER OF EXAMINATIONS
GOVERNMENT COLLEGE OF TECHNOLOGY
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GOVERNMENT COLLEGE OF TECHNOLOGY, COIMBATORE – 641 013
B.E. COMPUTER SCIENCE AND ENGINEERING
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

FIRST SEMESTER

SI. No.	Course Code	Course Title	Category	CA Marks	End Sem Marks	Total Marks	L	T	P	C
		THEORY								
	22AMC1Z0	Induction Programme	MC	-	-	-	-	-	-	0
1	22AHS1Z1	தமிழர் மரபு Heritage of Tamils	HSMC	40	60	100	1	0	0	1
2	22AHS1Z2	Professional English	HSMC	40	60	100	2	1	0	3
3	22ABS1Z1	Linear Algebra and Calculus	BS	40	60	100	3	1	0	4
4	22ABS1Z2	Engineering Physics	BS	40	60	100	3	0	0	3
5	22AES101	Programming in C	ES	40	60	100	3	0	0	3
6	22AMC1Z1	Environmental Science and Engineering	MC	40	60	100	3	0	0	0
		PRACTICAL								
7	22AHS1Z3	Cambridge English	HSMC	-	-	100	0	0	2	1
8	22ABS1Z3	Physics Laboratory	BS	60	40	100	0	0	3	1.5
9	22AES1Z2	Workshop Practice	ES	60	40	100	0	0	3	1.5
10	22AES103	Programming in C Laboratory	ES	60	40	100	0	0	3	1.5
		TOTAL		480	520	1000	15	2	11	19.5

SECOND SEMESTER

SI. No.	Course Code	Course Title	Category	CA Marks	End Sem Marks	Total Marks	L	T	P	C
		THEORY								
1	22AHS2Z4	தமிழரும் தொழில்நுட்பமும் Tamils and Technology	HSMC	40	60	100	1	0	0	1
2	22AHS2Z5	Values and Ethics	HSMC	40	60	100	3	0	0	3
3	22ABS204	Vector Spaces and Differential Equations with MATLAB	BS	40	60	100	3	1	0	4
4	22ABS205	Physics for Information Science	BS	40	60	100	3	0	0	3
5	22ABS206	Applied Chemistry	BS	40	60	100	3	0	0	3
6	22AES204	Basics of Electrical and Electronics Engineering	ES	40	60	100	3	0	0	3
		NCC Credit Course (Optional)					2	0	0	3
		PRACTICAL								
7	22ABS2Z7	Chemistry Laboratory	BS	60	40	100	0	0	3	1.5
8	22AES2Z5	Engineering Graphics	ES	60	40	100	1	0	4	3
		TOTAL		360	440	800	17	1	7	21.5

COMPUTER SCIENCE AND ENGINEERING
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

22AMC1Z0	INDUCTION PROGRAMME	SEMESTER I

Details of the Programme:
Day 0: College Admission
Day1: Orientation Programme
Day2 Onwards: Induction Programme

Activities:
Physical activity,
Playground Events,
Yoga Practices,
Literary,
Proficiency modules,
Team Building,
Lectures by Eminent people,
Familiarization to department,
Branch oriented information,
Motivational speakers,
Talent exposure,
Quiz completion,
Visit to local areas….etc.

22AHS1Z1	தமிழர் மரபு **Heritage of Tamils**	**SEMESTER I**
	(Common to all Branches)	

PREREQUISITES	CATEGORY	L	T	P	C
NIL	**HSMC**	**1**	**0**	**0**	**1**

Course Objectives	

UNIT – I	LANGUAGE AND LITERATURE	3 Periods

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 Periods

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 ofTemples in Social and Economic Life of Tamils.

UNIT – III	FOLK AND MARTIAL ARTS	3 Periods

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 Periods

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 Periods

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

Contact Periods:
Lecture: 15 Periods   **Tutorial: 0 Periods   Practical: 0 Periods   Total: 15 Periods**

TEXT BOOK:

1	தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2	கணினித்தமிழ் – முனைவர் இல.சுந்தரம் . (விகடன் பிரசுரம்).
3	கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4	பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)

REFERENCES:

1	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
2	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by:International Institute of Tamil Studies.
3	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu)(Published by: International Institute of Tamil Studies).
4	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by:International Institute of Tamil Studies.)
5	Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by:Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation,Tamil Nadu)
6	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay)(Published by: The Author)
7	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
8	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) –Reference Book.

COURSE OUTCOMES: Upon completion of the course, the students will be able to:	Bloom's Taxonomy Mapped
CO1	
CO2	
CO3	
CO4	
CO5	

COURSE ARTICULATION MATRIX															
COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1															
CO2															
CO3															
CO4															
CO5															
22AHS1Z1															
1 – Slight, 2 – Moderate, 3 – Substantial															

22AHS1Z1	தமிழர் மரபு Heritage of Tamils _(Common to all Branches)_	SEMESTER I

PREREQUISITES	CATEGORY	L	T	P	C
NIL	HSMC	1	0	0	1

Course Objectives		
அலகு I	மொழி மற்றும் இலக்கியம்	**3 Periods**

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 பௌத்தசமயங்களின் தாக்கம்-பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள்-சிற்றிலக்கியங்கள்-தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி-தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

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

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

அலகு III	நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்	**3 Periods**

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

அலகு IV	தமிழர்களின் திணைக் கோட்பாடுகள்	**3 Periods**

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

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

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

Contact Periods:
Lecture: 15 Periods   Tutorial: 0 Periods   Practical: 0 Periods   Total: 15 Periods

TEXT BOOK:

1	தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2	கணினித்தமிழ் – முனைவர் இல.சுந்தரம் . (விகடன் பிரசுரம்).
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2	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by:International Institute of Tamil Studies.
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6	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay)(Published by: The Author)
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8	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) –Reference Book.

COURSE OUTCOMES: Upon completion of the course, the students will be able to:	Bloom's Taxonomy Mapped
CO1	
CO2	
CO3	
CO4	
CO5	

COURSE ARTICULATION MATRIX															
COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1															
CO2															
CO3															
CO4															
CO5															
22AHS1Z1															
1 – Slight, 2 – Moderate, 3 – Substantial															

22AHS1Z2	PROFESSIONAL ENGLISH *(Common to all Branches)*	SEMESTER I

PREREQUISITES	CATEGORY	L	T	P	C
NIL	HSMC	2	1	0	3

Course Objectives	1. To engage learners in meaningful language activities to improve their LSRW skills 2. To enhance learners' awareness of general rules of writing for specific audiences 3. To help learners understand the purpose, audience, contexts of different types of writing 4. To develop analytical thinking skills for problem solving in communicative contexts 5. To demonstrate an understanding of job applications and interviews for internship and placements	
UNIT – I	**FUNDAMENTALS OF COMMUNICATION**	**9 Periods**

Listening –Listening to Personal Introduction and Filling a form
Speaking - Self Introduction; Introducing someone in a formal context
Reading -Reading Biographies/ Autobiographies and E-mails relevant to technical contexts.
Writing - Writing Biographies/ Autobiographies; Drafting Professional E-mails.
Grammar - Present Tense (Simple Present, Present Progressive, Present Perfect, Present Perfect Continuous);
Parts of Speech
Vocabulary - Word Formation with Prefixes; Antonyms; Portmanteau Words

UNIT – II	**SUMMATION AND PROBLEM SOLVING**	**9 Periods**

Listening - Listening to Short-Stories / Personal Experiences/Watching Movies.
Speaking - Narrating Personal Experiences / Events and Short Stories
Reading - Reading Travelogues and Books.
Writing - Report on an event (Field Trip, Industrial Visit, Educational Tours etc.), Review on Books and Movies.
Grammar –Past Tense (Simple Past, Past Progressive, Past Perfect, Past Perfect Continuous); Impersonal Passive
Vocabulary - Word Formation with suffixes; Synonyms; Phrasal Verbs.

UNIT – III	**DESCRIPTION OF A PROCESS / PRODUCT**	**9 Periods**

Listening - Listening to Digital Marketing Advertisements for Product /Process Descriptions
Speaking –Describing/Interpreting a Picture; Giving instructions to use the product.
Reading – Reading Advertisements, Gadget Reviews; User Manuals.
Writing - Writing Definitions; Product /Process Description; Transcoding; Content Writing
Grammar -Future Tense(Simple Future, future continuous, Future Perfect, Future Perfect Continuous); If Clauses
Vocabulary - Homonyms; Homophones, One Word Substitutes.

UNIT – IV	**EXPRESSION**	**9 Periods**

Listening – Listening to/Watching Formal Job interviews or Celebrity Interviews
Speaking – Participating in a Face to Face or Virtual Interview (Job/Celebrity Interview), virtual interviews
Reading – Company profiles, Statement of Purpose, (SOP), Excerpts of interview with professionals from
Newspaper, Magazine and other Resources
Writing – Job / Internship Application – Cover letter & Resume
Grammar – Question types: 'Wh' / Yes or No/ and Tags; Subject- Verb Agreement.
Vocabulary – Idiomatic Expressions

UNIT – V	**PUBLIC SPEAKING**	**9 Periods**

Listening – Listening to Ceremonious Speeches on You Tube and Jotting down phrases
Speaking – Delivering Welcome Address; Introducing the Chief-Guest; Proposing Vote of Thank and Felicitation
Reading – Excerpts of Speeches from Newspaper, Magazines and Motivational Books
Writing – Drafting a Welcome Address, Introduction to the Chief-Guest, Vote of Thanks and Felicitation
Grammar –Common Errors
Vocabulary – Commonly Confused Words

Contact Periods:
Lecture: 30 Periods   Tutorial: 15 Periods   Practical: 0 Periods   Total: 45 Periods

TEXT BOOK

1	*English for Science & Technology* Cambridge University Press, 2021. Authored by Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN. Shoba, and Dr. Lourdes Joevani, Department of English, Anna University.
2	*Communicative English,* Global Publishers, Chennai 2017 by Dr.J.Anbazhagan Vijay

REFERENCES

1	*Raman.Meenakshi, Sharma.Sangeeta(2019). **Professional English.** Oxford University Press. New Delhi.*
2	***Learning to Communicate** – Dr. V. Chellammal, Allied Publishing House, New Delhi,2003*
3	*Using English, Orient Blackswan, Chennai, 2017 by Board of Editors*
4	***OER**(Authentic Open Educational Resources)*

	COURSE OUTCOMES: On completion of the course, the students will be able to:	**Bloom's Taxonomy Mapped**
CO1	Participate in a basic communicative task.	K3
CO2	Analyse problems in order to arrive at feasible solutions and communicate them orally and in the written format.	K3
CO3	Describe a product or process or mechanism.	K2
CO4	Present their opinions in a planned and logical manner, and draft effective resumes in context of job search.	K3
CO5	Deliver speeches at formal functions.	K3

COURSE ARTICULATION MATRIX:

COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	-	-	1	-	-	2	-	-	-	2	-	-	-	1	1
CO2	-	1	1	-	-	2	-	-	1	2	-	1	-	1	-
CO3	-	-	1	1	-	-	-	-	-	2	-	-	-	1	1
CO4	-	-	1	-	-	-	-	-	2	2	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	2	2	-	-	-	-	-
22AHS1Z2	-	1	1	1	-	1	-	-	1	2	-	1	-	1	1
1 – Slight, 2 – Moderate, 3 – Substantial															

22ABS1Z1	LINEAR ALGEBRA AND CALCULUS *(Common to all Branches)*	SEMESTER I

PREREQUISITES		CATEGORY	L	T	P	C
	NIL	BS	3	1	0	4

Course Objectives	1. To acquire knowledge of system of equations, eigenvalues, eigenvectors, diagonalization of matrices and reduction of quadratic forms to canonical forms. 2. To obtain the knowledge of analyze the functions using Limits and derivative recognize the appropriate tools of differential calculus to solve applied problems. 3. To obtain the knowledge of definite and improper integration and recognize the appropriate tools of Integral Calculus to solve applied problems 4. To develop the skills in solving the functions of several variables by partial derivatives. 5. To acquire knowledge of multiple integration and related applied problems in various geometry

UNIT – I	LINEAR ALGEBRA	9+3 Periods

Consistency of System of Linear Equations - Eigen values and eigenvectors - Diagonalization of matrices by orthogonal transformation - Cayley-Hamilton Theorem - Quadratic to canonical forms.

UNIT – II	DIFFERENTIAL CALCULUS	9+3 Periods

Limit and continuity of function - Rolle's theorem - Mean value theorems - Taylor's and Maclaurin's theorems. Application of Differential Calculus: Radius of curvature, Centre of curvature, Circle of curvature and Evolutes of a curve.

UNIT – III	INTEGRAL CALCULUS	9+3 Periods

Evaluation of definite integral by trigonometric substitution - Convergence and Divergence of improper integrals - Beta & Gamma functions and their properties - Applications of definite integrals to evaluate surface areas and volume of revolution (Cartesian coordinates only).

UNIT – IV	PARTIAL DERIVATIVES AND ITS APPLICATIONS	9+3 Periods

Partial derivatives - total derivative - Taylor's series – Jacobians - Maxima, minima and saddle points - Method of Lagrange multipliers.

UNIT – V	MULTI VARIABLE INTEGRAL CALCULUS	9+3 Periods

Double integral - Area as double integral - change of order of integration in double integrals - Triple Integrals - Volume as Triple Integral. Change of variables: Cartesian to polar, Spherical polar coordinates, Cylindrical polar coordinates.

Contact Periods:
Lecture: 45 Periods   Tutorial: 15 Periods   Practical: 0 Periods   Total: 60 Periods

TEXT BOOK

1	*Veerarajan T., “**Engineering Mathematics I**”, Tata McGraw-Hill Education(India)Pvt. Ltd, New Delhi,2015.*
2	*David C.Lay, “**Linear Algebra and Its Application**”, Pearson Publishers, 6th Edition, 2021.*

REFERENCES

1	*B.S.Grewal, “**Higher Engineering Mathematics**”, Khanna Publishers, 44th Edition, 2017.*
2	*Howard Anton, “**Elementry Linear Algebra**”, 11th Edition, Wiley Publication, 2013.*
3	*Narayanan.S and Manicavachagom Pillai. T.K. – “**Calculas Vol I and Vol II**”, S.chand & Co, Sixth Edition, 2014.*
4	*H.K. Dass, “**Advance Engineering Mathematics**”, S. Chand and company, Eleventh Edition, 2015.*
5	*Jain R.K. and Iyengar S.R.K., “**Advanced Engineering Mathematics**”, Narosa Publicaitons, Eighth Edition, 2012.*

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		Bloom's Taxonomy Mapped
CO1	Solve the linear system of equations, diagonalize matrix by orthogonal transformation and reduce quadratic form to canonical form.	K5
CO2	Compare and contrast the ideas of continuity and differentiability and use them to solve engineering problems.	K5
CO3	Acquire fluency in integration of one variable and apply them to find surface area and volumes.	K5
CO4	Apply the techniques of partial derivatives in functions of several variables.	K5
CO5	Use multiple integration for finding area, surface and volume of different geometry.	K5

COURSE ARTICULATION MATRIX

COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	1	1	-	-	-	-	-	-	-	1	3	3	2
CO2	3	3	1	1	-	-	-	-	-	-	-	1	3	3	1
CO3	3	3	1	1	-	-	-	-	-	-	-	1	3	2	1
CO4	3	3	1	1	-	-	-	-	-	-	-	1	3	2	-
CO5	3	3	1	1	-	-	-	-	-	-	-	1	3	2	-
22ABS1Z1	**3**	**3**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**2**	**1**
1 – Slight, 2 – Moderate, 3 – Substantial															

22ABS1Z2	ENGINEERING PHYSICS *(Common to all Branches)*	SEMESTER I

PREREQUISITES		CATEGORY	L	T	P	C
	NIL	BS	3	0	0	3

Course Objectives	1. To understand the basics about crystal systems and defects.
	2. To understand the principle, characteristics, working and applications of laser and optical fiber.
	3. To solve problems in bending of beams.
	4. To solve quantum mechanical problems with the understanding of Quantum Principles.
	5. To understand the properties, production and applications of ultrasonic waves.

UNIT – I	CRYSTAL PHYSICS	9 Periods

Introduction – Crystalline and amorphous materials – Lattice – Unit Cell –Crystal system - Bravais lattices – Miller indices – Reciprocal lattice - d spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC, and HCP structures – Crystal defects – Point, line and surface defects.

UNIT – II	LASER PHYSICS AND FIBER OPTICS	9 Periods

Introduction- Principle of laser action - characteristics of laser - Spontaneous emission and Stimulated emission –Einstein's coefficients - population inversion – methods of achieving population inversion – Optical Resonator -Types of Lasers – Principle, construction and working of CO_2 Laser - applications of laser.

Introduction – Basic Principles involved in fiber optics- Total internal reflection–Propagation of light through optical fiber –Derivation for Numerical Aperture and acceptance angle - fractional index change.

UNIT – III	PROPERTIES OF MATTER	9 Periods

Elasticity- Hooke's law- stress-strain diagram - Factors affecting elasticity – Moment (Q) - Couple (Q) – Torque (Q) – Beam - Bending moment - Depression of a cantilever –Twisting Couple- Young's modulus by uniform bending - I shaped girders.

UNIT – IV	QUANTUM PHYSICS AND APPLICATIONS	9 Periods

Limitations of classical Physics - Introduction to Quantum theory - Dual nature of matter and radiation- de-Broglie wavelength in terms of voltage, energy, and temperature –Heisenberg's Uncertainty principle – verification – physical significance of a wave function- Schrödinger's Time independent and Time dependent wave equations –- Particle in a one dimensional potential well - Scanning Electron Microscope (SEM)-Transmission Electron Microscope (TEM).

UNIT – V	ULTRASONICS	9 Periods

Introduction - properties of ultrasonic waves - production of ultrasonic waves -Magnetostriction effect- Magnetostriction generator- Piezoelectric effect- Piezoelectric generator- Acoustic grating - Determination of wavelength and velocity of ultrasonic waves-cavitation - applications- ultrasonic drilling- ultrasonic welding- ultrasonic soldering and ultrasonic cleaning-Non- destructive Testing- Pulse echo system.

Contact Periods:
Lecture: 45 Periods   Tutorial: 0 Periods   Practical: 0 Periods   Total: 45 Periods

TEXT BOOK:

1	*K. Rajagopal, "Engineering Physics", PHI Learning Private Limited, 2015.*
2	*P. K. Palanisamy, "Engineering Physics-I", Scitech publications Private Limited, 2015.*
3	*M. Arumugam, "Engineering Physics", Anuradha Publishers, 2010.*

REFERENCES:

1	*Arthur Beiser, "Concepts of Modern Physics", Tata McGraw-Hill, 2010.*
2	*D. Halliday, R. Resnick and J. Walker, "Fundamentals of Physics", 6th Edition, John Wiley and Sons, 2001.*
3	*William T. Silfvast, "Laser Fundamentals", 2nd Edition, Cambridge University Press, New York 2004.*
4	*M. N. Avadhanulu and P.G. Kshirsagar, "A Textbook of Engineering Physics", S. Chand and Company Ltd, 2010.*
5	*R. K. Gaur and S. L. Gupta, "Engineering Physics", Dhanpat Rai Publishers, 2009.*

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		Bloom's Taxonomy Mapped
CO1	Interpret the crystal structure and analyse the type of defect.	K4
CO2	Explain the principle, characteristics, working and applications of laser and optical fiber, Analyse and solve problems in laser and optical fiber.	K4
CO3	Solve problems in bending of beams. Apply the knowledge in construction of buildings.	K3
CO4	Explain the importance of quantum mechanics. Solve problems in basic quantum physics. Apply the wave equations in real time problems.	K3
CO5	Explain the properties and production of ultrasonic waves. Apply ultrasonic waves for industrial problems.	K3

COURSE ARTICULATION MATRIX															
COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-	1	1	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	2	1	-	-	-	-	-	-	-	-	-	-	2	-	-
CO5	2	-	-	-	-	-	-	-	-	-	-	-	2	1	-
22ABS1Z2	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**
1 – Slight, 2 – Moderate, 3 – Substantial															

22AES101	PROGRAMMING IN C *(Common to all Branches Except MECH & PRODN)*	SEMESTER I

PREREQUISITES		CATEGORY	L	T	P	C
NIL		ES	3	0	0	3

Course Objectives	1. To study the basic concepts of computer and programming fundamentals. 2. To understand the data types in C , flow control statements, Arrays, Functions Pointers, Structures, Unions and File concepts in C.

UNIT – I	COMPUTER AND PROGRAMMING FUNDAMENTALS	9 Periods

Computer fundamentals – Evolution, classification, Anatomy of a computer: CPU, Memory, I/O – Introduction to software –Classification of programming languages – Compiling –Linking and loading a program – Introduction to OS – Types of OS.

UNIT – II	DATATYPES AND FLOW OF CONTROL	9 Periods

Structured programming – Algorithms – Structure of a C program – Variables – Data types – Operators and expressions – Input and Output statements – Tokens –Type Conversion – Control statements.

UNIT – III	ARRAYS AND FUNCTIONS	9 Periods

1DArrays– 2D Arrays – Multidimensional Arrays – Strings – String handling functions – Functions – Recursion – Array as function arguments – Storage Classes – Enumerations.

UNIT – IV	POINTERS	9 Periods

Introduction to pointers – Pointers arithmetic – call by reference – Relationship between Array and Pointers – Relationship between String and pointers – pointers to pointers – array of pointers – pointers to an array – Dynamic memory allocation – Arguments to main().

UNIT – V	STRUCTURES AND UNIONS, FILE OPERATIONS	9 Periods

Preprocessor directives – Structures – Unions – Bit fields – Opening and closing a file – Working with file of records – Random access to file of records.

Contact Periods: Lecture: 45 Periods   Tutorial: 0 Periods   Practical: 0 Periods   Total: 45 Periods

TEXT BOOK:

*PradipDey, Manas Ghosh, **"Computer Fundamentals and Programming in C",** Second Edition, Oxford University Press, 2018.*

REFERENCES:

1	*Al Kelley, Ira Pohl **,"A Book on C- Programming in C ",**Fourth Edition, Addison Wesley, 2001.*
2	*Herbert Schildt , **"C: The Complete Reference",** Fourth Edition, McGraw Hill Education, 2017.*
3	*YashavantP.Kanetkar, **"Let Us C",**15thedition, BPB Publications,2016.*
4	*Brian W. Kernighan and Dennis Ritchie, **"The C Programming Language",** Second Edition, Prentice Hall Software Series, 2015.*

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		Bloom's Taxonomy Mapped
CO1	Articulate the basics of computer and evolution of programming languages.	K1
CO2	Write simple C programs using appropriate datatypes and control statements.	K3
CO3	Write C programs using arrays, functions and enumerations.	K3
CO4	Use pointers effectively to develop programs.	K3
CO5	Create user defined datatypes using structures & union and effectively manipulate them in file operations.	K6

COURSE ARTICULATION MATRIX

COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	1	-	-	-	-	-	-	-	-	-	-	3	3	3
CO2	1	2	1	-	-	-	-	-	-	-	-	-	3	3	3
CO3	1	2	1	-	-	-	-	-	-	-	-	-	3	3	3
CO4	2	2	1	-	-	-	-	-	-	-	-	-	3	3	3
CO5	1	2	1	-	-	-	-	-	-	-	-	-	3	3	3
22AES101	**1**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**3**
1 – Slight, 2 – Moderate, 3 – Substantial															

22AMC1Z1	ENVIRONMENTAL SCIENCE AND ENGINEERING *(Common to all Branches)*	SEMESTER I

PREREQUISITES		CATEGORY	L	T	P	C
	NIL	MC	3	0	0	0

Course Objectives	1. To study the modern agriculture related problems, natural resources and its harnessing methods. 2. To study the interrelationship between living organism and environment. 3. To educate the people about causes of pollutions and its controlling methods. 4. To impart the knowledge of various environmental threats and its consequences. 5. To study the various water conservation methods, Act, Population policy, Welfare programs.	
UNIT – I	**ENVIRONMENTAL ENERGY RESOURCES**	**9 Periods**
Food-effects of modern agriculture, fertilizers, pesticides, eutrophication & biomagnifications-Energy resources: renewable resources - Hydro Energy, Solar & Wind. Non-renewable resources – Coal and Petroleum - harnessing methods.		
UNIT – II	**ECO SYSTEM AND BIODIVERSITY**	**9 Periods**
Eco system and its components - biotic and abiotic components. Biodiversity: types and values of biodiversity, hot spots of biodiversity, endangered and endemic species, conservation of biodiversity: In situ and ex situ conservation. Threats to biodiversity-destruction of habitat, habit fragmentation, hunting, over exploitation and man-wildlife conflicts. The IUCN red list categories.		
UNIT – III	**ENVIRONMENTAL POLLUTION**	**9 Periods**
Air pollution, classification of air pollutants – sources, effects and control of gaseous pollutants SO_2, NO_2, H_2S, CO, CO_2 and particulates. Water pollution - classification of water pollutants, organic and inorganic pollutants, sources, effects and control of water pollution. Noise pollution - decibel scale, sources, effects and control.		
UNIT – IV	**ENVIRONMENTAL THREATS**	**9 Periods**
Global warming-measure to check global warming - impacts of enhanced Greenhouse effect, Acid rain-effects and control of acid rain, ozone layer depletion- effects of ozone depletion, disaster management - flood, drought, earthquake and tsunami.		
UNIT – V	**SOCIAL ISSUES AND ENVIRONMENT**	**9 Periods**
Water conservation, rain water harvesting, e-waste management, Pollution Control Act, Wild life Protection Act. Population growth- exponential and logistic growth, variation in population among nations, population policy. Women and Child welfare programs. Role of information technology in human and health, COVID-19 - effects and preventive measures.		
Contact Periods:		
Lecture: 45 Periods Tutorial: 0 Periods Practical: 0 Periods Total: 45 Periods		

TEXT BOOK:

1	*Sharma J.P., “Environmental Studies”, 4th Edition, University Science Press, New Delhi 2016.*
2	*Anubha Kaushik and C.P.Kaushik, “Environmental Science and Engineering”, 7th Edition, New Age International Publishers, New Delhi, 2021.*

REFERENCES:

1	*A K De, “Environmental Chemistry”, 8th Edition, New Age International Publishers, 2017.*
2	*G. Tyler Miller and Scott E. Spoolman, “Environmental Science”, Cengage Learning India Pvt, Ltd, Delhi, 2014.*
3	*ErachBharucha, “Textbook of Environmental Studies”, Universities Press(I) Pvt, Ltd, Hyderabad, 2015.*
4	*Gilbert M.Masters, “Introduction to Environmental Engineering and Science”, 3rd Edition, Pearson Education, 2015.*

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		Bloom's Taxonomy Mapped
CO1	Recognize and understandabout the various environmental energy resources and the effective utility of modern agriculture.	K2
CO2	Acquire knowledge about the interaction of biosphere with environment and conservation methods of bio diversity.	K2
CO3	Be aware of the sources of various types of pollution, their ill effects and preventive methods.	K2
CO4	Identify and take the preventive measures to control the environmental threats and effects of Global warming, Ozone depletion, Acid rain, and natural disasters.	K2
CO5	Demonstrate an idea to save water and other issues like COVID -19.	K2

COURSE ARTICULATION MATRIX

COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	1	1	-	1	1	-	3	-	-	-	-	1	-	-	-
CO2	1	1	-	1	1	2	2	-	-	-	-	1	-	-	-
CO3	1	1	1	1	1	2	3	-	-	-	-	1	-	-	-
CO4	1	1	1	1	1	2	3	-	-	-	-	1	-	-	-
CO5	1	1	1	1	2	2	2	-	-	1	-	1	-	-	-
22AMC1Z1	**1**	**1**	**1**	**1**	**1**	**2**	**3**	**-**	**-**	**1**	**-**	**1**	-	-	-
1 – Slight, 2 – Moderate, 3 – Substantial															

22ABS1Z3	PHYSICS LABORATORY *(Common to all Branches)*	SEMESTER I

PREREQUISITES		CATEGORY	L	T	P	C
	NIL	BS	0	0	3	1.5

Course Objectives	1. To impart practical knowledge on the concept of properties of matter and utilize the experimental techniques to measure the properties 2. To impart practical knowledge on the modulii of elasticity 3. To analyze the properties of semiconductors 4. To learn practically the basic electronic concepts of transistor and logic gates 5. To realize the principle, concepts and working of a solar cell and study the properties of ferromagnetic material 6. To understand the concept of quantum physics
S. No.	LABORATORY EXPERIMENTS
1.	Determination of refractive index of the glass and given liquid – Spectrometer diffraction method.
2.	Determination of Planck's constant.
3.	Determination of Young's Modulus of the material in the form of bar – Cantilever Bending - Koenig's Method.
4.	a) Particle size determination using diode laser. b) Determination of numerical aperture and acceptance angle in an optical fiber.
5.	Hall effect - Determination of semiconductor parameters.
6.	Determination of band gap of semiconductor material.
7.	Determination of velocity of sound and compressibility of the given liquid-Ultrasonic Interferometer.
8.	Determination of moment of inertia of disc and rigidity modulus of a wire-Torsional pendulum.
9.	Transistor characteristics.
10.	Solar cell characteristics.
11.	Determination of Hysteresis losses in a Ferromagnetic material-B-H curve unit.
12.	Logic Gates – Verification and Construction.

Contact Periods:
Lecture: 0 Periods   Tutorial: 0 Periods   Practical: 45 Periods   Total: 45 Periods

COURSE OUTCOMES: Upon completion of the course, the students will be able to:	Bloom's Taxonomy Mapped
CO1	Determine refractive index and compressibility of liquids, micro size of particles and numerical aperture of an optical fibre	K5
CO2	Measure the Young's and rigidity modulii of the given material	K5
CO3	Determine the bandgap of a given semiconductor material and identify the type of semiconductor and its carrier concentration through Hall measurement	K5
CO4	Analyze the characteristics of transistor and verify the truth table of logic gates	K4
CO5	Measure the efficiency of a solar cell and energy loss associated with the ferromagnetic material by plotting B-H curve	K5
CO6	Determine the Planck's constant and work function	K5

COURSE ARTICULATION MATRIX

COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-	1	1	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO5	2	-	-	-	-	-	-	-	-	-	-	-	2	1	-
CO6	2	-	-	-	-	-	-	-	-	-	-	-	1	1	-
22ABS1Z3	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**

1 – Slight, 2 – Moderate, 3 – Substantial

22AES1Z2	WORKSHOP PRACTICE *(Common to all Branches)*	SEMESTER I

PREREQUISTES		CATEGORY	L	T	P	C
NIL		ES	0	0	3	1.5

Course Objectives	1. To make various basic prototypes in the carpentry trade such as Half Lap joint, Lap Tee joint, Dovetail joint, Mortise & Tenon joint. 2. To make various welding joints such as Lap joint, Lap Tee joint, Edge joint, Butt joint and Corner joint. 3. To make various moulds in foundry such as Cube, Straight pipe, V pulley, and Conical bush. 4. To make various components using sheet metal such as Tray, Frustum of cone and Square box. 5. To understand the working and identify the various components of CNC Machines.

LIST OF EXPERIMENTS

1. Introduction to use of tools and equipment's in Carpentry, Welding, Foundry and Sheet metal
2. Safety aspects in Welding, Carpentry, Foundry and sheet metal.
3. Half Lap joint and Dovetail joint in Carpentry.
4. Welding of Lap joint and Butt joint and T-joint.
5. Preparation of Sand mould for Cube, Conical bush, Pipes and V pulley
6. Fabrication of parts like Tray, Frustum of cone and Square box in sheet metal
7. CNC Machines demonstration and lecture on working principle.
8. Electrical wiring and simple house wiring.

Contact periods:

Lecture: 0 Periods	Tutorial: 0 Periods	Practical: 45 Periods	Total: 45 Periods

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		Bloom's Taxonomy Mapped
CO1	Safely Use tools and equipment's used in Carpentry, Welding, Foundry and Sheet metal to create basic joints.	K2
CO2	Prepare sand mould for various basic pattern shapes.	K3
CO3	Fabricate parts like Tray, Frustum of cone and Square box in sheet metal.	K3
CO4	Practice on the Welding and Carpentry	K3
CO5	Demonstrate the working of CNC Machines.	K2

COURSE ARTICULATION MATRIX

COs/ POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	-	-	1	-	-	3	1	1	-	2	-	1	-	-	-
CO2	2	-	2	-	-	3	3	1	-	3	2	1	-	-	1
CO3	2	-	2	-	-	3	3	1	-	3	2	1	-	-	-
CO4	2	-	2	-	-	3	3	1	-	3	2	1	-	-	-
CO5	-	-	-	-	1	-	-	-	-	2	-	1	-	-	1
22AES1Z2	1	-	1	-	1	2	2	1	-	3	1	1	-	-	1
1 – Slight, 2 – Moderate, 3 – Substantial															

22AES103	PROGRAMMING IN C LABORATORY *(Common to all Branches Except MECH & PRODN)*	SEMESTER I			

PREREQUISITES	CATEGORY	L	T	P	C
NIL	ES	0	0	3	1.5

Course Objectives	To understand the concepts like Data types, Flow control statements, Functions, Arrays, command line arguments, Pointer, Dynamic memory allocation, Preprocessor Directives, Structures ,Unions and Files in C.

EXERCISES ILLUSTRATING THE FOLLOWING CONCEPTS:	
1	Operators, Expressions and IO formatting.
2	Decision Making and Looping.
3	Arrays and Strings.
4	Functions and Recursion.
5	Pointers.
6	Dynamic Memory Allocation.
7	Command line arguments.
8	Preprocessor Directives.
9	Structures.
10	Unions.
11	Files.
12	MiniProject.

Contact periods:			
Lecture: 0 Periods	Tutorial: 0 Periods	Practical: 45 Periods	Total: 45 Periods

COURSE OUTCOMES: Upon completion of the course, the students will be able to:	Bloom's Taxonomy Mapped
CO1	Use appropriate data types and flow control statements to write C programs.	K6
CO2	Write C programs using arrays, functions and command line arguments.	K6
CO3	Write C programs using pointers, dynamic memory allocation and preprocessor directives.	K6
CO4	Implement user defined data types using structures & union and effectively manipulate them in file operations.	K6
CO5	Develop simple applications using C.	K6

COURSE ARTICULATION MATRIX

COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	1	-	-	-	-	-	-	-	-	-	-	3	3	3
CO2	-	1	-	-	-	-	-	-	-	-	-	-	3	3	3
CO3	-	1	-	-	-	-	-	-	-	-	-	-	3	3	3
CO4	-	1	-	-	-	-	-	-	-	-	-	-	3	3	3
CO5	2	2	2	-	-	-	-	-	3	3	-	-	3	3	3
22AES103	**1**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**	**3**	**3**	**3**

1 – Slight, 2 – Moderate, 3 – Substantial

22AHS2Z4	தமிழரும் தொழில்நுட்பமும் **TAMILS AND TECHNOLOGY** *(Common to all Branches)*	SEMESTER II

PREREQUISITES		CATEGORY	L	T	P	C
NIL		**HSMC**	**1**	**0**	**0**	**1**

Course Objectives	
UNIT – I	**WEAVING AND CERAMIC TECHNOLOGY**	**3 Periods**

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

UNIT – II	**DESIGN AND CONSTRUCTION TECHNOLOGY**	**3 Periods**

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 Periods**

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 Periods**

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

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

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

Contact Periods:
Lecture: 15 Periods   **Tutorial: 0 Periods**   **Practical: 0 Periods**   **Total: 15 Periods**

TEXT BOOK:

1	தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2	கணினித்தமிழ் – முனைவர் இல.சுந்தரம் . (விகடன் பிரசுரம்).
3	கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4	பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)

REFERENCES:

1	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
2	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by:International Institute of Tamil Studies.
3	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu)(Published by: International Institute of Tamil Studies).
4	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by:International Institute of Tamil Studies.)
5	Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by:Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation,Tamil Nadu)
6	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay)(Published by: The Author)
7	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
8	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) –Reference Book.

COURSE OUTCOMES: Upon completion of the course, the students will be able to:	Bloom's Taxonomy Mapped
CO1	
CO2	
CO3	
CO4	
CO5	

COURSE ARTICULATION MATRIX

COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1															
CO2															
CO3															
CO4															
CO5															
22AHS2Z4															
1 – Slight, 2 – Moderate, 3 – Substantial															

22AHS2Z4	தமிழரும் தொழில்நுட்பமும் **TAMILS AND TECHNOLOGY** *(Common to all Branches)*	SEMESTER II

PREREQUISITES		CATEGORY	L	T	P	C
NIL		HSMC	1	0	0	1

Course Objectives	
அலகு I	**நெசவு மற்றும் பானைத் தொழில்நுட்பம்**	**3 Periods**

சங்க காலத்தில் நெசவுத் தொழில் – பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள்– பாண் டங்களில் கீறல் குறியீடுகள்.

| **அலகு II** | **வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்** | **3 Periods** |

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு- சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும்– சிலப்பதிகாரத்தில் மேடைஅமைப்பு பற்றிய விவரங்கள் – மாமல்லபுரச் சிற்பங்களும், கோவில்களும்- சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் – நாயக்கர் காலக் கோயில்கள்-மாதிரிகட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சிஅம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர்மஹால் – செட்டிநாட்டு வீடுகள் – பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ-சாரோசெனிக் கட்டிடக் கலை.

| **அலகு III** | **உற்பத்தித் தொழில் நுட்பம்** | **3 Periods** |

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 – எலும்புத்துண் டுகள் –தொல்லியல் சான்றுகள் – சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

| **அலகு IV** | **வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்** | **3 Periods** |

அணை, ஏரி, குளங்கள் , மதகு – சோழர்காலக் குமுழித்தூம்பின் முக்கியத்துவம் – கால்நடை பராமரிப்பு – கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் – கடல்சார்அறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்குளித்தல் – பெருங்கடல் குறித்த பண்டைய அறிவு –அறிவுசார் சமூகம்.

| **அலகு V** | **அறிவியல் தமிழ் மற்றும் கணினித்தமிழ்** | **3 Periods** |

அறிவியல் தமிழின் வளர்ச்சி-கணினித்தமிழ் வளர்ச்சி- தமிழ் நூல்களை மின்பதிப்பு செய்தல் – தமிழ் மென்பொருட்கள் உருவாக்கம் – தமிழ் இணையக் கல்விக்கழகம் – தமிழ் மின் நூலகம் – இணையத்தில் தமிழ் அகராதிகள் – சொற்குவைத் திட்டம்.

Contact Periods:
Lecture: 15 Periods   Tutorial: 0 Periods   Practical: 0 Periods   Total: 15 Periods

TEXT BOOK:

1	தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2	கணினித்தமிழ் – முனைவர் இல.சுந்தரம் . (விகடன் பிரசுரம்).
3	கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4	பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)

REFERENCES:

1	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
2	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by:International Institute of Tamil Studies.
3	Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu)(Published by: International Institute of Tamil Studies).
4	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by:International Institute of Tamil Studies.)
5	Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by:Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation,Tamil Nadu)
6	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay)(Published by: The Author)
7	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
8	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) –Reference Book.

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		Bloom's Taxonomy Mapped
CO1		
CO2		
CO3		
CO4		
CO5		

COURSE ARTICULATION MATRIX

COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1															
CO2															
CO3															
CO4															
CO5															
22AHS2Z4															
1 – Slight, 2 – Moderate, 3 – Substantial															

22AHS2Z5	VALUES AND ETHICS *(Common to all Branches)*	SEMESTER II

PREREQUISITES		CATEGORY	L	T	P	C
NIL		HSMC	3	0	0	3

Course Objectives	1. To understand and appreciate the ethical issues faced by an individual in profession, society and polity.
	2. To learn about Engineering Ethics and case studies.
	3. To understand the negative health impacts of certain unhealthy behaviours.
	4. To appreciate the need and importance of physical, emotional health and social health.
	5. To get familiar with the global issues.

UNIT – I	BEING GOOD AND RESPONSIBLE	9 Periods

Morals, Values and Ethics - Integrity - Work Ethics - Service Learning - Civic Virtue - Respect for Others - Living Peacefully - Caring - Sharing - Honesty - Courage - Valuing Time - Cooperation - Commitment - Empathy - Self-Confidence - Character

UNIT – II	ENGINEERING AS SOCIAL EXPERIMENTATION	9 Periods

Engineering Ethics: Senses of 'Engineering Ethics' - variety of moral issued - types of inquiry - moral dilemmas - moral autonomy - Models of Professional Roles. Engineering as Experimentation – Engineers as responsible Experimenters – Research Ethics - Codes of Ethics – Industrial Standards - A Balanced Outlook on Law – Case studies : Chernobyl disaster and Titanic disaster

UNIT – III	ADDICTION AND HEALTH	9 Periods

Peerpressure - Alcoholism: Ethicalvalues, causes, impact, laws, prevention–Illeffects of smoking-
Prevention of Suicides; Sexual Health: Prevention and impact of premarital pregnancy and Sexually Transmitted Diseases. DrugAbuse: Abuse of different types of legal and illegal drugs: Ethical values, causes, impact, laws and prevention

UNIT – IV	PROFESSIONAL ETHICS	9 Periods

AbuseofTechnologies: Hacking and other cybercrimes, Addiction to mobile phone usage, Video games and Social networking websites

UNIT – V	GLOBAL ISSUES	9 Periods

Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers - consulting engineers - engineers as expert witnesses and advisors - Code of Conduct – Corporate Social Responsibility

Contact Periods:
Lecture: 45 Periods   Tutorial: 0 Periods   Practical: 0 Periods   Total: 45 Periods

TEXT BOOK:

1	*Mike W Martin and Roland Schinzinger, "Ethics in Engineering", 4th Edition, McGraw-Hill, New York 2017.*
2	*Govindarajan M, Natarajan S and Senthil Kumar VS, "Engineering Ethics", Prentice Hall of India, New Delhi, 2013.*

REFERENCES:

1	Dhaliwal,K.K, *"Gandhian Philosophy of Ethics: A Study of Relationship between his Presupposition and Precepts"*, WritersChoice, NewDelhi, India, 2016.
2	Jayshreesuresh, B.S.Raghavan,*"Human values and professional ethics"*, S.Chand and company Ltd, New Delhi, 2nd Edition, 2007.
3	L.A. and Pagliaro,A.M, *"Handbook of Child and Adolescent Drug and Substance Abuse: Pharmacological, Developmental and Clinical Considerations"*, Wiley Publishers, U.S.A,2012.
4	Pandey,P.K(2012*),"SexualHarassmentandLawinIndia"*, LambertPublishers,Germany. 2012.
5	Kiran D.R, *"Professional ethics and Human values,"* Tata McGraw Hill, New Delhi, 2007.
6	Edmund G See Bauer and Robert L Barry, *"Fundamentals of Ethics for Scientists and Engineers"*, Oxford University Press, Oxford, 2001.
7	David Ermann and Michele S Shauf, *"Computers, Ethics and Society"*, Oxford University Press, 2003.
8	Govindarajan M, Natarajan S, Senthil Kumar V. S, *"Engineering Ethics"*, Prentice Hall of India, New Delhi, 2004.

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		Bloom's Taxonomy Mapped
CO1	Follow sound morals and ethical values scrupulously to prove as good citizens.	K3
CO2	Assess the relevance of ethics and morals in engineering and to learn case studies.	K3
CO3	Describe the concept of addiction and how it will affect the physical and mental health.	K2
CO4	Identify ethical concerns while using advanced technologies.	K2
CO5	Judge the code of conduct, Environmental ethics and computer ethics.	K3

COURSE ARTICULATION MATRIX

COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	-	-	-	-	-	3	3	3	3	2	1	-	-	-	-
CO2	-	-	-	-	-	3	-	3	3	-	1	-	-	-	-
CO3	-	-	-	-	-	3	-	3	3	2	1	-	-	-	-
CO4	-	-	-	-	-	3	3	3	3	1	1	1	-	-	2
CO5	-	-	-	-	-	3	3	3	3	-	1	3	-	-	2
22AHS2Z5	**-**	**-**	**-**	**-**	**-**	**3**	**2**	**3**	**3**	**1**	**1**	**1**	**-**	**-**	**1**
1 – Slight, 2 – Moderate, 3 – Substantial															

22ABS204	VECTOR SPACES AND DIFFERENTIAL EQUATIONS WITH MATLAB *(Common to CSE & IT Branches)*	SEMESTER II			
PREREQUISITES		**CATEGORY**	**L**	**T**	**P**	**C**
NIL		**BS**	**3**	**1**	**0**	**4**

Course Objectives	1. To be familiar with MATLAB and solving the simple equations 2. To gain methods to solve second order differential equations with constant and variable coefficients. 3. To acquire knowledge of testing convergence of sequences and series. 4. To gain the concepts of vector spaces and linear transformations. 5. To obtain the knowledge of decomposition and inner product spaces.
UNIT – I **MATLAB**	**9+3 Periods**
MATLAB Basics- Simple problems: solving equations, matrix operations, calculating eigen values and eigen vectors, solving linear system of equations, differentiation.	
UNIT – II **ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDER**	**9+3 Periods**
Higher order linear differential equations with constant coefficients -variable coefficients: Cauchy-Euler equation, Cauchy-Legendre equation-Method of variation of parameters-Simultaneous first order linear equations with constant coefficients.	
UNIT – III **SEQUENCES AND SERIES**	**9+3 Periods**
Convergence of sequence, tests for convergence of series of positive terms: comparison test, D' Alembert's ratio test, Cauchy's Integral test, Raabe's test, logarithmic test, Gauss test, Cauchy's root test- alternating series: Leibnitz test – power series: absolutely convergent, conditionally convergent.	
UNIT – IV **VECTOR SPACES I**	**9+3 Periods**
Vector Space, linear dependence of vectors, basis, dimension, Linear transformations (maps), range and kernel of a linear map, rank and nullity, Inverse of a linear transformation, rank-nullity theorem, composition of linear maps, Matrix associated with a linear map.	
UNIT – V **VECTOR SPACES II**	**9+3 Periods**
Eigen bases, Cholesky Decomposition, Inner product spaces- norm, orthogonality, orthonormal set,Gram-Schmidt orthogonalization.	
Contact Periods: **Lecture: 45 Periods Tutorial: 15 Periods Practical: 0 Periods Total: 60 Periods**	

TEXT BOOK

1	*B.S.Grewal,* ***"Higher Engineering Mathematics"****, Khanna Publishers, New Delhi, 44[th]Edition, 2018.*
2	*Howard Anton, Chris Rorres,* ***"Elements of Linear Algebra with Applications"****, Wiley, New Delhi, 2[nd]Edition, 2015.*
3	*Brain R.Hunt, Ronald L.Lipsman, Jonathan M. Rosenberg with Kevin R.Coombes, John E. Osborn and Garrett J.Stuck,* ***"A Guide to MATLAB for beginners and experienced users"****, Published in the United States of America by Cambridge University Press, New York 2001.*

REFERENCES

1	E. A. Coddington, *"An Introduction to Ordinary Differential Equations"*, Prentice Hall India, 1995.
2	G.F. Simmons and S.G. Krantz, *"Differential Equations"*, Tata McGraw Hill, 2007.
3	Srimanta Pal and suboth.C.Bhunia, *"Engineering Mathematics"*, Oxford university publications, New Delhi, 2015.
4	Gilbert Strang, *"Linear Algebra and its Applications"*, Cengage Learning, Delhi, 4th Edition, 2006.
5	D.Poole, *"Linear Algebra: A Modern Introduction"*, 2nd Edition, Brooks/Cole, 2005.
6	V. Krishnamurthy, V.P. Mainra and J.L. Arora, *"An introduction to Linear Algebra"*, Affiliated East–West press, Reprint 2005.
7	Amos Gilat, *"MATLAB:An Introduction with Applications"*, Wiley, The Ohio State University, 6th Edition, 2013.

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		Bloom's Taxonomy Mapped
CO1	Solve algebraic equations by using MATLAB.	K5
CO2	Find solution for higher order linear differential equation with constant and variable coefficients and simultaneous differential equation.	K5
CO3	Perform basic computation in convergence and divergence of sequences and series	K5
CO4	Demonstrate the concepts of vector spaces and linear transformation orientation with matrices.	K5
CO5	Use Cholesky Decomposition and orthogonal transformation including Inner product spaces in the applications of many different fields.	K5

COURSE ARTICULATION MATRIX

COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	-	3	-	4	-	-	-	1	-	2	3	3	2
CO2	2	1	-	-	-	4	-	-	-	-	-	2	3	3	1
CO3	2	1	-	-	-	4	-	-	-	-	-	2	3	2	1
CO4	2	1	-	-	-	4	-	-	-	-	-	2	3	2	-
CO5	2	1	-	-	-	4	-	-	-	-	-	2	3	2	-
22ABS204	**2**	**1**	**-**	**1**	**-**	**4**	**-**	**-**	**-**	**1**	**-**	**2**	**3**	**2**	**1**
1 – Slight, 2 – Moderate, 3 – Substantial															

22ABS205	PHYSICS FOR INFORMATION SCIENCE *(Common to CSE & IT Branches)*	SEMESTER II

PREREQUISTIES		CATEGORY	L	T	P	C
NIL		BS	3	0	0	3

Course Objectives	1. To understand the properties of electronic materials. 2. To understand the characteristics of semiconductors. 3. To explain different number systems and their application in logic gates 4. To understand the properties of magnetic and superconducting materials and apply them for specific purpose 5. To explain engineered semiconductor materials and their Applications

UNIT – I	ELECTRONIC MATERIALS	9 Periods

Classical Free electron theory of metals – Postulates – Electrical and Thermal conductivity of metals – Derivation of Wiedeman – Franz law – Lorentz number – Drawbacks of Classical theory – Fermi distribution Function – Effect of temperature – Density of energy states in metals (derivation) – Carrier concentration in metals - Calculation of Fermi energy at 0 K

UNIT – II	SEMICONDUCTORS	9 Periods

Properties of semiconductors – elemental and compound semiconductors - Direct and indirect band gaps - Intrinsic and extrinsic semiconductors - Fermi level - Carrier concentration in intrinsic semiconductor - Dependence of Fermi level on temperature – Electrical conductivity – band gap determination – extrinsic semiconductors – Carrier concentration in P-type and N-type semiconductors - Dependence of Fermi level on impurity concentration and temperature for P-type and N-type semiconductors.

UNIT – III	DIGITAL ELECTRONICS	9 Periods

Introduction – Binary number system – place value – decimal to Binary conversion – Binary to decimal conversion – Octal and hectadecimal numbers. Logic Gates – Three basic Logic Gates:OR, AND, NOT: operation, circuit, truth table, Boolean expression – Universal gate: NAND and NOR Gates:NOT, AND and OR from NAND & NOR Gates – Exclusive OR Gate - Problems

UNIT – IV	MAGNETIC AND SUPER CONDUCTING MATERIALS	9 Periods

Origin of magnetic moment - Bohr magneton - Dia, Para, and Ferro magnetic materials - Domain theory of ferromagnetism - Hysteresis - Hard and Soft magnetic materials. Magnetic recording – Magnetic Tapes – Floppy disk – Optical Recording – Magneto Optical Recording – Principle – Recording – Reading – Construction.
Superconductivity - Types of superconductors - BCS theory of superconductivity (qualitative) - properties- Meissner effect, effect of magnetic field and current - Applications of superconductors: Cryotron, Magnetic levitation.

UNIT – V	ENGINEERED SEMICONDUCTOR MATERIALS	9 Periods

Introduction - Quantum confinement – Density of states in 2D, 1D and 0D (qualitatively) - Practical examples of low-dimensional systems such as quantum wells, wires, and dots – Nanomaterials – Properties – Methods of synthesize – Top-down & Bottom-up Approach – Ball Milling – Chemical vapour deposition – Applications of Nanomaterials.

Contact Periods:
Lecture: 45 Periods   Tutorial: 0 Periods   Practical: 0 Periods   Total: 45 Periods

TEXT BOOK:

1.	*P.K.Palanisamy, "**EngineeringPhysics-II**",Scitech Publications(India)pvt.Ltd, 2015.*
2.	*V.Rajendran, "**Material Science**", Tata McGraw-Hill Publications, 2011.*
3.	*S. Jayakumar, "**Materials Science**", R.K.publishers, 2008.*
4.	*V. K. Mehta and Shalu Mehta, "**Principles of Electronics**", S.Chand& Company Ltd., 2001.*

REFERENCES:

1.	*William D Callister and David G. Rithwish,* **"Materials science & Engineering**:*An introduction",Wiley, 2013.*
2.	*P. Bhattacharya,* **"Semiconductor Optoelectronic Devices"**, *Prentice Hall of India, 1997.*
3.	*G.W. Hanson,* **"Fundamentals of Nanoelectronics"**, *Pearson Education, 2009.*
4.	*M.Moris Mano,* **"Digital Logic and Computer Design"**, *Prentice- Hall of India Pvt. Ltd., 1998.*

COURSE OUTCOMES: Upon completion of the course, the students will be able to:	Bloom's Taxonomy Mapped
CO1	Explain the physical properties of conducting materials.	K2
CO2	Explain the characteristics of intrinsic and extrinsic semiconductors.	K2
CO3	Explain different number systems. Apply logic gates in circuits.	K3
CO4	Explain magnetic and superconductor characteristics. Apply magnetic materials and superconductors for industrial problems.	K3
CO5	Explain low dimensional systems and Choose suitable method for the synthesis. Apply nanomaterials for real time problems.	K3

COURSE ARTICULATION MATRIX

COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-	1	1	-
CO3	3	1	1	-	1	-	-	-	-	-	-	-	-	-	-
CO4	2	-	1	1	1	-	-	-	-	-	-	-	2	-	-
CO5	2	-	1	-	-	-	-	-	-	-	-	-	2	1	-
22ABS205	2	1	1	1	1	-	-	-	-	-	-	-	1	1	-
1-Slight, 2 – Moderate, 3 - Substantial															

22ABS206	APPLIED CHEMISTRY *(Common to EEE, ECE, EIE, CSE & IT Branches)*	SEMESTER II

PREREQUISITES		CATEGORY	L	T	P	C
	NIL	BS	3	0	0	3

Course Objectives	1. To know about the second law of thermodynamics and its various functions. 2. To understand the concept of electrochemistry, primary, secondary batteries, construction and its uses. 3. To understand the basic principles of corrosion, mechanism and its protection methods. 4. To acquire basic knowledge about the nanoparticles, its preparations, properties, types and applications in various field. 5. To impart the knowledge of preparations of single crystal, wafer preparation, P-N junction formation by various methods.	
UNIT – I	**CHEMICAL THERMODYNAMICS**	**9 Periods**
The Second law of thermodynamics-Concepts of entropy, Work and free energy functions - Maxwell's relationships for reversible and irreversible process - Gibbs Helmholtz equation – Partial molar free energy-Chemical potential-Gibb's Duhem Equation, Clausius - Clapeyron equation.		
UNIT – II	**ELECTRO CHEMISTRY AND STORAGE DEVICES**	**9 Periods**
Cells–Electro chemical cell and electrolytic cell – electrodes– electrode potentials – standard oxidation and reduction potentials-Hydrogen and Calomel electrodes- EMF series and its significance. Batteries - Types of batteries- Primary - Zn/MnO_2 and $Li/SOCl_2$ - Construction, working and applications. Secondary batteries-Lead acid battery and lithium-ion battery – $Li-TiS_2$- Construction, working and Applications.		
UNIT – III	**CORROSION**	**9 Periods**
Corrosion-Definition -Classifications: Chemical Corrosion and Electro chemical corrosion mechanism-Pilling Bedworth rule–Galvanic series and its importance- preventing methods-Cathodic protection (sacrificial anode and impressed current conversion method). Protective Coatings-Inorganic coating-surface preparation-Electro plating method applied to Cr and Ni, Organic coating- paints - constituents and its functions.		
UNIT – IV	**NANO MATERIALS**	**9 Periods**
Nanomaterials and bulk materials; Size-dependent properties (Optical, Electrical and Mechanical); Types of nanomaterials: Definition- properties and uses of nanoparticle, nanorod and nanotube. Preparation of nanomaterials: chemical vapour deposition, electrochemical deposition. Applications of nanomaterials in medicine and electronics.		
UNIT – V	**FABRICATION**	**9 Periods**
Silicon for IC chips - single crystal – preparation by Czochralski and float zone processes- wafer preparation, P-N junction formation – Ion implantation. Diffusion and epitaxial growth techniques - Insulator layer by oxidation- Printing of circuits by photolithography – masking and electron beam methods- etching by chemical and electrochemical methods.		
Contact Periods: **Lecture: 45 Periods Tutorial: 0 Periods Practical: 0 Periods Total: 45 Periods**		

TEXT BOOK:

1	*Jain. P.C. and Monica Jain,* **"Engineering Chemistry"**, *DhanpatRai Publications Pvt Ltd, New Delhi, 16th Edition, 2017.*
2	*S.S. Dara**, "A text book of Engineering Chemistry"**, S. Chand Publishing, 12th Edition, 2018.*

REFERENCES:

1	*Dara. S.S, Umarae,* **"Text book of Engineering Chemistry"**, *S. Chand Publications, 2013.*
2	*M.S.Tyagi,* **"Introduction to semiconductor materials and devices"**, *WileyIndia, 2012.*
3	*B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday**, "Textbook of nanoscience and nanotechnology"**, Universities Press-IIM Series in Metallurgy and Materials Science, 2018.*
4	*B.R Puri, L.R Sharma & M. S. Pathania,* **"Principles of Physical Chemistry"** *S. Nagin Chand and Co., 2017.*

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		Bloom's Taxonomy Mapped
CO1	Analyzethe applications of thermodynamics and its various functions.	K3
CO2	Implement the new ideas related to batteries which find uses in the society including engineering fields.	K3
CO3	Identify the corrosion mechanisms and its controlling methods.	K3
CO4	Applying the concepts of nanoscience and nanotechnology in the synthesis of nanomaterials for engineering applications.	K3
CO5	Construct the silicon chips and their fabrication methods and to apply in preparation ofelectrical and electronic instruments.	K3

COURSE ARTICULATION MATRIX

COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	1	-	-	-	1	-	-	-	-	-	-	-	-
CO2	2	2	1	-	1	-	1	-	-	-	-	-	-	1	-
CO3	2	2	1	1	-	-	1	-	-	-	-	-	-	-	-
CO4	2	2	1	1	1	-	1	-	-	-	-	-	-	-	-
CO5	3	2	1	1	1	-	1	-	-	-	-	-	-	1	-
22ABS206	**2**	**2**	**1**	**1**	**1**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**
1 – Slight, 2 – Moderate, 3 – Substantial															

22AES204	BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING *(Common to CIVIL, MECH, PRODN, CSE, IT & IBT Branches)*	SEMESTER II

PREREQUISITES	**CATEGORY**	**L**	**T**	**P**	**C**
NIL	**ES**	**3**	**0**	**0**	**3**

Course Objectives	1. To study the basic concepts of electric circuits, electronic devices and communication engineering. 2. To know the fundamentals of DC and AC machines. 3. To familiar with the basics of analog and digital electronics. 4. To understand the basics of house wiring. 5. To introduce the components of electrical installations and energy conservation.
UNIT – I **ELECTRICAL CIRCUITS** **9 Periods**	
Electrical circuit elements (R,L and C) - Voltage and Current sources – Ohm's Law – Kirchoff laws – Time domain analysis of First order RL and RC circuits – Representation of sinusoidal waveforms – Average, RMS and Peak values – Phasor representation – Real, Reactive, Apparent power and power factor.	
UNIT – II **ELECTRICAL MACHINES AND MEASUREMENTS** **9 Periods**	
Construction, Principle of Operation, basic equations and Types, Characteristics and Applications of DC generators, DC motors, Single phase Transformer, Single phase and Three phase Induction motor. Operating principles of Moving coil, Moving iron Instruments (Ammeter and Voltmeters).	
UNIT – III **ANALOG AND DIGITAL ELECTRONICS** **9 Periods**	
Analog Electronics: Semiconductor devices – P-N junction diode, Zener diode, BJT, Operational amplifier – principle of operation, Characteristics and applications. Digital Electronics: Introduction to numbers systems, basic Boolean laws, reduction of Boolean expressions and implementation with logic gates.	
UNIT – IV **FUNDAMENTAL OF COMMUNICATION AND TRANSDUCERS** **9 Periods**	
Types of Signals : Analog and Digital Signals – Modulation and Demodulation :Principles of Amplitude and Frequency Modulations – Resistive, Inductive, capacitive Transducers- Introduction.	
UNIT – V **ELECTRICAL INSTALLATIONS AND ENERGY CONSERVATION** **9 Periods**	
Single phase and three phase system – phase, neutral and earth, basic house wiring -tools and components, different types of wiring - basic safety measures at home and industry – Energy efficient lamps - Energy billing. Introduction to UPS and SMPS.	
Contact Periods: **Lecture: 45 Periods** **Tutorial: 0 Periods** **Practical: 0 Periods** **Total: 45 Periods**	

TEXT BOOKS:

1	*R.Muthusubramaniam,R.Salivaganan, Muralidharan K.A.,* ***"Basic Electrical and Electronics Engineering"*** *Tata McGraw Hill , Second Edition 2010.*
2	*Mittle V.N and Aravind Mittal,* ***"Basic Electrical Engineering",*** *Tata McGraw Hill, Second Edition, New Delhi, 2005.*

REFERENCES:

1	*D.P.Kothari, I.J. Nagrath,* ***"Basic Electrical Engineering"****, Tata McGraw Hill, 2010.*
2	*Nagsarkar T.K and Sukhija M.S,* ***"Basic Electrical Engineering"****, Oxford Press, 2005.*
3	*E.Hughes,****"Electrical and Elecronics Technology"****, Pearson, 2010.*
4	*MohmoodNahvi and Joseph A.Edminister,* ***"Electric Circuits"****, Shaum Outline series, McGraw Hill, Sixth edition, 2014.*
5	*Premkumar N and Gnanavadivel J,* ***"Basic Electrical and Electronics Engineering"****, Anuradha Publishers, 4ᵗʰ Edition, 2008.*
6	*Allan S Morris,* ***"Measurement and Instrumentation Principles"*** *Elsevier, First Indian Edition, 2008.*
7	*S.L. Uppal,* ***"Electrical Wiring Estimating and Costing"****, Khanna publishers, New Delhi, 2006.*

COURSE OUTCOMES: Upon completion of the course, the students will be able to:	Bloom's Taxonomy Mapped
CO1	Analyze the DC and AC circuits.	K4
CO2	Describe the operation and characteristics of electrical machines.	K4
CO3	Classify and compare various semiconductor devices and digital electronics.	K3
CO4	Infer the concept of communication engineering and Transducers.	K2
CO5	Assemble and Implement electrical wiring and electrical installations.	K6

COURSE ARTICULATION MATRIX

COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	-	1	-	-	-	-	-	-	-	3	-	-	-
CO2	2	1	-	1	-	-	-	-	-	-	-	-	-	-	-
CO3	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	2	1	-	-	-	-	-	-	-	-	-	-	1	-	2
CO5	1	1	-	1	-	-	-	-	-	-	-	3	2	-	2
22AES204	**2**	**1**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**

1 – Slight, 2 – Moderate, 3 – Substantial

22ABS2Z7	CHEMISTRY LABORATORY *(Common to all Branches)*	SEMESTER II

PREREQUISITES	CATEGORY	L	T	P	C
NIL	BS	0	0	3	1.5

Course Objectives	To inculcate the practical applications of Chemistry to students and make them apply in the fields of engineering and technology.

LIST OF EXPERIMENTS	
1.	Estimation of hardness by EDTA method.
2	Conductometric titration of mixture of strong acid and weak acid using strong base.
3.	Estimation of chloride by Argentometric method.
4.	Potentiometric titration of ferrous iron by dichromate.
5.	Determination of Saponification value of an oil.
6.	Estimation of Iron by Spectrophotometry.
7.	Estimation of Dissolved Oxygen.
8.	Estimation of HCl by pH titration.
9.	Estimation of Copper in brass sample.
10.	Estimation of Manganese in Pyrolusite ore.
11.	Anodiziation of aluminium.
12.	Determination of corrosion rate and inhibitor efficiency of mild steel in acid media by weight loss method.
Contact Periods:	

Lecture: 0 Periods	Tutorial: 0 Periods	Practical: 45 Periods	Total: 45 Periods

REFERENCE BOOKS:

1	*A.O. Thomas, "**Practical Chemistry**", Scientific Book Centre, Cannanore, 2006.*
2	*Vogel's "**Text book of Quantitative Analysis**", Jeffery G H, Basset J. Menthom J, Denney R.C., 6th Edition, EBS, 2009.*

COURSE OUTCOMES: Upon the completion of the course, the student will be able to:	Bloom's Taxonomy Mapped
CO1	Analyze the quality of water samples with respect to their hardness and DO.	K3
CO2	Determine the amount of metal ions through potentiometric and spectroscopic techniques.	K3
CO3	Infer the strength of acid, mixtures of acids by pH meter and conductivity cell.	K3
CO4	Estimate the chloride, manganese and copper from various samples.	K3
CO5	Interpret the corrosion rate determination and anodizing method.	K2

COURSE ARTICULATION MATRIX															
COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	1	1	-	-	2	3	-	2	1	-	1	-	-	-
CO2	2	1	-	-	-	-	3	-	2	1	-	1	-	-	-
CO3	2	1	-	1	-	-	3	-	2	1	-	1	-	-	-
CO4	2	1	-	-	-	-	3	-	2	1	-	1	-	-	-
CO5	2	1	1	1	-	-	3	-	2	1	-	1	-	1	-
22ABS2Z7	**2**	**1**	**1**	**1**	**-**	**1**	**3**	**-**	**2**	**1**	**-**	**1**	**-**	**1**	**-**
1 – Slight, 2 – Moderate, 3 – Substantial															

22AES2Z5	ENGINEERING GRAPHICS *(Common to all Branches)*	SEMESTER II

PREREQUISITES	CATEGORY	L	T	P	C
NIL	ES	1	0	4	3

Course Objectives	1. Understand the geometrical constructions. 2. Study the various types of projections. 3. Identify different section of solids. 4. Perform the development of surfaces and view of solids. 5. Familiarize with CAD packages.	
UNIT – I	**GEOMETRICAL CONSTRUCTIONS AND PLANE CURVES**	**3+12 Periods**
Principles of Engineering Graphics and their significance - Basic geometrical constructions. Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Drawing of tangents and normal to the above curves.		
UNIT – II	**ORTHOGRAPHIC PROJECTIONS**	**3+12 Periods**
Introduction to Orthographic Projection - Conversion of pictorial views to orthographic views. Projection of points - Projection of straight lines with traces - Projection of planes (polygonal and circular surfaces) inclined to both the principal planes.		
UNIT – III	**PROJECTION AND SECTION OF SOLIDS**	**3+12 Periods**
Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids, when the axis is inclined to both the principal planes by rotating object method. Sectioning of prisms, pyramids, cylinder and cone in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section.		
UNIT – IV	**DEVELOPMENT OF SURFACES AND ISOMETRIC PROJECTIONS**	**3+12 Periods**
Development of lateral surfaces of simple and sectioned solids – prisms, pyramids, cylinder and cone. Principles of isometric projection – isometric scale – isometric projections of simple solids and truncated solids - prisms, pyramids, cylinder, cone- combination of two solid objects in simple vertical positions.		
UNIT – V	**COMPUTER AIDED DRAFTING**	**3+12 Periods**
Introduction to computer aided drafting package to make 2D Drawings. Object Construction: Page layout – Layers and line types – Creating, editing and selecting the geometric objects. Mechanics: Viewing, annotating, hatching and dimensioning the drawing – Creating blocks and attributes. Drafting: Create 2D drawing. A number of chosen problems will be solved to illustrate the concepts clearly. (Demonstration purpose only, not to be included in examination).		
Contact Periods: **Lecture: 15 Periods Tutorial: 0 Periods Practical: 60 Periods Total: 75 Periods**		

TEXT BOOKS:

1	*K.Venugopal,* ***"Engineering Graphics",*** *New Age International (P) Limited, 2016.*
2	*K.V.Natarajan,* ***"A text book of Engineering Graphics",*** *Dhanalakashmi Publishers, Chennai, 2016.*

REFERENCES:

1	*K.L.Narayana and P.Kannaiah, "Text book on Engineering Drawing", 2ⁿᵈ Edition, SciTech Publications (India) Pvt. Ltd, Chennai, 2009.*
2	*N.S.Parthasarathy and Vela Murali, "Engineering Graphics", Oxford University Press, New Delhi, 2015.*
3	*K.R.Gopalakrishna, "Engineering Drawing" (Vol. I&II combined), Subhas Publications, Bangalore, 2014.*
4	*Basant Agarwal and C.M.Agarwal, "Engineering Drawing", Tata McGraw Hill Publishers, New Delhi, 2013.*
5	*Kevin Lang and Alan J.Kalameja, "AutoCAD 2012 Tutor for Engineering Graphics", Cengage Learning Publishers, 1ˢᵗ Edition, 2011.*

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		Bloom's Taxonomy Mapped
CO1	Acquire on representing solids as per international standards.	K3
CO2	Impart knowledge on different types of projections.	K3
CO3	Generate and interrupt the true shape of section.	K3
CO4	Develop the various surfaces according to the standards.	K3
CO5	Know the concept of computers in drafting engineering diagrams.	K6

COURSE ARTICULATION MATRIX

COs/ POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	-	-	1	1	1	2	-	-	1	2	-	-	-	-	-
CO2	2	-	1	1	1	-	-	1	1	2	-	-	-	-	-
CO3	1	1	1	1	1	-	-	-	1	2	-	-	-	-	-
CO4	1	1	1	1	1	2	-	-	1	2	-	-	-	-	-
CO5	1	1	1	1	1	-	-	-	1	2	-	-	-	3	3
22AES2Z5	**1**	**1**	**1**	**1**	**1**	**1**	**-**	**1**	**1**	**2**	**-**	**-**	**-**	**1**	**1**
1 – Slight, 2 – Moderate, 3 – Substantial															