

**COURSE OBJECTIVES :**

- To engage learners in meaningful language activities to improve their reading and writing skills
- To learn various reading strategies and apply in comprehending documents in professional context.
- To help learners understand the purpose, audience, contexts of different types of writing
- To develop analytical thinking skills for problem solving in communicative contexts
- To demonstrate an understanding of job applications and interviews for internship and placements

**UNIT I MAKING COMPARISONS****6**

Reading - Reading advertisements, user manuals, brochures; Writing – Professional emails, Email etiquette - Compare and Contrast Essay; Grammar – Mixed Tenses, Prepositional phrases

**UNIT II EXPRESSING CAUSAL RELATIONS IN SPEAKING AND WRITING****6**

Reading - Reading longer technical texts– Cause and Effect Essays, and Letters / emails of complaint, Writing - Writing responses to complaints. Grammar - Active Passive Voice transformations, Infinitive and Gerunds

**UNIT III PROBLEM SOLVING****6**

Reading - Case Studies, excerpts from literary texts, news reports etc. Writing – Letter to the Editor, Checklists, Problem solution essay / Argumentative Essay. Grammar – Error correction; If conditional sentences

**UNIT IV REPORTING OF EVENTS AND RESEARCH****6**

Reading –Newspaper articles; Writing – Recommendations, Transcoding, Accident Report, Survey Report Grammar – Reported Speech, Modals Vocabulary – Conjunctions- use of prepositions

**UNIT V THE ABILITY TO PUT IDEAS OR INFORMATION COGENTLY****6**

Reading – Company profiles, Statement of Purpose, (SOP), an excerpt of interview with professionals; Writing – Job / Internship application – Cover letter & Resume; Grammar – Numerical adjectives, Relative Clauses.

**TOTAL : 30 PERIODS****COURSE OUTCOMES:**

At the end of the course, learners will be able

**CO1:**To compare and contrast products and ideas in technical texts.

**CO2:**To identify and report cause and effects in events, industrial processes through technical texts

**CO3:**To analyse problems in order to arrive at feasible solutions and communicate them in the written format.

**CO4:**To present their ideas and opinions in a planned and logical manner

**CO5:**To draft effective resumes in the context of job search.

**TEXT BOOKS :**

1. English for Engineers & Technologists (2020 edition) Orient Blackswan Private Ltd. Department of English, Anna University.
2. English for Science & Technology Cambridge University Press 2021.
3. Authored by Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN. Shoba, and Dr. Lourdes Jeevani, Department of English, Anna University.

**REFERENCE BOOKS:**

1. Raman. Meenakshi, Sharma. Sangeeta (2019). Professional English. Oxford university press. New Delhi.
2. Improve Your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, 2001, New Delhi.
3. Learning to Communicate – Dr. V. Chellammal. Allied Publishers, New Delhi, 2003
4. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi.
5. Developing Communication Skills by Krishna Mohan, Meera Bannerji- Macmillan India Ltd. 1990, Delhi.

**ASSESSMENT PATTERN**

Two internal assessments and an end semester examination to test students' reading and writing skills along with their grammatical and lexical competence.

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

| CO   | PO1 | PO2 | PO3 | PO4 | PO5  | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|------|------|------|------|------|
| 1    | 3   | 3   | 3   | 3   | 3    | 3   | 3   | 3   | 2   | 3    | 3    | 3    | -    | -    | -    |
| 2    | 3   | 3   | 3   | 3   | 3    | 3   | 3   | 3   | 2   | 3    | 3    | 3    | -    | -    | -    |
| 3    | 3   | 3   | 3   | 3   | 3    | 3   | 3   | 3   | 2   | 3    | 3    | 3    | -    | -    | -    |
| 4    | 3   | 3   | 3   | 3   | 2    | 3   | 3   | 3   | 2   | 3    | 3    | 3    | -    | -    | -    |
| 5    | -   | -   | -   | -   | -    | -   | -   | -   | 3   | 3    | 3    | 3    | -    | -    | -    |
| AVg. | 3   | 3   | 3   | 3   | 2.75 | 3   | 3   | 3   | 2.2 | 3    | 3    | 3    | -    | -    | -    |

1-low, 2-medium, 3-high, '-'- no correlation

**Note:** The average value of this course to be used for program articulation matrix.

**MA3251**

**STATISTICS AND NUMERICAL METHODS**

**L T P C**  
**3 1 0 4**

**COURSE OBJECTIVES:**

- This course aims at providing the necessary basic concepts of a few statistical and numerical methods and give procedures for solving numerically different kinds of problems occurring in engineering and technology.
- To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems.
- To introduce the basic concepts of solving algebraic and transcendental equations.
- To introduce the numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines.
- To acquaint the knowledge of various techniques and methods of solving ordinary differential equations.

**UNIT I TESTING OF HYPOTHESIS**

**9 + 3**

Sampling distributions - Tests for single mean, proportion and difference of means (Large and small samples) – Tests for single variance and equality of variances – Chi square test for goodness of fit – Independence of attributes.

**UNIT II DESIGN OF EXPERIMENTS**

**9 + 3**

One way and two way classifications - Completely randomized design – Randomized block design – Latin square design -  $2^2$  factorial design.

**UNIT III      SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS      9 + 3**

Solution of algebraic and transcendental equations - Fixed point iteration method – Newton Raphson method- Solution of linear system of equations - Gauss elimination method – Pivoting - Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel - Eigenvalues of a matrix by Power method and Jacobi's method for symmetric matrices.

**UNIT IV      INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION      9 +3**

Lagrange's and Newton's divided difference interpolations – Newton's forward and backward difference interpolation – Approximation of derivatives using interpolation polynomials – Numerical single and double integrations using Trapezoidal and Simpson's 1/3 rules.

**UNIT V      NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS      9 +3**

Single step methods: Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge-Kutta method for solving first order differential equations - Multi step methods: Milne's and Adams - Bash forth predictor corrector methods for solving first order differential equations.

**TOTAL: 60 PERIODS**

**COURSE OUTCOMES:**

Upon successful completion of the course, students will be able to:

CO1:Apply the concept of testing of hypothesis for small and large samples in real life problems.

CO2:Apply the basic concepts of classifications of design of experiments in the field of agriculture.

CO3:Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.

CO4:Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.

CO5:Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

**TEXT BOOKS:**

1. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10<sup>th</sup> Edition, New Delhi, 2015.
2. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8<sup>th</sup> Edition, 2015.

**REFERENCES:**

1. Burden, R.L and Faires, J.D, "Numerical Analysis", 9<sup>th</sup> Edition, Cengage Learning, 2016.
2. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8<sup>th</sup> Edition, 2014.
3. Gerald. C.F. and Wheatley. P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 7<sup>th</sup> Edition, 2007.
4. Gupta S.C. and Kapoor V. K., "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 12<sup>th</sup> Edition, 2020.
5. Spiegel. M.R., Schiller. J. and Srinivasan. R.A., "Schaum's Outlines on Probability and Statistics ", Tata McGraw Hill Edition, 4<sup>th</sup> Edition, 2012.
6. Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", 9<sup>th</sup> Edition, Pearson Education, Asia, 2010.

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

| CO  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3   | 3   | 1   | 1   | 1   | 0   | 0   | 0   | 2   | 0    | 2    | 3    | -    | -    | -    |
| CO2 | 3   | 3   | 1   | 1   | 1   | 0   | 0   | 0   | 2   | 0    | 2    | 3    | -    | -    | -    |
| CO3 | 3   | 3   | 1   | 1   | 1   | 0   | 0   | 0   | 2   | 0    | 2    | 3    | -    | -    | -    |
| CO4 | 3   | 3   | 1   | 1   | 1   | 0   | 0   | 0   | 2   | 0    | 2    | 3    | -    | -    | -    |
| CO5 | 3   | 3   | 1   | 1   | 1   | 0   | 0   | 0   | 2   | 0    | 2    | 3    | -    | -    | -    |
| Avg | 3   | 3   | 1   | 1   | 1   | 0   | 0   | 0   | 2   | 0    | 2    | 3    | -    | -    | -    |

1 - low, 2 - medium, 3 - high, '-' - no correlation

PH3254

PHYSICS FOR ELECTRONICS ENGINEERING

L T P C  
3 0 0 3

#### COURSE OBJECTIVES:

- To make the students to understand the basics of crystallography and its importance in studying materials properties.
- To understand the electrical properties of materials including free electron theory, applications of quantum mechanics and magnetic materials.
- To instil knowledge on physics of semiconductors, determination of charge carriers and device applications
- To establish a sound grasp of knowledge on different optical properties of materials, optical displays and applications
- To inculcate an idea of significance of nano structures, quantum confinement and ensuing nano device applications.

#### UNIT I CRYSTALLOGRAPHY

9

Crystal structures: Crystal lattice – basis - unit cell and lattice parameters – crystal systems and Bravais lattices – Structure and packing fractions of SC, BCC, FCC, diamond cubic, NaCl, ZnS structures – crystal planes, directions and Miller indices – distance between successive planes – linear and planar densities – crystalline and noncrystalline materials –Example use of Miller indices: wafer surface orientation – wafer flats and notches – pattern alignment - imperfections in crystals.

#### UNIT II ELECTRICAL AND MAGNETIC PROPERTIES OF MATERIALS

9

Classical free electron theory - Expression for electrical conductivity – Thermal conductivity, expression - Quantum free electron theory :Tunneling – degenerate states – Fermi- Dirac statistics – Density of energy states – Electron in periodic potential – Energy bands in solids – tight binding approximation - Electron effective mass – concept of hole. Magnetic materials: Dia, para and ferromagnetic effects – paramagnetism in the conduction electrons in metals – exchange interaction and ferromagnetism – quantum interference devices – GMR devices.

#### UNIT III SEMICONDUCTORS AND TRANSPORT PHYSICS

9

Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors – Variation of carrier concentration with temperature – Carrier transport in Semiconductors: Drift, mobility and diffusion – Hall effect and devices – Ohmic contacts – Schottky diode.

**UNIT IV OPTICAL PROPERTIES OF MATERIALS****9**

Classification of optical materials – Optical processes in semiconductors: optical absorption and emission, charge injection and recombination, optical absorption, loss and gain. Optical processes in quantum wells – Optoelectronic devices: light detectors and solar cells – light emitting diode – laser diode - optical processes in organic semiconductor devices – excitonic state – Electro-optics and nonlinear optics: Modulators and switching devices – plasmonics.

**UNIT V NANO DEVICES****9**

Density of states for solids - Significance between Fermi energy and volume of the material – Quantum confinement – Quantum structures – Density of states for quantum wells, wires and dots – Band gap of nanomaterials – Tunneling – Single electron phenomena – Single electron Transistor. Conductivity of metallic nanowires – Ballistic transport – Quantum resistance and conductance – Carbon nanotubes: Properties and applications - Spintronic devices and applications – Optics in quantum structures – quantum well laser.

**TOTAL: 45 PERIODS****COURSE OUTCOMES:**

At the end of the course, the students should be able to

**CO1:** know basics of crystallography and its importance for varied materials properties

**CO2:** gain knowledge on the electrical and magnetic properties of materials and their applications

**CO3:** understand clearly of semiconductor physics and functioning of semiconductor devices

**CO4:** understand the optical properties of materials and working principles of various optical devices

**CO5:** appreciate the importance of nanotechnology and nanodevices.

**TEXT BOOKS:**

1. S.O. Kasap. Principles of Electronic Materials and Devices, McGraw Hill Education (Indian Edition), 2020.
2. R.F. Pierret. Semiconductor Device Fundamentals. Pearson (Indian Edition), 2006.
3. G.W. Hanson. Fundamentals of Nanoelectronics. Pearson Education (Indian Edition), 2009.

**REFERENCES:**

1. Laszlo Solymar, Walsh, Donald, Syms and Richard R.A., Electrical Properties of Materials, Oxford Univ. Press (Indian Edition) 2015.
2. Jasprit Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Education (Indian Edition), 2019.
3. Charles Kittel, Introduction to Solid State Physics, Wiley India Edition, 2019.
4. Mark Fox, Optical Properties of Solids, Oxford Univ. Press, 2001.
5. N. Gershenfeld. The Physics of Information Technology. Cambridge University Press, 2011.

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

| CO  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| 1   | 3   | -   | 1   | -   | -   | -   | -   | -   | -   | -    | -    | -    | -    | -    | -    |
| 2   | 3   | 2   | 1   | 2   | -   | 2   | -   | -   | -   | -    | -    | -    | -    | -    | -    |
| 3   | 3   | 2   | 2   | -   | 2   | -   | -   | -   | -   | -    | -    | -    | -    | -    | -    |
| 4   | 3   | -   | 1   | -   | 3   | 2   | 3   | -   | -   | -    | -    | 1    | -    | -    | -    |
| 5   | 3   | -   | 2   | 1   | -   | 2   | -   | -   | -   | -    | -    | 1    | -    | -    | -    |
| AVG | 3   | 2   | 1.4 | 1.5 | 2.5 | 2   | 3   |     |     |      |      | 1    |      |      |      |

1 - low, 2 - medium, 3 - high, '-' - no correlation

**COURSE OBJECTIVES :**

- To impart knowledge in types, construction and working of transformers
- To impart knowledge in types, construction and working of DC machines
- To impart knowledge in types, construction and working of AC rotating machines
- To introduce the functional elements and working of measuring instruments.
- To introduce the basics of power system and protection schemes

**UNIT I TRANSFORMER****9**

Introduction - Ideal and Practical Transformer – Phasor diagram— Per Unit System – Equivalent circuit- Testing- Efficiency and Voltage Regulation– Three Phase Transformers –Applications- Auto Transformers, Advantages- Harmonics.

**UNIT II DC MACHINES****9**

Introduction – Constructional Features– Motor and Generator mode - EMF and Torque equation – Circuit Model – Methods of Excitation- Characteristics – Starting and Speed Control – Universal Motor- Stepper Motors – Brushless DC Motors- Applications

**UNIT III AC ROTATING MACHINES****9**

Principle of operation of three-phase induction motors – Construction –Types – Equivalent circuit, Speed Control - Single phase Induction motors -Construction– Types–starting methods. Alternator: Working principle–Equation of induced EMF – Voltage regulation, Synchronous motors- working principle-starting methods – Torque equation.

**UNIT IV MEASUREMENTS AND INSTRUMENTATION****9**

Functional elements of an instrument , Standards and calibration, Operating Principle , types - Moving Coil and Moving Iron meters, Measurement of three phase power, Energy Meter, Instrument Transformers-CT and PT,DSO- Block diagram- Data acquisition.

**UNIT V BASICS OF POWER SYSTEMS****9**

Power system structure -Generation , Transmission and distribution , Various voltage levels, Earthing – methods of earthing, protective devices- switch fuse unit- Miniature circuit breaker- moulded case circuit breaker- earth leakage circuit breaker, safety precautions and First Aid

**TOTAL: 45 PERIODS****COURSE OUTCOMES :**

After completing this course, the students will be able to

- CO1:** Explain the working principle of electrical machines
- CO2:** Analyze the output characterizes of electrical machines
- CO3:** Choose the appropriate electrical machines for various applications
- CO4:** Explain the types and operating principles of measuring instruments
- CO5:** Explain the basic power system structure and protection schemes

**TEXT BOOKS:**

1. Kothari DP and I.J Nagrath, “Basic Electrical and Electronics Engineering”, Second Edition, McGraw Hill Education, 2020
2. S. K, Bhattacharya, “Basic Electrical and Electronics Engineering”, Second Edition, Pearson Education, 2017.
3. A.K. Sawhney, Puneet Sawhney ‘A Course in Electrical & Electronic Measurements &

Instrumentation', Dhanpat Rai and Co, New Delhi, 2015.

4. C.L.Wadhwa, "Generation, Distribution and Utilisation of Electrical Energy", New Age International pvt.ltd.,2003

#### REFERENCES:

1. Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw Hill Education, 2019
2. Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, 2002.
3. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010

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

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| 1  | 2   | 1   | 1   | -   | -   | -   | -   | 1   | -   | -    | -    | -    | -    | -    | -    |
| 2  | 2   | 1   | 1   | -   | -   | -   | -   | 1   | -   | -    | -    | -    | -    | -    | -    |
| 3  | 2   | 1   | 1   | -   | -   | -   | -   | 1   | -   | -    | -    | -    | -    | -    | -    |
| 4  | 2   | 1   | 1   | -   | -   | -   | -   | 1   | -   | -    | -    | -    | -    | -    | -    |
| 5  | 2   | 1   | 1   | -   | -   | -   | -   | 1   | -   | -    | -    | -    | -    | -    | -    |
| CO | 2   | 1   | 1   | -   | -   | -   | -   | 1   | -   | -    | -    | -    | -    | -    | -    |

1 - low, 2 - medium, 3 - high, '-' - no correlation

**GE3251**

**ENGINEERING GRAPHICS**

**L T P C**  
**2 0 4 4**

#### COURSE OBJECTIVES:

The main learning objective of this course is to prepare the students for:

- Drawing engineering curves.
- Drawing freehand sketch of simple objects.
- Drawing orthographic projection of solids and section of solids.
- Drawing development of solids
- Drawing isometric and perspective projections of simple solids.

#### CONCEPTS AND CONVENTIONS (Not for Examination)

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

#### UNIT I PLANE CURVES

**6+12**

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

#### UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACE

**6+12**

Orthographic projection - principles - Principal planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and traces. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

**6+12**

Practicing three dimensional modeling of simple objects by CAD Software (Not for examination)

**6 +12**

Practicing three dimensional modeling of simple objects by CAD Software (Not for examination)

6+12

Practicing three dimensional modeling of isometric projection of simple objects by CAD Software  
(Not for examination)

**TOTAL: (L=30+P=60) 90 PERIODS**

On successful completion of this course, the student will be able to

**C05:** Draw the development of simple solids.

1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 53<sup>rd</sup> Edition, 2019.
2. Natrajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.
3. Parthasarathy, N. S. and Vela Murali, "Engineering Drawing", Oxford University Press, 2015

1. Basant Agarwal and Agarwal C.M., “Engineering Drawing”, McGraw Hill, 2<sup>nd</sup> Edition, 2019.
2. Gopalakrishna K.R., “Engineering Drawing” (Vol. I&II combined), Subhas Publications, Bangalore, 27<sup>th</sup> Edition, 2017.
3. Luzzader, Warren.J. and Duff, John M., “Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
4. Parthasarathy N. S. and Vela Murali, “Engineering Graphics”, Oxford University, Press, New Delhi, 2015.
5. Shah M.B., and Rana B.C., “Engineering Drawing”, Pearson Education India, 2<sup>nd</sup> Edition, 2009.
6. Venugopal K. and Prabhu Raja V., “Engineering Graphics”, New Age International (P) Limited, 2008.



**Publication of Bureau of Indian Standards:**

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

**Special points applicable to University Examinations on Engineering Graphics:**

1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. The examination will be conducted in appropriate sessions on the same day

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

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| 1  | 3   | 1   | 2   | -   | 2   | -   | -   | -   | -   | 3    | -    | 2    | 2    | 2    | -    |
| 2  | 3   | 1   | 2   | -   | 2   | -   | -   | -   | -   | 3    | -    | 2    | 2    | 2    | -    |
| 3  | 3   | 1   | 2   | -   | 2   | -   | -   | -   | -   | 3    | -    | 2    | 2    | 2    | -    |
| 4  | 3   | 1   | 2   | -   | 2   | -   | -   | -   | -   | 3    | -    | 2    | 2    | 2    | -    |
| 5  | 3   | 1   | 2   | -   | 2   | -   | -   | -   | -   | 3    | -    | 2    | 2    | 2    | -    |
| CO | 3   | 1   | 2   | -   | 2   | -   | -   | -   | -   | 3    | -    | 2    | 2    | 2    | -    |

1 - low, 2 - medium, 3 - high, '-' - no correlation

EC3251

**CIRCUIT ANALYSIS**

**L T P C**  
**3 1 0 4**

**COURSE OBJECTIVES:**

- To learn the basic concepts and behaviour of DC and AC circuits.
- To understand various methods of circuit/ network analysis using network theorems.
- To understand the transient and steady state response of the circuits subjected to DC excitations and AC with sinusoidal excitations.
- To learn the concept of coupling in circuits and topologies.

**UNIT I DC CIRCUIT ANALYSIS**

**12**

Basic Components of electric Circuits, Charge, current, Voltage and Power, Voltage and Current Sources, Ohms Law, Kirchoff's Current Law, Kirchoff's voltage law, The single Node – Pair Circuit, series and Parallel Connected Independent Sources, Resistors in Series and Parallel, voltage and current division, Nodal analysis, Mesh analysis.

**UNIT II NETWORK THEOREM AND DUALITY**

**12**

Useful Circuit Analysis techniques - Linearity and superposition, Thevenin and Norton Equivalent Circuits, Maximum Power Transfer, Delta-Wye Conversion. Duals, Dual circuits. Analysis using dependent current sources and voltage sources

**UNIT III SINUSOIDAL STEADY STATE ANALYSIS**

**12**

Sinusoidal Steady – State analysis , Characteristics of Sinusoids, The Complex Forcing Function, The Phasor, Phasor relationship for R, L, and C, impedance and Admittance, Nodal and Mesh Analysis, Phasor Diagrams, AC Circuit Power Analysis, Instantaneous Power, Average Power, apparent Power and Power Factor, Complex Power.

**UNIT IV TRANSIENTS AND RESONANCE IN RLC CIRCUITS****12**

Basic RL and RC Circuits, The Source- Free RL Circuit, The Source-Free RC Circuit, The Unit-Step Function, Driven RL Circuits, Driven RC Circuits, RLC Circuits, Frequency Response, Parallel Resonance, Series Resonance, Quality Factor.

**UNIT V COUPLED CIRCUITS AND TOPOLOGY****12**

Magnetically Coupled Circuits, mutual Inductance, the Linear Transformer, the Ideal Transformer, An introduction to Network Topology, Trees and General Nodal analysis, Links and Loop analysis.

**SUGGESTED ACTIVITIES:**

- Practice solving variety of problems

**COURSE OUTCOMES**

**On successful completion of this course, the student will be able to**

**CO1:** Apply the basic concepts of circuit analysis such as Kirchoff's laws, mesh current and node voltage method for analysis of DC and AC circuits.

**CO2:** Apply suitable network theorems and analyze AC and DC circuits

**CO3:** Analyze steady state response of any R, L and C circuits

**CO4:** Analyze the transient response for any RC, RL and RLC circuits and frequency response of parallel and series resonance circuits.

**CO5:** Analyze the coupled circuits and network topologies

**TOTAL: 60 PERIODS****TEXT BOOKS:**

- Hayt Jack Kemmerly, Steven Durbin, "Engineering Circuit Analysis", Mc Graw Hill education, 9th Edition, 2018.
- Charles K. Alexander & Mathew N.O.Sadiku, "Fundamentals of Electric Circuits", Mc Graw-Hill, 2nd Edition, 2003.
- Joseph Edminister and Mahmood Nahvi, —Electric Circuits, Schaum's Outline Series, Tata McGraw Hill Publishing Company, New Delhi, Fifth Edition Reprint 2016.

**REFERENCES:**

- Robert.L. Boylestead, "Introductory Circuit Analysis", Pearson Education India, 12th Edition, 2014. David Bell, "Fundamentals of Electric Circuits", Oxford University press, 7th Edition, 2009.
- John O Mallay, Schaum's Outlines "Basic Circuit Analysis", The Mc Graw Hill companies, 2nd Edition, 2011
- Allan H.Robbins, Wilhelm C.Miller, "Circuit Analysis Theory and Practice", Cengage Learning, Fifth Edition, 1st Indian Reprint 2013

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

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| 1  | 3   | 2   | 1   | 1   | -   | -   | -   | 1   |     | 1    | -    | -    | -    | -    | -    |
| 2  | 3   | 3   | 2   | 2   | -   | -   | -   | 1   |     | 1    | -    | -    | -    | -    | -    |
| 3  | 3   | 3   | 3   | 3   | -   | -   | -   | 1   |     | 1    | -    | -    | -    | -    | -    |
| 4  | 3   | 3   | 3   | 3   | -   | -   | -   | 1   |     | 1    | -    | -    | -    | -    | -    |
| 5  | 3   | 3   | 3   | 2   | -   | -   | -   | 1   |     | 1    | -    | -    | -    | -    | -    |
| CO | 3   | 3   | 3   | 2   | -   | -   | -   | 1   |     | 1    | -    | -    | -    | -    | -    |

1 - low, 2 - medium, 3 - high, '-' - no correlation

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

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

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

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

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

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

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

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

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

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

**TOTAL : 15 PERIODS****TEXT-CUM-REFERENCE BOOKS**

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

Tamil Nadu)

10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

GE3252

**தமிழரும் தொழில்நுட்பமும்**

**L T P C**

**1 0 0 1**

**அலகு I நெசவு மற்றும் பானைத் தொழில்நுட்பம்:**

**3**

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

**அலகு II வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்:**

**3**

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

**அலகு III உற்பத்தித் தொழில் நுட்பம்:**

**3**

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

**அலகு IV வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்:**

**3**

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

**அலகு V அறிவியல் தமிழ் மற்றும் கணித்தமிழ்:**

**3**

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

**TOTAL : 15 PERIODS**

## TEXT-CUM-REFERENCE BOOKS

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

**NX3251**

**NCC Credit Course Level 1\*  
(ARMY WING)**

NCC Credit Course Level 1

|          |          |          |          |
|----------|----------|----------|----------|
| <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
| <b>2</b> | <b>0</b> | <b>0</b> | <b>2</b> |

|   |  |          |
|---|--|----------|
| <b>NCC GENERAL</b>                              |  | <b>6</b> |
| NCC 1   | Aims, Objectives & Organization of NCC   | 1        |
| NCC 2   | Incentives   | 2        |
| NCC 3   | Duties of NCC Cadet  | 1        |
| NCC 4   | NCC Camps: Types & Conduct   | 2        |
| <b>NATIONAL INTEGRATION AND AWARENESS</b>       |  | <b>4</b> |
| NI 1  | National Integration: Importance & Necessity   | 1        |
| NI 2  | Factors Affecting National Integration   | 1        |
| NI 3  | Unity in Diversity & Role of NCC in Nation Building  | 1        |
| NI 4  | Threats to National Security   | 1        |
| <b>PERSONALITY DEVELOPMENT</b>                  |  | <b>7</b> |
| PD 1  | Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving | 2        |
| PD 2  | Communication Skills   | 3        |
| PD 3  | Group Discussion: Stress & Emotions  | 2        |
| <b>LEADERSHIP</b>                               |  | <b>5</b> |
| L 1   | Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code              | 3        |
| L 2   | Case Studies: Shivaji, Jhasi Ki Rani   | 2        |
| <b>SOCIAL SERVICE AND COMMUNITY DEVELOPMENT</b> |  | <b>8</b> |
| SS 1  | Basics, Rural Development Programmes, NGOs, Contribution of Youth                          | 3        |
| SS 4  | Protection of Children and Women Safety  | 1        |
| SS 5  | Road / Rail Travel Safety  | 1        |
| SS 6  | New Initiatives  | 2        |
| SS 7  | Cyber and Mobile Security Awareness  | 1        |

**TOTAL: 30 PERIODS**

| NCC Credit Course Level - I                     |  | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
|---|--|----------|----------|----------|----------|
|   |  | <b>2</b> | <b>0</b> | <b>0</b> | <b>2</b> |
| <b>NCC GENERAL</b>                              |  |          |          |          | <b>6</b> |
| NCC 1   | Aims, Objectives & Organization of NCC   |          |          |          | 1        |
| NCC 2   | Incentives   |          |          |          | 2        |
| NCC 3   | Duties of NCC Cadet  |          |          |          | 1        |
| NCC 4   | NCC Camps: Types & Conduct   |          |          |          | 2        |
| <b>NATIONAL INTEGRATION AND AWARENESS</b>       |  |          |          |          | <b>4</b> |
| NI 1  | National Integration: Importance & Necessity   |          |          |          | 1        |
| NI 2  | Factors Affecting National Integration   |          |          |          | 1        |
| NI 3  | Unity in Diversity & Role of NCC in Nation Building  |          |          |          | 1        |
| NI 4  | Threats to National Security   |          |          |          | 1        |
| <b>PERSONALITY DEVELOPMENT</b>                  |  |          |          |          | <b>7</b> |
| PD 1  | Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving |          |          |          | 2        |
| PD 2  | Communication Skills   |          |          |          | 3        |
| PD 3  | Group Discussion: Stress & Emotions  |          |          |          | 2        |
| <b>LEADERSHIP</b>                               |  |          |          |          | <b>5</b> |
| L 1   | Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code              |          |          |          | 3        |
| L 2   | Case Studies: Shivaji, Jhansi Ki Rani  |          |          |          | 2        |
| <b>SOCIAL SERVICE AND COMMUNITY DEVELOPMENT</b> |  |          |          |          | <b>8</b> |
| SS 1  | Basics, Rural Development Programmes, NGOs, Contribution of Youth                          |          |          |          | 3        |
| SS 4  | Protection of Children and Women Safety  |          |          |          | 1        |
| SS 5  | Road / Rail Travel Safety  |          |          |          | 1        |
| SS 6  | New Initiatives  |          |          |          | 2        |
| SS 7  | Cyber and Mobile Security Awareness  |          |          |          | 1        |

**TOTAL : 30 PERIODS**

## NCC Credit Course Level - I

|          |          |          |          |
|----------|----------|----------|----------|
| <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
| <b>2</b> | <b>0</b> | <b>0</b> | <b>2</b> |

|   |  |          |
|---|--|----------|
| <b>NCC GENERAL</b>                              |  | <b>6</b> |
| NCC 1   | Aims, Objectives & Organization of NCC   | 1        |
| NCC 2   | Incentives   | 2        |
| NCC 3   | Duties of NCC Cadet  | 1        |
| NCC 4   | NCC Camps: Types & Conduct   | 2        |
| <b>NATIONAL INTEGRATION AND AWARENESS</b>       |  | <b>4</b> |
| NI 1  | National Integration: Importance & Necessity   | 1        |
| NI 2  | Factors Affecting National Integration   | 1        |
| NI 3  | Unity in Diversity & Role of NCC in Nation Building  | 1        |
| NI 4  | Threats to National Security   | 1        |
| <b>PERSONALITY DEVELOPMENT</b>                  |  | <b>7</b> |
| PD 1  | Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving | 2        |
| PD 2  | Communication Skills   | 3        |
| PD 3  | Group Discussion: Stress & Emotions  | 2        |
| <b>LEADERSHIP</b>                               |  | <b>5</b> |
| L 1   | Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code              | 3        |
| L 2   | Case Studies: Shivaji, Jhansi Ki Rani  | 2        |
| <b>SOCIAL SERVICE AND COMMUNITY DEVELOPMENT</b> |  | <b>8</b> |
| SS 1  | Basics, Rural Development Programmes, NGOs, Contribution of Youth                          | 3        |
| SS 4  | Protection of Children and Women Safety  | 1        |
| SS 5  | Road / Rail Travel Safety  | 1        |
| SS 6  | New Initiatives  | 2        |
| SS 7  | Cyber and Mobile Security Awareness  | 1        |

**TOTAL : 30 PERIODS**



**COURSE OBJECTIVES:**

The main learning objective of this course is to provide hands on training to the students in:

- Drawing pipe line plan; laying and connecting various pipe fittings used in common household plumbing work; Sawing; planing; making joints in wood materials used in commonhousehold wood work.
- Wiring various electrical joints in common household electrical wire work.
- Welding various joints in steel plates using arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipments; Making a tray out of metal sheet using sheet metal work.
- Soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB.

**GROUP – A (CIVIL & ELECTRICAL)****PART I****CIVIL ENGINEERING PRACTICES****15****PLUMBING WORK:**

- a) Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in household.
- b) Preparing plumbing line sketches.
- c) Laying pipe connection to the suction side of a pump
- d) Laying pipe connection to the delivery side of a pump.
- e) Connecting pipes of different materials: Metal, plastic and flexible pipes used inhousehold appliances.

**WOOD WORK:**

- a) Sawing,
- b) Planing and
- c) Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint.

Wood Work Study:

- a) Studying joints in door panels and wooden furniture
- b) Studying common industrial trusses using models.

**PART II****ELECTRICAL ENGINEERING PRACTICES****15**

- a) Introduction to switches, fuses, indicators and lamps - Basic switch board wiring with lamp, fan and three pin socket
- b) Staircase wiring
- c) Fluorescent Lamp wiring with introduction to CFL and LED types.
- d) Energy meter wiring and related calculations/ calibration
- e) Study of Iron Box wiring and assembly
- f) Study of Fan Regulator (Resistor type and Electronic type using Diac/Triac/quadrac)
- g) Study of emergency lamp wiring/Water heater

## **GROUP – B (MECHANICAL AND ELECTRONICS)**

### **PART III MECHANICAL ENGINEERING PRACTICES**

**15**

#### **WELDING WORK:**

- a) Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding.
- b) Practicing gas welding.

#### **BASIC MACHINING WORK:**

- a) (simple)Turning.
- b) (simple)Drilling.
- c) (simple)Tapping.

#### **ASSEMBLY WORK:**

- a) Assembling a centrifugal pump.
- b) Assembling a household mixer.
- c) Assembling an airconditioner.

#### **SHEET METAL WORK:**

- a) Making of a square tray

#### **FOUNDRY WORK:**

- a) Demonstrating basic foundry operations.

### **PART IV ELECTRONIC ENGINEERING PRACTICES**

**15**

#### **SOLDERING WORK:**

- a) Soldering simple electronic circuits and checking continuity.

#### **ELECTRONIC ASSEMBLY AND TESTING WORK:**

- a) Assembling and testing electronic components on a small PCB.

#### **ELECTRONIC EQUIPMENT STUDY:**

- a) Study an elements of smart phone..
- b) Assembly and dismantle of LED TV.
- c) Assembly and dismantle of computer/ laptop

**TOTAL: 60 PERIODS**

#### **COURSE OUTCOMES:**

Upon completion of this course, the students will be able to:

**CO1:**Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.

**CO2:**Wire various electrical joints in common household electrical wire work.

**CO3:**Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.

**CO4:**Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.

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

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| 1  | 3   | 2   | -   | -   | 1   | 1   | 1   | -   | -   | -    | -    | 2    | 2    | 1    | 1    |
| 2  | 3   | 2   | -   | -   | 1   | 1   | 1   | -   | -   | -    | -    | 2    | 2    | 1    | 1    |
| 3  | 3   | 2   | -   | -   | 1   | 1   | 1   | -   | -   | -    | -    | 2    | 2    | 1    | 1    |
| CO | 3   | 2   | -   | -   | 1   | 1   | 1   | -   | -   | -    | -    | 2    | 2    | 1    | 1    |

1 - low, 2 - medium, 3 - high, '-' - no correlation

EC3271

CIRCUIT ANALYSIS LABORATORY

L T P C

0 0 2 1

**COURSE OBJECTIVES:**

- To gain hands- on experience in Thevenin & Norton theorem, KVL & KCL, and Superposition Theorems.
- To understand the working of RL,RC and RLC circuits

**List of Experiments:**

1. Verifications of KVL & KCL.
2. Verifications of Thevenin & Norton theorem.
3. Verification of Superposition Theorem.
4. Verification of maximum power transfer Theorem
5. Determination of Resonance Frequency of Series & Parallel RLC Circuits.
6. Transient analysis of RL and RC circuits.

**TOTAL : 30 PERIODS**

**COURSE OUTCOMES:**

**At the end of the course, the student will be able to**

- Design RL and RC circuits.
- Verify Thevenin & Norton theorem KVL & KCL, and Super Position Theorems.

**TEXT BOOKS**

1. Hayt JackKemmerly, Steven Durbin, "Engineering Circuit Analysis", McGraw Hill education, 9<sup>th</sup> Edition, 2018.
2. Charles K. Alexander & Mathew N.O.Sadiku, "Fundamentals of Electric Circuits", McGraw- Hill, 2<sup>nd</sup> Edition, 2003.
3. Joseph Edminister and Mahmood Nahvi, "Electric Circuits, Schaum's Outline Series", Tata McGraw Hill Publishing Company, New Delhi, Fifth Edition Reprint 2016.

**REFERENCES**

1. David Bell, "Fundamentals of Electric Circuits", Oxford University press, 7<sup>th</sup> Edition, 2009
2. John O Mallay, Schaum's Outlines "Basic Circuit Analysis", The Mc Graw Hill companies, 2<sup>nd</sup> Edition, 2011.
3. A.Bruce Carlson, "Cicuits: Engineering Concepts and Analysis of Linear Electric Circuits, Cengage Learning, India Edition 2nd Indian Reprint 2009.
4. Allan H.Robbins, Wilhelm C.Miller, "Circuit Analysis Theory and Practice", Cengage Learning, Fifth Edition, 1st Indian Reprint 2013

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

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| 1  | 3   | 2   | 1   | 1   | -   | -   | -   | 1   | -   | 1    | -    | -    | -    | -    | -    |
| 2  | 3   | 3   | 2   | 2   | -   | -   | -   | 1   | -   | 1    | -    | -    | -    | -    | -    |
| 3  | 3   | 3   | 3   | 3   | -   | -   | -   | 1   | -   | 1    | -    | -    | -    | -    | -    |
| 4  | 3   | 3   | 3   | 3   | -   | -   | -   | 1   | -   | 1    | -    | -    | -    | -    | -    |
| 5  | 3   | 3   | 3   | 2   | -   | -   | -   | 1   | -   | 1    | -    | -    | -    | -    | -    |
| CO | 3   | 3   | 3   | 2   | -   | -   | -   | 1   | -   | 1    | -    | -    | -    | -    | -    |

1 - low, 2 - medium, 3 - high, '-' - no correlation

**GE3272**

**COMMUNICATION LABORATORY**

**L T P C**  
**0 0 4 2**

**COURSE OBJECTIVES:**

- To identify varied group discussion skills and apply them to take part in effective discussions in a professional context.
- To analyse concepts and problems and make effective presentations explaining them clearly and precisely.
- To be able to communicate effectively through formal and informal writing.
- To be able to use appropriate language structures to write emails, reports and essays
- To give instructions and recommendations that are clear and relevant to the context

**UNIT I**

**12**

Speaking-Role Play Exercises Based on Workplace Contexts, - talking about competition-discussing progress toward goals-talking about experiences- talking about events in life- discussing past events-Writing: writing emails ( formal & semi-formal).

**UNIT II**

**12**

Speaking: discussing news stories-talking about frequency-talking about travel problems- discussing travel procedures- talking about travel problems- making arrangements-describing arrangements-discussing plans and decisions- discussing purposes and reasons- understanding common technology terms-Writing: - writing different types of emails.

**UNIT III**

**12**

Speaking: discussing predictions-describing the climate-discussing forecasts and scenarios- talking about purchasing-discussing advantages and disadvantages- making comparisons- discussing likes and dislikes- discussing feelings about experiences-discussing imaginary scenarios Writing: short essays and reports-formal/semi-formal letters.

**UNIT IV**

**12**

Speaking: discussing the natural environment-describing systems-describing position and movement- explaining rules-( example- discussing rental arrangements)- understanding technical instructions-Writing: writing instructions-writing a short article.

**UNIT V**

**12**

Speaking: describing things relatively-describing clothing-discussing safety issues( making recommendations) talking about electrical devices-describing controlling actions- Writing: job application( Cover letter + Curriculum vitae)-writing recommendations.

**TOTAL: 60 PERIODS**

## LEARNING OUTCOMES

**CO1:** Speak effectively in group discussions held in formal/semi formal contexts.

**CO2:** Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions

**CO3:** Write emails, letters and effective job applications.

**CO4:** Write critical reports to convey data and information with clarity and precision

**CO5:** Give appropriate instructions and recommendations for safe execution of tasks

## Assessment Pattern

- One online / app based assessment to test speaking and writing skills
- Proficiency certification is given on successful completion of speaking and writing.

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

| CO   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| 1    | 2   | 3   | 3   | 3   | 1   | 3   | 3   | 3   | 3   | 3    | 3    | 3    | -    | -    | -    |
| 2    | 2   | 3   | 3   | 3   | 1   | 3   | 3   | 3   | 3   | 3    | 3    | 3    | -    | -    | -    |
| 3    | 2   | 2   | 3   | 3   | 1   | 3   | 3   | 3   | 3   | 3    | 3    | 3    | -    | -    | -    |
| 4    | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3    | 3    | 3    | -    | -    | -    |
| 5    | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3    | 3    | 3    | -    | -    | -    |
| AVg. | 2.4 | 2.8 | 3   | 3   | 1.8 | 3   | 3   | 3   | 3   | 3    | 3    | 3    | -    | -    | -    |

1-low, 2-medium, 3-high, '-'- no correlation

- **Note:** The average value of this course to be used for program articulation matrix.

**MA3355**

**RANDOM PROCESSES AND LINEAR ALGEBRA**

**L T P C**

**3 1 0 4**

## COURSE OBJECTIVES :

- To introduce the basic notions of vector spaces which will then be used to solve related problems.
- To understand the concepts of vector space, linear transformations, inner product spaces and orthogonalization..
- To provide necessary basic concepts in probability and random processes for applications such as random signals, linear systems in communication engineering.
- To provide necessary basics in probability that are relevant in applications such as random signals, linear systems in communication engineering.
- To understand the basic concepts of probability, one and two dimensional random variables and to introduce some standard distributions applicable to engineering which can describe real life phenomenon.

## UNIT - I PROBABILITY AND RANDOM VARIABLES

**9 + 3**

Axioms of probability – Conditional probability – Baye's theorem - Discrete and continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions - Functions of a random variable.

## UNIT - II TWO - DIMENSIONAL RANDOM VARIABLES

**9 + 3**

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).