KUMARAGURUCOLLEGE OF TECHNOLOGY
COIMBATORE – 641 049

REGULATIONS 2017

CURRICULUM

I & II Semester

Department of Mechanical Engineering

Vision:

To facilitate mechanical engineering education, research and services that contributes to the advancement of scientific knowledge leading to social development.

Mission:

The Department is committed to provide quality education and training with emphasis on engineering fundamentals and applications to the students to be competent professionals with ethics. The department executes research and provides engineering services for sustainable development of society.

PEOs:

PEO 1 Graduates will take up careers in manufacturing and design related sectors.

PEO 2 Graduates will be involved in the execution of mechanical engineering projects and service sectors.

PEO 3 Graduates will take up educational programmes in mastering mechanical engineering and management.

POs :

Engineering Graduates will be able to:

PO 1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

KUMARAGURU COLLEGE OF TECHNOLOGY
COIMBATORE – 641 049
REGULATIONS 2017
B.E MECHANICAL ENGINEERING
CURRICULUM
SEMESTER-I

Course Code	Course Title	Course category	Course Mode	L	T	P	J	C
U17ENI1201	English for Cognizance	HS	EMBEDDED	1	0	2	0	2
U17MAT1101	Linear Algebra and Calculus	BS	THEORY	3	1	0	0	4
U17PHT1009	Physics for Mechanical Engineering	BS	THEORY	3	0	0	0	3
U17CHT1007	Chemistry for Mechanical Engineering	BS	THEORY	3	0	0	0	3
U17MET1101	Engineering Graphics	ES	THEORY	2	2	0	0	3
U17CSI1211	Structured Programming using C	ES	EMBEDDED	3	0	2	0	4
U17CHP1501	Chemistry Laboratory	BS	LAB	0	0	2	0	1
U17MEP1501	Engineering Practices Laboratory	ES	LAB	0	0	2	0	1
U17VEP1501	Personal values	HS	LAB	0	0	2	0	1
Total Credits								**22**
Total Hours per week								**28**

SEMESTER-II

Course Code	Course Title	Course category	Course Mode	L	T	P	J	C
U17MAT2101	Advanced Calculus and Laplace Transforms	BS	THEORY	3	1	0	0	4
U17PHT2007	Material Science for Mechanical Engineering	BS	THEORY	3	0	0	0	3
U17MET2001	Manufacturing Technology	PC	THEORY	3	0	0	0	3
U17MET2102	Engineering Mechanics	PC	THEORY	3	1	0	0	4
U17ENP25--	Language Elective	HS	LAB	0	0	4	0	2
U17PHP2501	Physics Laboratory	BS	LAB	0	0	2	0	1
U17MEP2501	Manufacturing Technology and Metallurgy laboratory	PC	LAB	0	0	2	0	1
U17MEP2502	Machine drawing laboratory	ES	LAB	0	0	2	0	1
U17ISR2001	Social Immersion Project	e-RIDE	PROJECT	0	0	0	4	2
U17VEP2502	Inter-Personal values	HS	LAB	0	0	2	0	1
Total Credits								**22**
Total Hours per week								**30**

SEMESTER I

U17ENI1201 **ENGLISH FOR COGNIZANCE**

(Common to all branches of Engineering and Technology)

L	T	P	J	C
1	0	2	0	2

Course Outcomes

After the course the Student will be able to:

CO1: Understand and appreciate vocabulary and syntax with accuracy and clarity.

CO2: Communicate effectively by using appropriate grammar and technical parlance in a range of academic scenarios.

CO3: Interpret and critically evaluate discourses related to functional English.

CO4: Comprehend critical text leading to academic articulation.

CO5: Disseminate professional information through appropriatemeans of communication.

CO6: Demonstrate an understanding for innovative language learning strategies and write texts applying registers formats and language appropriate to the context.

Pre-requisites :

Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	W	M				W			M	S		M
CO2		W	M		W	S		W	M	S		S
CO3	W	S				W	W			S		M
CO4		M								S		M
CO5		S				W			M	S		S
CO6		W				W			W	S		S

Course Assessment methods

Direct

1. Continuous Assessment Test I, II (Theory component)
2. Open book test; Cooperative learning report, Assignment; Journal paper review, Group Presentation, Project report, Poster preparation, Prototype or Product Demonstration etc (as applicable) (Theory component)
3. Pre/Post - experiment Test/Viva; Experimental Report for each experiment (lab component)
4. Model examination (lab component)
5. End Semester Examination (Theory and lab component)

Indirect

1. Course-end survey

INTRODUCTION TO LITERARY SKILLS **9 Hours**

Parts of Speech – Word Formation – Homonyms - Homophones and Homographs, One

Word Substitutes, Acronyms and Abbreviations, Reading Aloud, Quick Reading, Sequencing of jumbled sentences, Reading to Predict.

TECHNICAL NUANCES **9Hours**

Tense, Voice, Kinds of Syntax, Gerund and Infinitives, Cause and effect expressions, Purpose and functional expressions, Conditional clauses, Reported speech, Diary Writing, Editing (Grammar – Concord, Articles, Parts of Speech, Modifiers – Dangling participles, Misplaced, Squinting and Punctuation).

COMPREHENSION AND ANALYSIS **9 Hours**

Sub Skills of Reading, Reading Comprehension, Text Visualization, Peer Reading, Cloze Test, Inferring Technical Texts, Reading a Travelogue, Reading for Interrogation, Reading to Respond, Note making – Linear and Non-linear.

PRACTISING LITERARY SKILLS **9 Hours**

Instructions and Recommendations, Discourse markers – Process description, Writing a Paragraph – Descriptive, Narrative, Compare and Contrast, Persuasive, Creative Writing, Critical Reading, Twirl Reading, Google Reading.

TECHNICAL CORRESPONDENCE **9 Hours**

Technical Discourse, Modules of a letter, Professional Letters, Industrial Visit/ In-plant Training, Basics of E-Mail writing and E-mail etiquette, Writing Notices, Circulars, Memo and Notes, Report writing.

Theory: 15	**Tutorial: 0**	**Practical: 30**	**Project: 0**	**Total: 45Hours**

REFERENCES

1. English for Engineers—Regional Institute of English, South India, Bangalore, published by Foundation Books, Chennai.

2. Effective Technical Communication—A Guide for Scientists and Engineers—BarunK.Mitra—Oxford University Press, New Delhi.

3. Interchange, Fourth Edition—Jack.C.Richards et.al,--Cambridge University Press, Sri Maitrey Print Tech., Noida.

U17MAT1101 **Linear Algebra and Calculus**

(Common to AE, AUE, CE, MCE, ME)

L	T	P	J	C
3	1	0	0	4

Course Outcomes

After successful completion of this course, the students should be able to

CO1 :Identify eigen values and eigen vectors , apply Cayley Hamilton theorem and convert quadratic form to canonical form

CO2 : Determine the radius, centre, circle of curvature of functions

CO3 : Discover the evolutes of curves and the envelope of a family of curves.

CO4 : Solve first order ordinary differential equation and apply in some physical situations.

CO5 : Solve higher order ordinary differential equations and apply the knowledge to physical situations

CO6 Evaluate the total derivative of a function, expand the given function as series and locate the maximum and minimum for multivariate functions.

Pre-requisites :

Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S							M	M		M
CO2	S	S							M	M		M
CO3	S	S							M	M		M
CO4	S	S							M	M		M
CO5	S	S							M	M		M
CO6	S	S							M	M		M

Course Assessment methods

Direct
1. Continuous Assessment Test I, II 2. Open book test; Cooperative learning report, Assignment; Journal paper review, Group Presentation, Project report, Poster preparation, Prototype or Product Demonstration etc (as applicable) 3. End Semester Examination
Indirect
1. Course-end survey

MATRICES **9 + 3 Hours**

Rank of a matrix – Linearly dependent and independent vectors – Eigen values and eigen vectors of a real matrix – Properties of eigen values and eigen vectors – Cayley Hamilton theorem (excluding proof) – Orthogonal matrices – Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformation.

GEOMETRICAL APPLICATIONS OF DIFFERENTIAL **4 + 1 Hours**

CALCULUS

Curvature – Radius, Centre and Circle of curvature in Cartesian, Parametric and Polar form

EVOLUTES AND ENVELOPES **5 + 2 Hours**

Evolute – Envelope of family of curves with one and two parameters – Evolute as the envelope of normals – properties of evolute and envelope.

FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS **9 + 3 Hours**

Leibnitz's equation – Bernoulli's equation – Equations of first order and higher degree - Clairauts form – Applications: Orthogonal trajectories and Newton's law of cooling

HIGHER ORDER LINEAR DIFFERENTIAL EQUATIONS **9 +3 Hours**

Linear equations of second and higher order with constant coefficients – Euler's and Legendre's linear equations – Method of variation of parameters – First order Simultaneous linear equations with constant coefficients - Application - Mass-spring mechanical system. (Differential equations and associated conditions should be given).

FUNCTIONS OF SEVERAL VARIABLES **9 +3 Hours**

Total derivative – Taylor's series expansion – Maxima and minima of functions of two variables – Constrained maxima and minima: Lagrange's multiplier method with single constraints – Jacobians.

Theory: 45 Tutorial: 15 Practical: 0 Project: 0 Total : 60 Hours

REFERENCES

1. Kreyzig E., "Advanced Engineering Mathematics", Eighth Edition, John Wiley and sons, 2010.
2. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition.
3. Veerarajan T., Engineering Mathematics (for First Year), Tata McGraw Hill Pub. Co. Ltd., New Delhi, Revised Edition, 2007.
4. Kandasamy P., Thilagavathy K., and Gunavathy K., "Engineering Mathematics", S. Chand & Co., New Delhi, (Reprint) 2008.
5. Arunachalam, T., Engineering Mathematics I, Sri Vignesh Publications, Coimbatore. (Revised) 2009.
6. Venkataraman M.K., "Engineering Mathematics", The National Pub. Co., Chennai,2003.
7. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, (2007).

E books and online learning materials

(1) Advanced Engineering Mathematics, P. V. O'Neil, 5th Indian reprint, 2009, Cengage Learning India Pvt. Ltd.

(2) Advanced Engineering Mathematics, Dennis Zill Warren S Wright Michael R. Cullen, 4th edition, 2011, Jones & Bartlett Learning.

Online Courses and Video Lectures: www.mathworld.wolfram.com http://nptel.ac.in

U17PHT1009 Physics for Mechanical Engineering

L	T	P	J	C
3	0	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Acquire the knowledge of conducting materials.
CO2: Perceive the preambles of semiconducting materials and categorize its applications.

CO3: Identify the superconducting materials for various engineering applications.

CO4: Categorize the different types of magnetic materials and their applications.

CO5: Enumerate the different types of polarization in dielectric materials.

CO6: Confer the preparation and properties of modern engineering materials and various composite materials.

Pre-requisites :

NIL

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M										M
CO2	S	M			S							M
CO3	S	M			S							M
CO4	S	M			S							M
CO5	S	M			S							M
CO6	S	M					M					M

Course Assessment methods

Direct
1. Continuous Assessment Test I, II 2. Open book test; Cooperative learning report, Assignment; Journal paper review, Group Presentation, Project report, Poster preparation, Prototype or Product Demonstration etc (as applicable) 3. End Semester Examination
Indirect
1. Course-end survey

CONDUCTING MATERIALS **9 Hours**

Introduction to Conductors – classical free electron theory of metals – Draw backs of classical theory - Electrical and Thermal conductivity of Metals – Derivation for Wiedemann – Franz law – Lorentz number — Fermi distribution function - effect of temperature – density of energy states – calculation of Fermi energy- carrier concentration in metals.

SEMI CONDUCTING MATERIALS **9 Hours**

Introduction – Properties – elemental and compound semiconductors - Intrinsic and extrinsic semiconductors – properties - Carrier concentration in intrinsic Semiconductor (Derivation) - variation of Fermi level with temperature and carrier concentration - Electrical Conductivity – band gap determination - extrinsic semiconductors - Carrier concentration in P- type and N- type semiconductors (Qualitative only) – variation of Fermi level with temperature and impurity concentration.

SUPER CONDUCTING MATERIALS **9 Hours**

Introduction – Superconducting state – magnetic properties of superconductors – Current flow and magnetic fields in superconductors – High current, High field superconductors - Types of superconductors - BCS theory of superconductivity (qualitative) – characteristics of superconductors - High Tc superconductors - Applications of superconductors - - SQUID, Cryotron and Magnetic levitation.

MAGNETIC AND DIELECTRIC MATERIALS **9 Hours**

Magnetic Materials: Properties of dia, para, ferro, anti-ferro and ferri magnetic materials – Domain theory of ferromagnetism - hysteresis – soft and hard magnetic materials – Ferrites - Applications.

Dielectric Materials: Electronic, ionic, orientation and space charge polarization - Frequency and temperature dependence of polarization – Dielectric loss – Internal field – ClausiusMossotti relation (Derivation) - Dielectric breakdown – different types of break down mechanism.

MODERN ENGINEERING AND COMPOSITE MATERIALS 9 Hours

Modern Engineering Materials: Smart materials - Chromic materials – Rheological fluids – Shape memory alloys (SMA) – characteristics, applications advantages and disadvantages of SMA - properties of NiTi alloy.
Composite materials: Types - production techniques - properties and applications of composites - advanced structure ceramics - Al_2O_3 and diamond.

Theory: 45	**Tutorial: 0**	**Practical: 0**	**Project: 0**	**Total: 45 Hours**

REFERENCES

1. Richard Wolfson, Essential University Physics, Vols. 1 and 2. Pearson Education, Singapore, 2011.
2. William D CallisterJr, "Materials Science and Engineering – An Introduction", John Wiley and Sons Inc., 6thedition, New York, 2003.
3. Rajendran.V, "Materials Science",Tata McGraw- Hill,New Delhi,2011.
4. Rolf E. Hummel, "Electronic Properties of Materials", 4th ed., Springer, New York, 2011.
5. James F Shackelford, S "Introduction to materials Science for Engineers", 6th Macmillan Publishing Company, New York, 2004
6. Avadhanulu M.N. and Kshirsagar P.G., A textbook of Engineering Physics, S.Chand& Company Ltd, New Delhi,2005.
7. Gaur R.K. and Gupta S.L., Engineering Physics, 8th edition, DhanpatRai Publications (P) Ltd., New Delhi, 2003.
8. Palanisamy P.K., Materials Science, Scitech Publications, Chennai, 2011.
9. Halliday, D., Resnick, R. & Walker, J. "Principles of Physics". Wiley, 2015.
10. Gopal S., Engineering Physics, Inder Publications, Coimbatore, 2006.
11. Bhattacharya, D.K. &Poonam, T. "Engineering Physics". Oxford University Press, 2015.

U17CHT1007 **Chemistry for Mechanical Engineering**

L	T	P	J	C
3	0	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Discuss Basic concepts of electrochemistry involved in corrosion (K3)
CO2: Defend the Corrosion problems (K3)
CO3: Apply the principle of electrochemistry and assemble a battery (K3)
CO4: Summarize different types of fuels and analyse the flue gas (K3)
CO5: Select lubricants for desired engineering application (K2)
CO6: Select proper engineering materials for desired engineering application (K2)

Pre-requisites :

NIL

CO/PO Mapping
(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	M					M						
CO2	M											
CO3	M	M				M						
CO4	S		M			M						
CO5	S											
CO6	M											

Course Assessment methods

Direct
1. Continuous Assessment Test I, II 2. Open book test; Cooperative learning report, Assignment; Journal paper review, Group Presentation, Project report, Poster preparation, Prototype or Product Demonstration etc (as applicable) 3. End Semester Examination
Indirect
1. Course-end survey

ELECTROCHEMISTRY 9 Hours

Introduction - Electrode potential - Nernst equation and problems - Electrochemical series - Application of EMF measurements and problems - Kohlrausch law of independent migration of ions and its application

Electrodes: Standard and Reference electrode (Hydrogen and Calomel) - Types of electrodes (Metal - Metal ion; Metal - Metal insoluble salt, Redox electrode) - Ion selective (glass electrode) - Determination of pH, pO_2, pCO_2 - Classification of electrochemical cell.

CORROSION SCIENCE 9 Hours

Corrosion: Principles and Mechanism of electrochemical corrosion - Factors influencing

corrosion

Types of corrosion: Galvanic corrosion - Differential aeration corrosion (pitting corrosion, water line corrosion) - Stress corrosion

Corrosion control: Inhibitors - Dehumidifier gels - Cathodic protection (sacrificial anode) - Plating Techniques: Plating - Need for plating - Electroforming - Electropolishing - Electrochemical machining - Electrophoretic painting

ENERGY STORING DEVICES 9 Hours

Batteries: Factors for selection of batteries - Rating calculation using datasheet.

Primary Battery (Alkaline battery) - Secondary Battery (Lead acid storage battery, Nickel - Cadmium battery, Lithium ion battery and Lithium polymer battery) - Nuclear battery

Flow battery: Introduction - Construction of types of fuel cell

Solar Cells: Silicon Solar cells - Hybrid Solar cells - Dye sensitized Solar cells - Tandem Solar cells.

FUELS AND COMBUSTION 9 Hours

Fuels: Classification of fuels - Solid fuel: Coal varieties - Analysis of coal (proximate and ultimate analysis) - coke manufacture (Otto-Hoffman byproduct coke oven method) - characteristics of metallurgical coke - cracking (thermal and catalytic cracking definition only)

Liquid Fuel: Manufacturing of synthetic petrol (Fischer Tropschmethod)

Gaseous fuels: Production, composition and uses of producer gas, water gas and natural gas.

Combustion: Gross and net calorific value - Explosive range - Calculation of minimum amount of air for combustion - Spontaneous ignition temperature - Flue gas analysis (Orsat apparatus)

MECHANICAL ENGINEERING MATERIALS 9 Hours

Refractories: Characteristics - Classification (acid, basic and natural refractories) - Properties (refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling)

Lubricants: Classification - Functions - Properties (viscosity index, flash and fire point, oiliness, carbon residue, aniline point, cloud and pour point) - Semi solid lubricant (greases with calcium based, sodium based, lithium based) - solid lubricants (graphite, molybdenum disulphide)

Abrasives: Moh's scale of hardness - Natural abrasives (diamond, corundum, emery, garnets and quartz) - Artificial abrasives (Silicon carbide, Boron carbide, Alundum) - Application of abrasives

Theory: 45	Tutorial: 0	Practical: 0	Project: 0	Total: 45 Hours

REFERENCES

1. Atkins, P. and de Paula, J., Atkins, Physical Chemistry, 9th ed., Oxford Univ. Press, 2009.
2. Glasstone S., An introduction to Electrochemistry, 10th Edition, Affiliated to East West Press Private Limited, 2007.
3. Derek Pletcher and Frank C Walsh., Industrial Electrochemistry, Blackie Academic and Professional, London, 1993
4. Ahmed Z., Principles of Corrosion Engineering and Corrosion Control, Butterworth

Heinemann, 2006.
5. David Linden & Thomas B. Reddy., Handbook of Batteries, 3rd edition, McGraw-Hill Companies, Inc. 2001
6. Revankar S.T., Majumdar P., Fuel Cell: Principles, Design and Analysis, CRC Press, 2014.
7. Samir Sarkar., Fuels and Combustion, 3rd Edition, Orient Longman, India, 2009.
8. Jain P.C. and Jain. M., Engineering Chemistry, 16th Edition, DhanpatRai Publishing Company, New Delhi, Reprint 2017.
9. Dara S.S. and Umare S.S., A text book of Engineering Chemistry, S.Chand and Company Limited, New Delhi, 2014.
10. Syed Shabudeen, P.S. and Shoba U.S., Engineering Chemistry, Inder Publishers, Coimbatore, 2013.
11. RitwikSarkar, Refractory Technology – Fundamental and application, CRC Press, 2016

U17MET1101 ENGINEERING GRAPHICS

L	T	P	J	C
2	1	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Construct various plane curves.

C02: Construct projection of points and projection of lines.

CO3: Develop projection of surfaces and solids.

CO4: Solve problems in sections of solids and development of surfaces.

CO5: Apply the concepts of isometric, and perspective projections

CO6: Apply free hand sketching in engineering practice.

Pre-requisites :

Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M										
CO2	S	S									W	
CO3	S	S									M	
CO4	S	S										
CO5	S											
CO6	S											

Course Assessment methods

Direct
1. Continuous Assessment Test I, II 2. Open book test; Cooperative learning report, Assignment; Journal paper review, Group Presentation, Project report, Poster preparation, Prototype or Product Demonstration etc (as applicable) 3. End Semester Examination
Indirect
1. Course-end survey

PLANE CURVES, PROJECTION OF POINTS AND LINES **6+3 Hours**

Importance of graphics in design process, visualization, communication, documentation and drafting tools, Construction of curves - ellipse, parabola, and hyperbola by eccentricity method only. Orthographic projection of points.

Projections of straight lines located in first quadrant - determination of true length and true inclinations.

PROJECTIONS OF SURFACES AND SOLIDS **6+3 Hours**

Projections of plane surfaces - polygonal lamina and circular lamina, located in first quadrant and inclined to one reference plane. Projection of simple solids - prism, pyramid, cylinder and cone. Drawing views when the axis of the solid is inclined to one reference plane.

SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES **6+3 Hours**

Sectioning of simple solids - prisms, pyramids, cylinder and cone. Obtaining sectional views and true shape when the axis of the solid is vertical and cutting plane inclined to one reference plane.

Development of lateral surfaces of truncated prisms, pyramids, cylinders and cones.

PICTORIAL PROJECTIONS **6+3 Hours**

Isometric projection, Isometric scale, Isometric views of simple solids, truncated prisms, pyramids, cylinders and cones.

Perspective projection of prisms and pyramids when its base resting on the ground by vanishing point method.

FREE-HAND SKETCHING **6+3 Hours**

Free hand sketching techniques, sketching of orthographic views from given pictorial views of objects, including free-hand dimensioning.

Sketching pictorial views from given orthographic views.

Theory: 30	**Tutorial: 15**	**Practical: 0**	**Project: 0**	**Total: 45 Hours**

REFERENCES

1. Bhatt ND, Engineering Drawing, Charotar Publishing house, 54th edition, 2014.
2. Venugopal K. and Prabhu Raja V., Engineering Graphics, New Age International (P) Limited, New Delhi, 2016.
3. Nataraajan K.V., Engineering Drawing and Graphics, Dhanalakshmi Publisher, Chennai, 2006.
4. BasantAgrawal and Agrawal C.M, Engineering Drawing and Graphics,McGraw Hill Edition(India), 2013.
5. Gopalkrishna K.R., Engineering Drawing (Vol. I & II), Subhas Publications, 2014.

U17CSI1211 **Structured Programming using C**

L	T	P	J	C
3	0	2	0	4

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Explain the basics of problem solving techniques

CO2: Select appropriate data types and control structures for solving a given problem

CO3: Illustrate the representation of arrays, strings and usage of string operations

CO4: Illustrate the importance of pointers and functions

CO5: Explain the fundamentals of structures and unions

CO6: Explain the fundamentals of file handling

Pre-requisite: Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M										
CO2	S	M										
CO3	S	L			L				L	L		
CO4	M	L			L				L	L		M
CO5	M	L			L				L	L		M
CO6	L	L										

Course Assessment methods:

Direct
6. Continuous Assessment Test I, II (Theory Component) 7. Assignment (Theory Component) 8. Group Presentation (Theory Component) 9. Pre/Post - experiment Test/Viva; Experimental Report for each experiment (lab component) 10. Model examination (lab component) 11. End Semester Examination (Theory and lab component)
Indirect
1. Course-end survey

Theory Component contents

FUNDAMENTALS OF PROBLEM SOLVING 9 Hours

Programs and Programming – Classification of Programming Languages based on Generations – Structured Programming Concept – Algorithm – Flowchart – Pseudo code

STRUCTURED PROGRAMMING 9 Hours

Introduction to C Programming – Operators and Expressions – Data Input and Output – Control Statements

ARRAYS AND STRINGS 9 Hours

Defining an array – Processing an array – Passing arrays to functions –Multidimensional Arrays

Defining a string – NULL character – Initialization of Strings – Reading and Writing Strings – Processing Strings – Character Arithmetic – Searching and Sorting of Strings – Library functions for strings

FUNCTIONS, STORAGE CLASSES AND POINTERS 9 Hours

Defining a function – Accessing a function – Function prototypes – Passing arguments to a function – Recursion – Storage classes – Pointer Fundamentals – Pointer Declaration – Passing Pointers to a Function – Pointers and one dimensional arrays – operations on pointers – Dynamic memory allocation

STRUCTURES, UNIONS AND FILES 9 Hours

Structures and Unions: Defining a Structure – Processing a Structure – User defined data types (Typedef) – Unions

Files: Opening and Closing a Data File – Reading and writing a data file – Processing a data file – Unformatted data files – Concept of binary files – Accessing a file randomly using fseek

Theory: 45 hours	Tutorial:0 hours	Practical:0 hours	Total Hours: 45 hours

REFERENCES

1. Byron S Gottfried and Jitendar Kumar Chhabra, “Programming with C”, Tata McGraw Hill Publishing Company, Third Edition, New Delhi, 2011.
2. PradipDey and ManasGhosh, “Programming in C”, Second Edition, Oxford University Press, 2011.
3. Kernighan,B.W and Ritchie,D.M, “The C Programming language”, Second Edition, Pearson Education, 2006
4. Ashok N. Kamthane, “Computer programming”, Pearson Education, 2007.

Lab Component

List of Experiments 30 Hours

1. Writing algorithms, flowcharts and pseudo codes for simple problems.
2. Programs on expressions and conversions
3. Programs using if, if-else, switch and nested if statements
4. Programs using while, do-while, for loops
5. Programs on one dimensional arrays, passing arrays to functions and array

operations

6. Programs using two dimensional arrays, passing 2D arrays to functions
7. Programs using String functions
8. Programs using function calls, recursion, call by value
9. Programs on pointer operators, call by reference, pointers with arrays
10. Programs using structures and unions.
11. Programs on file operations and modes.
12. Working with text files, random files and binary files

Theory: 0	**Tutorial: 0**	**Practical: 30**	**Project: 0**	**Total: 30 Hours**

REFERENCES

1. Byron S Gottfried and Jitendar Kumar Chhabra, "Programming with C", Tata McGraw Hill Publishing Company, Third Edition, New Delhi, 2011.
2. PradipDey and ManasGhosh, "Programming in C", Second Edition, Oxford University Press, 2011.
3. Kernighan,B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2006
4. Ashok N. Kamthane, "Computer programming", Pearson Education, 2007.

U17CHP1501 **Chemistry Laboratory (COMMON TO ECE, E&I, EEE, FT & ME)**

L	T	P	J	C
0	0	2	0	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Prepare standard solutions

CO2: Analyse the properties of water by applying the chemical concepts

CO3: Analyse the solutions by electrochemical techniques and apply it in real life situations like corrosion, soil, water testing etc

CO4: Analyse the solutions by spectroscopic techniques and apply it in real life situations like corrosion, soil, water testing etc

Pre-requisites :

NIL

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M											
CO2	M											
CO3	M					M						
CO4	M					M						

Course Assessment methods

Direct
1. Post-experiment Test/Viva; Experimental Report for each experiment; Model Examination 2. End Semester Examination
Indirect
1. Course-end survey

List of Experiments **30 hours**

1. Preparation of normal solutions of the following substances - Sodium carbonate, Hydrochloricacid and Buffer solution

WATER TESTING

2. Determination of total, temporary and permanent hardness by EDTA method.
3. Estimation of DO by Winkler'smethod
4. Estimation of alkalinity by Indicatormethod.
5. Estimation of chloride by Argentometricmethod.

ELECTRO CHEMICAL ANALYSIS

6. Estimation of hydrochloric acid by pHmetry.

7. Conductometric estimation of mixture of acids and strongbase
8. Estimation of corrosion of Iron byPotentiometry

PHOTOMETRY

9. Estimation of the extent of dissolution of Copper / Ferrous ions by Spectrophotmetry.
10. Estimation of sodium and potassium in water by Flamephotometry.

DEMONSTRATION

11. Determination of Fire point and Flash point
12. Determination of Cloud and Pour point
13. Microscopic usage in Metallurgy.
14. Determination of Molecular weight by Viscometer

Theory: 0	**Tutorial: 0**	**Practical: 30**	**Project: 0**	**Total: 30 Hours**

REFERENCES

1. Jeffery G.H., Bassett J., Mendham J. and Denny R.C., Vogel's Text Book of Quantitative Chemical Analysis, Oxford, ELBS, London,2012.
2. Shoemaker D.P. and C.W. Garland., Experiments in Physical Chemistry, Tata McGraw-Hill Pub. Co., Ltd., London,2003.
3. Shoba U.S., Sivahari R. and Mayildurai R., Practical Chemistry, Inder Publications, Coimbatore, 2011.

U17MEP1501 **ENGINEERING PRACTICES LABORATORY**

L	T	P	J	C
0	0	2	0	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Select the various tools and equipment's used in the fabrication workshop.
CO2: Develop various models in carpentry and fitting
CO3: Make components using sheet metal work.
CO4: Select the various tools and joints for different applications in plumbing.
CO5: Demonstrate and evaluate the parameters of basic electronic components (wires, resistors, capacitors, diodes etc.) and test the components.
CO6: Estimate DC and AC Voltage and currents using appropriate measuring instruments.

Pre-requisites :

Nil

	CO-PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak											
COs	**Programme Outcomes(POS)**											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S											
CO2					M							
CO3			M									
CO4						W						
CO5	M											
CO6	M											

Course Assessment methods

Direct
1. Pre-or Post-experiment Test/Viva; Experimental Report for each experiment; Comprehensive report / Model Examination 2.End Semester Examination
Indirect
1. Course-end survey

List of Experiments **30 Hours**

GROUP – I
A. CIVIL ENGINEERING

1. Carpentry
   - Study of carpentry tools
   - Preparation of T joint
   - Preparation of dovetail joint

2. Plumbing
   - Study of pipeline joints

B. MECHANICAL ENGINEERING

1. Fitting
   - Study of fitting tools
   - Preparation of L joint
   - Preparation of square joint

2. Sheet Metal Working
   - Study of sheet metal working tools
   - Preparation of cone
   - Preparation of tray

GROUP - II (ELECTRICAL & ELECTRONICS ENGINEERING)

C. ELECTRICAL ENGINEERING PRACTICE

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring.
3. Stair-case wiring.
4. Measurement of electrical quantities–voltage, current, power & Power factor in RLC circuit.
5. Measurement of energy using single phase energy meter.

D. ELECTRONIC ENGINEERING PRACTICE

1. Testing of Electronic components and Measurements using a digital multimeter.
2. Study of CRO and Function generator.
3. PCB Design and Fabrication.
4. Soldering simple electronic circuits and checking continuity.

Theory: 0	**Tutorial: 0**	**Practical: 30**	**Project: 0**	**Total: 30 Hours**

U17VEP1501 **PERSONAL VALUES**

L	T	P	J	C
0	0	2	0	1

Course Outcomes

After successful completion of this course, the students should be able to

CO 1: Become an individual in knowing the self

CO 2 : Acquire and express Gratitude, Truthfulness, Punctuality, Cleanliness & fitness.

CO 3: Practice simple physical exercise and breathing techniques

CO 4: Practice Yoga asana which will enhance the quality of life.

CO 5: Practice Meditation and get benefited.

CO 6: Procure Self Healing techniques for propagating healthy society

Pre-requisites : NIL

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												M
CO2										S		
CO3						M						
CO4						S			M			
CO5										M		
CO6								W				S

Course Assessment methods

Direct
1. Group Activity / Individual performance and assignment 2. Assessment on Value work sheet / Test
Indirect
1. Mini project on values / Goodwill Recognition

Values through Practical activities: **30 hours**

1.Knowing the self : Introduction to value education - Need & importance of Value education – Knowing the self – realization of human life – animal instinct vs sixth sense.

2. Mental Health : Evolution of senses – functioning steps of human mind – Body and Mind coordination - Analysis of thoughts – moralization of desires– autosuggestions – power of positive affirmations. – Meditation and its benefits.

3.Physical Health: Physical body constitution– Types of food - effects of food on body and mind – healthy eating habits – food as medicine– self healing techniques.

4.Core value : Self love&Self care Gratitude - Happiness - Optimistic –Enthusiasm – Simplicity – Punctual - Self Control - Cleanliness & personal hygiene - Freedom from

belief systems.

5.Fitness: Simplified physical exercises – Sun salutation - Lung strengthening practices: Naadisuddhi pranayama – Silent sitting and listening to nature – Meditation.

Theory: 0	**Tutorial: 0**	**Practical: 30**	**Project: 0**	**Total: 30 hours**

REFERENCES

1. KNOW YOURSELF — SOCRATES – PDF format at www.au.af.mil/au/awc/awcgate/army/rotc_self-aware.pdf

2. STEPS TO KNOWLEDGE: The Book of Inner Knowing – PDF format at www.newmessage.org/wp-content/uploads/pdfs/books/STK_NKL_v1.5.pdf

3. PROMOTING MENTAL HEALTH - World Health Organization – PDF format at www.who.int/mental_health/evidence/MH_Promotion_Book.pdf

4. LEARNING TO BE: A HOLISTIC AND INTEGRATED APPROACH TO VALUES – UNESCO PDF format at www.unesdoc.unesco.org/images/0012/001279/127914e.pdf

5. PERSONALITY DEVELOPMENT By SWAMI VIVEKANANDA www.estudantedavedanta.net/Personality-Development.pdf

SEMESTER-II

U17MAT2101	Advanced Calculus and Laplace Transforms (Common to AE, AUE, CE, MCE, ME)	L	T	P	J	C
		3	1	0	0	4

Course Outcomes

After successful completion of this course, the students should be able to:

CO1 : Evaluate multiple integrals and apply them to find area, moment of inertia, centre of mass and volume

CO2 : Apply various vector differential operators and integral theorems for solving Engineering problems involving cubes and rectangular parallelepipeds.

CO3 : Construct analytic functions of complex variables and transform functions from z- Plane and w-plane and vice-versa, using conformal mappings

CO4 :Use the fundamentals of residues, complex integration to evaluate real integrals.

CO5 : Transform functions in time domain to frequency domain using Laplace transform

CO6 : Convert ordinary differential equations into algebraic equations using Laplace Transform and solve them using inverse Laplace transform

Pre-requisites :

Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S							M	M		M
CO2	S	S							M	M		M
CO3	S	S							M	M		M
CO4	S	S							M	M		M
CO5	S	S							M	M		M
CO6	S	S							M	M		M

Course Assessment methods

Direct

4. Continuous Assessment Test I, II
5. Open book test; Cooperative learning report, Assignment; Journal paper review, Group Presentation, Project report, Poster preparation, Prototype or Product Demonstration etc (as applicable)
6. End Semester Examination

Indirect

1. Course-end survey

MULTIPLE INTEGRALS 9 + 2 Hours

Double integration – Cartesian and polar coordinates – Change of order of integration – Change of variables between cartesian and polar coordinates - Triple integration in cartesian coordinates – Application : Area as double integral –- Moment of inertia - Centre of mass - Volume as triple integral.

VECTOR CALCULUS 9 + 3 Hours

Gradient, divergence and curl – Directional derivative – Irrotational and solenoidal vector fields - Green's theorem in a plane, Gauss divergence theorem and Stoke's theorem

(excluding proofs) – Simple applications involving cubes and rectangular parallelepipeds.

ANALYTIC FUNCTION **9 + 3 Hours**

Functions of a complex variable – Analytic functions – Necessary conditions, Cauchy-Riemann equations in Cartesian coordinates and sufficient conditions (excluding proofs) – Properties of analytic function – Construction of analytic function by Milne Thomson method – Conformal mapping : $w = z + c$, cz , $1/z$ and bilinear transformation.

COMPLEX INTEGRATION **9 + 2 Hours**

Statement and applications of Cauchy's integral theorem and Cauchy's integral formula (excluding proofs) – Taylor's and Laurent's series expansions – Singularities – Residues – Cauchy's residue theorem (excluding proof) – Application of residue theorem to evaluate real integrals - Unit circle and semi-circular contours (excluding poles on real axis).

LAPLACE TRANSFORM **5 +3 Hours**

Definition - Properties – Superposition - Shift in t - Shift in s - Time Derivatives - Time Integral – Initial and Final Value Theorems – Periodic functions: sine wave, saw-tooth, square and triangular waves

INVERSE LAPLACE TRANSFORM **4 +2 Hours**

Inverse Laplace Transform – Simple system dynamic models – Transfer Functions – Poles and Zeroes - Response of First-Order Systems - Solution of RC Free, Step and Sinusoidal Responses; Response of Second-Order Systems - Free Response, step Response - Convolution theorem.

Theory: 45	**Tutorial: 15**	**Practical: 0**	**Project: 0**	**Total : 60 Hours**

REFERENCES

1. Kreyzig E., Advanced Engineering Mathematics, John Wiley & Sons (Asia), Pvt, Ltd., Singapore, 10th Edition, 2010
2. Grewal B.S., Higher Engineering Mathematics, Khanna Publishers, Delhi, 42nd Edition, 2012.
3. Philip D. Cha, James J. Rosenberg, Clive L. Dym, Fundamentals of Modelling and Analyzing Engineering Systems, Cambridge University Press, United Kingdom, 2000.
4 Veerarajan T., Engineering Mathematics (for First Year), Tata McGraw Hill, Pub. Co. Ltd., New Delhi, Revised Edition, 2007.
5 Venkataraman M.K., Engineering Mathematics, Volume - II, The National Pub. Co., Chennai, 2003.
6 Kandasamy P., Thilagavathy K. and Gunavathy K., Engineering Mathematics, S. Chand & Co., New Delhi, 2008.
7 Arunachalam T. and Sumathi K., Engineering Mathematics II, Sri Vignesh Publications, Coimbatore, Third Edition, 2011.
8 Weir .MD, Hass J, Giordano FR: Thomas Calculus Pearson education 12th ED, 2015.
9 N.P.Bali., Dr. Manish Goyal., ―Transforms and partial Differential equations, University science Press, New Delhi, 2010.

E books and online learning materials

(1) Advanced Engineering Mathematics, P. V. O'Neil, 5th Indian reprint 2009, Cengage Learning India Pvt. Ltd.
(2) Advanced Engineering Mathematics, Dennis Zill Warren S Wright Michael R. Cullen, 4th edition, 2011, Jones & Bartlett Learning.

Online Courses and Video Lectures:

http://nptel.ac.in/course.php?disciplineId=111
www.mathworld.wolfram.com

U17PHT2007 **Materials Science for Mechanical Engineering**

L	T	P	J	C
3	0	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Analyze and identify the crystal structure in materials.
CO2: Perceive the preambles of solid solutions.
CO3: Categorize the ferrous and non ferrous alloys based on their properties.
CO4: Elucidate the various process of heat treatment.
CO5: Understand the mechanical properties of materials for its engineering applications.
CO6: Recognize the basic concepts of testing of materials.

Pre-requisites :

NIL

CO/PO Mapping
(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S	M										M
CO2	S	M										M
CO3	S	M										M
CO4	S	M										M
CO5	S	M			M							M
CO6	S	M										M

Course Assessment methods

Direct
1. Continuous Assessment Test I, II 2. Open book test; Cooperative learning report, Assignment; Journal paper review, Group Presentation, Project report, Poster preparation, Prototype or Product Demonstration etc (as applicable) 3. End Semester Examination
Indirect
1. Course-end survey

CRYSTALLOGRAPHY **9 Hours**

Space lattice – unit cell – lattice planes – Bravais space lattices – Miller indices – calculation of interplanar distances – Atomic radius – co- ordination number – Packing factor for SC, BCC, FCC and HCP structures – crystal imperfections – point defects – line defects – surface defects – volume defects – effect of crystal imperfections.

SOLID SOLUTIONS **9 Hours**

Phase, Gibbs's Phase rule, Solubility and Solid Solutions - Iso-morphous alloy system - Binary Eutectic alloy system (Lead-Tin System), Eutectoid and Peritectic system, Iron-Iron

carbide phase diagram- Invariant reactions, Evolution of Microstructure, Phase Transformation-Temperature-Time-Transformation (TTT) and Continuous Cooling Transformation (CCT) Diagrams - Steels, Cast Irons and Stainless steels – types and applications – Effects of alloying elements.

FERROUS AND NON-FERROUS ALLOYS **9 Hours**

Non Ferrous Alloys of Aluminum, Magnesium, Copper, Nickel, Titanium – Microstructure and mechanical property relationships; Composites – Classification, Processing, Metal Matrix, Ceramic Matrix, polymer matrix – properties and applications; Ceramics – Alumina, Zirconia, Silicon Carbide, Sialons, Reaction Bonded Silicon Nitride(RBSN), Processing, properties and applications of ceramics, Glasses – properties and applications.

HEAT TREATMENT AND MECHANICAL PROPERTIES OF MATERIALS **9 Hours**

Heat Treatment: Annealing and its types, Normalizing, Aus-tempering, Mar-tempering, Quenching and Temper heat treatment, Hardenability – Basic concepts of wear and corrosion & their types - Surface hardening processes – Flame and induction hardening, Carburizing, Nitriding and Carbo-nitriding.

MECHANICAL PROPERTIES OF MATERIALS

Tension, Compression, Shear and Torsional Test of Metals -Stress-strain behaviour of ferrous & non-ferrous metals, polymer and ceramics - True stress and strain relations.

TESTING OF MATERIALS **9 Hours**

Flexural Test, Hardness measurement tests, Fracture of metals - Ductile Fracture, Brittle Fracture, Fatigue – Endurance limit of ferrous and non-ferrous metals – Fatigue test; Creep and stress rupture– mechanism of creep – stages of creep and creep test, Strengthening mechanisms.

Theory: 45	**Tutorial: 0**	**Practical: 0**	**Project: 0**	**Total: 45 Hours**

REFERENCES

1. Kenneth G.Budinski and Michael K.Budinski “Engineering Materials” Prentice-Hall of India Private Limited, 4thIndian Reprint 2002.
2. WoleSoboyejo, “Mechanical Properties of Engineered Materials”, Marcel DekkerInc., 2003.
3. Raghavan, V., Material Science and Engineering, 5th ed., Prentice-Hall of India, 2004.
4. O.P.Khanna “Material Science And Metallurgy”, DhanpatRaiPublication ,2011
5. William D Callister “Material Science and Engineering”, Wiley India pvt Ltd 2007.
6. Avner, S.H., Introduction to Physical Metallurgy, 2nd ed., McGraw-Hill Inc., 1976.

U17MET2001 MANUFACTURING TECHNOLOGY

L	T	P	J	C
3	0	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO 1: Apply the knowledge of various metal casting processes that are useful in designing system components or processes and create appropriate techniques and apply modern tools and research to model complex design and making processes of components.

CO 2: Discuss the various welding techniques with their equipment, process capabilities and principle of operations that match specific manufacturing needs with considerations for public health, safety and social issues.

CO 3: Apply the knowledge of metal working processes understanding and studying the physics behind it and focus on typical forging operations

CO 4: Identify various rolling, piercing and extrusion operations and study and make use of them in solving complex design needs through specific manufacturing tools and methods

CO 5: Understand the applications of heat treatment processes.

CO 6: Study the formability, characteristics, test methods and working principle of sheet metals by applying the knowledge of engineering and make use of sheet metal processing knowledge in practical engineering applications.

Pre-requisites :

NIL

CO/PO Mapping
(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1			S		S				W	M		
CO2			S	M	S	W			W	M		
CO3	M		S						W	M		
CO4	M		S						W	M		
CO5			S		M					M		
CO6	M		S							M		

Course Assessment methods

Direct

1. Continuous Assessment Test I, II
2. Open book test; Cooperative learning report, Assignment; Journal paper review, Group Presentation, Project report, Poster preparation, Prototype or Product Demonstration etc (as applicable)
3. End Semester Examination

Indirect

1. Course-end survey

METAL CASTING PROCESSES **12 Hours**

Sand casting – Sand moulds - Type of patterns – Pattern materials – Pattern allowances – Types of Moulding sand – Properties – Core making – Methods of Sand testing – Moulding machines – Types of moulding machines – Working principle of Special casting processes – Shell, investment casting – Ceramic mould – Pressure die casting – Centrifugal casting – Sand Casting defects – Inspection methods, Runner, Riser and Gating Design, Solidification.

FABRICATION PROCESSES **10 Hours**

Fusion welding processes – Types of Gas welding – Equipments used – Flame characteristics – Filler and Flux materials - Arc welding equipments - Electrodes – Coating and specifications – Principles of Resistance welding – Spot/butt, seam welding – Gas cutting opeartions – Flux cored – Submerged arc welding – TIG welding –Weld defects – Brazing and soldering process.

METAL FORMING AND HEAT TREATMENT PROCESSES **13 Hours**

FORGING

Hot working and cold working of metals – Forging processes – Open and close die forging – Characteristics of the process – Typical forging operations.

ROLLING

Rolling of metals – Flat strip rolling – Types of Rolling mills – Shape rolling operations – Tube piercing – Defects in rolled parts.

EXTRUSION

Principles of Extrusion – Types of Extrusion – Hot and Cold extrusion.

WIRE DRAWING

Principle of rod and wire drawing.

HEAT TREATMENT

Annealing – Normalizing – Hardening – Tempering – Surface hardening processes.

SHEET METAL FORMING PROCESSES **10 Hours**

Sheet metal characteristics - Typical shearing operations, bending and drawing operations – Stretch forming operations — Formability of sheet metal – Test methods – Working principle and application of special forming processes - Hydro forming – Rubber pad forming – Metal spinning – Explosive forming – Magnetic pulse forming – Super plastic forming – Process characteristics.

Theory: 45	**Tutorial: 0**	**Practical: 0**	**Project: 0**	**Total: 45 Hours**

REFERENCES

1. HajraChoudhury, “Elements of Workshop Technology”,MediaPromotorsPvt.Ltd., Mumbai, 2001.
2. SeropeKalpajian and Steven R.Schmid, “Manufacturing Engineering and Technology”, Pearson Education, 2002.
3. B.S. MagendranParashar and R.K. Mittal,“Elements of Manufacturing Processes”, Prentice Hall of India, New Delhi,2003.
4. P.N.Rao,“Manufacturing Technology”,Tata McGraw-Hill,2002.
5. P.C. Sharma, “Production Technology”, S. Chand,New Delhi,2007.

U17MET2102 ENGINEERING MECHANICS

L	T	P	J	C
3	1	0	0	4

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Explain the concept of equilibrium of particles subjected to concurrent forces.

CO2: Determine the reactions in different types of support and loading conditions.

CO3: Estimate the moment of inertia for various shapes and sections.

CO4: Make use of various concepts of friction.

CO5: Solve problems using the concepts in kinematics

CO6: Solve problems in kinetics.

Pre-requisites :

NIL

CO/PO Mapping (S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S											
CO2		S										
CO3		S										
CO4		M										
CO5	S											
CO6	S											

Course Assessment methods

Direct
4. Continuous Assessment Test I, II 5. Open book test; Cooperative learning report, Assignment; Journal paper review, Group Presentation, Project report, Poster preparation, Prototype or Product Demonstration etc (as applicable) 6. End Semester Examination
Indirect
1. Course-end survey

BASICS & STATICS OF PARTICLES 12 Hours

Introduction - Units and Dimensions - Laws of Mechanics Lame's theorem, Parallelogram and triangular Laws of forces – Coplanar Forces - Resolution and Composition of forces – Free body diagram - Equilibrium of a particle.

EQUILIBRIUM OF RIGID BODIES 12 Hours

Moment of a force about point – Varignon s theorem- Moment of a couple-Resolution of force in to force couple system-Resultant of coplanar non concurrent system - Types of

supports and their reactions- Requirements of stable equilibrium - Equilibrium of Rigid bodies in two dimensions.

PROPERTIES OF SURFACES AND SOLIDS **12 Hours**

First moment of area and the Centroid of sections Rectangle, circle, triangle, T section, I section Angle section and Hollow section. Second and product moments of plane area Rectangle, triangle, circle. T Section, I section, Angle section and Hollow section, Parallel axis theorem and perpendicular axis theorem - Polar moment of inertia.

FRICTION **12 Hours**

Frictional force-Law of coulomb friction, simple contact friction, Rolling resistance and Belt friction, Ladder friction, Wedge friction.

DYNAMICS OF PARTICLES **12 Hours**

Kinematics: Rectilinear & Curvilinear motion of particles, Displacements Velocity and acceleration.

Kinetics: Newton's law, Work Energy method, Impulse and Momentum, Impact of elastic bodies.

Theory: 45	**Tutorial: 15**	**Practical: 0**	**Project: 0**	**Total: 60 Hours**

REFERENCES

1. Beer F.P. and Johnson Jr. E.R., Vector Mechanics for Engineers, Vol. I Statics and Vol. II Dynamics, McGraw-Hill International Edition, 2004
2. Hibbeller, R.C., Engineering Mechanics, Vol. I Statics and Vol. II Dynamics, Pearson Education, Asia Pvt. Ltd., 2000.
3. Ashok Gupta, Interactive Engineering Mechanics Statics A Virtual Tutor, Pearson Education, Asia Pvt. Ltd., New Delhi, 2002.
4. Palanichamy M.S., and Nagan S., Engineering Mechanics (Statics & Dynamics) Tata McGraw Hill, 2001.
5. Irving H. Shames, Engineering Mechanics – Statics and Dynamics, IV Edition, Pearson Education, Asia Pvt. Ltd., 2003.
6. Sukumar T.R. and Sridhar S., Engineering Mechanics, Inder Publications, Coimbatore.

U17PHP2501 **PHYSICS LABORATORY**

(COMMON TO EC, EE, EI, FT, ME)

L	T	P	J	C
0	0	2	0	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Determine different physical properties of a material like thermal conductivity, thickness of the material.

CO2: Perform experiments involving the physical phenomena like interference and diffraction

CO3: Apply physical theories in real life situations by also taking into account its limitation.

Pre-requisites :

NIL

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S											
CO2		M	S									
CO3		S		M								

Course Assessment methods

Direct
1. Pre-or Post-experiment Test/Viva; Experimental Report for each experiment; Model Examination 2. End Semester Examination
Indirect
1. Course-end survey

List of Experiments **30 Hours**

1. Determine thermal conductivity of the given cardboard by Lee's disc method.
2. Determine the thickness of a thin sheet by air wedge method.
3. Determine the co-efficient of viscosity of the given liquid by Poiseuille's flow method.
4. Determine the value of acceleration due to gravity by compound pendulum.
5. Calculate the solar panel efficiency by using lux meter.
6. Determine the wavelengths of the violet, blue, green and yellow in mercury spectrum using spectrometer grating method (the green spectral line for which the wavelength is 5461 A^0).
7. Determine Young's modulus of the given bar using non-uniform bending method.
8. Calculate the frequency of the given tuning fork by longitudinal and transverse mode of vibrational methods.
9. Determine the velocity of ultrasonic sound and compressibility of the given liquid by using ultrasonic interferometer.
10. By using semiconductor laser determine:
    i) Wavelength of LASER using grating.
    ii) Acceptance angle & numerical aperture of optical fiber (grating element: N=5,00,000 lines/meter).

Theory: 0	**Tutorial: 0**	**Practical: 30**	**Project: 0**	**Total: 30 Hours**

REFERENCES

1. Laboratory Manual of Engineering Physics by Dr. Y. Aparna& Dr. K. VenkateswaraRao (V.G.S Publishers)
2. "Practical Physics", G.L. Squires, Cambridge University Press, Cambridge, 1985. 11. 12.
3. "Great Experiments in Physics", M.H. Shamos, Holt, Rinehart and Winston Inc., 1959.
4. "Experiments in Modern Physics", A.C. Melissinos, Academic Press, N.Y., 1966. Gupta S.C, and Kapur, J.N.

U17MEP2501 **MANUFACTURING TECHNOLOGY AND METALLURGY LABORATORY**

L	T	P	J	C
0	0	2	0	1

Course Outcomes

After successful completion of this course, the students should be able to

CO 1: Practice making molds using different types of patterns and core and acquire practical knowledge involved in designing prototypes/components

CO 2: Learn how to make internal geometries in castings using core

CO 3: Know and practice the skill of smithy and learn to modify the shapes of hard metal rods physically.

CO 4: Know how to perform welding operations and how to join different metals.

CO 5: Analyze the procedure of microstructure studies of various materials.

CO 6 : Execute the various heat treatment process for different stages.

Pre-requisites :

NIL

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			S		S				S	W	M	
CO2			S						S	W	W	
CO3					S			S	S	W	W	
CO4					S			S	S	W	W	
CO5	M			M						M		M
CO6	M			M						M		M

Course Assessment methods

Direct
1. Pre-or Post-experiment Test/Viva; Experimental Report for each experiment; Model Examination 2. End Semester Examination
Indirect
1. Course-end survey

List of Experiments **30 Hours**

LIST OF EXPERIMENTS: MANUFACTURING TECHNOLOGY LABORATORY

1. Mould with solid and split patterns
2. Mould with Core
3. Conversion of round rod in to hexagonal headed square rod
4. SMAW of different types of joints

LIST OF EXPERIMENTS: METALLURGY LABORATORY

1. Study the construction and working principle of metallurgical microscope.
2. Study the procedure of specimen preparation for metallographic studies.
3. Identification of microstructure of ferrous materials, EN8 and mild steel.
4. Heat treatment comparison of

   i) Unhardened specimen

   ii) Quenched specimen, annealed and normalized specimen

Theory: 0 **Tutorial: 0 Practical: 30** **Project: 0** **Total: 30 Hours**

L	T	P	J	C
0	0	2	0	1

U17MEP2502 MACHINE DRAWING LABORATORY

Course Outcomes

After successful completion of this course, the students should be able to

CO 1: Able to identify appropriate drawing standards.

CO 2: Able to draw 2-D drawings of mechanical components.

CO 3: Able to identify appropriate drawing packages.

CO 4: Able to draw 3-D drawings and assembling of mechanical components.

CO 5: Able to apply the concepts of interchangeability in assembly drawings.

CO 6 : Able to read and interpret blue prints.

Pre-requisites :

NIL

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M										
CO2	S	S		S	M							
CO3					S							
CO4	S	S		S	M							
CO5	M	S										
CO6	M	M		S								

Course Assessment methods

Direct
1. Pre-or Post-experiment Test/Viva; Experimental Report for each experiment; Comprehensive report / Model Examination 2. End Semester Examination
Indirect
1. Course-end survey

List of Experiments **30 Hours**

DRAWING STANDARDS

Code of practice for Engineering Drawing, BIS specifications – Welding symbols, riveted joints, keys, fasteners – Reference to hand book for the selection of standard components like bolts, nuts, screws, keys etc.

2-D DRAWINGS

Limits, Fits – Tolerancing of individual dimensions- Specification of Fits- Manual Preparation of production drawings and reading of part and assembly drawings.

CAD PRACTICE (USING APPLICATION PACKAGES)

Drawing, Editing, Dimensioning, Plotting Commands, Layering Concepts, Hatching, Detailing, Assembly, basic principles of GD&T (geometric dimensioning &tolerancing)

ASSEMBLY DRAWING (MANUAL & USING CAD PACKAGES)

Generation of assembly drawings by manual and using CAD packages from the part drawings for the following suggested assemblies:

1. Flange couplings – protected and unprotected
2. Gib and cotter joint
3. Knuckle joint
4. Universal joint
5. Plummer block
6. Screw jack
7. Tailstock
8. Machine Vice
9. Connecting rod

Preparation of Bill of materials and tolerance data sheet is mandatory for all drawings. When using CAD packages 3D part environment should be used for assembly drawing and extract 2D views.

REFERENCES:

1. Gopalakrishna, K.R., "Machine Drawing", Subhas publishing House, Bangalore, 2002
2. Sidheswar, N., Kannaiah, P., and Sastri, V.V.S., "Machine Drawing", TMH, New Delhi, 2006.
3. John, K.C., and Verghese, P.L., "Machine Drawing", Jovast Publishers, Trissur, 2004.
4. "PSG Design Data Book", Faculty of Mechanical Engineering, DPV Printers, 2006.
5. Ajeetsingh, "Machine Drawing", TMH, New Delhi, 2008.
6. Narayanan, K.L., Kanniah, P., and Venkata Reddy, K., "Machine Drawing", New Age International Publications, 2004.

Theory: 0	**Tutorial: 0**	**Practical: 30**	**Project: 0**	**Total: 30 Hours**

U17ISR2001–SOCIAL IMMERSION PROJECT

L	T	P	J	C
0	0	0	4	2

(Common to all branches of Engineering and Technology)

COURSE OUTCOMES

After successful completion of this course, the students should be able to:

CO1: Achieve the desirable awareness regarding significant social problems and identify the needs to provide a possible and innovative solution.

CO2: Acquire and demonstrate effective professional and technical skills to deal with social issues through innovative leadership and sustainable services / approaches.

CO3: Provide students with a rich practical and socially oriented team work approach.

CO4:Explain how to make leadership decisions concerning organizational structure and the role of project resources on a project's team.

CO5: Enhance technical knowledge in addressing the needs of a community problem.

CO6: Identify tools and techniques for planning and working on a project.

CO/PO Mapping
(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1			S			S	S					
CO2			M	S		S	M	M	M			
CO3			S	W		S	S		S			M
CO4			S			S	S		W		M	
CO5	S		M			S	M					
CO6			S			S	S					

Course Assessment methods

Direct	Indirect
1. Project Review 2. General report preparation 3. Team Presentation	1. Impact study 2. Field Visit & Observation Skill 3. Course end survey

SOCIAL BONDING AND ENGINEERING

Society and its impact on the individual – Responsibility of individuals towards community building – Essential requirement of the society – Role of an engineering graduate in approaching the requirements - Developing social consciousness.

ENGINEERING PREREQUISITE FOR ENHANCED SOCIAL LIVING

Theoretical reading (Based on the project / general – Books to be identified by the team) - Inculcating Social immersion and Leadership- Study on the society and identifying problems - Social immersion and Engineering implementation - Analysis of problems on issue based -Identification of causes and effects of the social issue identified.

ESSENTIAL ENGINEERING INNOVATION

Essential Engineering Concepts - Multiple approaches towards the problem &Selection for addressing- Addressing a theoretical social problem -Providing multiple solutions for the problem

PROJECT PLANNING AND APPROACHES

Knowledge on budgeting and fund raising - Approaching agencies related to problems. Partnering with agencies- Presentation Skills -Report preparation

BROAD AREA OF PROJECTS

(Students can also identify their own social issue)

Water / Sanitation and Hygiene - Waste Management -Women Empowerment- Community health- Child health/ Poverty/Education/others - Energy management -Environment Management - Adult Education - -Youth Empowerment - Green Industry - Given above are the broad areas of projects recommended. Projects may vary to individuals/ groups/ class/ branch.

TOTAL:60Hours

References:

Nicholls Alex and Murdock Alex, Social Innovation Blurring Boundaries to reconfigure markets, Palgrave Macmillan., New York, 2012. :

Osburg Thomas and Schmidpeter Rene`, Social Innovation Solutions for sustainable Future. Springer, Germany 2013.

Adedeji B. Badiru, STEP Project Management: Guide for Science, Technology, and Engineering Projects. Taylor and Francis Group., Florida 2009.

U17VEP2502 INTERPERSONAL VALUES

L	T	P	J	C
0	0	2	0	1

Course Outcomes

After successful completion of this course, the students should be able to

CO 1: Develop a healthy relationship & harmony with others
CO 2: Practice respecting every human being
CO 3: Practice to eradicate negative temperaments
CO 4: Acquire Respect, Honesty, Empathy, Forgiveness and Equality
CO 5: Practice Exercises and Meditation to lead a healthy life
CO 6: Manage the cognitive abilities of an Individual

Pre-requisites :

1. U17VEP1501 / PERSONAL VALUES

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										S		
CO2									S			
CO3											M	S
CO4						M						
CO5												M
CO6											M	

Course Assessment methods

Direct
1. Pre-or Post-experiment Test/Viva; Experimental Report for each experiment; Comprehensive report / Model Examination 2. End Semester Examination
Indirect
1. Course-end survey

Values through Practical activities: **30 hours**

1. Introduction: Introduction to interpersonal values – Developing harmony with others – Healthy relationship – Need & importance of interpersonal values for dealing with others

and team - Effective communication with others.

2. Maneuvering the temperaments: From Greed To Contentment - Anger To Tolerance - Miserliness To Charity – Ego To Equality - Vengeance To Forgiveness.

3. Core value : **Truthfulness -**Honesty –Helping–Friendship – Brotherhood – Tolerance – Caring & Sharing – Forgiveness – Charity –Sympathy — Generosity – Brotherhood - Adaptability.

4.Pathway to Blissful life :

Signs of anger – Root cause – Chain reaction – Evil effects on Body and Mind – Analyzing roots of worries – Techniques to eradicate worries.

5. Therapeutic measures: Spine strengthening exercises - Nero muscular breathing exercises - Laughing therapy - Mindfulness meditation.

Theory: 0	**Tutorial: 0**	**Practical: 30**	**Project: 0**	**Total: 30 hours**

REFERENCES

1. INTERPERSONAL SKILLS Tutorial (PDF Version) - TutorialsPoint www.tutorialspoint.com/interpersonal_skills/interpersonal_skills_tutorial.pdf
2. INTERPERSONAL RELATIONSHIPS AT WORK - KI Open Archive - Karolinska www. publications.ki.se/xmlui/bitstream/handle/10616/39545/thesis.pdf?sequence=1
3. VALUES EDUCATION FOR PEACE, HUMAN RIGHTS, DEMOCRACY – UNESCO www.unesdoc.unesco.org/images/0011/001143/114357eo.pdf
4. MANEUVERING OF SIX TEMPERAMENTS - Vethathiri Maharishi www.ijhssi.org/papers/v5(5)/F0505034036.pdf
5. THE BLISS OF INNER FIRE: HEART PRACTICE OF THE SIX ... - Wisdom Publications - www.wisdompubs.org/sites/.../Bliss%20of%20Inner%20Fire%20Book%20Preview.pd...

LANGUAGE ELECTIVES

U17ENE2101 **ACADEMIC ENGLISH**

(Common to all branches of Engineering and Technology)

L	T	P	J	C
0	0	4	0	2

Course Outcomes

After the course the Student will be able to:

CO1: Maintain the standards of communal communication and acquire excellent listening skills with good Received Pronunciation.

CO2: Accommodate with speaking skills, with fluency in communication obtaining levels of competency.

CO3: Project desirable research oriented skills to interface the corporate and meet out the challenges of the modern trends.

CO4: Familiarising with learner-centred strategies and improve writing activities through proper analysis.

CO5:Develop the ability in procuring information and effectiveness in communication based on situations.

CO6: Ability to present the individuals opinions, persuasion skills and academic curricular along with career profiles.

Pre-requisites :

Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1				M		S	M		M	S	S	M
CO2				M		S	M		M	S	S	M
CO3				M		S	M		M	S	S	M
CO4				M		S	M		M	S	M	M
CO5				M		S	M		M	S	M	M
CO6				M		S	M		M	S	M	M

Course Assessment methods

Direct
1. Pre-or Post-experiment Test/Viva; Experimental Report for each experiment; Comprehensive report / Model Examination 2. End Semester Examination
Indirect
1. Course-end survey

AUDITORY PERCEPTION **12 Hours**

Listening for understanding & information - short announcements, short conversations, telephonic conversation; Listening to British, American, Australian and Neutral Accent of Indian English; Listening and synthesizing information; Listening to TED/INK Talks (General); Critical review of short films, documentaries.

ORAL FLUENCY **12 Hours**

Informal introduction of self and others, conversation starters, articulating simple thoughts and ideas with clarity, Seeking Permission, Talking about People and Places. Describe an object or event. Retelling an incident, voicing opinions, persuasion skills, speaking from a single perspective (debate) - preparing and delivering an informal talk, Introduction to Presentation Skills – Formal tone – Impersonal style - Structuring and Presenting information. Transcodegraphics orally.

FOUNDATIONS OF ACADEMIC WRITING **12 Hours**

Plan and write a library-based coursework assignment on an Engineering topic. Read academic textbooks and journal articles. Research and analyse scientific data and express understanding. Procuring information - Identifying research papers in a specific discipline, reading abstracts of research papers, reading the abstract of projects, reading articles from journals and publications and documenting/ archiving information.

TRAITS OF RESEARCH WRITING **12 Hours**

Reading research articles and summarizing. Review of Secondary sources - Writing an abstract - Writing an introduction to a paper in academic writing - Avoiding plagiarism – Bibliography – International Academic Styles of writing a research paper - Peer Evaluation.

PROCESS OF PREPARING A RESEARCH ARTICLE **12 Hours**

Research Projects – Converging areas of interest into field of research - Identifying the problem of research – Formulating hypothesis – Research Objectives – Literature Review – Identifying the research gap - Research methodology – Requirements – Plan of work – Result and Discussion – Conclusion – References – Appendices.

Theory: 0	**Tutorial:0**	**Practical: 60**	**Project: 0**	**Total: 60Hours**

REFERENCES

1. English and Communication Skills—S.P.Dhanavel—Orient BlackswanPvtLted, Hyderabad.

2. Effective Technical Communication—Ashraf Rizvi—Tata McGraw Hill, New Delhi.

3. A Course in Communication Skils—KiranmaiDutt, GeethaRajeevan, C.L.N.Prakash—Foundation Books, New Delhi.

U17ENE2102 **PROFESSIONAL ENGLISH**

(Common to all branches of Engineering and Technology)

L	T	P	J	C
0	0	4	0	2

Course Outcomes

After the course the Student will be able to:

CO1: Formulate an understanding for effective use of short telephonic and oral conversations.

CO2: Analyse and identify necessary interpersonal and persuasive skills for effective oral presentation.

CO3: Employ appropriate strategies to articulate random thoughts and ideas in brainstormingsessions.

CO4: Analyse and review technical and non-technical contents.

CO5:Compose andcompile effective written documents needed in a professional scenario.

CO6: Recognize and establish dynamic corporate communication and relationship.

Pre-requisites :

Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

Cos	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										M		
CO2										S		M
CO3										S		M
CO4	M	S	M	S						S		M
CO5				M						S		
CO6						M	M	S	S			S

Course Assessment methods

Direct
1. Pre-or Post-experiment Test/Viva; Experimental Report for each experiment; Comprehensive report / Model Examination 2. End Semester Examination
Indirect
1. Course-end survey

AUDITORY PERCEPTION **12 Hours**

Listening for understanding & information - short announcements, short conversations, telephonic conversation; Listening to British, American, Australian and Neutral Accent of Indian English; Listening and synthesizing information; Listening to TED/INK Talks (General); Critical review of short films, documentaries.

ORAL FLUENCY **12 Hours**

Informal introduction of self and others, conversation starters, articulating simple thoughts and ideas with clarity, Seeking Permission, Talking about People and Places, Describe an object or event. Retelling an incident, voicing opinions, persuasion skills, speaking from a single perspective (debate) - preparing and delivering an informal talk, Introduction to Presentation Skills – Formal tone – Impersonal style - Structuring and Presenting information. Transcode graphics orally.

FOUNDATIONS OF ACADEMIC WRITING **12 Hours**

Focused listening, Listening to lectures and talks on science and technology, Listening in international seminars, Video Documentary review, Receiving compliments and sharing information in a corporate scenario, Speaking in Formal Context. Business Vocabulary. Speaking practice in a variety of registers, Giving and Getting Product and Service Information. Product Review. Recording equipment and safety checklist. Business Itinerary, Presenting a Company Profile, Encoding and decoding advertisements.

CORPORATE DYNAMICS **12 Hours**

Corporate Social Responsibility, Crisis Management - handling issues and situations, Creating a powerful first impression, Goal Setting - Immediate goals, short term goals, long term goals, smart goals, strategies to achieve goals, Time Management - Types of time, Identifying time wasters, time management skills, Stress Management - Reasons, Strategies to cope up with stress, Stress-busters, Emotional Intelligence – Mental health, Job performance, Managing emotions.

PROFESSIONAL WRITING **12 Hours**

Writing Agenda and minutes of the meetings, Writing daily/periodic reports, Writing business / professional letters, Business E-mail - Writing an Email Announcing a Meeting - Writing an Email Announcing the modifications in a Meeting - Writing an Email Announcing the cancellation/ postponement of Meeting.

Theory: 0	**Tutorial: 0**	**Practical: 60**	**Project: 0**	**Total: 60Hours**

REFERENCES

1. Soft Skills for Young Managers—Prof.M.S.Rao—Biztantra Publications, New Delhi.

2. Soft Skills—Dr.K.Alex—S.Chand and Co, New Delhi.

3.Professional Communication—ArunaKoneru—Oxford University Press, New Delhi.

U17ENE2103 **ENGLISH FOR COMPETENCY**

(Common to all branches of Engineering and Technology)

L	T	P	J	C
0	0	4	0	2

Course Outcomes

After the course the Student will be able to:

CO1*:* Recognize the inventory of listening strategies by various proposed listening activities.

CO2: Construct learning situations and increase speaking skills based on strong educational and communication theories.

CO3: Invent andpractice effective reading strategy to enhance competent communication

CO4: Honing the strengths of writing skills and set objectives for future development

CO5:Showcase industry-ready attitude along with corporate communication

CO6: Develop imaginative and critical thinking abilities, and improve the problem solving aptitude.

Pre-requisites :

Nil

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

Cos	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1				M		S	M		M	S	S	M
CO2				M		S	M		M	S	S	M
CO3				M		S	M		M	S	S	M
CO4				M		S	M		M	S	M	M
CO5				M		S	M		M	S	M	M
CO6				M		S	M		M	S	M	M

Course Assessment methods

Direct
1. Pre-or Post-experiment Test/Viva; Experimental Report for each experiment; Comprehensive report / Model Examination 2. End Semester Examination
Indirect
1. Course-end survey

AUDITORY PERCEPTION **12 Hours**

Listening for understanding & information - short announcements, short conversations, telephonic conversation; Listening to British, American, Australian and Neutral Accent of Indian English; Listening and synthesizing information; Listening to TED/INK Talks (General); Critical review of short films, documentaries.

ORAL FLUENCY **12 Hours**

Informal introduction of self and others, conversation starters, articulating simple thoughts and ideas with clarity, Seeking Permission, Talking about People and Places. Describe an object or event. Retelling an incident, voicing opinions, persuasion skills, speaking from a single perspective (debate) - preparing and delivering an informal talk, Introduction to Presentation Skills – Formal tone – Impersonal style - Structuring and Presenting information. Transcode graphics orally.

FOUNDATIONS OF ETS **12 Hours**

Analogy, Synonyms and antonyms, Morphemes –Derivational and Inflectional, Affixes – Prefix and Suffix, strategies to improve high frequency vocabulary

VERBAL BASED COMPETENCY **12 Hours**

Verbal Reasoning - Critical Reasoning & Verbal Deduction - Statement and Assumptions, Statement and Arguments, Statement and Inference, Strong and Weak Arguments, Sentence Correction,; Sentence Equivalence, Text Completion, Word Groups, Integrated Reasoning – Graphics Interpretation, Two-part Analysis, Table Analysis, Multi-source Reasoning.

SKILL BASED COMPETENCY **12 Hours**

Analytical writing – Argumentative writing, a 30-minute Analyse an argument, a 30-minute Analyse an issue, Listening and Speaking Tasks in ETS, Reading Comprehension – GRE, GMAT, TOEFL, IELTS, GATE.

Theory: 0 Tutorial: 0 Practical: 60 Project: 0	**Total: 60Hours**

REFERENCES

1. Personality Development and Soft Skill—Barun.K.Mitra—Oxford University Press, New Delhi.

2. A Modern Approach to Verbal and Non-verbal Reasoning—R.S.Agarwal—S.Chand& Co., New Delhi.

3. Soft Skills—Dr.K.Alex—S.Chand& Co., New Delhi.