HERITAGE INSTITUTE OF TECHNOLOGY

(An Autonomous Institute under MAKAUT)

DEPARTMENT OF

COMPUTER SCIENCE & BUSINESS SYSTEMS

B. TECH. CURRICULUM

PART 1

Structure of Syllabus

FIRST YEAR FIRST SEMESTER:

Sl.	Code	Subject	Contacts Periods/ Week				Credit Points
			L	T	P	Total	
A. Theory							
1	PHY1001	Physics I	3	0	0	3	3
2	MTH1101	Mathematics I	3	1	0	4	4
3	ECE1001	Introduction to Electronic Devices and Circuits	3	0	0	3	3
4	HUM1002	Universal Human Values and Professional Ethics	2	1	0	3	3
Total Theory			**11**	**2**	**0**	**13**	**13**
B. Practical							
1	PHY1051	Physics I Laboratory	0	0	2	2	1
2	ECE1051	Introduction to Electronic Devices and Circuits Laboratory	0	0	2	2	1
3	MEC1051	Workshop/ Manufacturing Practices	1	0	3	4	2.5
4	MEC1052	Engineering Graphics & Design	1	0	3	4	2.5
Total Laboratory			**2**	**0**	**10**	**12**	**7**
Total of Semester			**13**	**2**	**10**	**25**	**20**

FIRST YEAR SECOND SEMESTER:

Sl.	Code	Subject	Contacts Periods/ Week				Credit Points
			L	T	P	Total	
A. Theory							
1	CHM1001	Chemistry I	3	0	0	3	3
2	MTH1201	Mathematics II	3	1	0	4	4
3	CSE1001	Programming for Problem Solving	4	0	0	4	4
4	ELE1001	Basic Electrical Engineering.	3	1	0	4	4
5	HUM1001	English for Technical Writing	2	0	0	2	2
Total Theory			**15**	**2**	**0**	**17**	**17**
B. Practical							
1	CHM1051	Chemistry I Laboratory	0	0	2	2	1
2	CSE1051	Programming for Problem Solving Laboratory	0	0	3	3	1.5
3	ELE1051	Basic Electrical Engineering Laboratory	0	0	2	2	1
4	HUM1051	English for Technical Writing Laboratory	0	0	2	2	1
Total Laboratory			**0**	**0**	**9**	**9**	**4.5**
Total of Semester			**15**	**2**	**9**	**26**	**21.5**

PART 2

Detailed Syllabus

FIRST YEAR FIRST SEMESTER:

Course Name:	Physics I				
Course Code:	PHY1001				
Contact Hours per Week:	L	T	P	Total	Credit Points
	3	0	0	3	3

1. Course Outcomes

After completion of the course, students will be able to:

PHY1001.1	Understanding physical systems in terms of their modelling of time evolution.
PHY1001.2	Comprehending wave interpretation of natural phenomena and implications of allied observations.
PHY1001.3	Understanding theoretical backgrounds associated to some experiments based on wave phenomena.
PHY1001.4	Grasping an analytic view of micro and macroscopic world.
PHY1001.5	Accessing the knowledge of the behaviour of a particle under the influence of different potential.
PHY1001.6	Understanding conservative systems based on their particle and wave nature.

2. Detailed Syllabus

Module - I [10L]

Mechanics

Plane - polar coordinate system -velocity and acceleration of a particle- trajectory under central force- conservation principle - Kepler's laws - Rotating frame of reference - Five point acceleration formula- Coriolis effect - deflection of a moving particle.

Module - II [10L]

Oscillation:

Constitutive equation of damping- nature of solutions for large, critical and weak damping- relaxation time, logarithmic decrement, energy decay (qualitative discussion) – Forced oscillation- transient and steady state -amplitude and velocity resonance--- power transfer theorem- quality factor- series LCR circuit with AC source.

Module - III [10L]

Optics:

Plane Progressive Wave - phase/wave-length/frequency - qualitative description of light asan electromagnetic wave - Huygens principle - polarization (state of polarization, generalequation of ellipse, transformation of polarized lights) - interference (basic theory fromsuperposition principle)-Division of wave front (Young's double slit experiment) – Divisionof amplitude (thin film, wedge, Newton's ring) - Diffraction (single slit, double slit, grating,Resolving Power).

Module - IV [10L]

Quantum Mechanics :

An informal discussion from Planck to de Broglie as the historical context of quantum mechanics - Quantum Mechanics of a particle - operator- eigenvalue problem- Unitary-Hermitian frame work- position and momentum operator-Canonical Commutation Relations (CCR)- Schrodinger equation - time dependent/time independent Schrodinger equation- wave function- stationary states- probability density - probability current density- normalization- expectation value- uncertainty- Bound state problem-particle in a one dimensional box- scattering state problem-potential step-reflection and transmission coefficients- tunnelling.

3. Text / Referencebooks

1. Theoretical Mechanics : M R Spiegel (Schaum Series) McGrow-Hill Book Company
2. Classical Mechanics : N C Rana and P S Joag Tata- McGrow-Hill Publishing CompanyLimited
3. Vibrations and Waves : A P French, W W Norton and Company
4. The Physics of Waves and Oscillations : N K Bajaj, Tata- McGrow-Hill Publishing Company Limited
5. Optics : A Ghatak, Tata McGraw-Hill Publishing Company Limited
6. Optics : E. Hecht, Addison Wesley
7. Fundamentals of Optics : F A Jenkins and H E White, McGrow-Hill Higher Education
8. Atomic Physics (Modern Physics): S N Ghosal, S. Chand and Company
9. Practical Quantum Mechanics : S Flugge, Springer (Reprint of the 1994 Edition)
10. Concepts of Modern Physics : A Baiser, Tata McGraw-Hill Publishing Company Limited.
11. Refresher Course in B.Sc. Physics – Vol1 and Vol 2 – C.L.Arora.

Course Name:	Mathematics I				
Course Code:	MTH1101				
Contact Hours per Week:	L	T	P	Total	Credit Points
	3	1	0	4	4

1. Course Outcomes

After completion of the course, students will be able to:

MTH1001.1	Apply the concept of rank of matrices to find the solution of a system of linear simultaneous equations
MTH1001.2	Develop the concept of eigen values and eigen vectors
MTH1001.3	Combine the concepts of gradient, curl, divergence, directional derivatives, line integrals, surface integrals and volume integrals
MTH1001.4	Analyze the nature of sequence and infinite series
MTH1001.5	Choose proper method for finding solution of a specific differential equation
MTH1001.6	Describe the concept of differentiation and integration for functions of several variables with their applications in vector calculus

2. Detailed Syllabus

Module - I [10L]

Matrix:

Inverse and rank of a matrix; Elementary row and column operations over a matrix; System of linear equations and its consistency; Symmetric, skew symmetric and orthogonal matrices; Determinants; Eigen values and eigen vectors; Diagonalization of matrices; Cayley Hamilton theorem; Orthogonal transformation.

Module - II [10L]

Vector Calculus:

Vector function of a scalar variable, Differentiation of a vector function, Scalar and vector point functions, Gradient of a scalar point function, divergence and curl of a vector point function, Directional derivative, Related problems on these topics.

Infinite Series:

Convergence of sequence and series; Tests for convergence: Comparison test, Cauchy's Root test, D' Alembert's Ratio test(statements and related problems on these tests), Raabe's test; Alternating series; Leibnitz's Test (statement, definition); Absolute convergence and Conditional convergence.

Module - III [10L]

First order ordinary differential equations:

Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut'stype.

Ordinary differential equations of higher orders:

General linear ODE of order two with constant coefficients, C.F. & P.I., D-operator methods, Method of variation of parameters, Cauchy-Euler equations.

Module - IV [10L]

Calculus of functions of several variables:

Introduction to functions of several variables with examples, Knowledge of limit and continuity, Determination of partial derivatives of higher orders with examples, Homogeneous functions and Euler's theorem and related problems up to three variables.

Multiple Integration:

Concept of line integrals, Double and triple integrals. Green's Theorem, Stoke's Theorem and Gauss Divergence Theorem.

3. Text / Reference books

1. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 2000.
2. E. Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, 2006.
3. Veerarajan T., "Engineering Mathematics for first year", Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., "Higher Engineering Mathematics", Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. K. F. Riley, M. P. Hobson, S. J. Bence., "Mathematical Methods for Physics and Engineering", Cambridge University Press, 23-Mar-2006.
6. S. L. Ross, "Differential Equations", Wiley India, 1984.
7. G.F. Simmons and S.G. Krantz, "Differential Equations", McGraw Hill, 2007.
8. M. R. Spiegel, Seymour Lipschutz, Dennis Spellman, "Vector Analysis (Schaum's outline series)", McGraw Hill Education.
9. S. S. Sastry, "Engineering Mathematics", PHI.
10. M.C. Potter, J.L. Goldberg and E.F. Abonfadel (OUP), "Advanced Engineering Mathematics", Indian Edition.
11. Seymour Lipschutz, Marc Lipson, "Linear Algebra (Schaum's outline series)", McGraw Hill Education.

Course Name:	Introduction to Electronic Devices and Circuits				
Course Code:	ECE1001				
Contact Hours per Week:	L	T	P	Total	Credit Points
	3	0	0	3	3

1. Course Outcomes

After completion of the course, students will be able to:

ECE1001.1	Categorize different semiconductor materials based on their energy bands and analyze the characteristics of those materials for different doping concentrations based on previous knowledge on semiconductors acquired.
ECE1001.2	Describe energy band of P-N Junction devices and solve problems related to P-N Junction Diode both from device and circuit perspectives.
ECE1001.3	Design different application specific circuits associated with diodes operating both in forward and reverse bias.
ECE1001.4	Analyze various biasing configurations of Bipolar Junction Transistor and categorize different biasing circuits based on stability.
ECE1001.5	Categorize different field-effect transistors based on their constructions, physics and working principles and solve problems associated with analog circuits based on operational amplifiers.
ECE1001.6	Design and implement various practical purpose electronic circuits and systems meant for both special purpose and general purpose and anlayze their performance depending on the type of required output and subsequently the applied input.

2. Detailed Syllabus

Module - I [10L]

Basic Semiconductor Physics:

Crystalline materials, Energy band theory, Conductors, Semiconductors and Insulators, Concept of Fermi Energy level, intrinsic and extrinsic semiconductors, drift and diffusion currents in semiconductor

Diodes and Diode Circuits:

Formation of p-n junction, Energy Band diagram, forward & reverse biased configurations, V-I characteristics, load line, breakdown mechanisms, Zener Diode and its Application. Rectifier circuits: half wave & full wave rectifiers: ripple factor, rectification efficiency.

Module - II [8L]

Bipolar Junction Transistors (BJT):

PNP & NPN BJT structures, current components in BJT, CE, CB, CC configurations, V-I Characteristics of CB& CE modes, regions of operation, Base width modulation & Early effect, thermal runaway, Concept of Biasing: DC load line, Q-point, basics of BJT amplifier operation, current amplification factors, different biasing circuits: fixed bias, collector to base bias, voltage divider bias

Module - III [9L]

Field Effect Transistors (FET):

n-channel Junction Field Effect Transistor (JFET) structure &V-I characteristics.

Metal Oxide Semiconductor Field Effect Transistor (MOSFET): enhancement & depletion type MOSFETs (for both n&p channel devices), drain & transfer characteristics.

MOSFET as a digital switch, CMOS inverter, voltage transfer characteristic (VTC), NAND & NOR gate realization using CMOS logic.

Moore's Law, evolution of process node, state of integration (SSI, MSI, LSI, VLSI, ULSI), Classification of Integrated circuits (IC) and their applications.

Module - IV [9L]

Feedback in amplifiers:

Concept of feedback, advantages of negative feedback (qualitative), Barkhausen criteria.

Operational Amplifier:

Ideal OPAMP characteristics, OPAMP circuits: inverting and non-inverting amplifiers, Adder, Subtractor, Integrator, Differentiator, Basic Comparator.

Special Semiconductor Devices:

Light Emitting Diode (LED), Silicon Controlled Rectifier (SCR), Photodiode: Operations, characteristics & applications.

3. Text / Reference books

1. Electronic Devices & Circuit Theory, Boylestad & Nashelsky.
2. Op Amps and Linear IC's, R.A Gayakwad, PHI.
3. Electronics Fundamentals and Applications, D. Chattopadhyay, P. C Rakshit.
4. Microelectronics Engineering, Adel S. Sedra, Kenneth Carless Smith.
5. Integrated Electronics, Millman & Halkias.
6. Electronics Devices & Circuits, Salivahanan.
7. Electronic Principle, Albert Paul Malvino.

Course Name:	Universal Human Values and Professional Ethics				
Course Code:	HUM1002				
Contact Hours per Week:	L	T	P	Total	Credit Points
	2	1	0	3	3

1. Course Outcomes

After completion of the course, students will be able to:

HUM1001.1	Be aware of the value system and the importance of following such values at workplace.
HUM1001.2	Learn to apply ethical theories in the decision making process
HUM1001.3	Follow the ethical code of conduct as formulated by institutions and organizations
HUM1001.4	Implement the principles governing work ethics
HUM1001.5	Develop strategies to implement the principles of sustainable model of development
HUM1001.6	Implement ecological ethics wherever relevant and also develop eco-friendly technology

2. Detailed Syllabus

Module - I [10L]

Human society and the Value System

Values: Definition, Importance and application.
Formation of Values: The process of Socialization, Self and the integrated personality
Morality, courage, integrity.

Types of Values:

Social Values: Justice, Rule of Law, Democracy, Indian Constitution, Secularism
Aesthetic Values: Perception and appreciation of beauty
Organizational Values: Employee: Employer--- rights, relationships, obligations
Psychological Values: Integrated personality and mental health
Spiritual Values & their role in our everyday life
Value Spectrum for a Good Life, meaning of Good Life

Value Crisis in Contemporary Society

Value crisis at Individual Level, Societal Level, Cultural Level
Value Crisis management Strategies and Case Studies

Module - II [10L]

Ethics and Ethical Values, Principles and theories of ethics, Consequential and non-consequential ethics Egotism, Utilatirianism, Kant's theory and other non-consequential perspectives, Ethics of care, justice and fairness, rights and duties.
Ethics--Standardization, Codification, Acceptance, Application

Types of Ethics

Ethics of rights and Duties
Ethics of Responsibility
Ethics and Moral judgment
Ethics of care
Ethics of justice and fairness
Work ethics and quality of life at work

Professional Ethics

Ethics in Engineering Profession;

moral issues and dilemmas, moral autonomy(types of inquiry) Kohlberg's theory, Giligan's theory(consensus and controversy)

Code of Professional Ethics Sample Code of ethics like ASME, ASCE. IEEE, Institute of Engineers, Indian Institute of materials management, Institute of Electronics and telecommunication engineers

Violation of Code of Ethics---conflict, causes and consequences

Engineering as social experimentation, engineers as responsible experimenters (computer ethics, weapons development)

Engineers as managers, consulting engineers, engineers as experts, witnesses and advisors, moral leadership Conflict between business demands and professional ideals

social and ethical responsibilities of technologies.

Whistle Blowing: Facts, contexts, justifications and case studies.

Ethics and Industrial Law

Institutionalizing Ethics: Relevance, Application, Digression and Consequences

Module - III [10L]

Science, Technology and Engineering

Science, Technology and Engineering as knowledge and profession

----Definition, Nature, Social Function and Practical application of science Rapid Industrial Growth and its Consequences

Renewable and Non- renewable Resources: Definition and varieties Energy Crisis

Industry and Industrialization Man and Machine interaction

Impact of assembly line and automation Technology assessment and Impact analysis Industrial hazards and safety

Safety regulations and safety engineering Safety responsibilities and rights

Safety and risk, risk benefit analysis and reducing risk Technology Transfer: Definition and Types the Indian Context

Module - IV [6L]

Environment and Eco- friendly Technology

Human Development and Environment Ecological Ethics/Environment ethics

Depletion of Natural Resources: Environmental degradation Pollution and Pollution Control

Eco-friendly Technology: Implementation, impact and assessment

Sustainable Development: Definition and Concept, Strategies for sustainable development Sustainable Development--- The Modern Trends

Appropriate technology movement by Schumacher and later development, Reports of Club of Rome.

3. Text / Reference books

1. Human Values, Tripathi, A.N., New Age International, New Delhi, 2006.
2. Classical Sociological Theory, Ritzer, G., The McGraw Hill Companies, New York,1996
3. Postmodern Perspectives on Indian Society, Doshi, S.L., Rawat Publications, New Delhi, 2008
4. Sustainable Development, Bhatnagar, D.K., Cyber Tech Publications, New Delhi, 2008
5. The age of Spiritual Machines, Kurzwell, R., Penguin Books, New Delhi,1999
6. Social Problems in Modern Urban Society, Weinberg, S.K., Prentice Hall Inc.,USA, 1970
7. Anthony 2009. Sociology. London, Giddens, Polity Press (reprint 13th Edition).

Course Name:	Physics I Laboratory				
Course Code:	PHY1051				
Contact Hours per Week:	L	T	P	Total	Credit Points
	0	0	2	2	1

1. Course Outcomes

After completion of the course, students will be able to:

PHY1051.1	Gain practical knowledge by applying the experimental methods to correlate with the Physics theory.
PHY1051.2	Learn the usage of electrical and optical systems for various measurements
PHY1051.3	Apply the analytical techniques and graphical analysis to the experimental data
PHY1051.4	Understand measurement technology, usage of new instruments and real time applications in engineering studies
PHY1051.5	Develop intellectual communication skills and discuss the basic principles of scientific concepts in a group
PHY1051.6	

2. Detailed Syllabus

Minimum of six experiments taking at least one from each of the following four groups:

Module - I

Experiments in General Properties of matter:

1. Determination of Young's modulus by Flexure Method
2. Determination of bending moment and shear force of a rectangular beam of uniform cross-section.
3. Determination of modulus of rigidity of the material of a rod by static method
4. Determination of rigidity modulus of the material of a wire by dynamic method.
5. Determination of coefficient of viscosity by Poiseulle's capillary flow method.

Module - II

Experiments in Optics

1. Determination of dispersive power of the material of a prism
2. Determination of wavelength of light by Newton's ring method.
3. Determination of wavelength of light by Fresnel's bi-prism method.
4. Determination of the wavelength of a given laser source by diffraction method

Module - III

Electricity & Magnetism experiments

1. Determination of dielectric constant of a given dielectric material.
2. Determination of resistance of ballistic galvanometer by half deflection method and study of variation of logarithmic decrement with series resistance.
3. Determination of the thermo-electric power at a certain temperature of the given thermocouple.
4. Determination of specific charge (e/m) of electron.

Module - IV

Quantum Physics Experiments:

1. Determination of Planck's constant.
2. Determination of Stefan's radiation constant.
3. Verification of Bohr's atomic orbital theory through Frank-Hertz experiment.
4. Determination of Rydberg constant by studying Hydrogen/Helium spectrum.
5. Determination of Hall co-efficient of semiconductors.
6. Determination of band gap of semiconductors.
7. To study current-voltage characteristics, load response, areal characteristics and spectral response of photovoltaic solar cells.

3. Textbooks

1. Advanced Practical Physics (Vol.1 and Vol.2), B. Ghosh and K.G. Mazumdar.
2. Advanced Course in Practical Physics, D.Chattopadhyayand P.C. Rakshit

4. Reference books

1. Optics, Eugene Hecht, Pearson Education India Private Limited.
2. Introduction to Electrodynamics, David J. Griffiths, Pearson Education India Learning Private Limited
3. Waves and Oscillations, N.K. Bajaj
4. Principles of Physics, David Halliday, Robert Resnick Jearl Walker, 10ed,Wiley
5. Electricity, Magnetism and Light, Wayne M.Saslow, Academic Press
6. Classical Mechanics, Narayan Rana, Pramod Joag, McGraw Hill Education
7. Introduction to Classical Mechanics, R Takwale, P Puranik, McGraw Hill Education
8. Optics, Ghatak, McGraw Hill Education India Private Limited
9. Refresher Course in B.Sc. Physics, C.L. Arora, Vol1 and Vol2

Course Name:	Introduction to Electronic Devices and Circuits Laboratory				
Course Code:	ECE1051				
Contact Hours per Week:	L	T	P	Total	Credit Points
	0	0	2	2	1

1. Course Outcomes

After completion of the course, students will be able to:

ECE1051.1 Correlate theory with diode behavior.
ECE1051.2 Design and check rectifier operation with regulation etc
ECE1051.3 Design different modes with BJT and FET and check the operations.
ECE1051.4 Design and study adder, integrator etc. with OP-AMPs.
ECE1051.5
ECE1051.6

2. Detailed Syllabus

List of Experiments

1. Familiarization with passive and active electronic components such as Resistors, Inductors, Capacitors, Diodes, Transistors (BJT) and electronic equipment like DC power supplies, multi-meters etc.
2. Familiarization with measuring and testing equipment like CRO, Signal generators etc.
3. Study of I-V characteristics of Junction diodes.
4. Study of I-V characteristics of Zener diodes.
5. Study of Half and Full wave rectifiers with Regulation and Ripple factors.
6. Study of I-V characteristics of BJTs in CB mode
7. Study of I-V characteristics of BJTs in CE mode
8. Study of I-V characteristics of Field Effect Transistors.
9. Determination of input-offset voltage, input bias current and Slew rate of OPAMPs.
10. Determination of Common-mode Rejection ratio, Bandwidth and Off-set null of OPAMPs.
11. Study of OPAMP circuits: Inverting and Non-inverting amplifiers, Adders, Integrators and Differentiators.

3. Text/ Reference books

1. Electronics Fundamentals and Applications, D. Chattopadhyay, P. C Rakshit.
2. Electronics Laboratory Primer, B Sasikala.

Course Name:	Workshop/ Manufacturing Practices				
Course Code:	MEC1051				
Contact Hours per Week:	L	T	P	Total	Credit Points
	1	0	3	4	2.5

1. Course Outcomes

After completion of the course, students will be able to:

MEC1051.1	Follow the various safety practices in workshop and personal protective elements.
MEC1051.2	Identify tools, work material and measuring instruments useful for fitting, carpentry and sheet metal practices.
MEC1051.3	Operate machine tools, components and processes to prepare jobs of specific shape and size.
MEC1051.4	Acquire knowledge of foundry process and casting of a product.
MEC1051.5	Perform welding, brazing and soldering processes.
MEC1051.6	Assemble a simple product.

2. Detailed Syllabus

(i) Lectures & videos: (13 hours)

1. Introduction on Workshop and Safety Precautions.	1L
2. Carpentry and Fitting	2L
3. Sheet metal	1L
4. Metal casting	1L
5. Welding (arc welding & gas welding), brazing and soldering	2L
6. Manufacturing Methods- machining (Lathe, Shaping and Milling)	4L
7. Additive manufacturing	1L
8. Assembling of a product	1L

(ii) Workshop Practice: (39 hours)

1. Safety practices in workshop	3 hours
2. Carpentry shop	3 hours
3. Fitting shop	6 hours
4. Foundry shop	3 hours
5.Machine shop	9 hours
6. Welding shop-Arc welding	3 hours
7. Sheet metal shop and brazing	6 hours
8. Soldering operation	3 hours
9.Assembling of a product	3 hours

3. Text / Reference books

1. Elements of Workshop Technology, Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy. S.K., Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. Manufacturing Engineering and Technology Kalpakjian S. And Steven S. Schmid, 4th edition, Pearson Education India Edition, 2002.
3. Manufacturing Technology – I, Gowri P. Hariharan and A. Suresh Babu, Pearson Education, 2008.
4. Processes and Materials of Manufacture, Roy A. Lindberg, 4th edition, Prentice Hall India, 1998.
5. Manufacturing Technology Rao P.N., Vol. I and Vol. II, Tata McGrawHill House, 2017.

Course Name:	Engineering Graphics & Design				
Course Code:	MEC1052				
Contact Hours per Week:	L	T	P	Total	Credit Points
	1	0	3	4	2.5

1. Course Outcomes

After completion of the course, students will be able to:

MEC1052.1 Visualize the basic concept of engineering drawing.
MEC1052.2 Use engineering drawing tools (conventional / modern tools).
MEC1052.3 Apply the various standards and symbols followed in engineering drawing.
MEC1052.4 Implement the concept of projections used in engineering graphics.
MEC1052.5 Relate the concept of sections to determine its true shape.
MEC1052.6 Execute the concept of isometric projections.

2. Detailed Syllabus

Lecture [13L]

1. Importance and principles of engineering drawing [1L]
2. Lettering [1L]
3. Concepts of Conic sections and Scale [3L]
4. Introduction to concept of projection (Projections of points, lines and surfaces) [3L]
5. Definitions of different solids and their projections [1L]
6. Section of solids and sectional view [1L]
7. Isometric projection [1L]
8. Introduction to CAD [1L]

Detailed contents of Laboratory hours (39 hours)

Module - I [3 hours]

Introduction to Engineering Drawing:

Principles of Engineering Graphics and their significance, usage of Drawing instruments, lines, lettering & dimensioning, Conic sections like Ellipse (General method only); Involute; Scales – Plain, Diagonal.

Module - II [9 hours]

Orthographic Projections

Principles of Orthographic Projections - Conventions - Projections of Points and lines inclined to both planes; Projections on Auxiliary Planes, Projection of lamina.

Module - III [6 hours]

Projections of Regular Solids

those inclined to both the Planes- Auxiliary Views.

Module - IV [3 hours]

Sections and Sectional Views of Right Angular Solids

Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids.

Module - V [6 hours]

Isometric Projections

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions.

Module - VI [3 hours]

Overview of Computer Graphics

Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids.

Module - VII [3 hours]

Customizations & CAD Drawing

Consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and to lerancing; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

Module - VIII [4 hours]

Annotations, layering & other functions

Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques; Drawing sectional views of composite right regular geometric solids and project the true shape of the sectioned surface; Drawing annotation.

Module - IX [3 hours]

Demonstration of a simple team design project

Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint form and as 3D wire-frame.

3. Textbooks

1. Bhatt, N.D., Panchal V.M. & Ingle P.R., (2014) "Elementary Engineering Drawing"; CharotanPublishing House
2. Narayana, K.L. and Kannaaiah P "Engineering Graphics"; TMH.
3. Lakshminarayanan, V. and Vaish Wanar, R.S "Engineering Graphics" Jain Brothers.
4. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Edication.
5. Agarwal B. & Agarwal C. M. (2012), Engineering graphics, TMH Publications.

FIRST YEAR SECOND SEMESTER:

Course Name:	Chemistry I				
Course Code:	CHM1001				
Contact Hours per Week:	L	T	P	Total	Credit Points
	3	0	0	3	3

1. Course Outcomes

After completion of the course, students will be able to:

CHM1001.1	Knowledge acquisition of bulk properties of materials and understanding of reaction processes using thermodynamic considerations.
CHM1001.2	Conception of energy conversion and its importance in clean energy scenario, the operating principles for batteries, fuel cells and the materials and reactions involved there in, their applications as sustainable energy devices, particularly in automobiles sectors to reduce environmental pollution.
CHM1001.3	Analytic view of microscopic chemistry in terms of atomic structure, molecular orbital and intermolecular forces to reinforce strong background on materials science and engineering.
CHM1001.4	Rationalize periodic trends of elements to explain various physico - chemical properties.
CHM1001.5	Understanding of the spectrum of electromagnetic radiation used for exciting different molecular energy levels in various spectroscopic techniques.
CHM1001.6	Knowledge of stereochemistry and conception of the mechanism of major chemical reactions involved in synthesis of drug molecules.

2. Detailed Syllabus

Module - I [9L]

Thermodynamics: [5L]

The 1st and 2nd laws of thermodynamics and thermodynamic functions like free energy, work function and entropy; Carnot cycle, Joule-Thomson effect, Gibbs-Helmholtz equation; Chemical Potential, Gibbs- Duhem Equation and Clausius-Clapeyron Equation.

Electrochemical Cell: [4L]

Generation of electromotive force in electrochemical cells and application of Nernst equation; Electrode potentials and the redox reactions; Cell configuration and half cell reactions; Standard Hydrogen Electrode, Reference electrode, evaluation of thermodynamic functions; Electrochemical corrosion. Electrochemical Energy Conversion: Primary & Secondary batteries, Fuel Cells.

Module - II [9L]

Molecular Structure: [5L]

Molecular geometry, Hybridization, Ionic, dipolar and van Der Waals interactions; Molecular Orbital Theory and its application in diatomic molecule; Pi-molecular orbital of unsaturated system; Band structure of solids, intrinsic and extrinsic semiconductors and the role of doping on band structures.

Periodic Properties: [4L]

Effective nuclear charge, penetration of orbitals; variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes; ionization energies, electron affinity and electro-negativity, polarizability, oxidation states, coordination numbers and geometries; hard-soft acid base theory.

Module - III [9L]

Atomic structure and Wave Mechanics: [5L]

Brief outline of the atomic structure, wave particle duality, Heisenberg uncertainty principle; Introduction to quantum mechanics, Schrodinger wave equation for particle in one dimensional box

Spectroscopic Techniques & Applications: [4L]

Electromagnetic spectrum: Interaction of EMR with matter; Principle and applications of Fluorescence & Phosphorescence, UV-Visible, Infrared and NMR spectroscopy.

Module - IV [9L]

Stereochemistry: [5L]

Representations of 3- dimensional structures, structural isomers and stereo-isomers, configurations, symmetry and chirality; enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis.

Organic reactions and synthesis of drug molecules: [4L]

Introduction to reaction mechanism: substitution, addition, elimination and oxidation, reduction reactions. Synthesis of commonly used drug molecules.

3. Textbooks

1. Atkins' Physical Chemistry, P.W. Atkins (10th Edition).
2. Organic Chemistry, I. L. Finar, Vol-1 (6th Edition).
3. Engineering Chemistry, Jain & Jain (16th Edition).
4. Fundamental Concepts of Inorganic Chemistry, A. K. Das, (2nd Edition).
5. Engineering Chemistry -I, Gourkrishna Dasmohapatra, (3rd Edition).

4. Reference books

1. General & Inorganic Chemistry, R. P. Sarkar.
2. Physical Chemistry, P. C. Rakshit, 7th Edition.
3. Organic Chemistry, Morrison & Boyd, 7th Edition.
4. Fundamentals of Molecular Spectroscopy, C.N. Banwell, 4th Edition.
5. Physical Chemistry, G. W. Castellan, 3rd Edition.
6. Basic Stereo chemistry of Organic Molecules, Subrata Sen Gupta, 1st Edition.

Course Name:	Mathematics II				
Course Code:	MTH1201				
Contact Hours per Week:	L	T	P	Total	Credit Points
	3	1	0	4	4

1. Course Outcomes

After completion of the course, students will be able to:

MTH1201.1	Demonstrate the knowledge of probabilistic approaches to solve wide range of engineering problem.
MTH1201.2	Recognize probability distribution for discrete and continuous variables to quantify physical and engineering phenomenon.
MTH1201.3	Develop numerical techniques to obtain approximate solutions to mathematical problems where analytical solutions are not possible to evaluate.
MTH1201.4	Analyze certain physical problems that can be transformed in terms of graphs and trees and solving problems involving searching, sorting and such other algorithms.
MTH1201.5	Apply techniques of Laplace Transform and its inverse in various advanced engineering problems.
MTH1201.6	Interpret differential equations and reduce them to mere algebraic equations using Laplace Transform to solve easily.

2. Detailed Syllabus

Module - I [10L]

Basic Probability:

Random experiment, Sample space and events, Classical and Axiomatic definition of probability, Addition and Multiplication law of probability, Conditional probability, Bayes' Theorem, Random variables, General discussion on discrete and continuous distributions, Expectation and Variance, Examples of special distribution: Binomial and Normal Distribution.

Module - II [10L]

Basic Numerical Methods:

Solution of non-linear algebraic and transcendental equations: Bisection Method, Newton-Raphson Method, Regula-Falsi Method. Solution of linear system of equations: Gauss Elimination Method, Gauss-Seidel Method, LU Factorization Method, Matrix Inversion Method. Solution of Ordinary differential equations: Euler's Method, Modified Euler's Method, Runge-Kutta Method of 4th order.

Module - III [10L]

Basic Graph Theory:

Graph, Digraph, Weighted graph, Connected and disconnected graphs, Complement of a graph, Regular graph, Complete graph, Sub-graph, Walk, Path, Circuit, Euler Graph, Cut sets and cut vertices, Matrix representation of a graph, Adjacency and incidence matrices of a graph, Graph isomorphism, Bipartite graph, Dijkstra's Algorithm for shortest path problem. Definition and properties of a Tree, Binary tree and its properties, Spanning tree of a graph, Minimal spanning tree, Determination of spanning trees using BFS and DFS algorithms, Determination of minimal spanning tree using Kruskal's and Prim's

algorithms.

Module - IV [10L]

Laplace Transformation:

Basic ideas of improper integrals, working knowledge of Beta and Gamma functions (convergence to be assumed) and their interrelations. Introduction to integral transformation, Functions ofexponential order, Definition and existence of Laplace Transform(LT) (statement of initial and final valuetheorem only), LT of elementary functions, Properties of Laplace Transformations , Evaluation of sine , cosine and exponential integrals using LT, LT of periodic and step functions, Definition and properties of inverse LT,Convolution Theorem (statement only) and its application to the evaluation of inverse LT, Solution of linear ODEs with constant coefficients (initial value problem) using LT.

3. Text books

1. Advanced Engineering Mathematics, E.Kreyszig, Wiley Publications.
2. Introduction to Probability and Statistics for Engineers and Scientists, S.Ross, Elsevier.
3. Introductory methods of Numerical Analysis, S.S. Sastry, PHI learning.
4. Introduction to Graph Theory, D. B. West, Prentice-Hall of India.
5. Engineering Mathematics, B.S. Grewal, S. Chand & Co.

Course Name:	Programming for Problem Solving				
Course Code:	CSE1001				
Contact Hours per Week:	L	T	P	Total	Credit Points
	4	0	0	4	4

1. Course Outcomes

After completion of the course, students will be able to:

CSE1001.1	Remember and understand the functionalities of the different hardware and software components present in a computer system, the standard representations of various types of data in a computer system.
CSE1001.2	Illustrate how a computer system with one way of representation can be converted to one another equivalent representation.
CSE1001.3	Construct flow charts for any arithmetic or logical problems in hand.
CSE1001.4	Remember and understand the C programming development environment, writing, compiling, debugging, linking and executing a C program using that development environment, basic syntax and semantics of C programming language and interpret the outcome of any given C program.
CSE1001.5	Use loop constructs, conditional branching, iteration, recursion to solve simple engineering problems.
CSE1001.6	Apply pointers, arrays, structures, files to formulate simple engineering problems.

2. Detailed Syllabus

Module - I [10L]

History of Computers, Generations of Computers, Classification of Computers.

Basic Anatomy of Computer System, Primary & Secondary Memory, Processing Unit, Input & Output devices. Basic Concepts of Assembly language, High level language, Compiler and Assembler.

Binary & Allied number systems (decimal, octal and hexadecimal) with signed and unsigned numbers (using 1's and 2's complement) - their representation, conversion and arithmetic operations. Packed and unpacked BCD system, ASCII. IEEE-754 floating point representation (half- 16 bit, full- 32 bit, double- 64 bit).

Basic concepts of operating systems like MS WINDOWS, LINUX How to write algorithms & draw flow charts.

Module - II [10L]

C Fundamentals:

The C character set identifiers and keywords, data type & sizes, variable names, declaration, statements. Operators & Expressions:

Arithmetic operators, relational and logical operators, type, conversion, increment and decrement operators, bit wise operators, assignment operators and expressions, precedence and order of evaluation. Standard input and output, formatted output -- printf, formatted input scanf.

Flow of Control:

Statement and blocks, if-else, switch-case, loops (while, for, do-while), break and continue, go to and labels.

Module - III [10L]

Program Structures in C

Basic of functions, function prototypes, functions returning values, functions not returning values. Storage classes -

auto, external, static and register variables – comparison between them. Scope, longevity and visibility of variables. C preprocessor (macro, header files), command line arguments.

Arrays and Pointers:

One dimensional arrays, pointers and functions – call by value and call by reference, array of arrays. Dynamic memory usage– using malloc(), calloc(), free(), realloc(). Array pointer duality.

String and character arrays; C library string functions and their use.

Module - IV [10L]

Data Handling in C

User defined data types and files:

Basic of structures; structures and functions; arrays of structures.

Files – text files only, modes of operation. File related functions – fopen(), fclose(), fscanf(), fprintf(), fgets(), fputs(), fseek(), ftell();

3. Textbooks

1. Schaum's outline of Programming with C, Byron Gottfried.
2. Teach Yourself C, Herbert Schildt.
3. Programming in ANSI C, E Balagurusamy

4. Reference books

1. C: The Complete Reference, Herbert Schildt.
2. The C Programming Language, D.M.Ritchie, B.W. Kernighan

Course Name:	Basic Electrical Engineering				
Course Code:	ELE1001				
Contact Hours per Week:	L	T	P	Total	Credit Points
	3	1	0	4	4

1. Course Outcomes

After completion of the course, students will be able to:

ELE1001.1	Analyse DC electrical circuits using KCL, KVL and network theorems like Superposition Theorem, Thevenin's Theorem, Norton's Theorem and Maximum Power Transfer Theorem.
ELE1001.2	Analyse DC Machines; Starters and speed control of DC motors.
ELE1001.3	Analyse magnetic circuits.
ELE1001.4	Analyse single and three phase AC circuits.
ELE1001.5	Analyse the operation of single phase transformers.
ELE1001.6	Analyse the operation of three phase induction motors.

2. Detailed Syllabus

Module - I [11L]

DC Network Theorem: [6L]

Kirchhoff's law, Nodal analysis, Mesh analysis, Superposition theorem, Thevenin's theorem, Norton theorem, Maximum power transfer theorem, Star-Delta conversion.

Electromagnetism: [5L]

Review of magnetic flux, Force on current carrying conductors, Magnetic circuit analysis, Self and Mutual inductance, B-H loop, Hysteresis and Eddy current loss, Lifting power of magnet.

Module - II [10L]

AC single phase system:

Generation of alternating emf, Average value, RMS value, Form factor, Peak factor, representation of an alternating quantity by a phasor, phasor diagram, AC series, parallel and series-parallel circuits, Active power, Reactive power, Apparent power, power factor, Resonance in RLC series and parallel circuit.

Module - III [11L]

Three phase system: [4L]

Balanced three phase system, delta and star connection, relationship between line and phase quantities, phasor diagrams, power measurement by two wattmeter method.

DC Machines: [7L]

Construction, EMF equation, Principle of operation of DC generator, Open circuit characteristics, External characteristics, Principle of operation of DC motor, speed-torque characteristics of shunt and series machine, starting of DC motor, speed control of DC motor.

Module - IV [10L]

Transformer: [6L]

Construction, EMF equation, no load and on load operation and their phasor diagrams, Equivalent circuit, Regulation, losses of a transformer, Open and Short circuit tests, Efficiency and Introduction to three phase transformer .

3-phase induction motor: [4L]

Concept of rotating magnetic field, Principle of operation, Construction, Equivalent circuit and phasor diagram, torque-speed/slip characteristics, Starting of Induction Motor.

3. Textbooks

1. Basic Electrical engineering, D.P Kothari & I.J Nagrath, TMH, Second Edition.
2. Basic Electrical Engineering, V.N Mittle & Arvind Mittal, TMH, Second Edition
3. Basic Electrical Engineering, Hughes
4. Electrical Technology, Vol-I,Vol-II, Surinder Pal Bali, Pearson Publication
5. A Text Book of Electrical Technology, Vol. I & II, B.L. Theraja, A.K. Theraja, S.Chand & Company

4. Reference books

1. Electrical Engineering Fundamentals, Vincent Del Toro, Prentice-Hall.
2. Advance Electrical Technology, H.Cotton, Reem Publication.
3. Basic Electrical Engineering, R.A. Natarajan, P.R. Babu, Sictech Publishers.
4. Basic Electrical Engineering, N.K. Mondal, Dhanpat Rai.
5. Basic Electrical Engineering, Nath & Chakraborti.
6. Fundamental of Electrical Engineering, Rajendra Prasad, PHI, Edition 2005.

Course Name:	English for Technical Writing				
Course Code:	HUM1001				
Contact Hours per Week:	L	T	P	Total	Credit Points
	2	0	0	2	2

1. Course Outcomes

After completion of the course, students will be able to:

HUM1001.1	Acquire competence in using English language to communicate.
HUM1001.2	Be aware of the four essential skills of language usage-listening, speaking, reading and writing.
HUM1001.3	Be adept at using various modes of written communication at work.
HUM1001.4	Attain the skills to face formal interview sessions.
HUM1001.5	Write reports according to various specifications.
HUM1001.6	Acquire the skill to express with brevity and clarity

2. Detailed Syllabus

Module - I [6L]

Grammar (Identifying Common Errors in Writing)

- Subject-verb agreement
- Noun-pronoun agreement
- Misplaced Modifiers
- Articles
- Prepositions
- Redundancies

Module - II [6L]

Basic Writing Strategies Sentence Structures

- Use of phrases and clauses in sentences
- Creating coherence
- Organizing principles –accuracy, clarity, brevity
- Techniques for writing precisely
- Different styles of writing: descriptive, narrative, expository
- Importance of proper punctuation

Module - III [8L]

Business Communication- Scope & Importance

Writing Formal Business Letters:

Form and Structure-Parts ofa Business letter, Business Letter Formats, Style and Tone, Writing strategies

Organizational Communication:

Agenda & minutes of a meeting, Notice, Memo, Circular Organizing e-mail messages, E-mail etiquette

Job Application Letter:

Responding to Advertisements and Forced Applications, Qualities of well-written Application Letters: The You-Attitude, Length, Knowledge of Job Requirement, Reader-Benefit Information, Organization, Style, Mechanics – Letter Plan: Opening Section, Middle Section, Closing Section

Resume and CV:

Difference, Content of the Resume – Formulating Career Plans: Self Analysis, Career Analysis, Job Analysis, Matching Personal Needs with Job Profile – Planning your Resume – Structuring the Resume: Chronological Resume, The Functional Resume, Combination of Chronological and Functional Resume, Content of the Resume: Heading, Career Goal or Objectives, Education, Work Experience, Summary of Job Skills/Key Qualifications, Activities, Honors and Achievements, Personal Profile, Special Interests, References

Module - IV [6L]

Writing skills

Comprehension:

Identifying the central idea, inferring the lexical and contextual meaning, comprehension passage - practice

Paragraph Writing:

Structure of a paragraph, Construction of a paragraph, Features of a paragraph, Writing techniques/developing a paragraph.

Précis:

The Art of Condensation-some working principles and strategies. Practice sessions of writing précis of given passages.

Essay Writing:

Characteristic features of an Essay, Stages in Essay writing, Components comprising an Essay, Types of Essays-Argumentative Essay, Analytical Essay, Descriptive Essays, Expository Essays, Reflective Essays

3. Text / Reference books

1. Theories of Communication: A Short Introduction, Armand Matterlart and Michele Matterlart, Sage Publications Ltd.
2. Professional Writing Skills, Chan, Janis Fisher and Diane Lutovich. San Anselmo, CA: Advanced Communication Designs.
3. Business English, Hauppauge, Geffner, Andrew P. New York: Barron's Educational Series.
4. Business Communication, Kalia, S. &Agarwal, S.,Wiley India Pvt. Ltd., New Delhi, 2015
5. Business Communication- Connecting at work., Mukherjee, H.S., Oxford University Press.2nd Edition.2015
6. Technical Communication: Principles and Practice, 2nd Ed., Raman, M. and Sharma, S., 2011.

Course Name:	Chemistry I Laboratory				
Course Code:	CHM1051				
Contact Hours per Week:	L	T	P	Total	Credit Points
	0	0	2	2	1

1. Course Outcomes

After completion of the course, students will be able to:

CHM1051.1	Knowledge to estimate the hardness of water which is required to determine the usability of water used inindustries.
CHM1051.2	Estimation of ions like Fe^{2+}, Cu^{2+} and Cl^{-} present in water sample to know the composition of industrialwater.
CHM1051.3	Study of reaction dynamics to control the speed and yield of various manufactured goods produced in polymer, metallurgical and pharmaceutical industries
CHM1051.4	Handling physico-chemical instruments like viscometer, stalagmometer, pH-meter, potentiometer and conductometer.
CHM1051.5	Understanding the miscibility of solutes in various solvents required in paint, emulsion, biochemical andmaterial industries.
CHM1051.6	Knowledge of sampling water can be employed for water treatment to prepare pollution free water

2. Detailed Syllabus

1. Estimation of iron using KmnO4 self indicator.
2. Iodometric estimation of Cu2+.
3. Determination of Viscosity.
4. Determination of surface tension.
5. Adsorption of acetic acid by charcoal.
6. Potentiometric determination of redox potentials.
7. Determination of total hardness and amount of calcium and magnesium separately in a given water sample.
8. Determination of the rate constant for acid catalyzed hydrolysis of ethyl acetate.
9. Heterogeneous equilibrium (determination of partition coefficient of acetic acid in n-butanol and water mixture).
10. Conductometric titration for the determination of strength of a given HCl solution against a standard NaOH solution.
11. pH-metric titration for determination of strength of a given HCl solution against a standard NaOH solution.
12. Determination of chloride ion in a given water sample by Argentometric method (using chromate indicator solution)

3. Text / Reference books

1. Vogel's Textbook of Quantitative Chemical Analysis, G. H. Jeffery, J. Bassett, J. Mendham, R. C. Denney.
2. Advanced Practical Chemistry, S. C. Das.
3. Practicals in Physical Chemistry, P. S. Sindhu.

Course Name:	Programming for Problem Solving Laboratory				
Course Code:	CSE1051				
Contact Hours per Week:	L	T	P	Total	Credit Points
	0	0	3	3	1.5

1. Course Outcomes

After completion of the course, students will be able to:

CSE1051.1	Write simple programs relating to arithmetic and logical problems.
CSE1051.2	Interpret, understand and debug syntax errors reported by the compiler.
CSE1051.3	Implement conditional branching, iteration (loops) and recursion.
CSE1051.4	Decompose a problem into modules (functions) and amalgamating the modules to generate a complete program.
CSE1051.5	Use arrays, pointers and structures effectively in writing programs.
CSE1051.6	Create, read from and write into simple text files.

Software to be used: GNU C Compiler (GCC) with LINUX NB: Cygwin (Windows based) may be used in place of LINUX

2. Detailed Syllabus

Topic 1: LINUX commands and LINUX based editors
Topic 2: Basic Problem Solving
Topic 3: Control Statements (if, if-else, if-elseif-else, switch-case)
Topic 4: Loops - Part I (for, while, do-while)
Topic 5: Loops - Part II
Topic 6: One Dimensional Array
Topic 7: Array of Arrays
Topic 8: Character Arrays/ Strings
Topic 9: Basics of C Functions
Topic 10: Recursive Functions
Topic 11: Pointers
Topic 12: Structures
Topic 13: File Handling

3. Text books

1. Schaum's outline of Programming with C, Byron Gottfried.
2. Teach Yourself C, Herbert Schildt.
3. Programming in ANSI C, E Balagurusamy.

Course Name:	Basic Electrical Engineering Laboratory				
Course Code:	ELE1051				
Contact Hours per Week:	L	T	P	Total	Credit Points
	0	0	2	2	1

1. Course Outcomes

After completion of the course, students will be able to:

ELE1051.1 Get an exposure to common electrical apparatus and their ratings.
ELE1051.2 Make electrical connections by wires of appropriate ratings.
ELE1051.3 Apply various network theorems in Electrical Circuits
ELE1051.4 Understand the application of common electrical measuring instruments.
ELE1051.5 Understand the basic characteristics of different electrical machines.
ELE1051.6 Know the measurement technique various electrical parameters.

2. Detailed Syllabus

1. Characteristics of Fluorescent lamps
2. Characteristics of Tungsten and Carbon filament lamps
3. Verification of Thevenin's & Norton's theorem.
4. Verification of Superposition theorem
5. Verification of Maximum Power Transfer theorem
6. Calibration of ammeter and voltmeter.
7. Open circuit and Short circuit test of a single phase Transformer.
8. Study of R-L-C Series / Parallel circuit
9. Starting and reversing of speed of a D.C. shunt Motor
10. Speed control of DC shunt motor.
11. No load characteristics of D.C shunt Generators
12. Measurement of power in a three phase circuit by two wattmeter method.

3. Text / Reference books

1. A Text Book of Electrical Technology, Vol. I & II, B.L., Theraja, A.K. Theraja, S.Chand & Company

Course Name:	English for Technical Writing Laboratory				
Course Code:	HUM1051				
Contact Hours per Week:	L	T	P	Total	Credit Points
	0	0	2	2	1

1. Course Outcomes

After completion of the course, students will be able to:

HUM1051.1 Acquire the techniques to become an effective listener.
HUM1051.2 Acquire the skill to become an effortless speaker.
HUM1051.3 Organize and present information for specific audience.
HUM1051.4 Communicate to make a positive impact in professional and personal environment.
HUM1051.5 Engage in research and prepare authentic, formal, official documents.
HUM1051.6 Acquire reading skills for specific purpose.

2. Detailed Syllabus

Module - I [4 HRS]

Listening Skills

- Principles of Listening: Characteristics, Stages.
- Types of Listening: Passive listening, Marginal or superficiallistening, Projective Listening, Sensitive or Empathetic Listening, Active or Attentive listening.
- Guidelines for Effective Listening
- Barriers to Effective Listening
- Listening Comprehension

Module - II [8 HRS]

- Interviewing

Types of Interviews, Format for Job Interviews: One-to-one and Panel Interviews, Telephonic Interviews, Interview through video conferencing.

- Interview Preparation Techniques, Frequently Asked Questions, Answering Strategies, Dress Code, Etiquette, Questions for the Interviewer, Simulated Interviews

Module - III [6 HRS]

- Public Speaking: The Speech Process: The Message, The Audience, The Speech Style, Encoding, Feedback.
- Characteristics of a good speech : content and delivery, structure of a speech
- Modes of delivery in public speaking: Impromptu, Extemporaneous, Prepared or Memorized, Manuscript.
- Conversation: Types of conversation: formal and informal, Strategies for effective conversation, Improving fluency.
- Situational conversation practice: Greetings and making introductions, Asking for information and giving instructions, agreeing and disagreeing.
- Conversational skills in the business scenario: One-to-one and Group communication, Gender and Culture Sensitivity, Etiquette, Sample Business Conversation, Telephonic Conversation

Module - IV [8 HRS]

Presentation Skills

- Speaking from a Manuscript, Speaking from Memory, Impromptu Delivery, Extemporaneous Delivery, Analyzing the Audience, Nonverbal Dimensions of Presentation
- Organizing the Presentation: The Message Statement, Organizing the Presentation: Organizing the Speech to Inform, The Conclusion, Supporting Your Ideas – Visual Aids: Designing and Presenting Visual Aids, Selecting the Right Medium.

Project Team/Group Presentations

3. Text / Reference books

1. Business and Administrative Communication Locker, Kitty O The Cambridge guide to Teaching English to Speakers of Other Languages, Carter, R. And Nunan, D. (Eds), CUP, 2001.
2. Writing and Speaking At Work: A Practical Guide for Business Communication, Edward P. Bailey, Prentice Hall, 3rd Ed., 2004.
3. Guide to Managerial Communication: Effective Business Writing and Speaking, Munter, M., Prentice Hall, 5th Ed., 1999
4. Communication and Language Skills, Sen, S.,Mahendra, A. &Patnaik,P., Cambridge University Press, 2015
5. McGraw-Hill/ Irwin
6. Intercultural Business Communication. Chaney, L.andMartin, J., Prentice Hall