SEMESTER I

U23EN101 **ENGLISH FOR ENGINEERS** **Category: HSMC**
SDG: 4 **(Common to all Branches)**

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

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

UNIT 1 INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION 9

Listening– listening to Audio/video(formal&informal);Telephonicconversation (Activity) Speaking-SelfIntroduction;Introducingafriend (Activity);Conversation-politenessstrategies; Reading - Reading brochures (technical context), telephone messages / social media messagesrelevanttotechnicalcontexts-Writing-Writingonself, Writing Definition; Jumbled sentence Grammar – Simple present tense, Present continuous, Present perfect, Present perfect continuous; Question types: Wh/ Yes or No/ and Tags; Word formation, One-wordsubstitution.

UNIT 2 NARRATION AND SUMMATION 9

Listening-Listeningto the podcast, anecdotes/stories/event narration; documentaries andinterviews withcelebrities (Activity). Speaking-Narratingpersonalexperiences/events;interviewingacelebrity (Activity). Reading-Readingbiographies,travelogues,newspaperreports, Writing-Guidedwriting-Paragraphwriting,ShortReportonanevent(fieldtripetc.) - Grammar– Simple past tense, Past continuous, Past perfect, Past perfect continuous; Subject-VerbAgreement;Prepositions, Wordforms(prefixes&suffixes); Error Correction.

UNIT 3 DESCRIPTION OF PROCESS/PRODUCT 9

Listening – Listening to specific audio tracks (Activity) Speaking – Picture description; giving instruction to use the product; presenting a product; Role play (Activity) -Reading – Reading advertisements, gadget reviews; finding key information from a given text- Writing - Instructions; Process description; Grammar - Simple future tense, Future continuous, Future perfect, Future perfect continuous; Imperatives; Adjectives; Degrees of comparison; Compound Words.

UNIT 4 CLASSIFICATION AND RECOMMENDATIONS 9

Listening – watching videos/ documentaries and responding to the questions based on them, Scientific lectures; and educational videos. Speaking – Small Talk; Mini presentations (Activity) -Reading – Journal reports, predicting content of reading habits, Reading articles (Activity)- Writing –Memos to colleagues or friends; Opinion Blogs; Grammar – Articles; Pronouns - Possessive & Relative pronouns, Cause and Effect.

UNIT 5 EXPRESSION 9

Listening – Listening to different accent, Listening to speeches or presentation- Speaking – Debates and Expressing opinions through Simulations, exchanging personal information - (Activity)- Reading – Reading editorials; Poster making (Activity)- Writing – Creative Writing, Checklist- Grammar –Punctuation; Compound Nouns, Homonyms; and Homophones, Simple, Compound & Complex Sentences.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: Listenandcomprehendcomplexacademictexts.

CO2: Understand the denotative and connotative meanings of technical texts.

CO3: Identify definitions, descriptions, narrations and essays on various topics.

CO4: Apply different methods of integration in solving practical problems.

CO5: Expresstheiropinionseffectivelyinbothoralandwrittenmediumofcommunication.

TEXT BOOKS:

1. EnglishforEngineers&TechnologistsOrientBlackswanPrivateLtd.DepartmentofEnglish,Anna University(2020edition).

2.EnglishforScience&TechnologyCambridgeUniversityPress,2021. AuthoredbyDr.VeenaSelvam,Dr.SujathaPriyadarshini,Dr.DeepaMaryFrancis, Dr.KN.Shoba andDr.LourdesJoevani,DepartmentofEnglish,AnnaUniversity.

REFERENCES:

1. Technical Communication – Principles and Practices By Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2016, New Delhi.

2. ACourseBookonTechnicalEnglish byLakshmiNarayanan,ScitechPublications(India)Pvt.Ltd.

3.English forTechnicalCommunication (with CD) byAyshaViswamohan,Mc-grawHillEducation,ISBN:0070264244

4. EffectiveCommunicationSkill,KulbhusanKumar,RSSalaria,KhannaPublishingHouse.

5. LearningtoCommunicate–Dr.V.Chellammal,AlliedPublishingHouse,NewDelhi,2003.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PSO 3
CO1	-	-	-	-	-	1	1	-	3	1	-	2	-	-	-
CO2	-	-	-	-	-	1	1	-	3	-	-	2	-	-	-
CO3	-	-	-	-	-	1	1	-	3	2	-	3	-	-	-
CO4	-	-	-	-	-	1	2	-	3	1	-	2	-	-	-
CO5	-	-	-	-	-	1	2	-	3	2	-	3	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23MA101	CALCULUS AND DIFFERENTIAL EQUATIONS	Category: BSC			
SDG: 4	(Common to all Branches)	L	T	P	C
		3	1	0	4

COURSE OBJECTIVE:

1. To develop the use of matrix algebra techniques that is needed by engineers for practical applications.
2. To familiarize the students with differential calculus.
3. To enlighten the students with functions of several variables. This is needed in many branches of engineering.
4. To make the students acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
5. To acquaint the students with mathematical tools needed in evaluating multiple integrals and their applications.

UNIT 1 MATRICES 9+3

Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values and Eigen vectors (without proof) – Cayley – Hamilton theorem (Statement and applications only) - Orthogonal matrices – Orthogonal transformation of a symmetric matrix to diagonal form – Quadratic form – Nature of Quadratic forms - Reduction of quadratic form to canonical form by orthogonal transformation.

UNIT 2 DIFFERENTIAL CALCULUS 9 + 3

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

UNIT 3 MULTIVARIABLE CALCULUS 9 + 3

Functions of two variables – Partial derivatives – Total differential – Taylor's series for functions of two variables – Jacobian's – Constrained maxima and minima – Lagrange's multiplier and its applications

UNIT 4 ORDINARY DIFFERENTIAL EQUATIONS OF SECOND ORDER 9 + 3

Linear differential equations of second order with constant coefficients. Linear differential Equations of second order with variable coefficients: Cauchy's linear differential equation - Method of variation of parameters for second order differential equations

UNIT 5 MULTIPLE INTEGRALS 9 + 3

Double integration with constant and variable limits - Region of integration - Area as double integral in Cartesian coordinates. Triple integral in Cartesian coordinates. Application of integration – Volume of Solids

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students will be able to:

CO1: Comprehend the concepts of Eigen values, Eigen vectors, limits, continuity, functions of several variables, double integration and region of integration for solving complex problems.

CO2: Use rules of differentiation to solve maxima and minima problems.

CO3: Apply various techniques in solving ordinary and partial differential equations for practical applications.

CO4: Apply differential and integral calculus tools in modeling problems.

CO5: Evaluate integrals to compute area, volume and other practical problems.

TEXT BOOKS:

1. Grewal.B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 44th Edition 2018.
2. James Stewart, "Calculus : Early Transcendentals", Cengage Learning, 8th Edition, New Delhi,2015.
3. Kreyszig.E, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New delhi,2016.

REFERENCES:

1. Bali. N., Goyal. M. and Watkins. C., “Advanced Engineering Mathematics”, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009
2. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New delhi,2016
3. Anton. H, Bivens. I and Davis. S, " Calculus ", Wiley, 10th Edition, 2016
4. Narayanan. S. and Manicavachagom Pillai. T. K., “Calculus" Volume I and II, S.Viswanathan Publishers Pvt. Ltd., Chennai, 2009.
5. Jain. R.K. and Iyengar. S.R.K., “Advanced Engineering Mathematics”, Narosa Publications, New Delhi, 5th Edition, 2016.
6. Srimantha Pal and Bhunia. S.C, " Engineering Mathematics " Oxford University Press, 2015

CO’s-PO’s & PSO’s MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO 1	3	3	3	1	1	3	-	-	-	-	-	-	-	-	-
CO 2	3	3	1	-	-	3	-	-	-	-	-	-	-	-	-
CO 3	3	3	2	-	1	3	-	-	-	-	-	-	-	-	-
CO 4	3	3	3	-	-	3	-	-	-	-	-	-	-	-	-
CO 5	3	3	2	1	-	3	-	-	-	-	-	-	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high “-“- no correlation

U23PH101 **ENGINEERING PHYSICS** **Category: BSC**
SDG: 4

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

1. Understand the basics of Properties of Matter and apply them to Engineering.
2. Explore the applications of Lasers and Fiber optics in engineering contexts.
3. Apply principles of Ultrasonics and Thermal Physics to Engineering challenges.
4. Grasp foundational Quantum Physics concepts and their modern applications.
5. Analyze Crystal systems and their structures in Engineering and Technology.

UNIT 1 PROPERTIES OF MATTER 9

Elasticity – Stress-strain diagram and its uses - Factors affecting elastic modulus – Torsional stress and deformations –Torsion pendulum: theory and experiment - Bending of beams - Bending moment – Cantilever: theory and experiment – Uniform and non-uniform bending: theory and experiment - I-shaped girders - Applications. – Basic Solved Problems.

UNIT 2 LASER AND FIBER OPTICS 9

Introduction – Principle of Spontaneous emission and stimulated emission. Population inversion, pumping- Einstein's A and B coefficients: derivation. Types of lasers – Nd-YAG, CO_2- Industrial Applications of Lasers –Fiber Optics: Principle and propagation of light – Numerical aperture and Acceptance angle - Types of optical fibres (material, refractive index, mode) – Temperature and displacement sensors.

UNIT 3 ULTRASONICS AND THERMAL PHYSICS 9

Introduction – Piezoelectric effect - piezoelectric generator - Velocity measurement – Acoustic grating – Ultrasonic Medical applications - Introduction to heat - Transfer of heat energy :Thermal conduction, convection and radiation –Thermal conductivity - Forbe's and Lee's disc method: theory and experiment – Applications: heat exchangers, refrigerators, ovens and solar water heaters.

UNIT 4 QUANTUM PHYSICS 9

Black body radiation – Planck's theory (derivation) – Deduction of Wien's displacement law and Rayleigh-Jeans' Law from Planck's theory – Compton effect :Theory and experimental verification – Matter waves – Schrödinger's wave equation: Time independent and time dependent equations – Physical significance of wave function – Particle in a one-dimensional box - Microscope: Scanning Tunnelling microscope.

UNIT 5 CRYSTAL PHYSICS 9

Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – 'd' spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC and HCP structures – Diamond and graphite structures – Polymorphism and allotropy - Crystal defects – Point, line and surface defects- Burger vector.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: Realize the fundamental engineering ideas of matter, optics, heat, sound, and quantum theory.

CO2: Demonstrate a solid understanding of fundamental matter properties, Laser and Fiber optics classification, Quantum concepts and apply them successfully to solve practical engineering problems.

CO3: Apply the elastic modulus theory, Fiber Optic Sensors, Ultrasonics and thermal applications to integrate knowledge and problem solve at an advanced level.

CO4: Categorize the Elastic moduli concepts, Fiber optic lasers and Crystal structures to implement in

Engineer problems in Material Science and electronics.

CO5: Analyze the foundational Quantum and Crystal Physics concepts to implement solutions for modern engineering problems.

TEXT BOOKS:

1. Bhattacharya, D.K. & Poonam, T. "Engineering Physics". Oxford University Press, 2015.
2. Gaur, R.K. & Gupta, S.L. "Engineering Physics". Dhanpat Rai Publishers, 2012.
3. Pandey, B.K. &Chaturvedi, S. "Engineering Physics". Cengage Learning India, 2012

REFERENCES:

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

CO's-PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	3	1	-	1	-	1	-	-	1	-	1	-	-	-
CO2	3	3	1	-	1	-	1	-	1	-	-	1	-	-	-
CO3	3	3	1	-	1	-	1	-	1	-	-	1	-	-	-
CO4	3	2	1	-	1	-	-	-	-	1	-	1	-	-	-
CO5	3	3	1	-	-	-	1	-	1	-	-	1	-	-	-

Correlation levels: **1 – low** **2 – medium** **3 – high** **"-"- no correlation**

U23CY101 **ENGINEERING CHEMISTRY** **Category: BSC**

SDG: 9

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

1. Learn boiler feed water requirements, and water treatment techniques.
2. To acquire knowledge about the preparation, properties and applications of polymers.
3. Understand the basic concepts of electrochemistry and its applications.
4. Learn corrosion control and protective techniques.
5. Acquire the knowledge about the fuels and properties of energy storage devices.

UNIT 1 WATER TECHNOLOGY 9

Introduction - Sources of water - Impurities in water - Types of water –Hardness of water - Expression of hardness - Units of hardness - Estimation of hardness of water by EDTA method - Disadvantages of using hard water - Boiler troubles - Scale and sludge - Softening of water - External treatment method - Demineralization process - Internal treatment process – Carbonate, Phosphate and Calgon conditioning - Desalination by reverse osmosis method.

UNIT 2 POLYMERS 9

Introduction: Classification of polymers – Natural and synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerization. Types: Addition, condensation and copolymerization and mechanism of Addition polymerization (Free Radical); Techniques of polymerization: Bulk, emulsion, solution and suspension. Preparation, properties and uses of Nylon (6,6 and 11) and Epoxy resin. Engineering application of plastics- PVC, PTFE and Bakelite. Types of compounding of plastics- Moulding, injection moulding.

UNIT 3 ELECTRO CHEMISTRY 9

Electrochemistry**:** Introduction - Cells - Representation of a galvanic cell - Reversible and irreversible cells - Electrode potential - Nernst equation - Reference electrode (Calomel electrode) - Standard hydrogen electrode - Glass electrode - Electrochemical series and its applications – Battery: Introduction, Types of batteries- alkaline battery- lead storage battery - H_2 -O_2 fuel cell- applications. Construction of solar cells and E-Vehicle.

UNIT 4 CORROSION AND ITS CONTROL 9

Introduction - Chemical corrosion and Wet corrosion - Galvanic and differential aeration (Pitting, Crevice and Pipeline) - Factors influencing rate of corrosion - Corrosion- causes- factors- corrosion control - material selection and design aspects - electrochemical protection – sacrificial anode method and impressed current cathodic method- Cathodic protection method.

UNIT 5 FUELS AND COMBUSTION 9

Introduction - Classification of fuels - Requirements of a good fuel – Combustion: Principle of combustion - Calorific value - Gross and net calorific values - Explosive range - Spontaneous ignition temperature. Fuels: Solid fuels - Coal and its varieties - Proximate analysis - Significance - Metallurgical coke - Otto-Hoffman byproduct method - Liquid fuel: Manufacture of synthetic petrol - Bergius method - Knocking - Octane number - Cetane number - Gaseous fuel: Liquefied petroleum gas (LPG), Compressed natural gas (CNG).

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: Recall the concept about water technology, engineering polymers, electrodes, corrosion and combustion of fuels.

CO2: Understand the boiler problems and categorize the polymers.

CO3: Classify plastics, batteries, corrosion, and the calorific value of fuels.

CO4: Apply enough knowledge of contemporary water softening, polymerization, fuel cell, electrochemical protection, and fuel manufacturing procedures.

CO5: Analyze the hardness of water using the EDTA technique and characterization of coal.

TEXT BOOKS:

1. Jain P C and Monica Jain, “Engineering Chemistry”, 17th Edition, Dhanpat Rai Publishing Co., 2018.

2. Sivasankar B., “Engineering Chemistry”, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2017.

REFERENCES:

1. B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, “Textbook of nanoscience and nanotechnology”, Universities Press-IIM Series in Metallurgy and Materials Science, 2018.
2. O.G. Palanna, “Engineering Chemistry” McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
3. Friedrich Emich, “Engineering Chemistry”, Scientific International Pvt, Ltd, New Delhi, 2017.
4. Shikha Agarwal, “Engineering Chemistry-Fundamentals and Applications”, Cambridge University Press, Delhi, Second Edition, 2019.
5. R.D. Madan, “Modern Inorganic Chemistry”, S. Chand, New Delhi, 2012
6. S.S. Dara, “A Textbook of Engineering Chemistry”, S. Chand Publishing, 12th Edition, 2018.

CO’s-PO’s & PSO’s MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	3	-	-	2	-	-	2	-	-	-	-	1	-	-	-
CO2	3	-	-	2	2	-	2	-	-	-	-	2	-	-	-
CO3	3	-	-	2	2	-	2	-	-	-	-	2	-	-	-
CO4	3	-	-	2	3	-	2	-	-	-	-	3	-	-	-
CO5	3	-	-	2	3	-	2	-	-	-	-	3	-	-	-
CO6	3	-	-	2	2	-	2	-	-	-	-	2.2	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high “-“- no correlation

U23GE101 **ENGINEERING GRAPHICS** **Category: ESC**

SDG:8

L	T	P	C
2	0	3	4

COURSE OBJECTIVE:

1. Draw engineering curves of simple objects.
2. To Draw the orthographic projection of solids and section of solids.
3. Draw the development of surfaces.
4. Draw the isometric projections of simple solids.
5. Model a simple object using a CAD software.

CONCEPTS AND CONVENTIONS (Not for Examination) **2**

Importance of graphics in engineering applications - Use of drafting instruments - BIS conventions and specifications — Size, layout and folding of drawing sheets - Lettering and dimensioning.

UNIT 1 **PLANE CURVES** **10**

Basic Geometrical constructions, Curves used in engineering practices: Conics -Construction of ellipse, parabola and hyperbola by eccentricity method - Construction of cycloid - Construction of involutes of circle - Drawing of tangents and normal to the above curves.

UNIT 2 **PROJECTION OF POINTS, LINES AND PLANES** **10**

Orthographic projection - principles - Principal planes - First angle projection -projection of points. Projection of straight lines - Determination of true lengths and true inclinations by rotating line method and traces. Projection of planes (polygonal and circular surfaces).

UNIT 3 **PROJECTION OF SOLIDS** **10**

Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids by rotating object method.

UNIT 4 **PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES** **10**

Sectioning of solids in simple vertical position - obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids - Prisms, pyramids cylinders and cones.

UNIT 5 **ISOMETRIC PROJECTIONS** **10**

Principles of isometric projection - isometric scale - isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders and cones.

MODELING OF SIMPLE OBJECTS (Not for Examination) **8**

Practicing three-dimensional modeling of simple objects by CAD Software.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: Remember the concept of C programming to understand the functional knowledge about operators and the keywords used.

CO2: Demonstrate C program for data types, looping & array.

CO3: Illustrate the basics for functions, structures, pointers and union.

CO4: Make use of the concept to perform the operations dynamic memory allocation, searching and recursion.

CO5: Examine the file processing for sequential, random access and command line arguments.

TEXT BOOKS:

1. Venugopal K. and Prabhu Raja V., “Engineering Graphics", New Age International (P) Limited, 2008.
2. Natrajan K.V., “A Text Book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2018.
3. Jeyapoovan T., “Engineering Graphics", Newdelhi Vikas Publishing House, 2007.

REFERENCES:

1. Parthasarathy N. S. and Vela Murali, “Engineering Graphics”, Oxford University, Press, New Delhi, 2015.
2. Kulkarni D; Rastogi; Sarkar, “Engineering Graphics with AUTOCAD”, Newdelhi Prentice Hall of India, 2009.

CO’s-PO’s & PSO’s MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	1	2	2	-	2	-	-	-	2	-	-	2	1	2	1
CO2	2	2	2	-	2	-	-	-	2	-	-	3	2	2	1
CO3	3	3	2	-	2	-	-	-	2	-	-	2	2	2	1
CO4	2	2	2	-	3	-	-	-	2	-	-	3	2	2	1
CO5	2	3	3	-	2	-	-	-	2	-	-	2	2	3	1

Correlation levels: 1 – low 2 – medium 3 – high “-“- no correlation

U23HS101 SDG:4	HERITAGE OF TAMIL	Category : HSMC L T P C 1 0 0 1

COURSE OBJECTIVE:

1.To learn the extensive literature of classical tamil
2.To review the fine arts heritage of tamil culture
3.To realize the contribution in Indian freedom struggle

UNIT 1 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 2 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 3 FOLK AND MARTIAL ARTS 3

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

UNIT 4 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 5 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

COURSE OUTCOMES:

At the end of the course, students would

CO1: Remember the extensive literature of tamil and its classical nature, musical instruments, Folk, thinai concept, Indian Freedom Struggle& Aham, Puram and Aram Concept

CO2: Remember the principles in Thirukural, Bakthi Literature Azhwars and Nayanmars , heritage of sculpture, painting and musical instruments of ancient people, victory of chozha dynasty

CO3: Understand on folk and martial arts of tamil people, Justice in Sangam Literature, Development of Modern literature in Tamil, Making of musical instruments

CO4: Understand the role of Temples in Social and Economic Life of Tamils, Ancient Cities and Ports of Sangam Age, Conquest of Cholas

CO5: Understand the Cultural Influence of Tamils over the other parts of India, contribution of tamils self-esteem movement and siddha medicine, Print History of Tamil Books

TEXT BOOKS:

1.தமிழக வரலாறு – மக்களும் பண்பாடும் – .கே. கே பிள்ளை (வெளியீடு): தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள்கழகம்

2.கணினித்தமிழ் – முனைவர் இல. சுந்தரம் . (விகடன்பிரசுரம்).

3.கீழடி – வைகை நதிக்கரையில் சங்ககால நகர 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.Historical Heritage of the Tamils (Dr .S. V. Subaramanian, Dr .K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
3.The Contributions of the Tamils to Indian Culture (Dr. M. Valarmathi) (Published by: International Institute of Tamil Studies)
4. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
5.Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)

CO's-PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO2	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO3	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO4	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO5	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23EE101 **Category: EEC**

SDG: 17 **CAREER ENHANCEMENT TRAINING I**

L	T	P	C
1	0	2	1

COURSE OBJECTIVE:

1. To improve mathematical and analytical abilities of students, particularly in the context of comprehending engineering concepts and making data-driven decision.
2.To develop critical thinking skills including problem solving, logic, patterns, and reasoning.
3. To Comprehend and appreciate mathematical terminologies and concepts in order to understand, interpret, and represent science and technology.

UNIT 1 FUNDAMENTALS 6

Divisibility Test - Square root and Cube roots – HCF & LCM - problems on Numbers

UNIT 2 ALGEBRA 5

Simplification – Surds & Indices – Linear & Quadratic Equations

UNIT 3 BANKING ESSENTIALS 8

Average – Percentage – Profit & Loss – Simple Interest – Compound Interest

UNIT 4 TIME AND EFFICIENCY 8

Time Speed Distance – Problems on Trains – Boats & Streams – Time & Work – Pipes & Cisterns

UNIT 5 LOGICAL REASONING 3

Number & letter series – Analogy– Pattern classification – Coding & Decoding

TOTAL: 30 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: Exhibit a clear understanding of fundamental concepts of aptitude for engineering.
CO2: Demonstrate problem-solving skills and critical thinking abilities in the context of recruitment aptitude tests.
CO3: To use appropriate strategies and shortcuts to improve speed and accuracy in solving aptitude problems during recruitment processes.
CO4: Evaluate and interpret aptitude test results to identify areas of improvement and develop a personalized study plan for further enhancement.

TEXT BOOKS:

1. The Pearson Guide to Quantitative Aptitude For Competitive Examinations, Dinesh Khattar. Pearson
2. Quantitative Aptitude Dr. R.S. Aggarwal S. Chand Publication.
3. A modern Approach to Verbal and Non-Verbal Reasoning R.s. Aggarwal

REFERENCES:

1.Quantitative Aptitude for CAT, Arun Sharma.
2.Fast Track Objective Arithmetic, Rajesh Verma, Arihant Publication.
3. Quantitative Aptitude Quantum CAT Common Admission Tests for Admission into IIMs, Sarvesh K. Verma.
4. EffectiveCommunicationSkill,KulbhusanKumar,RSSalaria,KhannaPublishingHouse.
5.Wiley's Exam Expert Quantitative Ability for CAT, 2ed, Ashu Jain.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO 1	3	3	3	3	-	-	-	-	-	-	-	-			
CO 2	3	2	1	3	-	-	-	-	-	-	-	-			
CO 3	3	1	1	2	-	-	-	-	-	-	-	-			
CO 4	1	1	1	1	-	-	-	-	-	-	-	-			
CO 5	-	-	-	-	-	-	-	-	-	-	-	-			

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23BS111
SDG: 4 & 9

BASIC SCIENCE LABORATORY

Category: BSC

L	T	P	C
0	0	2	2

COURSE OBJECTIVE:

1. Realize the fundamental engineering ideas of matter, optics, heat, sound, and quantum theory.
2. Demonstrate a solid understanding of fundamental matter properties, Laser and Fiber optics classification, Quantum concepts and apply them successfully to solve practical engineering problems.
3. Apply the elastic modulus theory, Fiber Optic Sensors, Ultrasonics and thermal applications to integrate knowledge and problem solve at an advanced level.
4. Categorize the Elastic moduli concepts, Fiber optic lasers and Crystal structures to implement in Engineer problems in Material Science and electronics.
5. Analyse the foundational Quantum and Crystal Physics concepts to implement solutions for modern engineering problems.

PHYSICS - LIST OF EXPERIMENTS (Any 5 Experiments)

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

CHEMISTRY- LIST OF EXPERIMENTS (Any 5 Experiments)

1. Estimation of total, temporary and permanent hardness of water by EDTA method.
2. Estimation of alkalinity of the given water sample.
3. Determination of chloride content of water sample by Argentometric method.
4. Determination of strength of given hydrochloride acid using pH meter
5. Determination of DO content of water sample by Winkler's method.
6. Conduct metric titration strong acid Vs Strong Base.
7. Estimation of BOD of the given water sample.
8. Estimation of iron content of the given solution using potentiometer.
9. Estimation of Iron content by spectrophotometer.
10. Estimation of sodium present in water using flame photometer.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: Apply Physics principles of elasticity to evaluate engineering properties of materials.

CO2: Analyze the physical principle involved in various instruments in acoustics, optics and thermal physics.

CO3: Characterize the quality of water samples with respect to their acidity, alkalinity and hardness.

CO4: Apply chemistry principles to evaluate DO, BOD, Iron content of the given samples.

CO5: Analyze the strength and amount of acids using pH, potentiometer, conductivity meter and the amount of chloride, sodium iron using Argentometric method and flame photometer for the given solution.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PSO 3
CO1	3	2	1	1	-	-	1	-	1	-	-	-			
CO2	3	2	1	1	-	-	1	-	1	-	-	1			
CO3	3	2	1	1	-	-	1	-	1	-	-	-			
CO4	3	2	1	1	-	-	1	-	1	-	-	1			
CO5	3	2	-	1	-	-	1	-	1	-	-	1			

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23EN111 SDG: 4	COMMUNICATIVE ENGLISH LABORATORY	Category: HSMC L T P C 0 0 2 1

COURSE OBJECTIVE:

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

LIST OF EXPERIMENTS:

1. Conversation: Introduction to classmates-Audio/Video(formal & informal)
2. Self Introduction
3. Telephone Conversation
4. Listening to voicemail & messages
5. Listening and filling a form
6. Debate
7. Group Discussion
8. Exchanging personal Information
9. Introducing a friend politeness strategy
10. Essay Writing

TOTAL: 30 PERIODS

COURSE OUTCOMES:

At the end of the course, students would
CO1: Listen and comprehend complex academic texts.
CO2: Understand the denotative and connotative meanings of technical texts.
CO3: Identify definitions, descriptions, narrations and essays on various topics.
CO4: Apply different methods of integration in solving practical problems.
CO5: Express their opinions effectively in both oral and written medium of communication.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO 1	3	2	3	1	1	1	-	-	2	-	2	2	2	2	-
CO 2	3	2	2	2	1	1	-	-	2	-	2	2	3	3	-
CO 3	3	2	3	2	1	2	-	-	2	-	2	2	2	2	-
CO 4	3	2	2	2	1	2	-	-	3	-	2	3	3	3	-
CO 5	3	2	3	1	1	2	-	-	3	-	2	3	2	3	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23GE111 SDG: 4	ENGINEERING PRACTICES LABORATORY	Category: ESC L T P C 0 0 4 2

COURSE OBJECTIVE:

1. Drawing pipe line plan; laying and connecting various pipe fittings used in common household plumbing work; Sawing; planning; making joints in wood materials used in common household wood work.
2. Welding various joints in steel plates using arc welding work; Machining various simple processes like turning, drilling, tapping in parts.
3. Assembling simple mechanical assembly of common household equipment's; Making a tray out of metal sheet using sheet metal work.
4. Wiring various electrical joints in common household electrical wire work.
5. Soldering and testing simple electronic circuits; Assembling and testing simple electronic components.

LIST OF EXPERIMENTS:

GROUP A (CIVIL & MECHANICAL)

PART I CIVIL ENGINEERING PRACTICES:

Plumbing Work

1. Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in household.
2. Preparing plumbing line sketches.
3. Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.

Wood Work

4. Sawing
5. Plan
6. Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint.

PART II MECHANICAL ENGINEERING PRACTICES

Welding Work

1. Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding.
2. Practicing gas welding.

Basic Machining Work

1. Simple Turning
2. Simple Drilling
3. Simple Tapping

Machine Assembly Practice

1. Study of centrifugal pump
2. Study of air conditioner

Sheet Metal Work

1. Making of a Square tray

GROUP B (ELECTRICAL & ELECTRONICS)

PART I ELECTRICAL ENGINEERING PRACTICES

1. Introduction to switches, fuses, indicators and lamps - Basic switch board wiring with lamp, fan and three pin sockets.
2. Staircase wiring.
3. Fluorescent Lamp wiring with introduction LED types.
4. Energy meter wiring and related calculations/ calibration
5. Study of Iron Box wiring and assembly

PART II ELECTRONIC ENGINEERING PRACTICES

1. Study of Electronic components and equipments – Resistor, colour coding measurement of AC signal parameter (peak-

peak, rms period, frequency) using CR.
2. Study of logic gates AND, OR, EX-OR and NOT.
3. Generation of Clock Signal.
4. Soldering simple electronic circuits and checking continuity.
5. Assembly and dismantle of LED TV.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1: Fabricate carpentry components and pipe connections including plumbing works.

CO2: Use welding equipments to join the structures.

CO3: Carry out the basic assembling and machining operations; Make the models using sheet metal works.

CO4: Carry out basic home electrical works and appliances and to measure the electrical quantities.

CO5: Soldering the simple electronic circuits; Assemble the simple electronic devices.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	2	-	-	1	1	-	-	-	-	-	2	2	1	1
CO2	3	2	-	-	1	1	-	-	-	-	-	2	2	1	1
CO3	3	2	-	-	1	1	-	-	-	-	-	2	2	1	1
CO4	3	2	-	-	1	1	-	-	-	-	-	2	2	1	1
CO5	3	2	-	-	1	1	-	-	-	-	-	2	2	1	1

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

SEMESTER II

	DESIGN OF EXPERIMENT	**Category: BSC**			
U23MA203	**AND**	**L**	**T**	**P**	**C**
SDG: 4	**NUMERICAL METHOD**	**3**	**1**	**0**	**4**

COURSE OBJECTIVE:

1. Learn basic concepts of statistical and numerical methods as well as numerical problem solving procedure for planning marketing strategies
2. Gain the knowledge of testing of hypothesis for samples and design of experiments
3. Understand the basic concepts in solving algebraic and transcendental equations
4. Adopt the numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines
5. Develop the various techniques and methods of solving ordinary differential equations

UNIT 1 **TESTING OF HYPOTHESIS** **9+3**

Large Sample Test: Single Mean and Difference of two Means. Small Sample Test - Student's t Test - Single Mean-Difference of Two Means-F Test- Chi Square Test-Goodness of Fit - Test of Independence Attributes – Application- Comparative Analysis - Quality Testing.

UNIT 2 **DESIGN OF EXPERIMENTS** **9+3**

Analysis of Variance: One way and two-way classifications - Completely randomized design – Randomized block design – Latin square design. Application: Response Surface Methodology.

UNIT 3 **ALGEBRAIC AND TRANSCENDENTAL EQUATIONS** **9+3**

Solution of algebraic and transcendental equations–Newton Raphson method - Gauss elimination method – Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel Method. Application: System of Communications.

UNIT 4 **NUMERICAL DIFFERENTIATION AND INTEGRATION** **9+3**

Interpolation Using Newton's Forward and Backward Difference Formulae – Numerical Integration(Single): Trapezoidal Rule and Simpson's 1/3rd and 3/8 Rules. Application: The determination of discontinuous points in Image processing.

UNIT 5 **SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS** **9+3**

Taylor's series method - Euler's method - Modified Euler's method – Fourth orders Runge-Kutta method for solving first order differential equations. Application: Electrical circuits, Chemical reactions and Mechanical system.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: Taylor's series method - Euler's method - Modified Euler's method – Fourth orders Runge-Kutta method for solving first order differential equations. Application: Electrical circuits, Chemical reactions and Mechanical system.

CO2: Tests for single mean, Equality of variance, Chi square test for goodness of fit and Solution of linear equations.

CO3: Apply the numerical techniques of differentiation and integration for engineering problems and solving Ordinary Differential Equations.

CO4: Analyze the concepts of classifications of design of experiments and linear equations in the field of Engineering and Technology.

CO5: Solve the ordinary differential equations using certain techniques with engineering applications.

TEXT BOOKS:

1. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics forEngineers", Pearson Education, Asia, 8th Edition, 2015.

2. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015.

REFERENCES:

1. Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016

2. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning,New Delhi, 8th Edition, 2014

3. Gupta S.C. and Kapoor V. K., "Fundamentals of Mathematical Statistics", Sultan Chand &Sons, New Delhi, 12th Edition, 2020

4. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning,New Delhi, 8th Edition, 2014

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PSO 3
CO1	3	3	2	2	-	-	-	-	-	-	-	-	2.5	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-	3	-	-
CO3	3	3	3	2	-	-	-	-	-	-	-	-	2.75	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-	3	-	-
CO5	3	3	3	2	-	-	-	-	-	-	-	-	2.75	-	-

Correlation levels: **1 – low** **2 – medium** **3 – high** **"-"- no correlation**

U23PH204
SDG: 4

PHYSICS OF MATERIALS

Category: BSC

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

1. Make the students to have a knowledge on the basis of conducting materials, quantum mechanics and about energy bands.
2. Introduce the physics of semiconducting materials and applications of semiconductors in device fabrication.
3. Make the students to learn the origin of magnetism in magnetic materials and their classifications and also it describes the phenomena related microwaves.
4. Equip the students to learn the mechanisms of polarization in dielectric materials, and to learn the physics of superconductivity & various properties exhibited by superconductors.
5. Make the students familiarize in the new materials and it applications.

UNIT 1 ELECTRICAL PROPERTIES OF MATERIALS 9

Conducting materials: Introduction - Classical free electron theory – Electrical and thermal conductivities – Wiedemann- Franz law – Lorentz number –Merits and demerits of classical free electron theory – Quantum free electron theory-Fermi distribution function – Effect of temperature on fermi function - Density of energy states – Carrier concentration in metals - Electron effective mass.

UNIT 2 SEMICONDUCTING PROPERTIES OF MATERIALS 9

Elemental and Compound semiconductors - Intrinsic semiconductor – Carrier concentration derivation – Fermi level – Variation of Fermi level with temperature – Electrical conductivity – Band gap determination – Derivation of carrier concentration in n-type and p-type semiconductor – Variation of Fermi level with temperature and impurity concentration — Hall effect –Determination of Hall coefficient – Applications.

UNIT 3 MAGNETIC MATERIALS AND MICROWAVES 9

Origin of magnetic moment – Bohr magneton – comparison of Dia, Para and Ferro magnetism - Ferromagnetism: saturation magnetization and Curie temperature – Domain theory – Hysteresis – Soft and hard magnetic materials –Antiferromagnetic materials – Ferrites and its applications - Microwaves: Introduction - Conversion of microwaves into heat - Penetration depth and applications.

UNIT 4 DIELECTRIC AND SUPERCONDUCTING PROPERTIES OF MATERIALS 9

Electrical susceptibility –Dielectric constant – Electronic, ionic, orientational and space charge polarization – Frequency and temperature dependence of polarisation – Internal field – Claussius – Mosotti relation (derivation) – Dielectric loss – Dielectric breakdown - Superconductivity: properties – Type I and Type II superconductors – High Tc superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.

UNIT 5 NEW MATERIALS AND APPLICATIONS 9

Metallic glasses - Melt spinning process, applications - shape memory alloys: Ni-Ti alloy, applications – Ceramics - Types and applications – Nanomaterials: Low dimensional structures: quantum dot, quantum wire and quantum well –preparation (bottom up and top down approaches) - Properties and Industrial applications of nanotechnology in food processing and packaging.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1: Realize the fundamental properties of classical and quantum mechanics, semiconductor physics and about its energy band, magnetic properties of materials, dielectric materials superconducting materials and the basics of new engineering materials

CO2: Demonstrate a solid understanding of classical and quantum mechanics, semiconductor physics, magnetic properties of materials, dielectric materials and superconducting materials to solve practical engineering problems.

CO3: Apply the basic theory of classical and quantum mechanics, semiconductor physics, magnetic, dielectric materials, superconducting materials to integrate knowledge to various applications.

CO4: Categorize the semiconductor, magnetic, dielectric and superconducting properties of materials and apply it to solve Engineering problems in Material Science.

CO5: Analyse the foundational knowledge of conductor, semiconductor, magnetic, dielectric and superconducting materials to implement solutions for modern engineering problems.

TEXT BOOKS:

1. Arumugam M., Materials Science. Anuradha publishers, 2010
2. Pillai S.O., Solid State Physics. New Age International(P) Ltd., publishers, 2009
3. The Physics and Chemistry of NanoSolids by Frank J. Owens and Charles P. Poole Jr, Wiley-Inter science, 2008

REFERENCE BOOKS:

1. Palanisamy P.K. Materials Science. SCITECH Publishers, 2011
2. Senthilkumar G. Engineering Physics II. VRB Publishers, 2011
3. J.F.Shackelford. Introduction to Materials Science for Engineers. Pearson, 2015

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	2	1	-	-	-	1	-	-	-	-	1	-	-	-
CO2	3	2	-	-	-	-	1	-	-	-	-	-	-	-	-
CO3	3	2	1	-	1	-	1	-	-	-	-	1	-	-	-
CO4	3	2	1	-	-	-	1	-	-	-	-	1	-	-	-
CO5	3	2	1	-	1	-	1	-	-	-	-	1	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23CE201
SDG: 4

ENGINEERING MECHANICS

Category: ESC

L	T	P	C
3	2	0	3

COURSE OBJECTIVE:

1. To Learn the use scalar and vector analytical techniques for analyzing forces in Statically determinate structures.
2. To introduce the equilibrium of rigid bodies.
3. To study and understand the distributed forces, surface, loading on beam and intensity.
4. To learn the principles of friction, forces and to determine the apply the concepts of frictional forces at the contact surfaces of various engineering systems.
5. To develop basic dynamics concepts – force, momentum, work and energy.

UNIT 1 STATICS OF PARTICLES 9

Introduction – Units and Dimensions – Laws of Mechanics – Lami's theorem, Parallelogram and triangular Law of forces (Statement Only) – Vectorial representation of forces – Vector operations of forces - additions, subtraction, dot product, cross product – Coplanar Forces – rectangular components – Equilibrium of a particle – Equivalent systems of forces – Principle of transmissibility.

UNIT 2 EQUILIBRIUM OF RIGID BODIES 9

Free body diagram – Types of supports –Action and reaction forces (Beam only) – stable equilibrium – Conditions of equilibrium - Moments and Couples – Moment of a force about a point and about an axis.

UNIT 3 PROPERTIES OF SURFFACES AND SOLIDS 9

Centroids and centre of mass – Centroids sections - Rectangle, Circle, Triangle – T section, I section, - Angle section, Hollow section by using standard formula –Theorems of Pappus (Statement Only) - Area moments of inertia of plane areas – Rectangle, Circle, Triangle, T section, I section, Angle section, Hollow section by using standard formula – Parallel axis theorem and perpendicular axis theorem (Statement Only) – Polar Moment of Inertia – Radius of Gyration.

UNIT 4 DYNAMICS OF PARTICLES 9

Introduction – Dynamics - Kinematics & Kinetics – Characteristics of Kinematics - Displacements, Velocity and acceleration, their relationship - Newton's laws of motion – Work Energy Equation– Impulse and Momentum.

UNIT 5 FRICTION 9

Friction – Types of friction – Limiting friction – Coulomb's law of dry friction – Impending Motion – Angle of Repose – Body on a Rough inclined plane – Simple Contact Friction – Ladder Friction – Screw Friction – Belt Friction.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1: Illustrate the vectorial and scalar representation of forces and moments

CO2: Analyse the rigid body in equilibrium

CO3: Evaluate the centre of Gravity and Moment of Inertia of an object.

CO4: Calculate dynamic forces exerted in rigid body

CO5: Determine the friction and the effects by the laws of friction

TEXT BOOKS:

1. Bhavikatti, S.S and Rajashekarappa, K.G., "Engineering Mechanics", New Age International (P) Limited Publishers, 1998

2. Rajasekaran S and Sankarasubramanian G., "Engineering Mechanics Statics and Dynamics", 3rd Edition, Vikas Publishing House Pvt. Ltd., 2005.

REFERENCE BOOKS:

1. R.S.Khurmi. "A Text Book of Engineering Mechanics, S Chand Publishing, 2019.

2. N.Kottiswaran, "Engineering Mechanics", Sri Balaji Publications, 2013.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	3	3	2	1	-	-	-	-	-	-	2	3	3	2
CO2	3	3	3	2	2	-	-	-	-	-	-	2	3	3	2
CO3	3	3	2	1	1	-	-	-	-	-	-	1	3	3	2
CO4	3	3	3	2	2	-	-	-	-	-	-	1	3	3	2
CO5	3	3	3	2	2	-	-	-	-	-	-	2	3	3	2

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23HS202
SDG: 5

TAMILS AND TECHNOLOGY

Category: HSMC

L	T	P	C
1	0	0	1

COURSE OBJECTIVE:

1. To learn the extensive literature of classical Tamil.
2. To review the fine arts heritage of Tamil culture.
3. To realize the contribution in Indian freedom struggle.

UNIT 1 WEAVING AND CERAMIC TECHNOLOGY 3

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

UNIT 2 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 3 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 4 AGRICULTURE AND IRRIGATION TECHNOLOGY 3

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 5 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

COURSE OUTCOMES:

CO1: Understand the extensive literature of Tamil and its classical nature (understand)

CO2: Understand the heritage of sculpture, painting and musical instruments of ancient people (understand)

CO3: Review on folk and martial arts of Tamil people (understand)

CO4: Realization of thinai concepts, trade and victory of chozha dynasty (understand)

CO5: Understand the contribution of Tamils in Indian freedom struggle, self-esteem movement and siddha medicine (understand)

TEXT BOOKS:

1.தமிழகவரலாறு – மக்களும்பண்பாடும் – . கே. கேபிள்ளை (வெளியீடு): தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்

2.கணினித்தமிழ் – முனைவர்இல. சுந்தரம் . (விகடன்பிரசுரம்).

REFERENCE BOOKS:

1. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
2. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO2	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO3	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO4	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO5	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23EN202
SDG: 4

PROFICIENCY IN ENGLISH

Category: HSMC

L	T	P	C
2	0	2	3

COURSE OBJECTIVE:

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

UNIT 1 MAKING COMPARISONS 9

Listening – Listening to informal conversations (Activity)
Speaking – Role Play - talking about experiences- talking about events in life- discussing past events
Reading - Reading advertisements, Extensive Reading (Activity)
Writing – Reading Comprehension, Writing a review/ summary of story/article.
Grammar – Active voice & Passive voice, Prepositional phrases.

UNIT 2 EXPRESSING CASUAL RELATIONS IN SPEAKING AND WRITING 9

Listening - Listening to longer technical speech, Listening to situation based dialogues
Speaking – discussing news stories -talking about travel problems and procedures
Reading - Reading longer technical texts, Reading a short story
Writing - Personal letter (Inviting your friend), Congratulating letter, Writing responses to complaints and adjustment letter. Grammar - Infinitive and Gerunds, Modals

UNIT 3 PROBLEM SOLVING 9

Listening – Listening to movie scenes/ documentaries depicting a technical problem and suggesting solutions (Activity).Speaking – Conversation skills with a sense of stress, intonation, pronunciation, Welcome address - vote of thanksReading - Case Studies, news reports, reading passages with time limit. Writing – Letter to the Editor, Short report on an event (field trip).Grammar -– If conditional sentence, Phrasal Verbs

UNIT 4 REPORTING OF EVENTS AND RESEARCH 9

Listening – Listening Comprehension based on news reports. Speaking – Presenting an oral report, Talking about past, present and the future (Activity).Reading – Newspaper articles; Reading the job advertisements and the profile of the company. Writing – Essay writing and its types (Compare & Contrast, Cause & Effect, Problem & Solution). Grammar – Reported Speech, Conjunctions

UNIT 5 THE ABILITY TO PUT IDEAS OR INFORMATION TO COGENTLY 9

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: 45 PERIODS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1: Identify cause and effects in events, industrial processes through technical text

CO2: Understand and use tools of structured written communication

CO3: Identify individual personality types and role in a team

CO4: Understand the basics concepts of morality and diversity

CO5: Present their opinion in a planned and logical manner, and draft effective resumes in context of job search.

TEXT BOOKS:

1. English for Engineers & Technologists, Orient Blackswan Private Ltd. Department of English, Anna University, 2020

2. Barun.K.Mithra, Personality Development and Soft Skills, OUP India, 2019

REFERENCE BOOKS:

1. Jack C. Richards, "Interchange, Student's Book", 4th Edition, Cambridge University Press, New York, 2017.

2. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	-	-	-	-	-	1	1	-	3	1	-	2	-	-	-
CO2	-	-	-	-	-	1	1	-	3	2	-	2	-	-	-
CO3	-	-	-	-	-	1	1	-	3	2	-	3	-	-	-
CO4	-	-	-	-	-	1	1	-	3	1	-	2	-	-	-
CO5	-	-	-	-	-	1	1	-	3	3	-	3	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23CS203
SDG: 4

C PROGRAMMING

Category: ESC

L	T	P	C
2	0	2	3

COURSE OBJECTIVE:

1. To learn the basic constructs of C Programming.
2. To learn arrays and strings concepts of C Programming
3. To learn functions and pointers in C and use pointers for storing data in the main memory efficiently.
4. To learn structures and union concepts of C Programming.
5. To learn Applications of C programs.

UNIT 1 BASICS OF C PROGRAMMING 6

Structure of a 'C' program - C Tokens: Constants, Variables – Data Types: Primitive Data Types, Type Definition, Operators and Expressions- Managing Input and Output operations

UNIT 2 CONTROL STATEMENTS AND ARRAYS 6

Decision Making: Branching statements, Looping statements- Arrays: Declaration, Initialization, One dimensional, Two dimensional, and Multidimensional arrays

UNIT 3 STRINGS, FUNCTIONS AND POINTERS 6

String: String operations – Function: Declaration, Definition, Parameter passing methods, Recursion – Pointers: Declaration, Definition, Pointers and Functions

UNIT 4 STRUCTURE AND UNION 6

Structure and union - Nested structures – Pointer and Structures – Array of structures – Example Program using structures and pointers.

UNIT 5 APPLICATION OF C PROGRAMMING 6

Applications – Advantages of C in civil Engineering – Analysis and Simulations of Design using C programming – Data Processing - Implementation of C in Design- Case Studies.

LIST OF EXPERIMENTS

1. Programs using simple statements
2. Programs using decision making statements
3. Programs using looping statements
4. Programs using one dimensional and two-dimensional arrays
5. Programs using strings.
6. Programs using user defined functions and recursive functions
7. Programs using functions and pointers
8. Sort the list of numbers using pass by reference.
9. Generate salary slip of employees using structures and pointers
10. Case Studies on Applications of C program in Civil Engineering Design

TOTAL = 30+15 =45 PERIODS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1: Develop simple applications in C using basic constructs

CO2: Design applications using control statements and arrays

CO3: Develop and implement applications in C using functions and pointers and use pointers for storing data in the main memory efficiently.

CO4: Develop applications in C using structures and union.

CO5: Design Applications using C programming in Civil engineering

TEXT BOOKS:

1. Reema Thareja, "Programming in C", Oxford University Press, Second edition, 2016

2. Beecher K. Computational Thinking: A beginner's guide to Problem-solving and Programming. BCS Learning & Development Limited;2017.

REFERENCE BOOKS:

1. Byron Gottfried. Programming With C. Fourth Edition, McGrawHill, 2018.

2. Paul Deital , Harvey deital, "C How to Program" , 8th Edition , Pearson,2016

3. Yashavant P. Kanetkar. "Let Us C", BPB Publications, 2016.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	3	-	-	-	-	-	-	1	-	-	-	1	-	-
CO2	3	3	3	-	-	-	-	2	1	-	-	-	1	-	-
CO3	3	3	1	1	-	-	-	2	1	-	-	-	1	-	-
CO4	2	3	3	2	2	-	2	-	1	-	-	-	-	-	-
CO5	2	3	3	2	-	-	-	-	-	-	-	-	1	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23CE211 SDG: 9	COMPUTER AIDED BUILDING DRAWING LABORATORY	Category: PCC

L	T	P	C
0	0	4	2

COURSE OBJECTIVE:

1. To Develop Skill to use Software to Create 2D and 3D Models
2. To apply basic concept to drawing, edit, dimension, hatching etc. to develop 2D & 3D Modeling.
3. To make 3D modeling, along with detailing.

LIST OF EXPERIMENTS:

1. Study of capabilities of software for Drafting and Modeling – Coordinate systems (absolute, relative, polar, etc.) – Creation of simple figures like polygon and general multi-line figures.
2. Drawing of a Title Block with necessary text and projection symbol.
3. Drawing of curves like parabola, spiral, involutes using Bspline or cubic spline.
4. Drawing of front view and top view of simple solids like prism, pyramid, cylinder, cone, etc, and dimensioning.
5. Drawing front view, top view and side view of objects from the given pictorial views (eg. V- block, Base of a mix, Simple stool, Objects with hole and curves).
6. Drawing sectional views of prism, pyramid, cylinder, cone, etc
7. Drawing isometric projection of simple objects.
8. Drawing of a simple steel truss.
9. Drawing of a plan of residential building (Two bed rooms, kitchen, hall, etc.)
10. Creation of 3-D models of simple objects and obtaining 2-D multi-view drawings from 3-D model.

TOTAL = 30 PERIODS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1: Able to choose scale factor and drawing standards

CO2: Ability to use the software packers for drafting and modeling

CO3: Ability to create 2D and 3D models of Engineering Components

CO4: Draw the various building components and also other structural Components.

CO5: Develop the working Drawings and recommend the details as per local bye laws.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	-	3	-	2	3	1	1	3	-	-	1	3	2	-
CO2	3	2	3	-	2	3	1	2	3	2	-	1	3	2	2
CO3	3	2	3	-	2	3	2	2	3	2	2	3	3	2	2
CO4	3	2	3	2	2	3	2	1	3	2	2	3	3	2	2
CO5	3	2	3	2	2	3	2	2	3	2	2	3	3	2	2

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23EE202 SDG: 10	CAREER ENHANCEMENT TRAINING II	Category: EEC L T P C 3 0 0 1

COURSE OBJECTIVES:

1. To help students demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.
2. To enable students critically evaluate various real-life situations by resorting to an analysis of key issues and factors.
3. To help them improve their communicative English for Interview and corporate readiness

LIST OF EXPERIMENTS:

1. Study of capabilities of software for Drafting and Modeling – Coordinate systems (absolute, relative, polar, etc.) – Creation of simple figures like polygon and general multi-line figures.
2. Drawing of a Title Block with necessary text and projection symbol.
3. Drawing of curves like parabola, spiral, involutes using Bspline or cubic spline.
4. Drawing of front view and top view of simple solids like prism, pyramid, cylinder, cone, etc, and dimensioning.
5. Drawing front view, top view and side view of objects from the given pictorial views (eg. V- block, Base of a mix, Simple stool, Objects with hole and curves).
6. Drawing sectional views of prism, pyramid, cylinder, cone, etc
7. Drawing isometric projection of simple objects.
8. Drawing of a simple steel truss.
9. Drawing of a plan of residential building (Two bed rooms, kitchen, hall, etc.)
10. Creation of 3-D models of simple objects and obtaining 2-D multi-view drawings from 3-D model.

TOTAL = 30 PERIODS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1: Demonstrate problem-solving skills and critical thinking abilities in the context of Engineering Aptitude

CO2: To use appropriate strategies and shortcuts to improve speed and accuracy in solving aptitude problems during recruitment processes.

CO3: Evaluate and interpret aptitude test results to identify areas of improvement and develop a personalized study plan for further enhancement.

CO4: Use the correct Grammar, Vocabulary, Spelling and Comprehension ensuring the enhancement their language skills and the ability to use the skills for effective Communication

CO5: To improve the Communication skills for the self-introduce in the Interview.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	3	3	3	-	-	-	-	-	1	-	-	-	-	-
CO2	3	2	1	3	-	-	-	-	-	1	-	-	-	-	-
CO3	3	1	1	2	-	-	-	-	-	1	-	-	-	-	-
CO4	1	1	1	1	-	-	-	-	-	3	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

SEMESTER III

U23MA304 **FOURIER ANALYSIS AND PARTIAL DIFFERENTIAL EQUATIONS** **Category: BSC**

SDG: 4

L	T	P	C
3	1	0	4

COURSE OBJECTIVE:

1. To impart knowledge on partial differential equations.
2. To construct Fourier series for different periodic functions and to evaluate infinite series.
3. To classify different types of PDE and solve boundary value problems.
4. To acquaint the student with different transform techniques used in wide variety of situations.
5. To solve difference equations using Z – transforms that arise in discrete time systems.

UNIT 1 **PARTIAL DIFFERENTIAL EQUATIONS** **9+3**

Formation of partial differential equations — Singular integrals — Solutions of standard types of first order partial differential equations — Lagrange's linear equation - Linear partial differential equations of second order with constant coefficients of homogeneous types. Application: Modeling one dimensional dynamic problems

UNIT 2 **FOURIER SERIES** **9 + 3**

Dirichlet's conditions — General Fourier series — Odd and even functions — Half range sine series — Half range cosine series — Parseval's Identity - Harmonic analysis. Application: Modeling of vibrating membrane using Fourier series

UNIT 3 **BOUNDARY VALUE PROBLEMS** **9 + 3**

Classification of PDE –Fourier series solutions of one-dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two- dimensional equation of heat conduction. Application: wave propagation in cylinders

UNIT 4 **FOURIER TRANSFORMS** **9 + 3**

Fourier Transform, Statement of Fourier integral theorem – Fourier transform pair – Fourier sine and cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity. Application: Medical Imaging

UNIT 5 **Z TRANSFORMS AND DIFFERENCE EQUATIONS** **9 + 3**

Z-transforms — Elementary properties — Inverse Z-transform (using partial fraction and residues) — Initial and final value theorems — Convolution theorem — Formation of difference equations — Solution of difference equations using Z — transform. Application: Image analysis

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students will be able to:

CO1: State and define differential equations using Fourier series analysis and Steady state solution, Transform of simple functions which plays a vital role in Engineering applications.

CO2: Understand how to solve the given standard partial differential equations, Odd and Even functions using Fourier series, Classification of PDE, Fourier transform pair and Elementary properties using Z – Transforms.

CO3: Apply the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations, Appreciate the same in solving Convolution theorem by Transforms

CO4: Analyze the mathematical principles on transforms and partial differential equations would provide

them the ability to formulate and solve some of the physical problems of engineering.

CO5: Evaluate the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems and Steady state solutions and Harmonic Analysis.

TEXT BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, New Delhi, 2018.
2. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2018.
3. Kreyszig E, "Advanced Engineering Mathematics ", 10th Edition, John Wiley, New Delhi, India, 2018.

REFERENCES:

1. Andrews. L.C and Shivamoggi. B, "Integral Transforms for Engineers" SPIE Press, 1999.
2. James. G., "Advanced Modern Engineering Mathematics", 4thEdition, Pearson Education, New Delhi, 2016.
3. Wylie. R.C. and Barrett . L.C., "Advanced Engineering Mathematics "Tata McGraw Hill Education Pvt. Ltd, 6th Edition, New Delhi, 2012
4. Bali. N.P and Manish Goyal, "A Textbook of Engineering Mathematics", 10th Edition, Laxmi Publications Pvt. Ltd, 2021.
5. Narayanan. S.Manicavachagom Pillay.T.K and Ramanaiah.G "Advanced Mathematics for Engineering Students", Vol. II & III, S.Viswanathan Publishers Pvt. Ltd, Chennai, 1998.

CO's-PO's & PSO's MAPPING

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CO 2	3	2	1	-	-	-	-	-	1	-	-	1	-	-	-
CO 3	3	3	2	-	-	-	-	-	1	-	-	1	-	-	-
CO 4	3	2	3	-	-	-	-	-	1	-	-	1	-	-	-
CO 5	3	3	1	-	-	-	-	-	1	-	-	1	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23CE301 **STRENGTH OF MATERIALS I** **Category: PCC**

SDG: 9

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

1. To learn the fundamental concepts of stress, strain and deformation of solids.
2. To know the mechanism of load transfer in beams, the induced stress resultants and deformations.
3. To learn about slope and deflection of structures.
4. To understand the effect of torsion on shafts and spring.
5. To analyze plane and space trusses.

UNIT 1 STRESS, STRAIN AND DEFORMATION OF SOLIDS 9

Simple Stresses and strains – Elastic constants - Relationship between elastic constants – Stress Strain Diagram – Ultimate Stress – Yield Stress – Deformation of axially loaded member - Composite Bars - Thermal Stresses – State of Stress in two dimensions – Stresses on inclined planes – Principal Stresses and Principal Planes – Maximum shear stress - Mohr's circle method

UNIT 2 TRANSFER OF LOADS AND STRESSES IN BEAMS 9

Types of loads, supports, beams – concept of shearing force and bending moment - Relationship between intensity of load, Shear Force and Bending moment - Shear Force and Bending Moment Diagrams for Cantilever, simply supported and overhanging beams with concentrated load, uniformly distributed load, uniformly varying load and concentrated moment. Theory of Simple Bending – Stress Distribution due to bending moment and shearing force - Flitched Beams - Leaf Springs.

UNIT 3 DEFLECTION OF BEAMS 9

Elastic curve – Governing differential equation - Double integration method - Macaulay's method - Area moment method - conjugate beam method for computation of slope and deflection of determinant beams.

UNIT 4 TORSION 9

Theory of Torsion – Stresses and Deformations in Solid and Hollow Circular Shafts – combined bending moment and torsion of shafts - Power transmitted to shaft – Shaft in series and parallel – Closed and Open Coiled helical springs – springs in series and parallel – Design of buffer springs.

UNIT 5 ANALYSIS OF TRUSSES 9

Determinate and indeterminate trusses - Analysis of pin jointed plane determinate trusses by method of joints, method of sections and tension coefficient – Analysis of Space trusses by tension coefficient method.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: Understand the concepts of stress and strain, principal stresses and principal planes

CO2: Determine Shear force and bending moment in beams and understand concept of theory of simple bending.

CO3: Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.

CO4: Apply basic equation of torsion in design of circular shafts and helical springs.

CO5: Analyze the pin jointed plane and space trusses.

TEXT BOOKS:

1. Rajput.R.K. “Strength of Materials”, S.Chand and Co, New Delhi, 2015.
2.Punmia.B.C., Ashok Kumar Jain and Arun Kumar Jain, SMTS –I Strength of materials, Laxmi publications. New Delhi, 2015.

REFERENCES:

1. Timoshenko.S.B. and Gere.J.M, “Mechanics of Materials”, Van Nos Reinbhold, New Delhi 1999.
2. Vazirani.V.N and Ratwani.M.M, “Analysis of Structures”, Vol I Khanna Publishers, New Delhi,1995.
3. Junnarkar.S.B. and Shah.H.J, “Mechanics of Structures”, Vol I, Charotar Publishing House, New Delhi 2016
4. Singh. D.K., “ Strength of Materials”, Ane Books Pvt. Ltd., New Delhi, 2016
5.Basavarajaiah, B.S. and Mahadevappa, P., Strength of Materials, Universities Press, Hyderabad, 2010.
6. Gambhir. M.L., "Fundamentals of Solid Mechanics", PHI Learning Private Limited., New Delhi, 2009.

CO’s-PO’s & PSO’s MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PSO 3
CO1	-	2	1	2	1	-	-	-	2	1	-	-	2	-	2
CO2	3	-	2	1	-	-	-	-	1	-	-	-	-	1	-
CO3	-	2	-	2	3	-	-	-	3	1	-	-	-	2	1
CO4	2	2	1	-	-	-	-	-	-	-	2	-	2	-	-
CO5	1	-	2	-	2	-	-	-	-	2	-	-	1	2	1

Correlation levels: 1 – low 2 – medium 3 – high “-“- no correlation

U23CE302 **FLUID MECHANICS** **Category: ESC**

SDG: 4

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

1. To study the concepts of fluid mechanics.
2. To understand the closed conduit flow in different flow condition.
3. To understand the open channel flow types.
4. To understand the application of Dimensional analysis in similitude and model study
5. To study the concepts of hydraulic machines viz. flow through turbines and pumps.

UNIT 1 **FLUID PROPERTIES AND FLUID STATICS** **9**

Fluid – definition, distinction between solid and fluid - Units and dimensions - Properties of fluids - density, specific weight, specific volume, specific gravity, temperature, viscosity, compressibility,vapour pressure, capillarity and surface tension - Fluid statics: concept of fluid static pressure, absolute and gauge pressures - pressure measurements by manometers and pressure gauges-on planes – centre of pressure – bouncy and floatation.

UNIT 2 **FLIUD KINEMATICS AND DYNAMICS** **9**

Fluid Kinematics - Flow visualization - lines of flow - types of flow - velocity field and acceleration - continuity equation (one and three dimensional differential forms)- Equation of streamline – stream function - velocity potential function - circulation - flow net. Fluid dynamics - equations of motion -Euler's equation along a streamline - Bernoulli's equation – applications - Venturi meter, Orificemeter and Pitot tube. Linear momentum equation and its application.

UNIT 3 **FLOW THROUGH PIPES** **9**

Viscous flow - Shear stress, pressure gradient relationship - laminar flow between parallel plates - Laminar flow through circular tubes (Hagen poiseulle's) - Hydraulic and energy gradient – flow through pipes - Darcy - Weisbach's equation - pipe roughness -friction factor- Moody's diagram-major and minor losses in pipes-pipes in serial and in .parallel.

UNIT 4 **BOUNDARY LAYER** **9**

Boundary layer – definition- boundary layer on a flat plate – thickness and classification –displacement , energy and momentum thickness – Boundary layer separation and control – drag in flat plate – drag and lift coefficients.

UNIT 5 **DIMENSIONAL ANALYSIS AND MODEL STUDIES** **9**

Fundamental dimensions - dimensional homogeneity - Rayleigh’s method and Buckingham Pi-theorem- Dimensionless parameters-similitude and model studies-distorted models.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: Understand the broad principles of fluid statics, kinematics and dynamics

CO2: Calculate major and minor losses in flow through pipes

CO3: Apply the knowledge of fluid mechanics in addressing problems in open channels flow.

CO4: Apply the principle of dimensional analysis and model analysis in hydraulic engineering problems

CO5: Design and Study the performance of hydraulic machineries (Pumps & Turbines Apply the basics of Computational Fluid Dynamics in solving pipe flow

TEXT BOOKS:

1. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics forEngineers", Pearson Education, Asia, 8th Edition, 2015.

2. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015.

REFERENCES:

1. Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016

2. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning,New Delhi, 8th Edition, 2014

3. Gupta S.C. and Kapoor V. K., "Fundamentals of Mathematical Statistics", Sultan Chand &Sons, New Delhi, 12th Edition, 2020

4. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning,New Delhi, 8th Edition, 2014

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PSO 3
CO1	3	3	2	2	-	-	-	-	-	-	-	-	2.5	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-	3	-	-
CO3	3	3	3	2	-	-	-	-	-	-	-	-	2.75	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-	3	-	-
CO5	3	3	3	2	-	-	-	-	-	-	-	-	2.75	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23CE303 **SURVEYING I** **Category: PCC**

SDG: 9

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

1. To understand basic principle and concepts of different surveying methods.
2. To study the different surveying equipment in the field of civil engineering.
3. To enhance the ability to calculate surveying quantities.
4. To enable the suitability of surveying instruments and method to a given problem.
5. To develop basic dynamics concepts about Curves.

UNIT 1 **INTRODUCTION AND CHAIN SURVEYING** **9**

Definition and Principles of Surveying – Applications - Classification – Field and Office work – Scales – Conventional Signs. Chain Survey - Instruments – Ranging – Types - Obstacles in Chaining – Chain and Tape corrections - Setting out Perpendiculars – Well conditioned Triangles – Traversing – Enlarging and reducing Maps – Topological maps.

UNIT 2 **COMPASS SURVEYING AND PLANE TABLE SURVEYING** **9**

Prismatic Compass – Surveyor's Compass – Working and use of compass - Bearing – Systems and Conversions – Computation of angles from bearing - Local Attraction - Magnetic Declination – Dip – Traversing – Adjustment of error. Plane Table and Accessories – Radiation, Intersection, Resection – Two point problem - Three point problem.

UNIT 3 **LEVELLING AND APPLICATIONS** **9**

Basic Terms - Types of Level – Fundamental Axes - Levelling staff – Bench Marks – Temporary and Permanent Adjustments – Types of Levelling - Curvature and Refraction correction - Reciprocal Levelling – Calculation of Areas and Volumes – Contouring – Characteristics and Uses of Contours – Methods of contouring.

UNIT 4 **THEODOLITE SURVEYING** **9**

Theodolite – types – Terms - Temporary and Permanent Adjustments – Measurement of Horizontal Angles by Repetition and Reiteration – Closing Error and Distribution – Omitted Measurements.

UNIT 5 **CURVES** **9**

Simple curves - elements - Setting out of curves -Linear and angular methods - Difficulties in setting out - Compound and Reverse curves- elements - Setting out of Vertical Curves.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, students would

CO1: Able to calculate distances, angles.

CO2: Able to understand about compass and plane table.

CO3: Able to interpret survey data and compute areas and volumes.

CO4: Able to calculate levels of various points.

CO5: Able to know about setting out of curves.

TEXT BOOKS:

1. Kanetkar .T.P, and Kulkarni .S.V, "Surveying and Levelling, Vol. I & II", Pune Vidyarthi Griha Prakashan ,2004.
2. Duggal S.K ."Surveying ,Vol. I & II", Tata McGraw-Hill, Publishing Company, 2004.
3. Basak N.N, "Surveying and Leveling", Tata McGraw-Hill, Publishing Company, 2014.
4. Bhavikatti S.S, "Surveying and Leveling , Vol.I", I.K. International Pvt. Ltd., 2010.

REFERENCES:

1. Charles D Ghilani, Paul R Wolf., Elementary Surveying, Prentice Hall, 2012.
2. Bannister. A & Reynolds. S, "Surveying", ELBS, 1992.
3.Chandra A.M., "Plane Surveying", New Age International Pvt. Ltd, 2015.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PSO 3
CO1	3	2	-	1	-	-	-	-	2	-	-	-	-	-	-
CO2	1	-	-	2	-	-	-	-	1	-	-	-	-	1	-
CO3	-	2	-	-	-	-	-	-	3	-	-	-	-	-	-
CO4	2	3	-	-	-	-	-	-	-	-	1	-	-	2	-
CO5	1	-	-	2	-	-	-	-	-	-	-	-	1	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23CE304
SDG:4,9

ENGINEERING GEOLOGY

Category:PCC

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

1.At the end of this course the students will be able to understand the importance of geological knowledge such as earth, earthquake, volcanism and to apply this knowledge in projects such as dams, tunnels, bridges, roads, airport and harbour as well as to choose types of foundations.

UNIT 1 PHYSICALGEOLOGY 9

Geology in civil engineering – branches of geology – structure of earth and its composition – weathering of rocks–scale of weathering–soils-landforms and processes associated with river, wind, ground water and sea–relevance to civil engineering. Plate tectonics–Earthquakes–Seismic zones in India.

UNIT 2 MINERALOGY 9

Physical properties of minerals–Quartz group, Feldspar group, Pyroxene- hypersthene and augite, Amphibole – hornblende, Mica – muscovite and biotite, Calcite, Gypsumand Clayminerals.

UNIT 3 PETROLOGY 9

Classification of rocks, distinction between Igneous, Sedimentary andMetamorphic rocks.Engineering properties of rocks. Description, occurrence, engineering properties, distribution and uses of Granite, Dolerite,Basalt, Sandstone,Limestone,Laterite, Shale, Quartzite, Marble,Slate, Gneiss and Schist.

UNIT 4 STRUCTURAL GEOLOGY ANDGEOPHYSICAL METHODS 9

Geological maps–attitude of beds, study of structures–folds,faults and joints–relevance to civil engineering. Geophysicalmethods– Seismic and electrical methods forsubsurfaceinvestigations.

UNIT 5 APPLICATION OF GEOLOGICAL INVESTIGATIONS 9

Remote sensing for civil engineering applications; Geological conditions necessary for design and constructionof Dams,Reservoirs,Tunnels,andRoadcuttings–Hydrogeologicalinvestigationsand mining-Coastal protection structures.Investigation ofLandslides, causesand mitigation.

COURSE OUTCOMES:

At the end ofthe course,students would

CO1: The students can able to understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies.

CO2: Will get basics knowledgeon properties ofminerals.

CO3: Gain knowledge about types of rocks, their distribution and uses.

CO4: Will understand the methods of study on geological structure.

CO5: Will understand the application of geological investigation in projects such as dams,tunnels, bridges,roads, airport and harbour.

TOTAL:45 PERIODS

TEXT BOOKS:

1.Varghese,P.C.,Engineering Geology for Civil Engineering Prentice Hall of India Learning Private Limited, NewDelhi, 2012.

2. Venkat Reddy. D. Engineering Geology, Vikas Publishing House Pvt. Lt, 2010.

3. GokhaleKVGK,"Principles ofEngineering Geology", B.S. Publications, Hyderabad 2011.

4. Chenna Kesavulu N."Textbook ofEngineering Geology", MacmillanIndiaLtd., 2009.

REFERENCES:

1. BlythF.G.H.and de Freitas M.H., GeologyforEngineers, Edward Arnold,London, 2010.

2.Bell .F.G."Fundamentals ofEngineeringGeology",B.S. Publications. Hyderabad 2011.

3. Dobrin, M.B "An introduction to geophysical prospecting", McGraw Hill, New Delhi, 1988

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	-	-	-	-	-	-	1	-	2	-	-	3	-	1	1
CO2	-	-	-	-	-	-	2	-	3	-	-	2	-	1	1
CO3	-	-	-	-	-	-	2	-	3	2	-	3	-	1	1
CO4	-	-	-	-	-	-	2	-	2	1	-	2	-	1	2
CO5	-	-	-	-	-	-	2	-	3	2	-	3	-	1	2
Correlation levels:	**1– low**			**2 – medium**				**3– high**		**"-"-no correlation**					

U23CE305 CONSTRUCTION MATERIALS AND TECHNOLOGY **Category: PCC**

SDG: 9

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

1. To introduce students to various construction materials that is commonly used in civil engineering construction.
2.To knowledge in modern and smart materials of construction.
3. To understand about types of foundations, types of masonry, construction practices and service requirements.
4. To learn about the various construction equipment.
5. To understand in the construction planning and scheduling.

UNIT 1 INTRODUCTION 9

Basic construction materials-Stone as building material – Criteria for selection – Tests on stones – Bricks – Classification – Manufacturing of clay bricks – Tests on bricks – Compressive strength – Water Absorption – Efflorescence – Lime – Preparation of lime mortar – Concrete hollow blocks – Lightweight concrete blocks.

UNIT 2 MODERN MATERIALS OF CONSTRUCTION 9

Glass – Ceramics – Refractories – Composite Materials – Types and applications of laminar composites – FRP – Fibre textiles – Geomembranes and Geotextiles for earth reinforcement - Smart materials

UNIT 3 CONSTRUCTION PRACTICES & SERVICE REQUIREMENTS 9

Types of Foundations – Shallow and Deep Foundations – Stone Masonry – Brick Masonry – Plastering and Pointing – Cavity Walls – Diaphragm Walls – Formwork – Centering and Shuttering – Shoring – Scaffolding – Underpinning – Roofing – Flooring – Joints in concrete – Contraction/Construction/Expansion joints – Fire Protection – Thermal Insulation – Ventilation and Air conditioning – Acoustics and Sound Insulation – Damp Proofing.

UNIT 4 CONSTRUCTION EQUIPMENTS 9

Selection of equipment for earthwork – earth moving operations – types of earthwork equipment – Equipment for foundation and pile driving. Equipment for compaction, batching and concreting, material handling and erection of structures – Types of cranes - Equipment for dredging, trenching and tunneling.

UNIT 5 CONSTRUCTION PLANNING 9

Introduction to construction planning – Scheduling for activities – Critical path method (CPM) and PERT network modeling and time analysis – Case illustrations.

TOTAL = 45 PERIODS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1: Compare the properties of most common and advanced building materials.
CO2: Understand the importance of modern materials for construction.
CO3: Identify the best construction and services practices such as thermal insulations and air conditioning of the buildings.
CO4: Select various equipment for construction work conditioning of building.
CO5: Understand the construction planning and scheduling techniques.

TEXT BOOKS:

1. Varghese.P.C, Building Materials, Second Edition PHI Learning Ltd., 2015. .
2. Arora S.P and Bindra S.P Building construction, Dhanpat Rai and sons, 2013.
3. Building construction—B.C.Punmia; Ashok Kumar Jain; Arun Kumar Jain, Firewall Media, 2005
4. Building Construction- P.C.Varghese, PHI Learning Pvt. Ltd.2009

REFERENCE BOOKS:

1. Varghese.P.C, Building Construction, Second Edition PHI Learning ltd., 2016.
2. Punmia ,B.C Building construction , Laxmi publication (p)ltd..,2008.
3. Peurifoy R.L., Schexnayder,C.J., Shapira A., Schmitt.R., Construction Planning Equipment and Methods, Tata McGraw-hill, 2011.
4. Srinath L.S.,PERT and CPM -Principles and applications, Affliated East West Press 2001

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PSO 3
CO1	2	2	-	3	-	2	2	-	-	-	-	2	3	-	-
CO2	3	-	-	3	-	-	2	-	-	-	-	2	3	-	2
CO3	3	-	-	2	-	-	3	-	-	-	2	-	3	-	2
CO4	2	-	-	-	-	-	-	-	-	-	2	-	3	3	-
CO5	2	3	2	3	2	2	-	-	2	-	3	2	3	3	3

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23CE311 **SURVEYING LABORATORY** **Category: PCC**
SDG: 15

L	T	P	C
0	0	4	2

COURSE OBJECTIVE:

1. To enhance the ability to measure different surveying measurements.
2. To enable the handling of various surveying equipments.
3. To apply suitable surveying methods and instruments for a given problem.
4. To understand the advanced surveying techniques.
5. To enable the handling of advanced surveying equipments.

LIST OF EXPEERIMENTS:

1. **CHAIN SURVEY**
   - i) Study of chains and its accessories, aligning, ranging, chaining and marking perpendicular offset.
   - ii) Setting out works – Foundation marking for single and double room using tapes and chain.

2. **TRAVERSING**
   - i) Compass Traversing – Measuring Bearings and Arriving included angles.
   - ii) Plane Table Traversing – Intersection method.
   - iii) Plane Table Traversing – Two point problem.
   - iv) Plane Table Traversing – Three point problem.

3. **LEVELLING**
   - i) Fly levelling using dumpy level.

4. **THEODOLITE**
   - i) Measurements of horizontal angles by reiteration and repetition method.
   - ii) Measurements of vertical angles.

5. **TOTAL STATION**
   - i) Study of Total Station.
   - ii) Traversing using Total station and Area of Traverse.

6. To plot the contour map for a given area by direct method.

7. Setting out a Building.

COURSE OUTCOMES:

At the end of the course, students would

CO1: The student will be able to handle the surveying instruments like Chain, Compass, Plane table and Dumpy level.

CO2: The Student will be able to measure distances and angles using Theodolite.

CO3: The Student will be able to conduct field survey and collect data.

CO4: The student will be able to do measurements precisely using advanced surveyinginstruments.

CO5: The student will be able to handle the advanced surveying instruments like total station andGPS.

CO's-PO's & PSO's MAPPING															
CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**	**PSO 3**
CO1	3	2	1	1	-	-	-	-	2	-	-	-	1	-	-
CO2	1	-	-	2	-	-	-	-	-	2	-	-	-	1	-
CO3	-	2	1	-	-	-	-	-	2	2	-	-	-	-	1
CO4	2	3	-	-	-	-	-	-	-	2	2	-	-	2	-
CO5	1	-	-	2	-	-	-	-	-	-	-	-	1	-	1
Correlation levels: **1 – low** **2 – medium** **3 – high** **"-"- no correlation**															

MATERIAL TESTINGLABORATORY **Category:PCC**

U23CE312	**L**	**T**	**P**	**C**
SDG:4,9,11	**3**	**0**	**4**	**2**

COURSE OBJECTIVE:

1.To exposethestudents to thetestingofdifferentmaterials undertheaction ofvarious forces and determination of their characteristics experimentally.

2. To develop skills to test various construction materials.

LIST OFEXPEERIMENTS

1 TESTSON METALS

iii) Tension test on steel rod.
iv) Torsion test on mild steel rod.
v) Deflection test on metalbeam.
vi) Doublesheartest on metal.
vii) Impact test on metal specimen (Izod and Charpy).
viii) Hardness test on metals (Rockwell and Brinell Hardness Tests).
ix) Compression test on helical spring.
x) Deflection test on carriagespring.

2 TESTSON CEMENT

v) Determination of fineness of cement.
vi) Determination of consistencyofcement.
vii) Determination ofspecificgravityof cement.
viii) Determination ofinitial and final settingtimeofcement.

3 TESTSON FINE AGGREGATE

ii) Determination ofspecificgravityand water absorption of fineaggregate. iii) Determination ofgrading of fineaggregate.
iv) Determination ofwaterabsorption for fineaggregate.

4 TESTSON COARSEAGGREGATE

iii) Determination of compacted and loosebulk densityofcoarseaggregate. iv) Determination ofimpactvalueof coarseaggregate.
v) Determination of elongation indexof coarseaggregate.
vi) Determination of flakiness indexof coarseaggregate.
vii) Determination ofaggregate crushingvalueof coarseaggregate.
viii) Determination ofspecificgravityand water absorption of coarseaggregate.

5 TESTSON BRICKS

iii) Determination of compressivestrength ofbricks.
iv) Determination ofwaterabsorption ofbricks.
v) Determination ofefflorescenceofbricks.

6 TESTON WOOD

i) Determination ofCompression test on wood.

TOTAL:45 PERIODS

At the end ofthe course,students would

CO1: Determine the mechanicalpropertiesofsteel.

CO2: Determine the mechanicalpropertiesof Cement. **CO3:** Determinethephysicalpropertiesof fine aggregate.

CO4: Determinethephysicalpropertiesofcoarseaggregate.

CO5: Determinethestrength ofbrick and wood.

CO's-PO's & PSO's MAPPING															
CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**	**PSO 3**
CO1	1	2	-	2	-	2	-	-	3	-	-	3	1	1	1
CO2	1	2	-	2	-	2	-	-	3	-	-	2	1	1	1
CO3	1	2	-	2	-	2	-	-	3	-	-	3	1	1	1
CO4	1	2	-	2	-	2	-	-	3	-	-	3	1	1	2
CO5	1	2	-	2	-	2	-	-	3	-	-	3	1	1	2
Correlationlevels: 1– low 2 – medium 3– high "-"-no correlation															

COURSE DESIGNED BY	**APPROVED BY**

U23EE313 SDG: 4	Aptitude and Communication for Engineers I (Common to all Branches)	Category : BSC L T P C 1 0 1 1

COURSE OBJECTIVE:

1. To create an awareness regarding the internal inhibitions that prevents the students from opening out in classrooms and other forums and there by overcoming the shyness to perform..
2. To make students understand the importance of English as a global language and train them for simple English communication through various speech craft activities and improve their communicative English for industry readiness.
3. To develop an awareness about making a conscious effort towards avoiding errors in daily communication
4. To train students on clearing various placement papers with greater accuracy

UNIT 1 **Introduction** **3**

Introduction about the Course -Learning expectations - Communication pre-assessment

UNIT 2 **Speaking Skills -Novice** **6**

Communication skills – Shy barrier - Importance of English - Challenges faced in English communication - Developing a globally comprehensible accent -Speech Craft- Public Speaking -Squabble

UNIT 3 **Speaking Skills -Intermediate** **6**

Speech Craft –for and against –Debate (Ship Wreck Activity)

UNIT 4 **Language Gym - I** **6**

Tenses for various communication scenarios – Common errors in daily communication – Thought Group reading – Passage writing

UNIT 5 **Aptitude for Placements - I** **6**

Placement Paper 1 – HCF & LCM, Problems on Numbers-Placement Paper 2 – Average, Simplification – Placement Paper 3-Percentage, Simple & compound Interest - Placement Paper 4 – Time & Distance – Placement Paper 5-Trains & Boats, Placement Paper 6 – Time & Work, Pipes & Cistern.

COURSE OUTCOMES:

Upon completion of this course,

CO1: Students will be able to participate in any learning activity without any reservations. They shall be ready to move beyond their comfort zone to acquire new skills throughout their life.

CO2: Students shall understand and appreciate the importance of English in the current global scenario and make efforts towards up skilling the same.

CO3: Students shall be able to present their view and standpoints in any scenarios confidently.

CO4: Use the correct Grammar and Vocabulary, ensuring the enhancement their language skills and effective communication.

CO5: To use appropriate strategies and shortcuts to improve speed and accuracy in solving aptitude problems during recruitment processes

TOTAL: 30 PERIODS

TEXT BOOKS:

1. The Pearson Guide to Quantitative Aptitude for Competitive Examinations, Dinesh Khattar. Pearson
2. Quantitative Aptitude Dr. R.S. Aggarwal S. Chand Publication
3. A modern Approach to Verbal and Non-Verbal Reasoning R.S. Aggarwal
4. A Modern Approach to Verbal & Non-Verbal Reasoning - Aggarwal R. S

REFERENCES:

1. Quantitative Aptitude for CAT, Arun Sharma
2. Fast Track Objective Arithmetic, Rajesh Verma, Arihant Publication
3. Quantitative Aptitude Quantum CAT Common Admission Tests for Admission into IIMs,Sarvesh K. Verma
4. Wiley's Exam Xpert Quantitative Ability for CAT, 2ed, Ashu Jain

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
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CO 2	1	-	-	-	-	-	-	1	-	3	-	-	-	-	-
CO 3	1	-	-	-	-	-	-	1	-	3	-	-	-	-	-
CO 4	1	-	-	-	-	-	-	1	-	3	-	-	-	-	-
CO 5	3	-	-	-	-	-	-	1	1	-	-	-	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

COURSE DESIGNED BY	APPROVED BY
Ramesh Raja M	
Name and Department	Name and Department of BoS Chairman

MATERIAL TESTINGLABORATORY **Category:PCC**

U23CE312	**L**	**T**	**P**	**C**
SDG:4,9,11	**3**	**0**	**4**	**2**

COURSE OBJECTIVE:

1.To expose the students to the testing of different materials under the action of various forces and determination of their characteristics experimentally.

2. To develop skills to test various construction materials.

LIST OF EXPERIMENTS

1 TESTS ON METALS

1) Tension test on steel rod.
2) Torsion test on mild steel rod.
3)Deflection test on metal beam.
4)Double shear test on metal.
5)Impact test on metal specimen (Izod and Charpy).
6)Hardness test on metals (Rockwell and Brinell Hardness Tests).
7)Compression test on helical spring.
8)Deflection test on carriagespring.

2 TESTS ON CEMENT

1) Determination of fineness of cement.
2) Determination of consistency of cement.
3) Determination of specific gravity of cement.
4) Determination of initial and final setting time of cement.

3 TESTS ON FINE AGGREGATE

1)Determination of specific gravity and water absorption of fine aggregate.
2)Determination of grading of fine aggregate.
3) Determination of water absorption for fine aggregate.

4 TESTS ON COARSE AGGREGATE

1) Determination of compacted and loose bulk density of coarse aggregate.
2) Determination of impact value of coarse aggregate.
3) Determination of elongation index of coarse aggregate.
4) Determination of flakiness index of coarse aggregate.
5) Determination of aggregate crushing value of coarse aggregate.
6) Determination of specific gravity and water absorption of coarse aggregate.

5 TESTS ON BRICKS

1) Determination of compressive strength of bricks.
2) Determination of water absorption of bricks.
3) Determination of efflorescence of bricks.

6 TEST ON WOOD

1) Determination of Compression test on wood.

TOTAL:45 PERIODS

At the end of the course, students would

CO1: Determine the mechanical properties of steel.

CO2: Determine the mechanical properties of Cement.

CO3: Determine the physical properties of fine aggregate.

CO4: Determine the physical properties of coarse aggregate.

CO5: Determine the strength of brick and wood.

CO's-PO's & PSO's MAPPING														
CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**	**PSO3**
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CO2	1	2	-	2	-	2	-	-	3	-	-	2	1	1	1
CO3	1	2	-	2	-	2	-	-	3	-	-	3	1	1	1
CO4	1	2	-	2	-	2	-	-	3	-	-	3	1	1	2
CO5	1	2	-	2	-	2	-	-	3	-	-	3	1	1	2
Correlationlevels: 1– low 2 – medium 3– high "-"-no correlation															

U23EE313 SDG: 4	Aptitude and Communication for Engineers I (Common to all Branches)	Category : BSC L T P C 1 0 1 1

COURSE OBJECTIVE:

1. To create an awareness regarding the internal inhibitions that prevents the students from opening out in classrooms and other forums and there by overcoming the shyness to perform..
2. To make students understand the importance of English as a global language and train them for simple English communication through various speech craft activities and improve their communicative English for industry readiness.
3. To develop an awareness about making a conscious effort towards avoiding errors in daily communication
4. To train students on clearing various placement papers with greater accuracy

UNIT 1 **Introduction** **3**

Introduction about the Course -Learning expectations - Communication pre-assessment

UNIT 2 **Speaking Skills -Novice** **6**

Communication skills – Shy barrier - Importance of English - Challenges faced in English communication - Developing a globally comprehensible accent -Speech Craft- Public Speaking -Squabble

UNIT 3 **Speaking Skills -Intermediate** **6**

Speech Craft –for and against –Debate (Ship Wreck Activity)

UNIT 4 **Language Gym - I** **6**

Tenses for various communication scenarios – Common errors in daily communication – Thought Group reading – Passage writing

UNIT 5 **Aptitude for Placements - I** **6**

Placement Paper 1 – HCF & LCM, Problems on Numbers-Placement Paper 2 – Average, Simplification – Placement Paper 3-Percentage, Simple & compound Interest - Placement Paper 4 – Time & Distance – Placement Paper 5-Trains & Boats, Placement Paper 6 – Time & Work, Pipes & Cistern.

COURSE OUTCOMES:

Upon completion of this course,

CO1: Students will be able to participate in any learning activity without any reservations. They shall be ready to move beyond their comfort zone to acquire new skills throughout their life.

CO2: Students shall understand and appreciate the importance of English in the current global scenario and make efforts towards up skilling the same.

CO3: Students shall be able to present their view and standpoints in any scenarios confidently.

CO4: Use the correct Grammar and Vocabulary, ensuring the enhancement their language skills and effective communication.

CO5: To use appropriate strategies and shortcuts to improve speed and accuracy in solving aptitude problems during recruitment processes

TOTAL: 30 PERIODS

TEXT BOOKS:

1. The Pearson Guide to Quantitative Aptitude for Competitive Examinations, Dinesh Khattar. Pearson
2. Quantitative Aptitude Dr. R.S. Aggarwal S. Chand Publication
3. A modern Approach to Verbal and Non-Verbal Reasoning R.S. Aggarwal
4. A Modern Approach to Verbal & Non-Verbal Reasoning - Aggarwal R. S

REFERENCES:

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2. Fast Track Objective Arithmetic, Rajesh Verma, Arihant Publication
3. Quantitative Aptitude Quantum CAT Common Admission Tests for Admission into IIMs,Sarvesh K. Verma
4. Wiley's Exam Xpert Quantitative Ability for CAT, 2ed, Ashu Jain

CO's-PO's & PSO's MAPPING

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CO 2	1	-	-	-	-	-	-	1	-	3	-	-	-	-	-
CO 3	1	-	-	-	-	-	-	1	-	3	-	-	-	-	-
CO 4	1	-	-	-	-	-	-	1	-	3	-	-	-	-	-
CO 5	3	-	-	-	-	-	-	1	1	-	-	-	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

SEMESTER IV **Category:PCC**

U23CE401 **STRENGTH OF MATERIALS II** **L T P C**

SDG:9 3 0 0 3

COURSE OBJECTIVE :

1.To know the method of finding slope and deflection of beams and trusses using energy theorems and to know the concept of analysing indeterminate beam.
2.To estimate the load carrying capacity of columns, stresses due to unsymmetrical bending and various theories for failure of material.

UNIT 1 ENERGY PRINCIPLES 9

Strain energy and strain energy density – strain energy due to axial load (gradual, sudden and impact loadings) , shear, flexure and torsion – Castigliano's theorems – Maxwell's reciprocal theorem - Principle of virtual work – unit load method - Application of energy theorems for computing deflections in determinate beams , plane frames and plane trusses – lack of fit and temperature effects - Williot Mohr's Diagram.

UNIT 2 INDETERMINATE BEAMS 9

Concept of Analysis - Propped cantilever and fixed beams - fixed end moments and reactions – sinking and rotation of supports - Theorem of three moments – analysis of continuous beams – shear force and bending moment diagrams.

UNIT 3 COLUMNS AND CYLINDERS 9

Euler's column theory – critical load for prismatic columns with different end conditions – Effective length – limitations - Rankine-Gordon formula - Eccentrically loaded columns – middle third rule - core of a section – Thin cylindrical and spherical shells – stresses and change in dimensions - Thick cylinders – Compound cylinders – shrinking on stresses

UNIT 4 STATE OF STRESS IN THREE DIMENSIONS 9

Stress tensor at a point – Stress invariants - Determination of principal stresses and principal planes - Volumetric strain. Theories of failure: Maximum Principal stress theory – Maximum Principal strain theory – Maximum shear stress theory – Total Strain energy theory – Maximum distortion energy theory – Application problems.

UNIT 5 ADVANCED TOPICS 9

Unsymmetrical bending of beams of symmetrical and unsymmetrical sections – Shear Centre - curved beams – Winkler Bach formula – stresses in hooks..

TOTAL : 45 PERIODS

COURSE OUTCOMES

On successful completion of this course, students will be able to:
CO1: The students can able to determine the strain energy and compute the deflection of determinate beams, frames and trusses using energy principles

CO2: Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements.
CO3: Find the load carrying capacity of columns and stresses induced in columns and cylinders.

CO4: Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure.
CO5: Determine the stresses due to Unsymmetrical bending of beams, locate the shear centre, and find the stresses in curved beams.

TEXT BOOKS:

1.Rajput R.K. "Strength of Materials (Mechanics of Solids)", S.Chand & company Ltd., New Delhi, 2015.
2. Rattan.S.S., "Strength of Materials", Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2011
3. Punmia B.C., Ashok Kumar Jain and Arun Kumar Jain,"Theory of Structures" (SMTS) Vol - II, Laxmi Publishing Pvt Ltd, New Delhi 2017.
4. Basavarajiah and Mahadevapa, Strength of Materials, University press, Hyderabad, 2016.

REFERENCES:

1. Kazimi S.M.A, "Solid Mechanics", Tata McGraw-Hill Publishing Co., New Delhi, 2003
2. William A .Nash, "Theory and Problems of Strength of Materials", Schaum's Outline Series, Tata McGraw Hill Publishing company, 2007
3. Singh. D.K., " Strength of Materials", Ane Books Pvt. Ltd., New Delhi, 2016.
4. Egor P Popov, "Engineering Mechanics of Solids", 2nd edition, PHI Learning Pvt. Ltd., New Delhi, 2012

CO's-PO's&PSO's MAPPING

CO	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	2	1	3	3	2	2	-	1	1	2	1	3	2	3
CO2	1	-	-	2	2	2	3	-	1	1	2	1	2	3	2
CO3	2	3	3	2	3	3	2	1	2	2	2	1	3	3	3
CO4	2	3	3	3	2	1	2	1	1	1	2	1	3	3	3
CO5	1	3	3	3	2	2	1	1	2	2	3	2	2	3	2

Correlationlevels: 1– low 2– medium 3 – high "-"-no correlation

U23CE402 SDG: 9	APPLIED HYDRAULICS ENGINEERING	Category : PCC L T P C 2 0 0 2

COURSE OBJECTIVE:

1. To impart basic knowledge to the students about the open channel flows with analysis of uniform flow, gradually varied flow and rapidly varied flow and to expose them to basic principles of working of hydraulic machineries and to design Pelton wheel, Francis and Kaplan turbine, Centrifugal and Reciprocating pumps

UNIT 1 UNIFORM FLOW 9

Definition and differences between pipe flow and open channel flow - Types of Flow - Properties of open channel - Fundamental equations - Sub-critical, Super-critical and Critical flow - Velocity distribution in open channel - Steady uniform flow.

UNIT 2 VARIED FLOW AND RAPIDLY VARIED FLOW 9

Dynamic equations of gradually varied - Water surface flow profile classifications: Hydraulic Slope, Hydraulic Curve - Profile determination by Numerical method: Direct step method and Standard step method- Application of the momentum equation for RVF - Hydraulic jumps

UNIT 3 TURBINES 9

Turbines - Classification - Impulse turbine – Pelton wheel - Reaction turbines - Francis turbine - Kaplan turbine - Draft tube - Cavitation - Performance of turbine - Specific speed.

UNIT 4 PUMPS 9

Centrifugal pumps - Minimum speed to start the pump - NPSH - Cavitations' in pumps - Operating characteristics - Multistage pumps - Reciprocating pumps.

UNIT 5 INTRODUCTION TO WATER RESOURCE SYSTEM 9

Hydrological cycle-precipitation-types of precipitation-Infiltration-reservoirs-Droughts-floods-rainfall-rainguage-types of rain gauges

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1: Describe the basics of open channel flow, its classification and analysis of uniform flow in steady state conditions with specific energy concept and its application

CO2: Analyse steady gradually varied flow, water surface profiles and its length calculation using direct and standard step methods with change in water surface profiles due to change in grades.

CO3: Derive the relationship among the sequent depths of steady rapidly varied flow and estimating energy loss in hydraulic jump with exposure to positive and negative surges

CO4: Design turbine and explain the working principle

CO5: Differentiate pumps and explain the working principle with characteristic curves and design centrifugal and reciprocating pumps

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Jain. A.K., Fluid Mechanics, Khanna Publishers, Delhi,2010.
2. Chandramouli P N, Applied Hydraulic Engineering, Yes Dee Publisher, 2017

REFERENCES*:*

1. Ven Te Chow, Open Channel Hydraulics, McGraw Hill, New York, 2009.
2. Mays L.W.,Water Resources Engineering, JohnWiley and Sons (WSE), New York, 2019
3. Subramanya K., Flow in open channels, Tata McGraw Hill, New Delhi, 2019.

CO's-PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	2	1	-	1	-	-	1	-	-	1	1	1	2	2	2
CO 2	3	3	2	3	-	-	1	-	-	1	1	1	2	2	2
CO 3	3	2	1	2	-	-	1	-	-	1	1	1	1	1	2
CO 4	3	2	1	3	2	-	1	-	-	1	1	1	2	2	1
CO 5	3	2	2	2	3	-	1	-	-	1	1	1	2	2	2

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

Category:PCC

U23CE403	**SURVEYING II**	**L**	**T**	**P**	**C**
SDG:9		3	0	0	3

COURSE OBJECTIVE :

1. To learn about the advanced methods of surveying to solve complex civil engineering problems
2. To understand the principles and concepts of control surveying using instruments.
3. To learn about errors in field measurements and their adjustments..
4. To understand the principles and concepts of Hydrographic Survey.
5. To understand the principles and concepts of advanced surveying instruments.

UNIT 1 TACHEOMETRIC SURVEYING 9

Tacheometric Systems-Tangential, Stadia and Subtence Methods-Stadia Systems- Fixed and Movable Hairs-Stadia Constants - Horizontal and Inclined Line of Sights-Vertical and Normal Staffing- Tangential Tacheometry - Anallactic Lens

UNIT 2 CONTROL SURVEYING 9

Vertical and Horizontal Control-Triangulation-Classification – Intervisibility - Triangulation Figures – Strength of Figure - Signals and Towers - Base Line Measurements - Satellite Stations and Reduction to Centre - Trignometric Leveling – Geodetic Observations – Difference in Elevation - Single and Reciprocal Observations.

UNIT 3 SURVEY ADJUSTMENTS 9

Definitions - Errors- Types - Sources, Precautions and Corrections- True and Most Probable Values - Laws of Weights - Principle of Least Squares- Determination of Most Probable Values - Normal Equations Method – Method of Differences - Method of Correlates – Adjustment of Plane and Spherical Triangle.

UNIT 4 HYDROGRAPHIC SURVEYING 9

Shore Line Survey – Tides – Tide Gauges – Types – Sounding – Equipments – Locating Sounding - Reduction- Route Survey – Reconnaissance, Preliminary, Location and Construction Survey.

UNIT 5 MODERN SURVEYING INSTRUMENTS 9

Digital Level - Electromagnetic Distance Measurement - Electromagnetic Waves – Principle – Types of Edm Instruments – Total Station – Parts – Accessories – Field Procedure – Errors – Office Work – GPS – Development – Basic Concepts – Segments - Receivers and Methods - Applications – GIS – Components - Data Models – Data Acquisition – Maps and Map Projection

TOTAL : 45 PERIODS

COURSE OUTCOMES

On successful completion of this course, students will be able to:

CO1:The students will possess knowledge about tachometric surveying and control surveying.
CO2: Able to do survey adjustments in the field measurements
CO3: The student will be able to interpret survey data and calculate surveying quantities.
CO4: The student will be able to know about hydrographic surveying.
CO5: The student will gain knowledge on modern surveying instruments.

TEXT BOOKS

1.Kanetkar .T.P, and Kulkarni .S.V, "Surveying and Levelling, Vol. I & II", Pune Vidyarthi Griha Prakashan ,2004.

2.Duggal S.K ."Surveying ,Vol. I & II", Tata McGraw-Hill, Publishing Company, 2004.

3.Basak N.N, "Surveying and Leveling", Tata McGraw-Hill, Publishing Company, 2014.

4.Bhavikatti S.S, "Surveying and Leveling , Vol.I& II", I.K. International Pvt. Ltd., 2010.

REFERENCE BOOKS

1.Charles D Ghilani, Paul R Wolf., Elementary Surveying, Prentice Hall, 2012.
Bannister. A & Reynolds. S, "Surveying", ELBS, 1992.
2.Chandra A.M., "Plane Surveying", New Age International Pvt. Ltd, 2015.

CO's-PO's&PSO's MAPPING

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CO2	3	-	-	1	-	-	-	-	1	-	-	-	-	1	-
CO3	-	-	-	2	-	-	-	-	3	1	-	-	-	2	-
CO4	2	-	1	-	-	-	-	-	-	-	2	-	-	-	-
CO5	1	-	-	-	-	-	-	-	-	2	-	-	1	2	-

Correlation levels: 1– low 2– medium 3 – high "-"-no correlation

Category:PCC

U23CE404	**SOIL MECHANICS**	**L**	**T**	**P**	**C**
SDG:9		3	0	0	3

COURSE OBJECTIVE :

1.To provide an exposure to the concept of three phase system and soil properties. Classify the soil, understand its behaviour and will be able to compute/estimate index parameters.

2.To learn the role of water in soil behaviour and its applications in soil stresses, permeability and seepage.

3.To explain the volume-change behaviour in soil through Compaction and consolidation and estimating consolidation settlement.

4.To develop the knowledge in Stress distribution and Settlement in soil.

5.To understand the concept of shear strength of soil through various shear test and to learn Slope stability concepts.

UNIT 1 SOIL CLASSIFICATION AND COMPACTION 9

Formation of soil - Soil description – Particle – Size shape and colour – Composition of gravel, sand, silt, clay particles – Particle behaviour – Soil structure – Phase relationship – Index properties – Significance – BIS classification system – Unified classification system – Compaction of soils – Theory, Laboratory and field tests – Field Compaction methods – Factors influencing compaction of soils

UNIT 2 EFFECTIVE STRESS AND PERMEABILITY 9

Soil - water – Static pressure in water - Effective stress concepts in soils – Capillary phenomena– Darcy's law – Laboratory Determination (Constant head and falling head methods) and field measurement pumping out in unconfined and confined aquifer – Factors influencing permeability of soils – Seepage - Two dimensional flow – Laplace's equation – Introduction to flow nets

UNIT 3 STRESS DISTRIBUTION AND SETTLEMENT 9

Stress distribution in homogeneous and isotropic medium – Boussinesq theory – (Point land, Line land and udl.) - Use of New marks influence chart –Components of settlement — Immediate and consolidation settlement – Terzaghi's one dimensional consolidation theory – Computation of rate of settlement. - $\sqrt{t}$ and log t methods– e-log p relationship

UNIT 4 SHEAR STRENGTH 9

Shear strength of cohesive and cohesion less soils – Mohr-Coulomb failure theory – Measurement of shear strength - Direct shear, Triaxial compression, UCC and Vane shear tests – Pore pressure parameters

UNIT 5 SLOPE STABILITY 9

Stability Analysis - Infinite slopes and finite slopes – Total stress analysis for saturated clay – Friction circle method – Use of stability number – Method of slices – Fellenious and Bishop's method - Slope protection measures.

TOTAL : 45 PERIODS

COURSE OUTCOMES

On successful completion of this course, students will be able to:

CO1:Demonstrate an ability to identify various types of soils and its properties, formulate and solve engineering Problems

CO2:Show the basic understanding of flow through soil medium and its impact of engineering solution

CO3:Understand the basic concept of stress distribution in loaded soil medium and soil settlement due to consolidation

CO4:Show the understanding of shear strength of soils and its impact of engineering solutions to the loaded soil medium and also will be aware of contemporary issues on shear strength of soils

CO5:Demonstrate an ability to design both finite and infinite slopes, component and process as per needs and specifications

TEXT BOOKS

1.Murthy, V.N.S., "Soil Mechanics and Foundation Engineering", CBS Publishers Distribution Ltd., New Delhi. 2015

2.Gopal Ranjan, A S R Rao, "Basic and Applied Soil Mechanics" New Age International Publication, 3rd Edition, 2016

3.Punmia, B.C., "Soil Mechanics and Foundations", Laxmi Publications Pvt. Ltd. New Delhi, 16th Edition, 2017.

REFERENCE BOOKS

1.McCarthy, D.F., "Essentials of Soil Mechanics and Foundations". Prentice-Hall, 2006.

2.Coduto, D.P., "Geotechnical Engineering – Principles and Practices", Prentice Hall of India Pvt.Ltd. New Delhi, 2010.

3.Das, B.M., "Principles of Geotechnical Engineering". Brooks / Coles / Thompson Learning Singapore, 8th Edition, 2013

CO's-PO's & PSO's MAPPING

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CO4	2	3	3	2	2	1	1	1	1	1	2	3	2	2	3
CO5	3	3	2	2	2	1	1	1	1	1	1	3	2	3	2

Correlation levels: 1– low 2– medium 3 – high "-"-no correlation

U23CE405 SDG: 9	CONCRETE TECHNOLOGY	Category : ESC L T P C 2 0 0 2

COURSE OBJECTIVE:

1. To study the properties of concrete making materials.
2. To have better knowledge about the chemical and mineral admixtures in concrete.
3. To familiarize with the IS method of mix design as per the latest code.
4. To understand the fresh and hardened properties of concrete.
5. To know the importance and applications of special concretes

UNIT 1 CONSTITUENT MATERIALS 9

Cement-Different types-Chemical composition and Properties -Tests on cement-IS Specifications- Aggregates-Classification-Mechanical properties and tests as per BIS Grading requirements-Water- Quality of water for use in concrete**.**

UNIT 2 CHEMICAL AND MINERAL ADMIXTURES 9

Accelerators-Retarders- Plasticizers- Super plasticizers-Water proofers - Mineral Admixtures like Fly Ash, Silica Fume, Ground Granulated Blast Furnace Slag and Metakaoline -Their effects on concrete properties

UNIT 3 PROPORTIONING OF CONCRETE MIX 9

Principles of Mix Proportioning-Properties of concrete related to Mix Design-Physical properties of materials required for Mix Design - Design Mix and Nominal Mix-BIS Method of Mix Design - Mix Design Examples

UNIT 4 FRESH AND HARDENED PROPERTIES OF CONCRETE 9

Workability-Tests for workability of concrete-Slump Test and Compacting factor Test-Segregation and Bleeding-Determination of Compressive and Flexural strength as per BIS - Properties of Hardened concrete- Stress-strain curve for concrete-Determination of Modulus of elasticity.

UNIT 5 SPECIAL CONCRETES 9

Light weight concretes - High strength concrete - Fibre reinforced concrete – Ferrocement - Ready mix concrete - SIFCON - Shotcrete – Polymer concrete - High performance concrete- self compacting concrete - Geopolymer Concrete.

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

CO1: Understand the requirements of cement, aggregates and water for concrete
CO2: Select suitable admixtures for enhancing the properties of concrete
CO3: Design concrete mixes as per IS method of mix design
CO4: Determine the properties of concrete at fresh and hardened state.
CO5: Determine the properties of concrete at fresh and hardened state.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Gupta.B.L., Amit Gupta, "Concrete Technology", Jain Book Agency, 2010.
2. Shetty,M.S, "Concrete Technology", S.Chand and Company Ltd, New Delhi, 2003

REFERENCES:

1. Neville, A.M; "Properties of Concrete", Pitman Publishing Limited, London,1995
2. Gambhir.M.L.Concrete Technology,Fifth Edition, McGraw Hill Education,2017.
3. Job Thomas., Concrete Technology, Cencage learning India Private Ltd, New Delhi, 2015.
4. IS10262-2019 Recommended Guidelines for Concrete Mix Design, Bureau of Indian Standards, New Delhi.

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CO 3	3	2	3	3	1	3	3	1	1	1	1	2	3	2	3
CO 4	3	1	1	1	1	3	3	2	1	1	2	2	3	2	3
CO 5	3	1	1	1	1	3	3	2	1	1	1	2	3	2	3

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

Category:ESC

U23CY402 **ENVIRONMENTAL ECOSYSTEM AND SUSTAINABILITY** **L T P C**

SDG:9 2 0 0 2

COURSE OBJECTIVE :

1. Study the interrelationship between living organism and environment
2. Assess the environmental pollution and its impact
3. Understand the significance of natural resources and their conservation
4. Identify and implement scientific, economic and political solutions to environmental problems.
5. Understand the influence of human population on environmental issues and role of information technology as a tool to minimize the environmental problems.

UNIT 1 ECOSYSTEMS AND BIODIVERSITY 9

Definition, Scope and importance of environment - Concept of an ecosystem - Structure and function of an ecosystem (Grassland and River ecosystem only) - Food chains, Food webs and ecological pyramids - Introduction to biodiversity- Definition- Genetic, Species and ecosystem diversity - Value of biodiversity - Threats to biodiversity- Conservation of biodiversity. Case study of simple ecosystems -pond, river, hill slopes, etc..

UNIT 2 ENVIRONMENTAL POLLUTION 9

Definition - Causes, Effects and control measures of (a) Air pollution (b) Water pollution (c) Thermal pollution - Solid waste management: Causes, Effects and control measures of municipal solid wastes - Role of an individual in prevention of pollution - Pollution case studies -Disaster management - Floods, Earthquake, Cyclone and landslides. Case study of local polluted site - Urban / Rural / Industrial / Agricultural

UNIT 3 NATURAL RESOURCES 9

Forest resources - Use and over-exploitation, Deforestation - Water resources - Use and over-utilization of surface and ground water, Drought, Conflicts over water, dams-Benefits and problems - Food resources- Changes caused by agriculture and overgrazing, Effects of modern agriculture, Fertilizer-pesticide problems, water logging, Salinity-Role of an individual in conservation of natural resources (National and International level).

UNIT 4 SOCIAL ISSUES AND THE ENVIRONMENT 9

Unsustainable to sustainable development-Water conservation, Rain water harvesting, Watershed management - Resettlement and rehabilitation of people - its problems and concerns –Carbon credit, Carbon footprint, Climate change, Global warming, Acid rain, Ozone layer depletion - Environment protection Act - Air (Prevention and Control of Pollution) Act - Water (Prevention and Control of Pollution) Act., Consumerism and Consumerism act.

UNIT 5 HUMAN POPULATION AND THE ENVIRONMENT 9

Population growth, Variation among nations -Population explosion - Family welfare programme - Environment and human health -Value education - Pandemic issues and management-Women and child welfare - Role of information technology in environment and human health - Case

studies.

TOTAL : 45 PERIODS

COURSE OUTCOMES

On successful completion of this course, students will be able to:

CO1: The students will able to understand the basis of ecological principles and environmental regulations which in turn helps in sustainable development and human population and environment. Use and over exploitation of forest and water and food resources

CO2: The students will able to understand various schemes for the protection of species, role of an individual in prevention of pollution and conservation of natural resources.

CO3: The students will able to understand design of pollution control structures, resettlement and rehabilitation of people, welfare about the women and child.

CO4: The students will able to apply enough knowledge of implement various Environmental ethics, regulations and schemes, Pandemic issues and management, dams-benefits and problems, conservation of biodiversity..

CO5: The students will able to analyze the disaster management – floods, earthquake, cyclone and landslides. Water logging, salinity, climate change, global warming, acid rain and ozone layer depletion.

TEXT BOOKS:

1. Benny Joseph, "Environmental Science and Engineering", Tata McGrawHill, New Delhi, 2017

2. Gilbert M.Masters, "Introduction to Environmental Engineering and Science", 2nd Edition, Pearson Education, 2016.

3. George Tchobanoglous, Frank Kreith, "Handbook of Solid Waste Management" (McGrawHill Handbooks), McGraw-Hill Education, 2ndEdition July 2017.

REFERENCES:

1. R.K. Trivedi, "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol. I and II, Enviro Media. 2015.

2. ErachBharucha, "Textbook of Environmental Studies", Universities Press (I) Private Limited, Hydrabad, 2015.

3. Rajagopalan R, "Environmental Studies-From Crisis to Cure", Oxford University Press, 2005.

CO's-PO's&PSO's MAPPING

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CO3	3	1	1	1	-	-	1	-	1	1	-	1			
CO4	3	1	1	1	-	-	1	-	1	1	-	1			
CO5	3	1	1	1	-	-	1	-	1	1	-	1			

Correlationlevels: 1– low 2– medium 3 – high "-"-no correlation

Category:PCC

U23CE411 HYDRAULIC ENGINEERING LABORATORY L T P C

SDG:9 0 0 3 2

COURSE OBJECTIVE :

To provide hands on experience in calibration of flow meters, performance characteristics of pumps and turbines.

LIST OF EXPERIMENTS:

I. FLOW MEASUREMENT

Sl.No	Experiment
1.	Calibration of Rotameter
2.	Flow through Orifice meter/mouthpiece,Venturimeter and Notches
3.	Bernoulli's Experiment

II. LOSSES IN PIPES

Sl.No	Experiment
4.	Determination of friction factor in pipes.
5.	Determination of minor losses.

III. PUMPS

Sl.No	Experiment
6.	Characteristics of Centrifugal pumps
7.	Characteristics of Gear pump
8.	Characteristics of Submersible pump
9.	Characteristics of Reciprocating pump

IV.TURBINES

Sl.No	Experiment
10.	Characteristics of Pelton wheel turbine
11.	Characteristics of Francis turbine

V.DETERMINATION OF METACENTRIC HEIGHT

Sl.No	Experiment
12.	Determination of met centric height of floating bodies.

TOTAL : 45 PERIODS

COURSE OUTCOMES

On successful completion of this course, students will be able to:

CO1: Apply Bernoulli equation for calibration of flow measuring devices

CO2: Measure friction factor in pipes and compare with Moody diagram

CO3: Determine the performance characteristics of roto dynamic pumps.

CO4: Determine the performance characteristics of positive displacement pumps

CO5: Determine the performance characteristics of turbines.

CO's-PO's&PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
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CO3	3	3	3	3	1	1	1	1	3	1	1	3	2	3	3

Correlation levels: 1– low 2– medium 3 – high "-"-no correlation

Category :PCC

U23CE412 **SOIL MECHANICS LABORATORY** **L T P C**

SDG:9 0 0 3 2

COURSE OBJECTIVE :

To develop skills to test the soils for their index and engineering properties and to characterize the soil based on their properties.

LIST OF EXPERIMENTS

I.DETERMINATION OF INDEX PROPERTIES

Sl.No	Experiment
1.	Specific gravity of soil solids
2.	Grain size distribution – Sieve analysis
3.	Grain size distribution - Hydrometer analysis
4.	Liquid limit and Plastic limit tests
5.	Shrinkage limit and Differential free swell tests

II.DETERMINATION OF INSITU DENSITY AND COMPACTION CHARACTERISTICS

Sl.No	Experiment
6.	Field density Test (Sand replacement and Core cutter method)
7.	Determination of moisture – density relationship using standard proctor compaction test.

III.DETERMINATION OF ENGINEERING PROPERTIES

Sl.No	Experiment
8.	Permeability determination (constant head and falling head methods)
9.	One dimensional consolidation test (Determination of Co-efficient of consolidation only)compaction test.
10.	Direct shear test in cohesionless soil
11.	Unconfined compression test in cohesive soil
12.	Laboratory vane shear test in cohesive soil
13.	Tri-axial compression test in cohesionless soil (Demonstration only)
14.	California Bearing Ratio Test

TOTAL : 45 PERIODS

COURSE OUTCOMES

On successful completion of this course, students will be able to:

CO1:Conduct tests to determine the index properties of soils.

CO2:Determine the in situ density and compaction characteristics.

CO3:Conduct tests to determine the compressibility, permeability and shear strength of soils.

REFERENCE BOOKS

1.Soil Engineering Laboratory Instruction Manual" published by Engineering College Co- operative Society, Anna University, Chennai, 2010.

2."Saibaba Reddy, E. Ramasastri, K. "Measurement of Engineering Properties of Soils", New age International (P) limited publishers, New Delhi, 2008.

3.Lambe T.W., "Soil Testing for Engineers", John Wiley and Sons, New York, 1951. Digitized 2008

CO's-PO's&PSO's MAPPING

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Correlation levels: 1– low 2– medium 3 – high "-"-no correlation

Category:PCC

U23CE413 **CONCRETE TECHNOLOGY LABORATORY** **L T P C**

SDG:9 0 0 3 2

COURSE OBJECTIVE :

1. To learn the principles and procedures of testing Concrete material through various test..

LIST OF EXPERIMENTS:

Grading of Fine Aggregate

1. Crushing Value of Coarse Aggregate
2. Slump Cone Test
3. Flow Table Test
4. Compaction Factor
5. Vee-Bee Test
6. Compressive Strength test of Concrete
7. Split Tensile Strength test of Concrete
8. Flexure Strength test of Concrete
9. Determination of flowability of self-compacting concrete (Demo only)

TOTAL : 45 PERIODS

COURSE OUTCOMES

On successful completion of this course, students will be able to:

CO1: Determine the quality of aggregate

CO2: Understand various test on concrete

CO3: Determine the workability and compressive strength of concrete

CO's-PO's & PSO's MAPPING

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Correlation levels: 1– low 2– medium 3 – high "-"-no correlation

Category:MC

U23MC401 DISASTER RISK REDUCTION AND MANAGEMENT L T P C

SDG 9 2 0 0 0

COURSE OBJECTIVE :

To impart knowledge on concepts related to disaster, disaster risk reduction, disaster management
To acquaint with these kills for planning and organizing disaster response

UNIT 1 HAZRADS, VULNERABILITY AND DISASTERR 9

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Types of Disasters: Natural, Human induced, Climate change induced –Earthquake, Landslide, Flood, Drought, Fire etc – Technological disasters- Structural collapse, Industrial accidents, oil spills -Causes, Impacts including social, Economic, political, environmental, health, psychosocial, etc.- Disaster vulnerability profile of India and Tamil Nadu - Global trends in disasters: urban disasters, pandemics, Complex emergencies - Inter relations between Disasters and Sustainable development Goals

UNIT 2 DISASTER RISK REDUCTION (DRR) 9

Sendai Framework for Disaster Risk Reduction, Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community Based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions / Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders- Early Warning System –Advisories from Appropriate Agencies. –Relevance of indigenous Knowledge, appropriate technology and Local resources.

UNIT 3 DISASTER MANAGEMENT 9

Components of Disaster Management –Preparedness of rescue and relief, mitigation, rehabilitation and reconstruction – Disaster Risk Management and post disaster management – Compensation and Insurance – Disaster Management Act (2005) and Policy –Other related policies, plans, programmers and legislation –Institutional Processes and Framework at State and Central Level-(NDMA–SDMA-DDMA-NRDF-Civic Volunteers)

UNIT 4 TOOLS AND TECHNOLOGY FOR DISASTER MANAGEMENT 9

Early warning systems – Components of Disaster Relief :Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, –Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster–Disaster Damage Assessment. - Elements of Climate Resilient Development –Standard operation Procedure for disaster response – Financial planning for disaster Management

UNIT 5 DISASTERMANAGEMENT:CASESTUDIES 9

Discussion on selected case studies to analyse the potential impacts and actions in the contest of disasters-Landslide Hazard Zonation : Earthquake Vulnerability Assessment of Buildings and

Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.- Field work-Mock drill

TOTAL : 45 PERIODS

COURSE OUTCOMES

1 To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)

2 To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction

3 To develop disaster response skills by adopting relevant tools and technology

4 Enhance awareness of institutional processes for Disaster response in the country and

5 Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity

TEXT BOOKS

1. Taimpo (2016), Disaster Management and Preparedness, CRC Publications

   Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India

2. Education Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13: 978-1259007361]

REFERENCE BOOKS

1. Govt. of India : Disaster Management Act, Government of India, New Delhi, 2005.
2. Government of India, National Disaster Management Policy, 2009
3. Shaw R (2016), Community based Disaster risk reduction, Oxford University Press

CO's-PO's&PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	3	2	3	-	-	2	2	-	-	2	-	-	-	1
CO2	3	3	3	3	-	-	2	1	-	-	2	-	-	-	1
CO3	3	3	3	3	-	-	2	2	-	-	-	-	2	-	1
CO4	3	3	2	3	-	-	2	2	-	-	2	-	-	-	1
CO5	3	3	3	3	-	-	2	2	-	-	2	-	-	-	1

Correlation levels: 1– low 2– medium 3 – high "-"-no correlation

SEMESTER V

U23CE501 **DESIGN OF REINFORCED CONCRETE STRUCTURAL ELEMENTS** **Category: PCC**

SDG:

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

1. To acquire importance of design concepts and design of RC rectangular beam.
2. To study the design strength of flanged beams, design for shear & torsion.
3. To analysis the behavior of RC slabs and staircase design.
4. To know about the design short columns for axial, uni-axial and bi-axial eccentric loadings.
5. To Understand the design of wall footing, isolated footing and combined rectangular footing.

UNIT 1 INTRODUCTION 9

Objective of structural design - Type of Loads on Structures and Load combinations - Code of practices and Specifications - Concept of Working Stress Method, Ultimate Load Design and Limit State Design Methods for RCC – Properties of Concrete and Reinforcing Steel - Analysis and Design of Singly reinforced rectangular beams by working stress method - Limit State philosophy as detailed in IS code.

UNIT 2 DESIGN OF BEAM 9

Analysis and design of singly and doubly reinforced rectangular beams by Limit State Method - Analysis and design of Flanged beams for flexure - Design requirements as per current code.

UNIT 3 DESIGN OF COLUMN 9

Types of columns – Axially Loaded columns – Design of short Rectangular Square and circular columns – Design of Slender columns - Design for Uniaxial and Biaxial bending.

UNIT 4 DESIGN OF SLABS AND STAIRCASE 9

Analysis and design of cantilever, one way simply supported and continuous slabs and supporting beams - Two-way slab - Design of simply supported and continuous slabs using IS code coefficients- Types of Staircases – Design of dog-legged Staircase.

UNIT 5 DESIGN OF FOOTING 9

Concepts of Proportioning footings and foundations based on soil properties - Design of wall footing – Design of axially and eccentrically loaded square, rectangular pad and sloped footings – Design of Combined Rectangular footing for two columns only.

COURSE OUTCOMES:

At the end of the course the student will able to

CO1 Know the various design concepts and design RC rectangular beams by working stress and limit state methods.

CO2 Understand the design of flanged beams, design for shear and torsion, and anchorage and development length.

CO3 Design a RC slabs and staircase and draw the reinforcement detailing.

CO4 Design short columns for axial, uni-axial and bi-axial eccentric loadings.

CO5 Design wall footings, isolated footings and combined rectangular footing.

TOTAL: 45 PERIODS

TEXBOOKS:

1. Gambhir.M.L., "Fundamentals of Reinforced Concrete Design", Prentice Hall of India Private Limited, New Delhi, 2006.
2. Krishnaraju.N " Design of Reinforced Concrete Structurres ", CBS Publishers & Distributors Pvt. Ltd., New Delhi.

REFERENCES:

1. Sinha, S.N., "Reinforced Concrete Design", Tata McGraw Hill Publishing Company Ltd., New Delhi, 2017.
2. Unnikrishna Pillai, S., Devdas Menon, "Reinforced Concrete Design", Tata McGraw Hill Publishing Company Ltd., 2021.
3. Punmia.B.C., Ashok Kumar Jain, Arun Kumar Jain, "Limit State Design of Reinforced Concrete",Laxmi Publication Pvt. Ltd., New Delhi, 2016.
4. Shah V L Karve S R., "Limit State Theory and Design of Reinforced Concrete", Structures Publilcations, Pune, 2013.

CO's-PO's & PSO's MAPPING

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CO1	3	2	2	1	1	2	-	1	-	-	-	3	3	3	3
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CO4	3	2	3	1	1	1	-	1	-	-	-	3	3	3	3
CO5	3	2	3	1	1	2	-	2	-	-	-	3	3	3	3

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

Category:PCC

U23CE502 **STRUCTURAL ANALYSIS I** **L T P C**

SDG:9 3 0 0 3

COURSE OBJECTIVE :

1. To understand the basic theory and concepts of structural analysis.
2. To calculate energy and classical methods for analysis of buildings.
3. To identify and analyse arches, cables and suspension bridges

UNIT 1 ANALYSIS OF TRUSSES 9

Determinate and indeterminate trusses - analysis of determinate trusses - method of joints - method of sections - Deflections of pin-jointed plane frames - lack of fit - change in temperature method of tension coefficient - Application to space trusses..

UNIT 2 SLOPE DEFLECTION METHOD 9

Slope deflection equations – Equilibrium conditions - Analysis of continuous beams and rigid frames – Rigid frames with inclined members - Support settlements - symmetric frames with symmetric and skew-symmetric loadings.

UNIT 3 MOMENT DISTRIBUTION METHOD 9

Stiffness - distribution and carry over factors –- Analysis of continuous Beams- Plane rigid frames with and without sway – Support settlement - symmetric frames with symmetric and skew-symmetric loadings.

UNIT 4 FLEXIBLITY METHOD 9

Stress tensor at a point – Stress invariants - Determination of principal stresses and principal planes - Primary structures - Compatibility conditions – Formation flexibility matrices - Analysis of indeterminate pin- jointed plane frames, continuous beams and rigid jointed plane frames by direct flexibility approach.

UNIT 5 STIFFNESS METHOD 9

Restrained structure –Formation of stiffness matrices - equilibrium condition - Analysis of Continuous Beams, Pin-jointed plane frames and rigid frames by direct stiffness method.

TOTAL : 45 PERIODS

COURSE OUTCOMES

On successful completion of this course, students will be able to:

CO1: Analyze the pin-jointed plane and space frames.

CO2: Analyse the continuous beams and rigid frames by slope defection method.

CO3: Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway.

CO4: Analyse the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method..

CO5: Understand the concept of matrix stiffness method and analysis of continuous beams, pin

jointed trusses and rigid plane frames.

TEXT BOOKS:

1. Bhavikatti, S.S,Structural Analysis,Vol.1,& 2, Vikas Publishing House Pvt.Ltd.New Delhi-4, 2014..
2. Punmia.B.C, Ashok Kumar Jain & Arun Kumar Jain, Theory of structures, Laxmi Publications, New Delhi, 2004

REFERENCES:

1.William Weaver, Jr and James M.Gere, Matrix analysis of framed structures, CBS Publishers & Distributors, Second Edition, Delhi, 2004
2. Reddy .C.S, "Basic Structural Analysis", Tata McGraw Hill Publishing Company, 2005.
3. Bhavikatti, S.S, Matrix Method of Structural Analysis, I. K. International Publishing House Pvt.Ltd.,New Delhi-4, 2014.

CO's-PO's&PSO's MAPPING

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CO3	3	3	2	1	1	3	1	1	3	2	2	1	3	3	3
CO4	3	3	3	1	1	3	1	1	3	2	2	1	3	3	3
CO5	3	3	3	1	1	3	1	2	3	2	3	2	2	3	2

Correlationlevels: 1– low 2– medium 3 – high "-"-no correlation

Category:PCC

U23CE503	**FOUNDATION ENGINEERING**	**L**	**T**	**P**	**C**
SDG: 9		3	0	0	3

COURSE OBJECTIVE :

1.To familiarized with a basic understanding of the essential steps involved in a geotechnical site investigation

2.To Learn the principle types of foundation and the factors governing the choice of the most suitable type of foundation for a given solution, settlement of foundation

3.Get familiarized with the procedures used for: a) bearing capacity estimation, b) load carrying capacity of pile c) determining earth pressure and d) concept on stability of slope.

UNIT 1 SOIL EXPLORATION AND SELECTION OF FOUNDATION 9

Scope and objectives – Methods of exploration – Depth and spacing of bore holes – Soil samples – Representative and undisturbed – Sampling methods –Types of samplers– Penetration tests (SPT and SCPT) – Data interpretation - - Selection of foundation based on soil condition- Bore log report.

UNIT 2 BEARING CAPACITY OF SHALLOW FOUNDATION 9

Introduction – Location and depth of foundation – Codal provisions – Bearing capacity of shallow foundation -Allowable bearing pressure – Seismic considerations in bearing capacity evaluation-Determination of Settlement of foundations on granular and clay deposits– Methods of minimizing total and differential settlements.

UNIT 3 FOOTINGS AND RAFTS 9

Types of footing– Contact pressure and settlement distribution – Proportioning of foundations for conventional rigid behaviour –Applications – Floating foundation – Special foundations – Seismic force consideration

UNIT 4 PILE FOUNDATION 9

Types of piles and their functions – Factors influencing the selection of pile – Carrying capacity of single pile– Static formula – Dynamic formulae– Capacity from insitu tests (SPT, SCPT) – Negative skin friction – Uplift capacity- Group capacity by different methods – Settlement of pile groups Under reamed piles

UNIT 5 RETAINING WALLS 9

Plastic equilibrium in soils – Active and passive states – Rankine's theory – Cohesionless and cohesive soil – Coulomb's wedge theory – Condition for critical failure plane – Culmann Graphical method – Pressure on the wall due to line load – Stability analysis of retaining walls

TOTAL : 45 PERIODS

COURSE OUTCOMES

On successful completion of this course, students will be able to:

CO1: Plan and execute a detailed site investigation to select geotechnical design parameters and type of foundation
Get Knowledge on bearing capacity and testing methods
CO3: Demonstrate an ability to design shallow foundations , combined footings and raft foundations, its component or process as per the needs and specifications
CO4: Design Pile foundations and its component or process as per the needs and specifications.
CO5: Design retaining walls, its component or process as per the needs and specifications.

TEXT BOOKS

1.Murthy, V.N.S., "Soil Mechanics and Foundation Engineering", CBS Publishers Distribution Ltd., New Delhi. 2015
2.Gopal Ranjan, A S R Rao, "Basic and Applied Soil Mechanics" New Age International Publication, 3rd Edition, 2016

REFERENCE BOOKS

1.Kaniraj, S.R. "Design aids in Soil Mechanics and Foundation Engineering", Tata McGraw Hill publishing company Ltd., New Delhi, 2017.
2. Varghese, P.C.,"Foundation Engineering", Prentice Hall of India Private Limited, New Delhi, 2012.
3.Das, B.M., "Principles of Geotechnical Engineering". Brooks / Coles / Thompson Learning Singapore, 8th Edition, 2013.

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	2	3	2	2	3	1	1	1	2	1	2	3	3	3	2
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CO3	3	3	2	2	2	2	1	1	2	1	2	3	2	2	3
CO4	2	3	3	2	2	1	1	1	1	1	2	3	2	2	3
CO5	3	3	2	2	2	1	1	1	1	1	1	3	2	3	2

Correlation levels: 1– low 2– medium 3 – high "-"-no correlation

Category

U23CE504 CONSTRUCTION PROJECT MANAGEMENT L T P C

SDG 9 3 0 0 3

COURSE OBJECTIVE :

To study the project life cycle in construction

To understand the project network analysis

UNIT 1 INTRODUCTION 9

Introduction - Project life cycle – Types of construction – Selection of Professional Services – Construction Project Characteristics – Role of Project Managers – Leadership and Motivation for the Project Team – Contract Management.

UNIT 2 PROJECT FORMULATION 9

Project – Concept – Capital investments – Generation and Screening of Project ideas – Project identification – Preliminary analysis, Market, Technical, Financial, Economical and Ecology – Pre-Feasibility Report and its Clearance.

UNIT 3 PROJECT NETWORK ANALYSIS 9

Project Plan – Types – Defining Project activities – Work breakdown structure – Resources leveling – CPM – PERT – Precedence networks for construction

UNIT 4 MATERIAL, LABOUR AND SAFETY MANAGEMENT 9

Labour Productivity – Factors Affecting Job – Site Productivity – Labour Relations in Construction – Materials Management – Material Procurement and Delivery – Inventory Management - Safety Management – Importance – Safety Measures

UNIT 5 COST AND QUALITY CONTROL MANAGEMENT 9

Factors influencing construction quality – Responsibility and authority – Quality plan – Quality management Guidelines – Control Control– Cost control methods and techniques – Control of Project cash flow.

TOTAL : 45 PERIODS

COURSE OUTCOMES

1 Understand the project life cycle and role of project manager.

2 Outline the project formulation, preliminary analysis and feasibility report

3 Apply the network analysis in construction project

4 Explain the material labour and safety management in construction

5 Summarize the cost and quality control management in construction

TEXT BOOKS

1. Chitkara, K.K, " Construction Project Management", 1st edition, McGraw Hill, 2019

2. Srinath, L.S., "PERT and CPM Principles and Applications", 2nd edition, Affiliated East West Press, 2001

REFERENCE BOOKS

1. Frederick E, Gould and Nancy Eleanor Joyce, Construction Project Management",

Pearson Education, London, 5th edition, 2011
2. George J Ritz, " Total Construction project Management", McGraw Hill Inc, New York, 6th Edition 2013.

CO's-PO's&PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3					3		1	3	2	1	3			
CO2	3					3		1	3	2	1	3			
CO3	3	3				3		1	3	2	1	3			
CO4	3					3		1	3	2	1	3			
CO5	3					3		2	3	2	1	3			

Correlationlevels: 1– low 2– medium 3 – high "-"-no correlation

U23CE511
SDG:

STRUCTURAL DESIGN AND DRAWING LABORATORY

Category: CC

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

1. To Develop Skill to use Software to Create 2D Floor plan of residential and commercial building.
2. To apply basic concept to drawing, edit, dimension, hatching etc. to develop 2D building.
3. To make 2D drafting along with detailing.

LIST OF EXPERIMENT:

1. Design and Draft the Rectangular Column.
2. Design and draft the isolated footing.
3. Draw a plan, elevation and section for the combined footing with two column.
4. Draw the cantilever and counterfort retaining wall.
5. Draft the RCC T Beam bridge deck.
6. Design the Underground Rectangular water tank.
7. Draw an elevated circular water tank.
8. Draw the detail diagram of Buildup column base and foundation in steel.
9. Draw a simple steel roof trusses.
10. Draw a plate girder and gantry girder.
11. Draw a framed connection and detailing with industrial building elements.

TEXBOOKS:

1. Gambhir.M.L., "Fundamentals of Reinforced Concrete Design", Prentice Hall of India Private Limited, New Delhi, 2006.
2. Krishnaraju.N " Design of Reinforced Concrete Structurres ", CBS Publishers & Distributors Pvt. Ltd., New Delhi.

CO's-PO's & PSO's MAPPING

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CO2	3	2	3	1	1	2	-	1	-	-	-	3	3	3	2
CO3	3	2	2	1	1	1	-	1	-	-	-	3	3	3	3
CO4	3	2	3	1	1	1	-	1	-	-	-	3	3	3	3
CO5	3	2	3	1	1	2	-	2	-	-	-	3	3	3	3

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23EE414 SDG: 4	Aptitude and Communication for Engineers II (Common to all Branches)	Category : BSC L T P C 1 0 1 1

COURSE OBJECTIVE:

1. To enhance the students' ability to contribute effectively and confidently in classroom and other forums and thereby they can exhibit their skills and gain attention.
2. To further enhance and improve their communicative English for industry readiness through various speech craft activities.
3. To take a stock of internal strength and weakness and prepare a plan to manage external threats and opportunities
4. To get ready to kick start their career journey by assessing their current skills and talents.
5. To train students on clearing various placement papers with greater accuracy

UNIT 1 **Course Introduction** **2**

Introduction about the Course - Learning expectations

UNIT 2 **Speaking Skills -Vantage** **12**

Speech Craft –My buddy - Impromptu

UNIT 3 **Personality Development** **3**

Psychometric Assessments - SWOT analysis

UNIT 4 **Placement Readiness** **4**

Placement inventory-– Resume - Grooming

UNIT 5 **Aptitude for Placements - II** **9**

Placement Paper 7–Permutation & Combination – Probability, Placement Paper 8 – Arithmetic Reasoning – Problems on Ages, Placement Paper 9 – Ratio Proportion & Alligation Mixture, Placement Paper 10 – Clocks & Calendars.

COURSE OUTCOMES:

Upon completion of this course,

CO1: Students will be able to participate in any learning activity without any reservations. They shall be ready to move beyond their comfort zone to acquire new skills throughout their life.

CO2: Students shall understand and appreciate the importance of English in the current global scenario and make efforts towards up skilling the same.

CO3: They must be able to identify their strength and enhance the same.

CO4: They shall prepare themselves to kick start their career by taking a stock of their existing skills and plan to acquire new skills required to achieve their goals.

CO5: They shall demonstrate a good understanding of basic mathematical concepts required to learn engineering. To use appropriate strategies and shortcuts to improve speed and accuracy in solving aptitude problems during recruitment processes

TOTAL: 30 PERIODS

TEXT BOOKS:

1. The Pearson Guide to Quantitative Aptitude for Competitive Examinations, Dinesh Khattar. Pearson
2. Quantitative Aptitude Dr. R.S. Aggarwal S. Chand Publication
3. A modern Approach to Verbal and Non-Verbal Reasoning R.S. Aggarwal
4. A Modern Approach to Verbal & Non-Verbal Reasoning - Aggarwal R. S

REFERENCES:

1. Quantitative Aptitude for CAT, Arun Sharma
2. Fast Track Objective Arithmetic, Rajesh Verma, Arihant Publication
3. Quantitative Aptitude Quantum CAT Common Admission Tests for Admission into IIMs,Sarvesh K. Verma
4. Wiley's Exam Xpert Quantitative Ability for CAT, 2ed, Ashu Jain

CO's-PO's & PSO's MAPPING

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CO 3	3	3	3	3	-	-	-	-	-	1	-	-	-	-	-
CO 4	3	2	1	3	-	-	-	-	-	1	-	-	-	-	-
CO 5	1	1	1	1	-	-	-	-	-	3	-	-	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

U23EE517 SDG: 4	Campus to Corporate- I (Common to all Branches)	Category : BSC L T P C 1 0 1 1

COURSE OBJECTIVE:

1. To orient students to the course structure, clarify learning expectations, and reinforce the importance of aptitude skills in the placement process through a quick recap of concepts and practice from previous placement papers.
2. To develop students' verbal communication proficiency through speech crafting, role-play exercises, and structured presentation practice, enabling them to communicate ideas confidently and effectively in academic and professional contexts.
3. To enhance students' understanding of current industry trends, expectations, and hiring practices, and to equip them with a structured resume inventory that reflects their skills, qualifications, and achievements accurately.
4. To strengthen students' analytical and visual reasoning skills by practicing figure series, figure matrices, analogies, mirror and water images, counting figures, and embedded figures, preparing them for aptitude and competitive assessments.
5. To improve grammatical accuracy and fluency in English through targeted practice in tenses for daily conversation, sentence correction (focusing on tenses and subject–verb agreement), and correct usage of articles, thereby enhancing overall language competence for interviews and workplace communication.

UNIT 1 **Introduction** **4**

Course Introduction: Introduction about the Course - Learning expectations - Recap of Aptitude (Placement Papers)

UNIT 2 **Speaking Skills -Novice** **12**

Speaking Skills –Vantage: Speech Craft – Role Play - Presentation Skills

UNIT 3 **Placement Readiness II** **2**

Industry Awareness - Resume Inventory

UNIT 4 **Non-Verbal Reasoning** **6**

Figure series, Figure Matrix, Figure Analogy, Mirror and Water Image, Counting Figures – Embedded Figures

UNIT 5 **Language Gym – English Proficiency** **6**

Tenses for daily conversation, Sentence Correction (Tenses & SV Agreement) – Articles

COURSE OUTCOMES:

Upon completion of this course,

CO1: Students will be able to participate in any learning activity without any reservations. They shall be ready to move beyond their comfort zone to acquire new skills throughout their life.

CO2: Explain the expectations, and the role of aptitude in the placement process .

CO3: Analyse current industry trends and prepare a comprehensive resume that aligns with employer expectations.

CO4: They shall prepare themselves to kick start their career by taking a stock of their existing skills and plan to acquire new skills required to achieve their goals **.**

CO5: Solve non-verbal reasoning problems including figure series, matrices, analogies, mirror/water images, counting, and embedded figures with accuracy and speed.

TOTAL: 30 PERIODS

TEXT BOOKS:

1. The Pearson Guide to Quantitative Aptitude for Competitive Examinations, Dinesh Khattar. Pearson
2. Quantitative Aptitude Dr. R.S. Aggarwal S. Chand Publication
3. A modern Approach to Verbal and Non-Verbal Reasoning R.S. Aggarwal
4. A Modern Approach to Verbal & Non-Verbal Reasoning - Aggarwal R. S

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3. Quantitative Aptitude Quantum CAT Common Admission Tests for Admission into IIMs,Sarvesh K. Verma
4. Wiley's Exam Xpert Quantitative Ability for CAT, 2ed, Ashu Jain

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CO 3	1	-	-	-	-	-	-	1	-	3	-	-	-	-	-
CO 4	1	-	-	-	-	-	-	1	-	3	-	-	-	-	-
CO 5	3	-	-	-	-	-	-	1	1	-	-	-	-	-	-

Correlation levels: 1 – low 2 – medium 3 – high "-"- no correlation

COURSE DESIGNED BY	APPROVED BY
Ramesh Raja M	
Name and Department	Name and Department of BoS Chairman