Jharkhand University of Technology, Ranchi
B. Tech. First Year

Branch: EE, EEE, ECE, CSE, IT, Cybersecurity
Data Science

Revised
Semester: II

Session: 2023-2024

BSM02 Engineering Mathematics II

Course Outcomes:

Students should be able to

1. **Design, Classify** and **Develop** the linear differential equation of first order for the real life problems
2. **Evaluate** the analytical solution of two-dimensional heat flow problem and wave problems using variable separable method.
3. **Analyze** periodic phenomenon of forces, electric currents, voltage, wave motion, sound waves in the form of trigonometric function using Fourier series.
4. **Introduce** and **apply** the distribution function in statistical analysis.

Unit 1

Ordinary Differential Equations:

First order Ordinary Differential Equations: Homogeneous, Linear, Exact ; Higher order linear equations with constant coefficients, Euler-Cauchy equations, Non homogeneous higher order linear differential equations with constant coefficients (method of undetermined coefficients and method of variation of parameters), Applications to Initial and boundary value problems: Orthogonal Trajectories, Statement and Application of Newton's Law of Cooling, Growth and Decay, Kirchhoff's Law, Simple Electrical Circuits, Heat Flow, Rectilinear Motion, Simple Harmonic Motion.

S: First order Ordinary Differential Equations - Variable Separable, Homogeneous, Linear

Unit 2

Partial Differential Equations:

Fourier Series, Dirichlet's condition, Half range series, Formulation of Partial differential equation, Solution of First order partial differential equations, Quasi-linear differential equations, Second order differential equations and canonical form. Initial and Boundary value problem, Method of separation of variable, Dirichlet's problem, Poisson's Equation, Vibrations of a String, One dimensional heat equation, Two- dimensional heat equation (Laplace Equation) under steady state conditions.

S: two-dimensional heat equation (Laplace Equation) under steady state conditions

Unit 3

Probability:

Random variables, Probability distributions, Expectation and variance, Moment Generating Function, Binomial distribution, Poisson distribution, Normal distribution and Exponential distribution.

S: Basic concept of Probability, Conditional Probability, Exponential distribution

Textbooks:

1. Erwin Kreyszig , "Advanced Engineering Mathematics", Wiley eastern Ltd ,10th edition

Reference Book:

1. Maurice D. Weir, Joel Hass, Frank R. Giordano, "Thomas' Calculus ",14th edition Pearson Education.
2. P.N. Wartikar and J.N. Wartikar ,"Applied Mathematics", Vidhyarthi Griha Prakashan Pune ,Vol.1 (Reprint July 2014)
3. Ross S.M., "Introduction to probability and statistics for Engineers and Scientists", Elsevier Academic press, 8th Edition, 2014
4. Ram, B., Engineering Mathematics, Dorling Kindersley (India), Pearson Education.

BSC02 Engineering Chemistry

Course Outcomes:

Students should be able to

1. Impart an understanding of Engineering chemistry's fundamental concepts, analytical methods and technological features.
2. Develop the capacity to analyze engineering problems based on the knowledge of chemistry.
3. Develop problem-solving ability.
4. Keep students abreast of the newest advancements and uses of contemporary materials

Unit 1

Analytical Techniques for Engineers:

- Role of materials in engineering fields.
- Quality control and assurance in engineering contexts.
- Qualitative and quantitative analysis
- Emerging trends and applications of analytical techniques for engineering.
- Instrumental methods of analysis: spectroscopy (UV and IR), chromatography (GLC and HPLC), Microscopy: SEM, Thermo-gravimetry: TGA

Unit 2

Corrosion and material protection

- Introduction to corrosion and its impact on engineering materials
- Mechanism, Types/forms of corrosion, Factors that enhance corrosion and choice of parameters to mitigate corrosion.
- Corrosion prevention techniques, advanced surface coatings and corrosion inhibitors
- Case studies and real-world applications in corrosion prevention

Unit 3

Electrochemical energy systems

- High energy electrochemical energy systems: Lithium-ion batteries principle, construction, working, advantages and applications, Na-ion Battery, fiber battery
- New emerging Fuel cells-working principles, advantages, applications
- Solar cells, Types Importance of silicon single crystal, polycrystalline and amorphous silicon solar cells-working principles, characteristics and applications
- Green hydrogen technology

Unit 4

Nanomaterials for electronics

- Nanomaterials, classification, Nanoscale phenomena and quantum effects
- Top-down and bottom –up approach, Synthesis methods: ball milling, RF sputtering, pulsed laser deposition, thin film deposition
- Applications of nanomaterials in electronics
- Fundamentals of Sensors and materials used in sensors, Synthesis of a sensor.
- Fundamentals of Super capacitor and materials used in super capacitor, Synthesis of a super capacitor.

List of Recommended Books:

1. Willard Dean, Merrittee, "Instrumental Methods of Chemical Analysis",Tata McGraw Hill Limited.
2. Gurdeep R. Chatwal,"Instrumental Methods of Chemical Analysis",Himalaya Publishing House.
3. Jain and Jain "A textbook of Engineering Chemistry", Dhanpatrai Publication.
4. S. S. Dara , "A textbook of Engineering Chemistry", S. Chand Publication 2010 ed.
5. Shashi Chawla, "A textbook of Engineering Chemistry", Dhanpatrai Publication.
6. Prof. Jianmin Ma, "Battery Technologies: Materials and Components", Wiley
7. Charles P. Poole, Frank J. Owens "Introduction to Nanotechnology"
8. Shripad Revankar, Pradeep Majumdar , "Fuel Cells"
9. Fuel Cell Fundamentals-Ryan O'Hayre, Suk-Won Cha
10. Suddhasatwa Basu, "Recent Trends in Fuel Cell Science and Technology"

BSCP2: Engineering Chemistry Laboratory

Course Outcomes:

Students will demonstrate the ability to

1. Apply theoretical knowledge for practical use and solve engineering problems.
2. Design and carry out scientific experiments, accurately record and analyze the results of experiments.

List of Experiments (Minimum 8 to 10 experiments should be perform)

1. To prepare a solution of NaOH and find the concentration of a given solution of sodium hydroxide by titrating it with the standard solution of oxalic acid using phenolpthalein as indicator.
2. To find the concentration of a given solution of Hydrochloric acid by titrating it with the standard solution of $Na_2CO_3.10H_2O$ using methyl orange as indicator.
3. To find the concentration of a given solution of potassium permanganate by titrating it with the standard solution of Mohr's salt.
4. Synthesis of complex compound (copper ammonium complex).
5. Synthesis of polymer (Phenol formaldehyde/urea formaldehyde resin).
6. Synthesis of aspirin.
7. pH-metric analysis of a sample solution – soil, food stuff e.t.c.
8. Analysis of inorganic solution by spectroscopic method (Calorimetry)
9. Corrosion testing of electronic integrated circuits (anodic corrosion via Faradays law).
10. Finding the Calorific value of fuel by Bomb calorimeter (GCV, LCV)
11. Flash point-fire point and cloud point-pour point of fuel/lubricant
12. Synthesis of nanomaterials by green route (co-precipitation method)

Course Educational Objectives:

CEO1: To impart an understanding of Engineering chemistry's concepts, analytical methods and technological features.

CEO2: To acknowledge Laboratory Safety rules.

BSBB2 Biology for Engineers

Course Outcomes:

Students should be able to

1. Understand the overlapping areas between biology and engineering
2. Observe the principles of biological organization with lessons of increasing efficiency of engineered technologies
3. Analyze the analogies between biological and engineering processes
4. Explore the basic biological principles as guiding elements for engineering structures and processes
5. Appreciate the technological optimization of living systems

Unit 1

Crosstalk between Biology and Engineering:

a) Biologically inspired technologies: Case studies of designs in nature and inspired technologies, Biomemetics: Nature inspired material and mechanisms, Self-cleaning surfaces; Self-healing Bioconcrete, Biomining, Algorithms in nature,

b) Contribution of engineering in biological domain: Contribution of Microscope, Imaging techniques, Bio-medical Instruments, Mechanisms (Ergonomics)

Unit 2

Organization of Living Machines:

Biomolecules and manufacturing of Biopolymers:

- Carbohydrates (structure-based function and engineering applications)
- Lipids (structure-based function and engineering applications)
- Proteins (structure-based function and engineering applications)
- Nucleic Acids (structure-based function and engineering applications)

Organization of life forms: Cell to organism

Bioenergetics- Energy dynamics in biological system- principles of energy conservation and optimization

Unit 3

Analogy of biological organ/system and engineering Device/Mechanism:

Organ & system: Brain & CPU, Eye & Camera, Kidney & Filtration system, Lungs & purification system, Heart & Pumping system Process: Photosynthesis & solar cells, Xylem & plumbing, Thermoregulation in human body & heat transfer in machine, Defense mechanism in organism, signaling processing in biology and electronics

Unit 4

Concepts in Bioengineering:

Biomechanics: Mechanical properties of tissues, Prosthesis and rehabilitation

Bioprinting: 3D printing of biological tissues and organ engineering and transplanting

Biomaterials: Types, properties and applications

Tissue Engineering: Principle, Components, Methods of Scafold synthesis, properties and applications.

Unit 5

Application areas of Bioengineering:

Databases & Biocomputing: Acquisition, storage, processing and transmission of biological data and its applications like PCR

Bioinstrumentation: Diagnostic and Therapeutic devices

Bioimaging: Principle, types and examples

Biosensors: Principle, types and examples

Computational biology and application of Artificial Intelligence in bio-medical field

Suggested learning resources:

1. Lodish H, Berk A, Zipursky SL, et al. (2000)“ Molecular Cell Biology” W. H. Freeman
2. Lehninger, A. L., Nelson, D. L., & Cox, M. M. (2000),“Lehninger principles of biochemistry” New York: Worth Publishers
3. Lewin B. (2000) “Genes VII” Oxford University Press
4. Rao CNR, et.al. , “Chemistry of Nanomaterials: Synthesis, Properties and Applications”
5. Eggins BR. (1006) , “Biosensors: An Introduction”, John Wiley & Sons Publishers
6. Palsson B.O. and Bhatia S.N. (2009) “Tissue Engineering” Pearson

ESEL2 Elements of Electronics Engineering

Course Outcomes:

Students should be able to

1. Illustrate the band theory of solids and the carrier concentration in solids.
2. Articulate and estimate the charge distribution and charge transfer process in semiconductors.
3. Analyze the characteristics of PN junction diode and junction transistor.
4. Exemplify the applications of diode.
5. Design logic expressions using gates.

Unit 1

Semiconductor Physics

Classification of Solids, intrinsic and extrinsic semiconductors, equilibrium carrier concentration, Mass action law, Fermi-Dirac probability function, Temperature dependence of carrier concentration, direct and indirect band-gap semiconductors, Carrier Transport: diffusion current, drift current, mobility and resistivity, generation and recombination of carriers, Poisson and continuity equations, Diffusion length and mean life time, Tunneling process.

Unit 2

Semiconductor Diodes

Formation of p-n junctions, position of Fermi level in equilibrium, V-I characteristics in forward and reverse bias, Capacitances in p-n junction diode, Zener diode, Zener diode as a voltage regulator, Applications of special purpose diodes viz. PIN diode, Schottky diode, Gunn diode, LED, Laser Diode, photo diode, Tunnel diode, and solar cell, Diode Circuits: clipping, clamping, voltage multiplier and rectifiers.

Unit 3

Junction Transistors

Structure of NPN and PNP Transistors, BJT Configurations, Operation of BJT Common Emitter Configuration, V-I characteristics, Introduction to FET and MOSFET, Application as a switch.

Unit 4

Fundamentals of Digital Electronics

Construction, characteristics and working of SCR, DIAC, TRIAC and UJT. Square wave generator using 555 IC.

Textbooks:

- Millman &Halkies, “Electronic Device and Circuits”, 4th edition, Tata McGraw Hill.
- R.P.Jain, “Modern Digital Electronics”, 4th edition, Tata McGraw Hill.

Reference Book:

- Millman Halkies, “Integrated Electronics”, Tata McGraw Hill.
- Boylestead&Nashelsky, “Electronic devices and Circuits Theory”, 8th edition, PHI
- Streetman, Ben G., and Sanjay Banerjee. “Solid state electronic devices”, 6th edition. New Jersey: Prentice hall.
- M Morris Mano, “Digital Design”, 4th edition, Pearson.

ESTP2: Elements of Electronics Engineering Laboratory

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

1. Design basic circuits using diodes
2. Identify and characterize basic devices such as BJT and FET from their package information by referring to manufacturers' data sheets.
3. Design, simulate, built and debug simple combinational circuits using gates

List of Experiments:

1. Introduction to various electrical passive components such as Resistors, inductors and capacitors, introduction to active components, introduction to breadboard, Measurement of resistance using the colour code, series and parallel connection of the resistances and its implementation on breadboard. Exposure to usual electronic equipment/instruments such as Multi-meter, Oscilloscope, Function generator, Power supply.
2. To Design clipping circuits - Single ended clipping, Double ended clipping, and clamping circuits.
3. To observe the effect of Variation of Frequency and Load Regulation for Voltage Multiplier.
4. To observe the output voltage of a half wave rectifier and center tapped full wave rectifier with and without capacitor filter. Calculate Vdc and Idc.
5. To observe Input and Output Characteristics of BJT in CE configuration and Find h parameters from characteristics.
6. To observe Transfer and Drain Characteristics of MOSFET and Find gm, rd and μ from characteristics.
7. To simplify and implement a Boolean function using k -map technique e.g. code converter
8. To design and implement logic using Multiplexers and Demultiplexer.

ESED2 Engineering Drawing and Computer Graphics

Course Outcomes:

Students should be able to

1. Familiarize with different drawing tools, technical standards and procedures for construction of different geometries and engineering objects.
2. Develop the ability to visualize and communicate three dimensional shapes and their sections by representing three-dimensional objects into two-dimensional views using concept of orthographic projection.
3. Apply the visualization practices to draw isometric projection from a given orthographic views.
4. Draw the development of lateral surfaces of assembly and cut sections of different geometrical solids for engineering applications.
5. Draw 2D and 3D drawings using computer aided drafting tool

Unit 1

Introduction to Engineering Drawing: Drawing tools, conventions, lettering, systems and rules of dimensioning

Unit 2

Projection of Points and Straight Lines : Projection of points in different quadrants, Projection of straight lines in different orientations

Unit 3

Orthographic Projections: Principles of Orthographic Projections, types of orthographic projections–First angle and third angle projections, Obtaining orthographic projections of given solids and machine elements by using first angle projection method along with sectional views. Basic drawing commands and its applications to draw 2D views using CAD software

Unit 4

Isometric Projections: Principles of Isometric projection – Isometric and natural Scale, Isometric views of simple and compound solids, drawing isometric views from given orthographic views. Basic drawing commands and its applications to draw 3D views using CAD software

Textbooks:

- N.D.Bhatt, “Elementary Engineering Drawing”, Charotar Publishing House, Anand (India)
- M.L.Dabhade, “Engineering Graphics” I, Vision Publications, Pune
- Dhananjay Jolhe, “Engineering Drawing”, Tata McGraw Hill publishing company Ltd., New Delhi

Reference Books:

- Warren Luzzader, “Fundamentals of Engineering Drawing”, Prentice Hall of India, New Delhi.
- Shah, M.B. & Rana B.C. , “Engineering Drawing and Computer Graphics”, Pearson Education
- Agrawal B. & Agrawal C. M. , “Engineering Graphics”, Tata McGraw Publication
- Suraj Singh , “ Civil Engineering Building Practice ”,

ESDC2: Engineering Drawing and Computer Graphics

To draw 02 examples on each assignment on A3 size drawing sheet

Assignment 1:

Draw projection of points and lines in different positions and in different quadrants.

Assignment 2:

Draw orthographic views of any machine elements along with sectional view.

Assignment 3:

Draw isometric view for given orthographic views.

Assignment 4: (Programme specific assignment, One example only)

- Draw a plan, elevation, section of single storey building.(For Civil Engineering)
- Conventional representation of piping layouts, pipe fittings, valves, joints. Stuffing box & glands, Expansion joints etc (For mechanical , Manufacturing , Metallurgy and Robotics and Automation)
- Engineering drawings such as complex circuits/schematic/layout drawings, process flow diagrams (PFDs), sensor diagrams (SDs) and piping and instrumentation diagrams (P & IDs) (For Electrical , Electronics and Instrumentation Engineering)

Complete the following assignment by using CAD software (04 examples each)

Assignment 1:

Draw orthographic views of any machine elements along with sectional view.

Assignment 2:

Draw isometric view for given orthographic views.(3D drawings)

Assignment 3: (Programme specific assignment, One example only)

- Draw a plan, elevation, section of single storey building. (For Civil Engineering)
- Conventional representation of piping layouts, pipe fittings, valves, joints. Stuffing box & glands, Expansion joints etc(For mechanical , Manufacturing , Metallurgy and Robotics and Automation) (For Electrical , Electronics and Instrumentation Engineering)
- Engineering drawings such as Complex circuit/schematic/layout drawings, process flow diagrams (PFDs), sensor diagrams (SDs) and piping and instrumentation diagrams (P&IDs)

PCMS2 Fundamentals of Measurement and Sensors

Course Outcomes:

At the end of the course, students will demonstrate the ability:

1. To have comprehensive understanding of measuring instruments, transducers, and their applications, enabling them to make accurate measurements and effectively analyze measurement systems.
2. To be proficient in utilizing various measurement techniques, including Wheatstone and Kelvin bridges, ohmmeters, and Q-meters, for precise resistance, inductance, and capacitance measurements.
3. Students will be equipped to select, operate, and understand a wide range of displacement measurement transducers for various engineering applications.
4. To make students proficient in using a wide array of velocity and acceleration measurement instruments.
5. To make students proficient in the application of diverse force and torque measurement methods and instruments.

Unit 1

Introduction of measuring Systems: Measuring Instruments: Classification, Absolute and secondary instruments, indicating instruments, control, balancing and damping, constructional details, characteristics, Ammeters, voltmeters: (DC/AC) PMMC, MI, Electrodynamometer type, Wattmeter: Electrodynamometer type, induction type, single phase and three phase wattmeter. Concepts and terminology of transducer, sensor, Classification of transducers, static and dynamic characteristics, selection criteria, sources of errors.

Unit 2

Resistance, Inductance & Capacitance Measurement: Wheatstone bridge, design, arrangement of ratio arms, Kelvin Bridge, Kelvin double bridge, series ohmmeter, shunt ohmmeter, DMM. Maxwell'sbridge, Hay'sbridge, Schering bridge,Q-meter.

Unit 3

Displacement Measurement: Resistive: Potentiometer, Linear and rotary, Inductive: LVDT and Eddy current type Transducers. Capacitive: Capacitance pickups, Differential capacitive cells. Piezoelectric, Ultrasonic transducers and Hall effect transducers, Optical transducers.

Unit 4

Velocity and Acceleration measurement: Moving magnet and moving coil, Electromagnetic tachometer, Photoelectric tachometer, Toothed rotor variable reluctance tachometer. Magnetic pickups, Encoders, Photoelectric pickups, stroboscopes and stroboscopic method, Shaft speed measurement.
Eddy current type, piezoelectric type, Seismic Transducer, Accelerometer: Potentiometric type, LVDT type, Piezo-electrictype.

Unit 5

Force and torque measurement: Basic methods of force measurement, elastic force traducers, load cells, shear web, piezoelectric force transducers, vibrating wire force transducers, Strain gauge torque meter, Inductive torque meter, Magneto-strictive transducers, torsion bar dynamometer.

Textbooks:

- K. Sawhney, "Electrical and Electronic Measurements and Instrumentation", Dhanpat Rai and Sons, 12th ed., 2005
- B. C. Nakra and K. K. Choudhari, "Instrumentation Measurements and Analysis" by, Tata McGraw Hill Education, 4th ed.,2016

Reference Books:

- E.O. Doebelin, "Measurement Systems", McGraw Hill, 6th ed.,2017
- D.Patranabis,"PrincipleofIndustrialInstrumentation",TataMcGrawHill,2nded.,1999
- A. J. Bouwens, "Digital Instrumentation", McGraw-Hill, 6th reprint,2008
- H S Kalsi, "Electronic Instrumentation", Tata McGraw-Hill, 4th ed.,2017
- Albert D. Helfrick, William David Cooper, "Modern electronic Instrumentation and Measurement

Techniques" Prentice Hall, Second ed.,1990

PCMP2: Fundamentals of Measurement and Sensors Laboratory

1. Measurement of AC Voltage using Electrodynamometer type Voltmeter.
2. Measurement of unknown Resistance using a Wheatstone Bridge
3. Measurement of Capacitance using a Schering Bridge.
4. Measurement of Inductance using a Maxwell's Bridge.
5. To study the Piezoelectric Sensor.
6. Measurement of Linear Displacement using an LVDT Transducer.
7. To study velocity measurement using a Photoelectric Tachometer.
8. To study force Measurement Using a Load Cell
9. To study photo conductive cell (LDR).
10. Measurement using proximity sensors (inductive/Capacitive) for an application

HSM02 Communication Skills

Course Outcomes:

At the end of the course, students will demonstrate the ability to

1. Recall and use basic language skills-listening, speaking, reading and writing and attempt tasks using grammar and vocabulary efficiently
2. Understand the concepts/ principles of communication skills and structure conversations effectively
3. Develop the knack to make their point of view clear to the audience and portray their communicative competence efficiently in front of a large audience on a variety of relevant situations
4. Analyze, apply and present themselves competently in all formal spheres

Unit 1		
Introduction to English for Engineers :Varieties and Registers of English, English for Specific Purposes (ESP): Business English	**:**	Idea of Sentences, Verbs, Parts of Speech, Voice, Narration, Transformation, Gerund, Participle, Non-finite, Modals, Articles, Punctuation, Common Errors, Sub-Verb Agreement, Noun-Pronoun Agreement. Vocabulary Building, Root Words, Words from Foreign Languages, Antonyms-Synonyms, Prefixes-Suffixes, Standard Scientific Abbreviations, Analysis and Synthesis of Sentences, Forms of Sentences, Transformation of Sentences, Sense of Syntax, Diction, Describing and Defining Scientific Objects/ Instruments. Business Correspondences – Daily/ Routine Workplace Correspondences, Business Letters, Resume/ CV Writing, Job Application/ Covering Letter, Preparing Agendas and Minutes of Meeting, Report Writing, Tender Writing, Notices etc
Unit 2		
Foundation of Communicative and Linguistic Ability Development: Types of Communication, Process of Communication, Barriers and ways to overcome them, Common Challenges: Phonological, Syntactic, Semantic andPragmatic Errors	**:**	Foundation of Communicative & Linguistics Ability Development. Types of Communication – Oral, Written, use of symbols, body languages, facial expressions etc. Channels of Communication, Barriers of Communication, Strategies to tackle Barriers of Communication, Strategies for Effective LSRW Skills. Linguistics – Phonology, Morphology, Semantic, Syntactic, Vowels, Consonants, Dipthongs, Syllables, Phonetic and Phonemic Transcription of Words, Rhythm, Juncture, Pauses, Accentual Pattern.
Unit 3		
Advanced Speaking Skills: Nuances of Speaking Skills/ Public Speaking, Group Communication, Presentation Skills: The 4 P's of Presentation, Do's and Don'ts, Techniques for Effective Delivery	**:**	Accuracy and Fluency in Oral Communication, Clarity in Proper Articulation, Establish Connection with Audience, Understanding of British R.P. Conduct of Group Tasks including GDs, Debates, Extempore, Elocution etc Individual Tasks like Lecturettes. Basic techniques and tips for effective speaking and presentation. Understanding Presentation Skills – Projection, Pace, Pitch and Pauses, Supra Segmental Features
Unit 4		
Business Writing Development: Techniques of Writing: Note-making, Drafting, Editing, Paraphrasing and Proof-reading, Business Letters, e-mails and Brief Reports	**:**	Basic Mantra/ ABCs of Writing Skill – Accuracy, Brevity and Clarity. Internal and External Communication in an Organization, Note Making, Note of Action etc, Drafting letters, Different Elements of Letter Writing, Editing. Format, Layout, Spacing, numbering of paragraphs/ page numbers of letters, annexures & appendices of a letter. Avoiding use of Jargon and Cliches. Significance of Proof Reading, Paraphrasing etc. Letter to Civil Dignitaries, Formal and Informal Letters, Demi-Official Letters, writing e-mails, Tour Report and writing reports on various Visits, Inspections, Workshops, Seminars, Events in a flawless manner. Paragraph Writing, Essay Writing, Precis Writing, Importance of Organized and Effective Writing Business Correspondences.

(Activity and Exposure Oriented T & L Methodology)

Unit 1		
Foundation of Language Learning Skills	:	Receptive Skills: Listening and Reading; Productive Skills: Speaking and Writing; Grammaticality and Appropriateness; Vocabulary Development
Unit 2		
Listening Skills	:	Stages of Listening (Pre, While and Post), Strategies to Develop Active Listening Skills, Problematic Sounds for Indian Users
Unit 3		
Speaking Skills	:	Oral Communication, Sounds in English, Pronunciation, Stress, Intonation and Pauses, Formal and Informal Expressions, Situational Conversations, Group Discussion
Unit 4		
Reading and Writing Skills	:	Reading Techniques: Scanning and Skimming, Active Reading; Common Problems in Reading; Stages of Writing (Pre, While and Post), 7 Cs of Effective Communication; Letter/ e-mail Writing- Drafting, Editing, Summarizing

CCA02

Sports/NSS/NCC/YOGA/Painting/Music/Classical dance

INT02

Summer Internship