

19HS1111/19HS1211: English

(Common to all branches)

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INTRODUCTION

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In English classes, the focus should be on the skill development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

Learning Objectives: The course will help to

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
- Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
- Develop study skills and communication skills in formal and informal situations.

Course Outcomes: Students should be able to

- Use English Language effectively in spoken and written forms.
- Comprehend the given texts and respond appropriately.
- Communicate confidently in various contexts and different cultures.
- Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

UNIT –I

‘**The Raman Effect**’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes.

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Basic Writing Skills: Sentence Structures -Use of Phrases and Clauses in Sentences- Analysis of sentences- Transformation and Synthesis of sentences- Assertive to Negative and vice versa; Interrogative to Assertive/Negative and vice versa-

UNIT –II

‘**Ancient Architecture in India**’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary: Synonyms and Antonyms.

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Writing: Techniques for writing precisely – Paragraph writing – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents- Format of a Formal Letter-Writing Formal Letters eg., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT –III

The Man Who Carved a Road through the Mountain by Josceline Anne Mascarenhas January 16, 2015 (Source: Internet)

Vocabulary: Lexical set of words- Formation of hints with lexical set of words- Usage of lexical sets in framing of meaningful sentences.

Grammar: Conversion of lexical words into meaningful paragraphs

Reading: Reading and Its Importance- Techniques for Effective Reading- Improving Comprehension Skills-Techniques for Good Comprehension- Sub-skills of Reading- Skimming, Scanning, Intensive Reading and Extensive Reading- Exercises for Practice

Writing: Nature and Style of Sensible Writing- Defining- Describing Objects, Places and Events – Classifying- Providing Examples or Evidence

UNIT –IV

‘**What Should You Be Eating**’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Writing: Writing Practices--Writing Introduction and Conclusion - Essay Writing-Précis Writing.

UNIT –V

‘**How a Chinese Billionaire Built Her Fortune**’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary: Technical Vocabulary and their usage

Grammar: Common Errors in English

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

TEXTBOOK:

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.

REFERENCES:

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007).Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.

5. Hamp-Lyons, L. (2006). Study Writing. Cambridge University Press.
6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.
7. Raju, Yadava B, B T Sujatha & C, Murali Krishna. *English for Better Performance*, Orient Blackswan, Pvt.,Ltd, 2014.

19HS1151/19HS1251: English Language & Communication Skills Lab

(Common to all branches)

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The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

- To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
- To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency of students in spoken English and neutralize their mother tongue influence
- To train students to use language appropriately for public speaking and interviews

Learning Outcomes: Students will be able to attain -

- Better understanding of nuances of English language through audio- visual experience and group activities
- Neutralization of accent for intelligibility
- Speaking skills with clarity and confidence which in turn enhances their employability skills

Syllabus

English Language and Communication Skills Lab (ELCS) shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab**b. Interactive Communication Skills (ICS) Lab****Listening Skills**

Objectives

1. To enable students develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

Listening for general content

Listening to fill up information

Intensive listening

Listening for specific information

Speaking Skills

Objectives

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts

- Oral practice: Just A Minute (JAM) Sessions
- Describing objects/situations/people
- Role play – Individual/Group activities

The following course content is prescribed for the English Language and Communication Skills Lab based on Unit-6 of AICTE Model Curriculum 2018 for B.Tech First Year English. As the syllabus is very limited, it is required to prepare teaching/learning materials by the teachers collectively in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning and timesaving in the Lab)

Exercise – I

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening.

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants- Consonant clusters

ICS Lab:

Understand: Communication at Work Place- Spoken vs. Written language.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II

CALL Lab:

Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context- Minimal pairs

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab:

Understand: Features of Good Conversation – Non-verbal Communication.

Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette- Giving Directions

Exercise - III

CALL Lab:

Understand: Past tense and Plural markers- Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation- Listening to foreign speakers

ICS Lab:

Understand: Descriptions and Narrations- Fictional Writing- Developing a Story through hints- Story telling through Translation

Practice: Describing Objects/Places/Persons/Situations- Story telling- Narrating incidents

Exercise – IV

CALL Lab:

Understand: Listening for General Details.

Practice: Listening Comprehension Tests- Speech/Audio and Video Recording for Self Analysis

ICS Lab:

Understand: Oral Presentation skills- Public speaking-

Practice: Making a Short Speech – Extempore

Exercise – V

CALL Lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests- Critical Analysis on Video and Audio

Lessons/Speeches

ICS Lab:

Understand: Resume Writing- Interview Skills- Career building

Practice: Mock interviews

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

System Requirement (Hardware component):

Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:

i) Computers with Suitable Configuration

ii) High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public-Address System, a LCD and a projector etc

19BS1112/19BS1212: Applied Physics

(Common for ECE, EEE, CSE & IT)

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Course Objectives:

- To understand the behavior of a particle quantum mechanically.
- To be able to distinguish pure and doped semi conductors and understand formation of P-N Junction.
- To be able to distinguish ordinary light with a laser light and to realize propagation of light through optical fibers.
- To understand dielectric properties of materials.

Course Outcomes: After completion of this course the student is able to

- Realize the concept of uncertainty principle and to compute quantized energy levels.
- Estimate the concentration of charge carriers in semi conductors.
- Learn principle, working of various laser systems and light propagation through optical fibers.
- Learn various dielectric properties and their usage in various engineering applications.

UNIT –I: Quantum Mechanics

Introduction to quantum physics, Black body radiation, Planck's law (Qualitative treatment only), Photoelectric effect, Compton effect, postulates of quantum mechanics, Physical significance of the wave function ψ , de-Broglie's hypothesis, Wave-particle duality, Davisson and Germer experiment, Heisenberg's Uncertainty principle, Schrodinger's time independent wave equation, Particle in one dimensional box.

UNIT –II: Semiconductor Physics

Intrinsic and Extrinsic semiconductors, Fermi level, calculation of carrier concentration, Hall Effect, formation of PN junction, forward and reverse bias and V-I Characteristics, energy diagram of PN junction, PIN and avalanche photodiode, Direct and indirect band gap semiconductors, LED: Device structure, Materials and Characteristics, Solar cell working principle and Characteristics.

UNIT –III: Electromagnetism

Laws of Electrostatics, Electric current and continuity equation, Amperes and Faraday's laws, Maxwell's Equations, Electric dipole, dipole moment, dielectric constant, polarizability, electric susceptibility, displacement vector, types of polarizations: electronic and ionic polarizations (quantitative treatment), internal field, Clausius-Mossotti relation, Piezoelectricity, pyroelectricity and ferroelectricity-applications of dielectric materials.

UNIT – IV: Lasers and Optical Fibers

Lasers: Characteristics of lasers, absorption, spontaneous and stimulated emission of radiation, Einstein coefficients, population inversion, basic components of laser, pumping mechanisms, types of lasers: Ruby laser, Helium – Neon laser, and semiconductor laser, Nd:YAG laser, applications of lasers.

Fiber Optics: Principle of optical fiber (TIR), construction of fiber, acceptance angle and acceptance cone, numerical aperture, types of optical fibers: single mode, multi mode, step index and graded index fibers, attenuation in optical fibers, applications of optical fibers(with special focus on communications).

UNIT –V: Magnetic Materials

Magnetization, Permeability, magnetic field intensity, magnetic field induction, magnetic susceptibility, Bohr magneton, classification of magnetic materials, domain theory, hysteresis curve, soft and hard magnetic materials, applications of magnetic materials, introduction to superconductivity.

TEXT BOOKS:

1. Solid State Physics, A. J. Dekkar, Macmillan publishers Ind. Ltd.,
2. Solid State Physics, Chales Kittel, Wiley student edition.
3. Engineering Physics, B.K. Pandey, S. Chaturvedi – Cengage Learning.
4. Halliday and Resnick, Physics – Wiley.
5. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar – S. Chand Publications.

REFERENCES:

1. Engineering Physics S.O.Pillai, New Age International publications.
2. Engineering Physics P.K. Palanisamy, Scitech Publications.
3. Modern Engineering Physics A.S. Vasudeva S.Chand publications
4. Engineering Physics H.K.Malik and A.K.Singh McGraw Hill Publications.
5. Engineering Physics R.K.Gaur and S.L.Gupta Dhanpat Ray Publications.

19BS1152/19BS1252: Applied Physics Lab

(Common for ECE, EEE, CSE & IT)

L	T	P	C
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List of Experiments:

- 1. Energy gap of P-N junction diode:**
To determine the energy gap of a semiconductor diode.
- 2. Solar Cell:**
To study the V-I Characteristics of solar cell.
- 3. Light Emitting Diode:**
Plot V-I and P-I characteristics of light emitting diode
- 4. Stewart – Gee’s experiment:**
Determination of magnetic field along the axis of a current carrying coil.
- 5. Hall effect**
To determine the Hall coefficient of a given semiconductor diode.
- 6. Optical fibre:**
To determine the Numerical aperture and bending losses of a given fibre.
- 7. Laser Diode:**
To determine V-I characteristics of laser diode
- 8. Photoelectric Effect:**
To determine stopping potential of different filters and Planck’s constant
- 9. LCR series:**
To determine the resonant frequency and quality factor of LCR circuit.
- 10. R-C circuit:**
To determine the time constant of R-C circuit.

Note: Any 8 experiments are to be performed

19BS1115: Engineering Physics

(Common for ME & CE)

L	T	P	C
3	1	-	4

Course Objectives:

- To understand basic concepts in Mechanics.
- To study production, applications of ultrasonics and to understand basic principles of acoustics in the architecture of buildings.
- To be able to distinguish ordinary light with a laser light and to realize propagation of light through optical fibers.
- To understand dielectric properties of materials.

Course Outcomes: After completion of this course the student is able to

- The Knowledge of Mechanics relevant to engineering is critical for converting ideas into technology.
- Learn various methods in production, application of ultrasonics and applying architectural acoustics in the design and construction of buildings.
- Learn principle, working of various laser systems and light propagation through optical fibers.
- Learn various dielectric material properties and their usage in latest engineering applications.

UNIT –I: Crystallography

Crystallography: Space lattice, unit cell and lattice parameters, basis, crystal systems, Bravais crystal systems, co-ordination number and packing factor of SC, BCC, FCC. Miller indices, crystal planes and directions, inter planar spacing, structure of NaCl.

X-ray Diffraction: Introduction to X-rays, Bragg's law, XRD methods: Laue and powder methods

UNIT –II: Wave Optics

Huygens Principle, Superposition of waves and interference of light by wavefront splitting and Amplitude Splitting, Young's double slit Experiment, Newton's Rings, Michelson's Interferometer, Mach –zehnder's Interferometer, Fraunhofer diffraction from a single slit and circular aperture, diffraction Grating-Resolving Power.

UNIT –III: Lasers and Optical Fibers

Lasers: Characteristics of lasers, absorption, spontaneous and stimulated emission of radiation, Einstein coefficients, population inversion, block diagram of laser, pumping, types of lasers: Ruby laser, Helium – Neon laser, applications of lasers.

Fiber Optics: Principle of optical fiber, construction of fiber, acceptance angle and acceptance cone, numerical aperture, types of optical fibers: step index and graded index fibers, attenuation in optical fibers, applications of optical fibers.

UNIT –IV: Introduction to Mechanics

Scalars and vectors, dot and cross product, Forces in Nature, Newton's laws, Form invariance of Newton's second law, Solving Newton's equations of motion in polar coordinates, Extension to cylindrical and spherical coordinates.

UNIT –V: Waves and Oscillations.

The simple oscillator, characteristics of SHM, energy of a Simple harmonic Oscillator, frequency of vibrating spring, damped harmonic oscillator, energy and power dissipation in damped harmonic oscillator, logarithmic decrement and relaxation time and quality factor, forced vibrations, resonance and electrical analogy for a simple oscillator.

TEXT BOOKS:

1. Engineering Mechanics, 2nd ed.- MK Harbola, Cengage Learning.
2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar – S. Chand Publications.
3. Solid State Physics, Chales Kittel, Wiley student edition.

REFERENCES:

1. Engineering Physics S.O.Pillai, New Age International publications.
2. Engineering Physics P.K. Palanisamy, Scitech Publications.
3. Modern Engineering Physics A.S. Vasudeva S.Chand publications
4. Engineering Physics H.K.Malik and A.K.Singh McGraw Hill Publications.
5. Engineering Physics R.K.Gaur and S.L.Gupta Dhanpat Ray Publications.

19BS1155: Engineering Physics Lab

(Common for ME & CE)

L	T	P	C
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List of Experiments:

- 1. Melde's experiment:**
To determine the frequency of a vibrating bar or tuning fork using Melde's apparatus.
- 2. Torsional Pendulum:**
To determine the rigidity modulus of the material of the given wire using Torsional pendulum.
- 3. Light Emitting Diode**
To study the V-I characteristics of LED.
- 4. Optical fibre:**
To determine the bending losses of Optical fibres.
- 5. Optical fibre:**
To determine the Numerical aperture of a given fibre.
- 6. Newton's rings:**
To determine the radius of curvature of the lens by forming Newton's rings.
- 7. Diffraction grating:**
To determine the wavelength of the given source using grating.
- 8. Dispersive power of Prism:**
To determine the dispersive power of prism by using spectrometer.
- 9. Stewart – Gee's experiment:**
Determination of magnetic field along the axis of a current carrying coil.
- 10. Coupled Oscillator:**
To determine the spring constant by single coupled oscillator.

Note: Any 8 experiments are to be performed

19BS1113/19BS1213: Engineering Chemistry

(Common for ECE, EEE, CSE & IT)

L	T	P	C
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Course Objectives:

- To impart the basic knowledge of atomic, molecular and electronic modifications which makes the students to understand the technology based on them.
- To acquire knowledge of Nanomaterials and their engineering applications.
- To acquire knowledge of Electrochemistry, Corrosion which are essential for the engineers in industry.
- To acquire required knowledge about engineering materials, polymers.
- To acquire the skills pertaining to spectroscopy and to apply them for material studies.

Course Outcomes:

- They gain the knowledge of atomic, molecular and electronic changes, for Band theory related to conductivity of materials.
- They can understand the synthesis of Nanomaterials and their basic properties for engineering use.
- Students will gain the basic knowledge of batteries and electrochemical methods for controlling corrosion.
- They learn the preparation and applications of various polymer materials.
- They learn the required skills to get clear concepts in basic spectroscopic methods and their application for engineering materials.

UNIT-I

Molecular structure and Theories of Bonding: Atomic and Molecular orbitals. Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N_2 , O_2 and F_2 molecules. π molecular orbitals of butadiene and benzene. Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d- orbitals in Tetrahedral, Octahedral and square planar geometries. Band structure of solids and effect of doping on conductance.

UNIT-II

Nanomaterials: Classification -Preparation : High energy ball milling, chemical vapour deposition, wet Chemical synthesis, Gas condensation processing, chemical vapour condensation, laser ablation. Carbon nonmaterial's: Fullerenes carbon nano tubes, Nano wires, Nanocones, Graphite. Properties of nanomaterials. Applications in medicine, catalysis,

environmental technology, bio mimicry.

UNIT-III

Electrochemistry and corrosion: Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – calomel, Quinhydrone and glass electrode. Nernst equation Determination of pH of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications. Numerical problems. Potentiometric titrations. Batteries – Primary (Lithium cell) and secondary batteries (Lead – acid storage battery and Lithium ion battery). Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application. Electroless plating of Nickel.

UNIT-IV

Polymers: Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples.

Plastics: Definition and characteristics- thermoplastic and thermosetting plastics, compounding and fabrication of plastics (compression and injection moulding). Preparation, Properties and engineering applications of PVC and Bakelite.

Fibers: Characteristics of fibers – preparation, properties and applications of Nylon-6, 6 and Dacron. Fiber reinforced plastics (FRP) – Applications.

Rubbers: Natural rubber and its vulcanization – compounding of rubber.

Elastomers: Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.

Conducting polymers: Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

Biodegradable polymers: Concept and advantages – Polylactic acid and poly vinyl alcohol and their applications.

UNIT-V

Instrumental methods of Chemical Analysis

Molecular spectroscopy – rotational spectra, vibrational spectra, Raman spectra, UV visible spectra, nuclear magnetic spectra

Thermal methods: Thermogravimetric analysis, differential thermal analysis, differential scanning calorimetry

TEXT BOOKS:

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, New Delhi (2010)
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, New Delhi. (2016)
3. Fundamentals of Molecular Spectroscopy, C.N.Banwell

REFERENCES:

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)

19BS1153/19BS1253: Engineering Chemistry Lab

(Common for ECE, EEE, CSE & IT)

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Course Outcomes: The experiments will make the student gain skills on:

1. Determination of parameters like hardness and chloride content in water.
2. Estimation of rate constant of a reaction from concentration – time relationships.
3. Determination of physical properties like adsorption and viscosity.
4. Calculation of R_f values of some organic molecules by TLC technique.

List of Experiments:

1. Determination of total hardness of water by complexometric method using EDTA
2. Determination of chloride content of water by Argentometry
3. Estimation of an HCl by Conductometric titrations
4. Estimation of Acetic acid by Conductometric titrations
5. Estimation of HCl by Potentiometric titrations
6. Estimation of Fe^{2+} by Potentiometry using $KMnO_4$
7. Determination of rate constant of acid catalysed hydrolysis of methyl acetate
8. Synthesis of Aspirin and Paracetamol
9. Thin layer chromatography calculation of R_f values. eg ortho and para nitro phenols
10. Determination of acid value of coconut oil
11. Verification of freundlich adsorption isotherm-adsorption of acetic acid on charcoal
12. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
13. Determination of partition coefficient of acetic acid between n-butanol and water.
14. Determination of surface tension of a give liquid using stalagmometer.
15. Verification of Beer's law and estimation of given $KMnO_4$ solution
16. Estimation of iron in cement

REFERENCES:

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi)
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi)
3. Vogel's text book of practical organic chemistry 5th edition
4. Text book on Experiments and calculations in Engineering chemistry – S.S. Dara

19BS1214: Applied Engineering Chemistry

(Common for ME & CE)

L	T	P	C
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Course Objectives:

- To include the importance of water in industrial usage, significance of hardness and corrosion control to protect the structures.
- To understand the phase equilibria in heterogeneous systems.
- To acquire knowledge of fuels and combustion.
- To acquire required knowledge about engineering materials like cement, refractories and composites.

Course Outcomes:

- They can understand the basic properties of water and its usage in domestic and industrial purposes.
- They gain knowledge of the phase equilibria in heterogeneous systems.
- They learn origin and properties of fuels and their calorific values.
- They learn the use of fundamental principles to make predictions about the general properties of engineering materials.

UNIT-I

Water and its treatment: Introduction – hardness of water – causes of hardness – types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Numerical problems. Potable water and its specifications- Steps involved in the treatment of potable water – Disinfection of potable water by chlorination and Ozonization. Defluoridation – Nalgonda technique – Determination of F⁻ ion by ion-selective electrode method.

Boiler troubles: Sludges, scales, Caustic embrittlement and boiler corrosion. Internal treatment of Boiler feed water – Calgon conditioning – Phosphate conditioning – Colloidal conditioning – Softening of water by ion- exchange processes. Desalination of water – Reverse osmosis. Numerical problems – Sewage water – Steps involved in treatment of sewage.

UNIT-II**Phase Rule & Surface Chemistry**

Explanation with suitable examples, terms involved in Phase equilibria – phase, component, degrees of freedom, true/metastable equilibrium, eutectic mixture/ point, triple point, thermodynamic derivation of phase rule, applications and limitations of phase rule, phase diagrams of one component and two component systems like water, sulphur and Pb/Ag systems. Eutectic mixtures – desilverisation. Heat treatment of steel. Iron allotropy, micro constituents of iron and steel, iron-carbon equilibrium diagram

UNIT-III

Fuels and Combustion: Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking – types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol – Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG.

Combustion: Definition, Calorific value of fuel – HCV, LCV; Calculation of air quantity required for combustion of a fuel.

UNIT-IV

Engineering materials:

Special cements: White cement, water proof cement, High alumina cement and Acid resistant cement.

Refractories: Classification, characteristics of good refractories, Refractoriness, refractoriness under load, porosity and chemical inertness – applications of refractories.

Lubricants: Classification of lubricants with examples-characteristics of a good lubricants – mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.

Composites: Introduction- Constituents of composites – advantages, classification and constituents of composites. Applications of composites.

Rubbers: Natural rubber –vulcanization,compounding. Buna S, Thiokol rubber.

UNIT-V

Instrumental methods of Chemical Analysis

Molecular spectroscopy – rotational spectra, vibrational spectra, Raman spectra, UV visible spectra, nuclear magnetic spectra

Thermal methods: Thermo gravimetric analysis, differential thermal analysis, differential scanning calorimetry

TEXT BOOKS:

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, New Delhi (2010)
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, New Delhi. (2016)
3. Fundamentals of Molecular Spectroscopy, C.N.Banwell

REFERENCES:

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)

19BS1111: Mathematics-I

(Common to all branches)

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Course Objectives: To learn

- Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form
- Geometrical approach to the mean value theorems and their application to the mathematical problems
- Evaluation of surface areas and volumes of revolutions of curves.
- Partial differentiation, concept of total derivative
- Finding maxima and minima of function of two and three variables.

Course Outcomes: After learning the contents of this paper the student must be able to

- Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations
- Find the Eigen values and Eigen vectors
- Reduce the quadratic form to canonical form using orthogonal transformations.
- Solve the applications on the mean value theorems.
- Find the extreme values of functions of two variables with/ without constraints.

UNIT-I: Matrices

Matrices: Types of Matrices, Symmetric; Hermitian; Skew-symmetric; Skew-Hermitian; orthogonal matrices; Unitary Matrices; rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; solving system of Homogeneous and Non-Homogeneous equations. Gauss elimination method; Gauss Seidel Iteration Method.

UNIT-II: Eigen values and Eigen vectors

Linear Transformation and Orthogonal Transformation: Eigen values and Eigenvectors and their properties: Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); finding inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of the Quadratic Forms; Reduction of Quadratic form to canonical forms by Orthogonal Transformation

UNIT-III: Numerical Methods

Numerical Methods: Solution of polynomial and transcendental equations – Bisection method, Iteration Method, Newton-Raphson method and Regula-Falsi method. Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8 rules. Ordinary differential equations: Taylor's series; Picard's method; Euler and modified Euler's methods; Runge-Kutta method of fourth order.

UNIT-IV: Calculus

Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series. Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-V: Multivariable calculus (Partial Differentiation and applications)

Definitions of Limit and continuity. Partial Differentiation; Euler's Theorem Total derivative; Jacobian; Functional dependence and independence, Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
4. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

REFERENCES:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

19BS1211: Mathematics-II

(Common to all branches)

L	T	P	C
3	1	-	4

Course Objectives: To learn

- Methods of solving the differential equations of first and higher order.
- Evaluation of multiple integrals and their applications
- The physical quantities involved in engineering field related to vector valued functions
- The basic properties of vector valued functions and their applications to line, surface and volume integrals

Course Outcomes: After learning the contents of this paper the student must be able to

- Identify whether the given differential equation of first order is exact or not
- Solve higher differential equation and apply the concept of differential equation to real world problems
- Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelepiped
- Evaluate the line, surface and volume integrals and converting them from one to another

UNIT-I: First Order ODE

Exact, linear and Bernoulli's equations; Applications : Newton's law of cooling, Law of natural growth and decay; Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT-II: Ordinary Differential Equations of Higher Order

Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax} , $\sin ax / \cos ax$, x^k & $e^{ax}V(x)$, $x^kV(x)$; method of variation of parameters; Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

UNIT-III: Multivariable Calculus (Integration)

Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals. Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

UNIT-IV: Vector Differentiation

Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoidal and Irrotational vectors.

UNIT-V: Vector Integration

Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

REFERENCES:

1. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

19EE1113/19EE1213: Basic Electrical Engineering

(Common for ECE, EEE, CSE & IT)

L	T	P	C
3	-	-	3

Course Objectives:

- To introduce the concepts of electrical circuits and its components
- To understand DC circuits and AC single phase circuits
- To study and understand the different types of DC/AC machines and Transformers.
- To understand the basic concept of Measuring Instruments.

Course Outcomes

- To analyze and solve electrical circuits using network laws and theorems.
- To understand and analyze basic Electric circuits
- To study the working principles of Electrical Machines
- To introduce components measuring instruments

Unit I D.C. Circuits

Ohm's law, Types of elements, sources, independent, dependent sources, source transformation, V-I Relation for Passive elements, KVL, KCL, Network reduction techniques-series-parallel-series parallel –star delta transformation, mesh and nodal analysis.

Unit II Network Theorems& A.C. Circuits

Network Theorems: Superposition-Thevenin's, and Norton's theorems for DC excitation

A.C. Circuits: Representation of sinusoidal waveforms, peak and RMS values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance in series and parallel R- L-C circuits, calculation of q-factor and band width.

Unit III D.C.Machines

D.C.Genertors: Principle of operation of D.C Generator -types-E.m.f. Equation-Numerical problems.

D.C.Motors: Principle of operation of D.C. Motor-types -losses and efficiency -torque Equation.

Unit IV A.C.Machines

Transformers: Principle of operation-constructional details ,Ideal and practical transformer, equivalent circuit, losses in transformers, open circuit and short circuit tests-numerical problems, regulation and efficiency.

Three-phase Induction motor: Principle of operation-Production of R.M.F -slip – rotor frequency -torque-slip & Torque characteristics. Synchronous Generators

Unit V Measuring Instruments

Introduction- classification of instruments-operating principles-essential features of measuring instruments- permanent magnet moving coil (PMMC) instruments-moving iron type ammeters and voltmeters.

Text books :

1. Basic electrical engineering ,M.S Naidu & Kamakshaiah, Tata McGraw-Hill Education,
2. Basic Electrical Engineering , P.S.Subramanyam, BS publications ,second edition
3. Ghosh, Fundamentals of Electrical & Electronics S Engineering, 2nd Ed., PHI, 2010
4. V. K. Mehta and Rohit Mehta, Basic Electrical Engineering, S Chand and company Ltd, New Delhi, India, Revised Edition, 2012.
5. D. P. Kothari and I. J. Nagrath, Theory and Problems of Basic Electrical Engineering, 4th Ed., PHI Learning Private limited, 2013.
6. L.S. Bobrow, Fundamentals of Electrical Engineering”, Oxford University Press, 2011
7. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010

References:

1. J. B. Gupta, Basic Electrical and Electronics Engineering, 3rd Ed., S. K. Kataria & Sons, 2009
2. B. L. Theraja, Fundamentals of Electrical Engineering and Electronics, 5th Ed., S. Chand & Company Ltd, 2013
3. Principles of Electrical machines, V.K Mehta& Rohith Mehta, S.Chand Publiactions.

19EE1153/19EE1253: Basic Electrical Engineering Lab

(Common for ECE, EEE, CSE & IT)

L	T	P	C
-	-	2	1

Course Objectives:

- To analyze a given network by applying various electrical laws and network theorems
- To know the response of electrical circuits for different excitations
- To calculate, measure and know the relation between basic electrical parameters.
- To analyze the performance characteristics of DC and AC electrical machines

Course Outcomes:

- Get an exposure to basic electrical laws.
- Understand the response of different types of electrical circuits to different excitations.
- Understand the measurement, calculation and relation between the basic electrical parameters
- Understand the basic characteristics of transformers and electrical machines.

List of experiments/demonstrations:

1. Verification of Ohms Law
2. Verification of KVL and KCL
3. Verification of Superposition theorem.
4. Verification of Thevenin's, and Norton's theorems
5. Resonance in series RLC circuit
6. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits
7. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
8. Measurement of Active and Reactive Power in a balanced Three-phase circuit
9. Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
10. Performance Characteristics of a Three-phase Induction Motor
11. No-Load Characteristics of a Three-phase Alternator

19CS1113/19CS1213: Programming for Problem Solving

(Common to all branches)

L	T	P	C
3	1	-	4

Course Objectives:

- To learn the fundamentals of computers and understand the structure of a C Program.
- To learn how to develop a program using control structures.
- To learn how to use arrays and pointers to solve problems
- To learn heterogeneous types i.e. Structures and unions.
- To learn how to use files in various applications.

Course Outcomes:

- Able to understand the basics components of computer and languages and able to apply Control structures in program development.
- Able to apply modular programing concept to solve problems.
- Able to apply arrays and pointers to solve various problems.
- Able to develop programs using structures and unions.
- Able to develop applications using files.

UNIT I:Introduction to C Programing

ComputerSystems: Computer Languages, Creating and running programs, Program Development. Flow chart, Algorithm, Pseudo code. Number systems: Binary, octal, hexadecimal number systems.

Overview of C Language: Background, C Program structure, C Tokens(Identifiers, key words, constants, symbols), Data Types, Variables, Input/output functions.

Operators: Arithmetic, relational, logical, bitwise, conditional, increment/decrement, assignment operators etc., Cprogram examples. Expressions, Operator Precedence and Associativity, Expression Evaluation, Type conversions.

Control statements: Selection Statements (decision making) – if and switch statements Repetitive/Iterative statements (loops) - while, do-while, for withC Program examples. break, continue, goto, returnetc with C program examples

UNIT II: Functions and Arrays

Arrays – Concept of array in C, one dimensional arrays, Accessing and manipulating elements of arrays, array applications-Linear search, Binary search, Bubble sort, Selection sort, Insertion sort, two – dimensional arrays, multidimensional arrays, C program examples

Functions-Designing Structured Programs, user defined functions- categories, parameter passing mechanisms, inter function communication, Standard functions, Storage classes-auto, register, static, extern, scope rules, type qualifiers, C program examples.

Recursion- recursive functions, Limitations of recursion, C programs examples.

UNIT III: Pointers, Dynamic memory allocation and Strings

Pointers – Introduction (Basic Concepts), Pointers for inter function communication (call by value and call by reference), pointers to pointers, compatibility, void pointer, null pointer, dangling pointer, passing an array to a function, Pointer Applications - Arrays and Pointers, Pointer Arithmetic, Pointer to functions.

Dynamic Memory allocation – Memory allocation functions - malloc(), calloc(), realloc(), free(), Allocating memory for arrays of different data types, C program examples.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, C program examples.

UNIT IV: Structures and Unions

Structures – Declaration, initialization, accessing structure members, Complex structures, C program examples. Structures and functions, structures and pointers, self-referential structures, unions, bit fields, C programming examples, the type definition (typedef), Enumerated types.

Command line arguments- C program examples.

UNIT V: File handling and Preprocessor Commands

Concept of file- streams, text files and binary files, State of a file, Opening and Closing files, file opening modes, file input / output functions (standard library input / output functions for files), file status functions (error handling), Positioning functions (fseek, rewind and ftell), Writing and reading structures using binary files, C program examples.

Preprocessor commands- Macro substitution, File inclusion, Conditional compilation C program examples.

TEXT BOOKS:

- [1] A Structured Programming Approach Using C, B.A. Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
- [2] The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, Second Edition, Pearson education.
- [3] Programming in C. P. Dey and M Ghosh, Oxford University Press.
- [4] Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

REFERENCE BOOKS:

- [1] C for All, S. ThamaraiSelvi, R. Murugesan, Anuradha Publications.
- [2] Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7th Edition, Pearson education.
- [3] Programming in C, Ajay Mittal, Pearson.
- [4] Programming with C, B. Gottfried, 3rd edition, Schaum's outlines, TMH.
- [5] Problem solving with C, M.T. Somasekhara, PHI
- [6] Computer Programming & Data Structures, E. Balagurusamy, 4th edition, TMH

19CS1152/19CS1252: Programming for Problem Solving Lab

(Common to all branches)

L	T	P	C
-	-	3	1.5

Course Objectives:

- To learn C-language Programs using the data types, input/ output statements and control statements.
- Describe the importance of modular programming and arrays using C-Language Program.
- Understand the concept and use of pointers for memory management techniques, structure, union, and enumerated types.
- Understand the basic characteristics of text, binary files and C implementation of file I/O using streams.

Course Outcomes:

- Ability to design and test programs to solve mathematical and scientific problems.
- Ability to write structured programs using control structures and functions.
- Able to Implement C programs using arrays & pointers.
- Able to Use the type definition, enumerated types, define and use structures, unions in programs using C language.
- Able to Execute programs that read and write text, binary files using the formatting and character I/O functions.

EXPERIMENTS

1. a) Write a C Program to read and print student details.
 b) Write a C program to find area of rectangle.
 c) Write a C program to find simple interest and compound interest.
 d) Write a C program to evaluate the expression $y = 3x^2 + 4x + 5$.

2. a) Write a C Program to swap two numbers.
 b) Write a C program to convert Celsius to Fahrenheit.
 c) Write a C program to perform all arithmetic operations (+, -, *, /, %).
 d) Write a C program to check whether the given number is even or odd using Conditional Operator.

3. a) Write a C program to find the Largest of two numbers.
 b) Write a C program to Check the given year is leap year or not.
 c) Write a C program to print ascending order of three given integers.
4. a) Write a C program to Find the grade of a student using the following data. (use else if ladder and switch)

SNO	MARKS	GRADE
i	Greater than or equal to 90 %	O grade

ii	80 and less than 90%	A+ grade
iii	70 and Less than 80%	A grade
iv	60 and less than 70%	B+ grade
v	50 and less than 60%	B grade
vi	40 and less than 50 %	C grade
vii	Below 40 %	Fail

- b) Write a C program to find the roots of quadratic equation.
c) Write a C Program to implement arithmetic calculator using switch case.
5. a) Write a C program to find sum of individual digits of the given integer.
b) Write a C program to find factorial of a given number.
c) Write a C program to calculate sum of the following geometric equation.

$$\text{Sum} = 1 + x + x^2 + x^3 + \dots + x^n + \dots$$
d) Write a C program to check whether the given number is palindrome or not.
6. a) Write a C program to display the prime numbers from 1 to n (where n value is given by user)
b) Write a C program to print Fibonacci series. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.
c) Write a C program to calculate the following Sum:

$$\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10! + \dots$$
d) Write a C program to find GCD and LCM of two given numbers using functions.
7. a) Write a C program find x^y .
b) Write a C program find ${}^n C_r$.
c) Write a C program to construct a pyramid of following numbers .
1
1 2
1 2 3
d) Write a C program to construct the pascal triangle
8. a) Write a C program to find largest and smallest numbers in a list of array elements using functions.
b) Write a C program to sort the given list of elements in ascending order using functions. by the following methods
A) Bubble sort B) Selection sort C) Insertion sort
c) Write a C program to search for a given element in the list of array using the following methods
A) Linear Search B) Binary Search
d) Write a C program to find mean, variance, standard deviation using functions.
9. a) Write a C program that uses functions to transpose a matrix.
b) Write a C program that uses functions to perform the Addition of Two Matrices.

- c) Write a C program that uses functions to perform the Multiplication of Two Matrices.
10. a) Write a C program to find the factorial of a given number using recursive function.
 b) Write a C program to generate the Fibonacci series using recursive function.
 c) Write a c program to solve towers of Hanoi problem using recursion.
 d) Write a C program to find GCD using recursion.
11. a) Write a C program to swap two integers using following methods.
 i. call by value ii. call by reference
 b) Write a program for reading elements using pointer into array and display the values using array.
 c) Write a C program to find sum of n numbers using Dynamic Memory Allocation.
12. a) Write a C program that uses functions to perform the following operations:
 i. to insert a sub-string into a given main string from a given position.
 ii. to delete n characters from a given position in a given string.
 b) Write a C program to arrange given strings in alphabetical order.
 c) Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
13. a) Write a C program to find total and average marks for five subjects of three students using structures.
 b) Write a C program that uses functions to perform the following operations:
 i) Reading a complex number
 ii) Writing a complex number
 iii) Addition of two complex numbers
 iv) Multiplication of two complex numbers
Note: represent complex number using a structure.
14. a) Write a C program to display the contents of a file to standard output device.
 b) Write a C program which copies one file to another into another file.
 c) Write a C program to merge two files into a third file
 (i.e., the contents of the first file followed by those of the second are put in the third file)
 d) Write a C program to find total and average of 3 numbers using command line arguments.
15. a) Write a C program to change the nth character (byte) in a text file. Use fseek function.
 b) Write a C program to reverse the contents of a file.
 c) Define a macro that finds the maximum of two numbers. Write a C program that uses the macro and prints the maximum of two numbers.

TEXT BOOKS:

- [1] C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
- [2] Computer Programming in C, V. Rajaraman, PHI Publishers.
- [3] C Programming, E. Balagurusamy, 3rd edition, TMH Publishers.
- [4] C Programming, M.V.S.S.N. Prasad, ACME Learning Pvt. Ltd.
- [5] C and Data Structures, N.B. Venkateswarlu and E.V. Prasad, S. Chand Publishers
- [6] Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

19ME1213: Engineering Mechanics

(Common for ME & CE)

L	T	P	C
3	1	-	4

Course Objectives: The objectives of this course are to

- Explain the resolution of a system of forces, compute their resultant and solve problems using equations of equilibrium
- Perform analysis of bodies lying on rough surfaces.
- Locate the centroid of a body and compute the area moment of inertia and mass moment of inertia of standard and composite sections
- Explain kinetics of particles, curvilinear motion, centroidal motion and plane motion of rigid bodies.
- Explain the concepts of work-energy method and its applications to translation and rotation.

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

- Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces.
- Solve problem of bodies subjected to friction.
- Find the location of centroid and calculate moment of inertia of a given section.
- Understand the kinetics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion.
- Solve problems using work energy equations for translation and fixed axis rotation.

UNIT-I

Introduction to Mechanics: Basic Concepts, system of Forces Coplanar Concurrent Forces - Components in Space Resultant -Moment of Force – Principle of Moments and its Application - Couples and Resultant of Force Systems. Equilibrium of system of Forces: Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems.

UNIT-II

Friction: Types of friction -Limiting friction -Laws of Friction -Static and Dynamic Frictions - Motion of Bodies –Wedge, Ladder Screw and Screw-jack.

UNIT-III

Centroid and Center of Gravity: Introduction – Centroids of lines – Centroids of area - Centroids of Composite figures - Theorem of Pappus -Centre of Gravity of Bodies – Center of gravity of composite bodies.

Area moments of Inertia: Introduction – Definition of Moment of Inertia -Polar Moment of Inertia – Radius of gyration. Transfer Theorem for moment of inertia – Moments of inertia by integration - Moments of Inertia of Composite Figures.

UNIT-IV

Mass Moment of Inertia: Introduction - Moment of Inertia of Masses – Radius of gyration - Transfer Formula for Mass Moments of Inertia – Mass moments of inertia by integration - Mass moment of inertia of composite bodies.

UNIT-V

Kinetics: Kinetics of a particle-D'Alemberts principle-Motion in a curved path – work, energy and power. Principle of conservation of energy- Kinetics of rigid body in translation, oscillation and rotation, work done-Principle of work-energy-Impulse-momentum.

TEXT BOOKS:

1. Engineering Mechanics - A.K. Tayal/Umesh Publications.
2. Engineering Mechanics – N.H. Dubey/TMH
3. Singer's Engineering Mechanics Statics and Dynamics/ K. Vijaya Kumar Reddy, J. Suresh Kumar/ BSP
4. Engineering Mechanics/ Irving Shames, G. Krishna Mohan Rao / Prentice Hall
5. Foundations and applications of Engineering Mechanics by HD Ram and AK Chouhan, Cambridge publications.

REFERENCES:

1. Engineering Mechanics - S.Timoshenko and D.H. Young/TMH.
2. Singer's Engineering Mechanics Statics and Dynamics/ K. Vijaya Kumar Reddy, J. Suresh Kumar/ BSP
3. Engineering Mechanics/ Irving Shames, G. Krishna Mohan Rao / Prentice Hall
4. Foundations and applications of Engineering Mechanics by HD Ram and AK Chouhan, Cambridge publications.
5. A Text of Engineering Mechanics /YVD Rao/ K. Govinda Rajulu/ M. Manzoor Hussain / Academic Publishing Company
6. Engineering Mechanics / Bhattacharyya/ Oxford.

19ME1154/19ME1254: Engineering Graphics

(Common to all branches)

L	T	P	C
1	-	4	3

Course objectives:

- To provide basic concepts in engineering drawing.
- To impart knowledge about standard principles of orthographic projection of objects.
- To draw sectional views and pictorial views of solids.

Course Outcomes: At the end of the course, the student will be able to:

- Prepare working drawings to communicate the ideas and information.
- Read, understand and interpret engineering drawings.

UNIT - I

Introduction to Engineering Drawing: Principles of Engineering Graphics – Various Drawing instruments – conventions in Drawing, Lettering practice – BIS Conventions.

Curves: Conic Sections - Ellipse, parabola and Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid.

Scales: Plain and Diagonal scales.

UNIT - II

Orthographic Projections: Principles of Orthographic Projections – Conventions, Projection of Points and Lines, Projection of Planes: regular geometric figures.

UNIT – III

Projection of Solids: Projection of regular solids, Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone.

UNIT – IV

Development of Surfaces: Development of surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone.

Intersection of Solids: Intersection of Prism vs Prism, Cylinder vs Cylinder.

UNIT – V

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Plane Figures, Simple and Compound Solids – Isometric Projection of parts with Spherical.

Transformation of Projections: Conversion of Isometric Views to Orthographic Views and Vice versa.

Introduction to CAD (For internal Evaluation weightage only): Introduction to CAD, coordinate system and reference planes, commands – 2D drawings.

TEXT BOOKS:

1. Engineering Drawing - N.D. Bhatt / Charotar.
2. Engineering Drawing - Basant Agrawal /TMH

REFERENCES:

1. Engineering Drawing – P.J. Shah/S.Chand Publishers.
2. Engineering Drawing - M.B. Shah AND B.C. Rana / Pearson.
3. Engineering Drawing - N.S. Parthasarathy and Vela Murali/ Oxford
4. Engineering Drawing – K.Venugopal and V.Prabu Raja/New age publications.
5. Engineering Graphics – P I Varghese/TMH.

19ME1114/19ME1214: Engineering Workshop

(Common to all branches)

L	T	P	C
1	-	3	2.5

Pre-requisites: Practical skill.**Course Objectives:**

1. To Study of different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at work place.
5. It explains the construction, function, use and application of different working tools, equipment and machines.
6. To study commonly used carpentry joints.
7. To have practical exposure to various welding and joining processes.
8. Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

Course Outcomes: At the end of the course, the student will be able to:

1. Study and practice on machine tools and their operations.
2. Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, and foundry, house wiring and welding.
3. Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
4. Apply basic electrical engineering knowledge for house wiring practice.

1. TRADES FOR EXERCISES:**At least two exercises from each trade:**

- I. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise and Tenon Joint).
- II. Fitting – (V-Fit, Dovetail Fit and Semi-circular fit).
- III. Tin Smithy – (Square Tin, Rectangular Tray and Conical Funnel).
- IV. Foundry – (Preparation of Green Mould Sand using Single Piece and Split piece Pattern).
- V. Welding Practice – (Arc Welding and Gas Welding).
- VI. House-wiring – (Parallel and Series, Two way Switch and Tube Light).
- VII. Black Smithy – (Round to Square, Fan Hook and S-Hook).

2. TRADES FOR DEMONSTRATION AND EXPOSURE:

1. Plumbing.
2. Machine Shop.
3. Metal Cutting (Water Plasma).
4. Power tools in construction and Wood Working.

TEXT BOOKS:

1. Workshop Practice /B. L. Juneja / Cengage.
2. Workshop Manual / K. Venugopal / Anuradha.

REFERENCE BOOKS:

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ SciTech.
2. Workshop Manual / Venkat Reddy/ BSP.

19CS1153/19CS1253: IT Workshop Lab

(Common to all branches)

L	T	P	C
-	-	2	1

Course Objectives:

- The IT Workshop is a training lab course to get training on PC Hardware, Internet & World Wide Web, and Productivity tools for documentation, Spreadsheet computations, and Presentation.
- To introduce to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers, hardware and software level troubleshooting process.
- To introduce connecting the PC on to the internet from home and workplace and effectively usage of the internet, Usage of web browsers, email, newsgroups and discussion forums. To get knowledge in awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyberattacks.
- To introduce the usage of Productivity tools in crafting professional word documents excel spreadsheets and power point presentations using open office tools and LaTeX.

Course Outcomes:

- Apply knowledge for computer assembling and software installation.
- Ability how to solve the trouble shooting problems.
- Apply the tools for preparation of PPT, Documentation and budget sheet etc.

PC Hardware: The students should work on working PC to disassemble and assemble to working condition and install operating system like Linux or any other on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.

Problem 1: Every student should identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor. Every student should disassemble and assemble the PC back to working condition.

Problem 2: Every student should individually install operating system like Linux or MS Windows on the personal computer. The system should be configured as dual boot with both Windows and Linux.

Problem 3: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition.

Problem 4: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

Internet & World Wide Web.

Problem 5: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP settings. Finally students should demonstrate how to access the websites and email.

Problem 6: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured

Problem 7: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. Usage of search engines like Google, Yahoo, ask.com and others should be demonstrated by student.

Problem 8: Cyber Hygiene: Students should learn about viruses on the internet and install antivirus software. Student should learn to customize the browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Problem 9: Develop home page: Student should learn to develop his/her home page using HTML consisting of his/her photo, name, address and education details as a table and his/her skill set as a list.

Productivity tools: LaTeX and Word

Word Orientation: An overview of LaTeX and Microsoft (MS) office / equivalent (FOSS) tool word should be learned: Importance of LaTeX and MS office / equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that should be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter

Problem 10: Using LaTeX and Word to create project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Problem 11: Creating project abstract Features to be covered:- Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Problem 12: Creating a Newsletter: Features to be covered:- Table of Content, Newspapercolumns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images,Textboxes, Paragraphs in word.

Problem 13 - Spreadsheet Orientation: Accessing, overview of toolbars, savingspreadsheet files, Using help and resources. **Creating a Scheduler:-** Gridlines, Format Cells,Summation, auto fill, Formatting Text

Problem 14: Calculating GPA - .Features to be covered:- Cell Referencing, Formulae inspreadsheet – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyperlinking, Count function, Sorting, Conditional formatting.

Problem 15: Creating Power Point: Student should work on basic power point utilities andtools in Latex and Ms Office/equivalent (FOSS) which help them create basic power pointpresentation. PPT Orientation, Slide Layouts, Inserting Text, Formatting Text, Bullets andNumbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting Images, Tables andCharts

REFERENCE BOOKS:

- [1] Introduction to Information Technology, ITL Education Solutions limited, PearsonEducation.
- [2] LaTeX Companion – Leslie Lamport, PHI/Pearson.
- [3] Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
- [4] IT Essentials PC Hardware and Software Companion Guide Third Edition by DavidAnfinson and Ken Quamme. – CISCO Press, Pearson Education.
- [5] PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft)

19MC0002: Environmental Science

(Common to all branches)

L	T	P	C
3	-	-	-

Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

Course Outcomes:

- Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

UNIT-I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, Field visits.

UNIT-II

Natural Resources: Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy Resources-renewable and non-renewable.

UNIT-III

Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. Hot spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV

Environmental Pollution and Control Technologies:

Environmental Pollution: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Sources and types of pollution, drinking water quality standards. Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies. Global Environmental Issues and Global Efforts: Green House Gases And its effect, Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol.

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economic aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). Towards Sustainable Future: Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:

1. Erach Bharucha, Textbook of Environmental Studies for Undergraduate Courses, University Grants Commission.
2. R. Rajagopalan, Environmental Studies, Oxford University Press.

REFERENCES:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS.Publications.

19MC0003: Indian Constitution

(Common to all branches)

L	T	P	C
2	-	-	-

The Constitution of India is the supreme law of India. Parliament of India cannot make any law which violates the Fundamental Rights enumerated under the Part III of the Constitution. The Parliament of India has been empowered to amend the Constitution under Article 368, however, it cannot use this power to change the “basic structure” of the constitution, which has been ruled and explained by the Supreme Court of India in its historical judgments. The Constitution of India reflects the idea of “Constitutionalism” –a modern and progressive concept historically developed by the thinkers of “liberalism” –an ideology which has been recognized as one of the most popular political ideology and result of historical struggles against arbitrary use of sovereign power by state. The historic revolutions in France, England, America and particularly European Renaissance and Reformation movement have resulted into progressive legal reforms in the form of “constitutionalism” in many countries. The Constitution of India was made by borrowing models and principles from many countries including United Kingdom and America. The Constitution of India is not only a legal document but it also reflects social, political and economic perspectives of the Indian Society. It reflects India’s legacy of “diversity”. It has been said that Indian constitution reflects ideals of its freedom movement; however, few critics have argued that it does not truly incorporate our own ancient legal heritage and cultural values. No law can be “static” and therefore the Constitution of India has also been amended more than one hundred times. These amendments reflect political, social and economic developments since the year 1950. The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it “as one of the strongest court in the world”.

Course content

1. Meaning of the constitution law and constitutionalism
2. Historical perspective of the Constitution of India
3. Salient features and characteristics of the Constitution of India
4. Scheme of the fundamental rights
5. The scheme of the Fundamental Duties and its legal status
6. The Directive Principles of State Policy –Its importance and implementation

7. Federal structure and distribution of legislative and financial powers between the Union and the States
8. Parliamentary Form of Government in India –The constitution powers and status of the President of India
9. Amendment of the Constitutional Powers and Procedure
10. The historical perspectives of the constitutional amendments in India
11. Emergency Provisions: National Emergency, President Rule, Financial Emergency
12. Local Self Government –Constitutional Scheme in India
13. Scheme of the Fundamental Right to Equality
14. Scheme of the Fundamental Right to certain Freedom under Article 19
15. Scope of the Right to Life and Personal Liberty under Article 21