GEETHANJALI INSTITUTE OF SCIENCE & TECHNOLOGY: NELLORE

(AUTONOMOUS)

NELLORE–524317 (A.P) INDIA

B.TECH IN MECHANICAL ENGINEERING

(ACCREDITATED BY NBA)

COURSE STRUCTURE AND SYLLABI UNDER RG 22 REGULATIONS

GEETHANJALI INSTITUTE OF SCIENCE AND TECHNOLOGY
(AUTONOMOUS)
NELLORE – 524137 (A.P) INDIA

B.TECH Mechanical Engineering

Course Structure (RG22)

Semester - 2 (Theory-4, Lab-5)							
Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	BSC	22A0002T	Differential Equations and Vector Calculus	2	1	0	3
2	BSC	22A0004T	Engineering Physics	3	0	0	3
3	HSSC	22A0013T	Communicative English	3	0	0	3
4	ESC	22A0301T	Basics of Mechanical Engineering	3	0	0	3
5	ESC	22A0302T	Engineering Drawing	1	0	4	3
6	ESC (Lab)	22A0303P	Engineering Graphics Lab	0	0	3	1.5
7	HSSC(Lab)	22A0014P	Communicative English Lab	0	0	3	1.5
8	BSC (Lab)	22A0008P	Engineering Physics Lab	0	0	3	1.5
			Total credits				**19.5**

Category	Credits
Basic Science Courses	7.5
Humanities and Social Science Courses	4.5
Engineering Science Courses	7.5
Total	19.5

Differential Equations and Vector Calculus					
Course Code	**L:T:P:S**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0002T	**2: 1:0:0**	**3**	**CIE:30 SEE:70**	**3 Hours**	**BSC**

Course Objectives:

To enlighten the learners in the concept of differential equations and multivariable calculus, to furnishthe learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

Syllabus		**Total Hours:45**
Unit - I	**Linear differential equations of higher order (Constant Coefficients)**	**9 Hrs**

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskean, method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Mass spring system.

Unit - II	**Partial Differential Equations**	**9 Hrs**

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order equations using Lagrange's method. Non linear equations of first order – Type I, II, III, IV.

Unit - III	**Applications of Partial Differential Equations**	**9 Hrs**

Classification of PDE, method of separation of variables for second order equations. Applications of Partial Differential Equations: One dimensional Wave equation (Without Derivation), Solutions one Dimensional Wave equation by the method of separation of variables and related Problems.

Unit - IV	**Vector differentiation**	**9 Hrs**

Scalar and vector point functions, vector operator del, del applies to scalar point functions- Gradient, del applied to vector point functions-Divergence and Curl, vector identities.

Unit - V	**Vector integration**	**9 Hrs**

Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and applications of these theorems.

Course Outcomes (CO):

On completion of this course, student will be able to

- Solve the linear differential equations with constant coefficients by appropriate method.
- Apply a range of techniques to find solutions of standard partial differential equations.
- Calcify the PDE, learn the applications of PDEs
- Apply del to Scalar and vector point functions, illustrate the physical interpretation of Gradient, Divergence and Curl.

- Apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals.

Textbooks:

1. B.S. Grewal, Higher Engineering Mathematics, 44/e, Khanna publishers, 2017.
2. T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, Differential Equations & Vector Calculus, S. Chand publication.

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. B.V.Ramana, "Higher Engineering Mathematics", Mc Graw Hill publishers.
3. Engineering Mathmatic I & II, by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad S. Chand publication.

Engineering Physics (Common to CE and ME)					
Course Code	**L:T:P:S**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0004T	**3: 0:0:0**	**3**	**CIE:30 SEE:70**	**3 Hours**	**BSC**

Course Objectives:

- To make a bridge between the physics in school and engineering courses.
- To impart knowledge in basic concepts of optical phenomenon like interference, diffraction and Polarisation
- To understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications, study of propagation of light wave through optical fibres along with engineering applications.
- To enlighten the periodic arrangement of atoms in crystals, Bragg's law and to provide fundamentals related to structural analysis through powder diffraction method.
- To familiarize the basic concepts of acoustics and ultrasonics with their Engineering applications.
- To explain the significant concept of magnetic materials leading to the emerging micro device applications.
- To familiarize the applications of nano and smart materials relevant to engineering branches.

Syllabus		**Total Hours:48**
Unit - I	**Wave Optics**	**10 Hrs**

Interference- Principle of superposition – Interference of light – Types of Interference – Path difference – Phase difference – Conditions for sustained interference- Interference in thin films (Reflection Geometry) – Colors in thin films – Newton's Rings – Determination of wavelength and refractive index of liquid.

Diffraction- Introduction – Fresnel and Fraunhofer diffraction – Fraunhofer diffraction due to singleslit, double slit and N-slits (qualitative) – Grating spectrum.

Polarization- Introduction – Types of polarization – Polarization by reflection, refraction and doublerefraction - Nicol's Prism - Half wave and Quarter wave plates with applications.

Unit - II	**Lasers and Fiber optics**	**8 Hrs**

Lasers- Introduction – Characteristics of laser – Spontaneous and Stimulated emission of radiation – Einstein's coefficients – Population inversion – Lasing action – Pumping mechanisms – Ruby laser – He-Ne laser – Applications of lasers.

Fiber optics- Introduction – Principle of optical fiber – Acceptance Angle – Numerical Aperture – Classification of optical fibers based on refractive index profile and modes – Propagation of electromagnetic wave through optical fibers – Propagation Losses (qualitative) – Applications

Unit - III	Crystallography and X-ray diffraction	8 Hrs

Crystallography- Space lattice, Basis, unit cell and lattice parameters – Bravais Lattice – Crystal systems – Packing fraction – Coordination number – Packing fraction of SC, BCC & FCC – Miller indices – Separation between successive (hkl) planes.

X-Ray Diffraction- Bragg's law – Bragg's X-ray diffractometer – Crystal structure determination by Powder method.

Unit - IV	Acoustics and Ultrasonics	9 Hrs

Acoustics- Introduction – Requirements of acoustically good hall – Reverberation – Reverberation time – Sabine's formula (Derivation using growth and decay method) – Absorption coefficient and its determination – Factors affecting acoustics of buildings and their remedies.

Ultrasonics- Introduction – Properties – Production by magnetostriction and piezoelectric methods – Detection – Acoustic grating – Non Destructive Testing – Pulse echo system through transmission and reflection modes – Applications.

Unit - V	Engineering Materials	9 Hrs

Magnetic Materials- Introduction- basic definitions – Origin of permanent magnetic moment – Classification of magnetic materials: Dia, para & Ferro –Hysteresis – Soft and Hard magnetic materials.

Nanomaterials- Introduction – Surface area and quantum confinement –Properties of Nanomaterials – Synthesis of nanomaterials: Top-down: Ball Milling – Bottom-up: Chemical Vapour Deposition – Applications of nanomaterials.

Smart Materials- Introduction to Smart Materials- Characteristics- Types of smart materials: Smart Memory alloys (SMA)- definition- two stable solid phases: Low temperature phase (martensite transformations) - High temperature phase (austenitic transformations)- Applications of SMA.

Course Outcomes (CO):

On completion of this course, student will be able to

- Describe the importance of Interference, Diffraction and Polarization and the engineering applications as well (L2)
- Demonstrate the properties of lasers and fibre opticsto various applications in science and technology (L2)
- Explain the important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction (L2)
- Explain the fundamental properties and propagation principles of ultrasonics and acoustics in diverge engineering applications (L2)

- Explain the fundamental concepts and theory related to magnetic materials (L1)
- Illustrate diverse principles and theories of nano and smart materials and their technological applications in diverse fields (L2)

Textbooks:

1. Engineering Physics – Dr. M.N. Avadhanulu & Dr. P.G. Kshirsagar, S. Chand and Company
2. Engineering physics – D.K. Battacharya and Poonam Tandon, Oxford University press.
3. Applied Physics for Engineers- K.Venkataramanan, R. Raja, M. Sundararajan(Scitech) [3,5] 2014

Reference Books:

1. Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish, University Press
2. Engineering Physics – K. Thyagarajan, McGraw Hill Publishers
3. Engineering Physics – D K Pandey, S. Chaturvedi, Cengage Learning 4. Engineering Physics – M.R. Srinivasan, New Age Publications
4. T.Pradeep "A Text book of Nano Science and Nano Technology"- Tata Mc GrawHill 2013
5. Melton, K. N, Stockel, D. and Wayman, C.M. "Engineering aspects of Shape memory Alloys", Butterworth – Heinemann, 1990.

E-resources:

- https://www.textbooks.com/Catalog/MG5/Applied-Physics.php
- https://edurev.in/courses/9596_Electromagnetic-Theory-Notes--Videos--MCQs--PPTs
- https://libguides.ntu.edu.sg/c.php?g=867756&p=6226561
- https://bookauthority.org/books/best-applied-physics-books
- https://www.electronicsforu.com/resources/16-free-ebooks-on-material-science/2

Communicative English
(Common to all Branches of Engineering)

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
22A0013T	3: 0:0:0	3	CIE:30 SEE:70	3 Hours	HSC

Course Objectives:

- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- Help improve speaking skills motivating the learners to participate in activities such as role plays, discussions and structured talks/oral presentations
- Focus on appropriate reading skills for comprehension of various academic texts and authentic materials
- Impart effective strategies for good writing skills in summarizing, writing well organized essays, drafting formal letters and designing well structured reports
- Broaden the knowledge base of grammatical structures and vocabulary and encourage their appropriate use in speech and writing

Syllabus		Total Hours:48
Unit - I	**On the Conduct of Life: William Hazlitt**	**9 Hrs**

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.

Reading: Skimming to get the main idea of a text Scanning to look for specific pieces of information.

Reading for Writing: Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph.

Grammar and Vocabulary: Parts of Speech,

Content words and function words;

Word order in sentences;

Basic sentence structures;

Types of questions - Wh- questions.

Unit - II	**The Brook: Alfred Tennyson**	**9 Hrs**

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts.

Speaking: Discussion in pairs/small groups on specific topics followed by short structured talks.

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing - punctuation, capital letters.

Grammar and Vocabulary: Use of Articles and zero Article
Prepositions
Punctuation, capital letters
Cohesive devices - linkers

Unit - III	**The Death Trap: Saki**	**11 Hrs**

Listening: Listening for global comprehension and summarizing what is listened to.
Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed
Reading: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.
Writing: Paragraph Writing , Summarizing
Grammar and Vocabulary: Verbs - Tenses
Subject-Verb agreement
Direct & Indirect speech

Unit - IV	**Innovation: Muhammad Yunus**	**10 Hrs**

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.
Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.
Reading: Read and Interpret graphic Information to reveal trends/patterns/relationships, communicate processes or display complicated data.
Writing: Letter Writing: Official Letters/Report Writing
Grammar and Vocabulary: Adjectives and Adverbs; Comparing and Contrasting
Voice - Active & Passive Voice.

Unit - V	**An Astrologer's Day: R. K. Narayan**	**8 Hrs**

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.
Speaking: Formal oral presentations on topics from academic contexts- without the use of PPT slides
Reading: Reading for Comprehension
Writing: Writing structured essays on specific topics using suitable claims and evidences.
Grammar and Vocabulary: Identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Course Outcomes (CO):

On completion of this course, student will be able to

- Retrieve the knowledge of basic grammatical concepts
- Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
- Apply grammatical structures to formulate sentences and correct word forms
- Analyze discourse markers to speak clearly on a specific topic in informal discussions

- Evaluate listening /reading texts and to write summaries based on global comprehension of these texts.
- Create and develop coherent paragraph interpreting graphical description.

Textbooks:

1. Language and Life: English Skills for Engineering Students - Orient Black Swan

Reference Books:

1. Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014.
2. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
3. Raymond Murphy's English Grammar in Use Fourth Edition (2012) E-book
4. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012.
5. Oxford Learners Dictionary, 12th Edition, 2011
6. Norman Lewis Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary (2014)

Web links:

1. www.englishclub.com
2. www.easyworldofenglish.com
3. www.languageguide.org/english/
4. www.bbc.co.uk/learningenglish
5. www.eslpod.com/index.html

Basics of Mechanical Engineering					
Course Code	**L:T:P:S**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0301T	**3: 0:0:0**	**3**	**CIE:30 SEE:70**	**3 Hours**	**ESC**

Course Objectives:

- Expose commercially important metals and alloys (both ferrous and non ferrous) with engineering constraints.
- Expose to various mechanical property measuring techniques.
- Provide insights on various metal cutting processes. (Lathe, drilling, milling).
- Expose to various linear and angular measuring techniques.
- Introduce to the concepts of fluid statics and dynamics.
- Impart the knowledge on selection of various types of fluid machinery.
- Impart knowledge on Conservation of energy.
- Impart the knowledge on selection of boilers for different operating pressure.
- Provide insights on working of IC engines.

Syllabus		**Total Hours:49**
Unit - I	**Basics of Mechanical Engineering**	**12 Hrs**

Classification of engineering materials: Cast iron- Classification of cast iron-Grey cast iron-White cast Iron- Ductile cast iron-Malleable cast iron-Carbon steels-Plain carbon steel-Classification of plain carbon steel-Alloy steel-Effect of alloying elements in steel-Classification of alloy steel-Iron carbon diagram

Properties of materials: Mechanical properties-Stress: Classification of stress-Strain: Classification of strain- Simple problems on stress and strain

Materials testing: Tensile test-stress - strain diagram of mild steel material- Shear test-Brinell's hardness test-Vicker's hardness test-Fatigue failure: factors affecting the fatigue strength-Fatigue testing

Unit - II	**Mechanical Measurements**	**10 Hrs**

Temperature measurement: Temperature measuring Instruments-Thermal expansion-Electrical Resistance thermometers-Thermo-Electric thermometers-Radiation method

Pressure Measurement: Moderate pressure measurement using Manometers- Moderate pressure measurement using Elastic Elements-Low pressure or vacuum measurement- High pressure measurement

Velocity measurement: Measurement of linear velocity- Measurement of angular velocity

Flow measurement: Positive Displacement meter-Differential Pressure Flow meter-Rotameter

Strain measurement: Measurement of strain using Electrical resistance strain gauge

Torque measurement: Measurement of torque using Transmission dynamometers and

Absorption dynamometers

Errors in measurement: Classification of errors-Uncertainties

Unit - III	Machine Tools and Metrology	9 Hrs

Lathe: Classification of Lathe-Lathe specifications-Lathe accessories-Lathe operations-Drilling machine: Classification of Drilling machines-Drilling machine specifications-Drilling machine operations-Milling machines: Milling machines-Classification of Milling machines- Milling machine specifications-Types of Milling cutters-Milling operations-Shaping machines: Classification of shaping machines- Shaping machine specifications-Construction and main parts- Quick return mechanism

Metrology: Accuracy and Precision-Vernier Calipers: Construction-Least count of Vernier calipers-Determination of the length of a rod-Applications-Micrometer: Types of Micrometers-Construction-Pitch of a Micrometer-Least count of a Micrometer-Determination of Zero Error of a micrometer-Determination of diameter of a wire using Micrometer-Applications-Slip gauges-Sine Bar: Construction-Working principle-Applications-Dial gauge: Construction-Applications

Unit - IV	Fluid Mechanics and Fluid Machinery	9 Hrs

Properties of Fluids: Pressure or intensity of Pressure-Mass density or Density or Specific mass-Weight density or Specific weight-Specific volume-Specific gravity-Viscosity-Newton's law of viscosity-Kinematic viscosity-Pascal's law: Pressure variation with depth-Hydrostatic law-Continuity Equation-Bernoulli's Equation for Incompressible fluids-Viscous flow-Turbulent flow

Hydraulic Turbines: Pelton wheel-Francis Turbine-Kaplan Turbine-Pumps: Kinetic Energy Pump-Positive Displacement Pump-Fluid Coupling-Compressors: Positive displacement compressors-Dynamic compressor- Pneumatic Machinery: Pneumatic components-Applications

Unit - V	Laws of Thermodynamics, Boilers and IC Engines	9 Hrs

First law of thermodynamics: First law of thermodynamics for a closed system undergoing a change of state-Corollaries of first law of thermodynamics-Limitations of first law of thermodynamics-Second law of thermodynamics: The Kelvin-Planck statement-Clasius statement-Equivalence of Kelvin-Planck and Clasius statements-PMM-II

Boilers: Classification of Boilers-Cochron Boiler: Construction-Working-Adnatages-Limitations- Lancashire Boiler: Construction-Working-Adnatages-Limitations- Bobcock and Wilcox Boiler: Construction-Working-Adnatages-Limitations-Differences between Water tube and Fire tube boilers

IC Engines: Working of Four stroke Diesel Engine- Working of Four stroke Petrol Engine-Working of Two stroke Diesel Engine- Working of Two stroke Petrol Engine-Comparisons of Two stroke and Four stroke engines-Comparisons between External and Internal Combustion Engines.

Course Outcomes (CO):

On completion of this course, student will be able to

- Select steels and cast irons for a given engineering application.
- Determine the simple stresses and deformations due to axial loads in members
- Evaluate the properties of materials.
- List various measuring instruments used in metrology
- Identify the methods of cutting process to generate different types of surfaces.
- Measure force, torque, temperature, pressure and strain.
- Estimate the fluid properties under laminar and turbulent flows.
- Select the type of turbine required for different flow conditions.
- Explain the importance of thermodynamic properties related to conversion of heat energy into work.
- Select the type of boiler required for different operating conditions.
- Explain the working of IC engines relevant to combustion process.

Textbooks:

1. Basic Mechanical engineering by Basant Agarwal and CM Agarwal, Wiley India Pvt Limited, 2008
2. Basic Mechanical engineering by R.K Rajput, Lakshmi Publication Pvt Ltd, New Delhi, 2003
3. Basics of Mechanical engineering by Rishi singal and Mridul Singal, IK International Publishing House Pvt Ltd, 2007

Reference Books:

1. Basic Mechanical engineering By M. P. Poonia and S.C. Sharma, Kanna Book Publishing company Pvt Ltd, 2019
2. Basic Mechanical Engineering by Pravin Kumar, Person Publications, 2013
3. 3. Basics of Mechanical engineering by R.rajesh Kumar, Jyothis Publishers, 2016

Engineering Drawing
(Common to all Branches of Engineering)

Course Code	L:T:P/D:S	Credits	Exam marks	Exam Duration	Course Type
22A0302T	1: 0: 0/4 :0	3	CIE:30 SEE:70	3 Hours	ESC

Course Objectives:

- Bring awareness that Engineering Drawing is the Language of Engineers.
- Familiarize how industry communicates technical information.
- Teach the practices for accuracy and clarity in presenting the technical information.
- Develop the engineering imagination essential for successful design.

Syllabus		**Total Hours:50**
Unit - I	**Introduction to Engineering Drawing**	**10 Hrs**

Introduction to Engineering Drawing: Principles of Engineering Drawing and its significance- Conventions in drawing-lettering - BIS conventions.

a) Draw the Conic sections including Ellipse, Parabola, Hyperbola, and the Rectangular hyperbola using general methods,
b) Draw the Cycloid, Epicycloids, and Hypocycloid
c) Draw the Involutes of circle, square, pentagon, and hexagon

Unit - II	**Projections of points, lines and planes**	**10 Hrs**

Projections of points, lines, and planes: Projection of points in any quadrant, lines inclined to one and both planes, finding true lengths, finding true inclinations, angle made by line. Projections of regular plane surfaces using rotating plane method.

Unit - III	**Projections of Solids**	**10 Hrs**

Projections of solids: Projections of regular solids inclined to one and both the principle planes using auxiliary views method.

Unit - IV	**Sections of solids**	**10 Hrs**

Sections of solids: Section planes and sectional view of right regular solids- prism, cylinder, pyramid and cone. True shapes of the sections.

Unit - V	**Development of surfaces**	**10 Hrs**

Development of surfaces: Development of surfaces of right regular solids-prism, cylinder, pyramid, cone and their sectional parts.

Course Outcomes (CO):

On completion of this course, student will be able to

- Draw various curves applied in engineering. (l2)
- Show projections of solids and sections graphically. (l2)
- Draw the development of surfaces of solids. (l3)

Textbooks:

1. K.L.Narayana & P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.
2. N.D.Bhatt, Engineering Drawing, 53/e, Charotar Publishers, 2016.

Reference Books:

1. Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2009
2. Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers, 2000
3. Shah and Rana, Engineering Drawing, 2/e, Pearson Education, 2009
4. K.C.John, Engineering Graphics, 2/e, PHI, 2013
5. Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

Engineering Graphics Lab					
Course Code	**L:T:P:S**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0303P	**0 :0:3:0**	**1.5**	**CIE:30 SEE:70**	**3 Hours**	**ESC**

Course Objectives:

This course will enable students to:

- Instruct the utility of drafting & modeling packages in orthographic and isometric drawings.
- Train the usage of 2D and 3D modeling.
- Instruct graphical representation of machine components.

Syllabus	**Total Hours:39**

Computer Aided Drafting:

Introduction to AutoCAD: Basic drawing and editing commands: line, circle, rectangle, erase, view, undo, redo, snap, object editing, moving, copying, rotating, scaling, mirroring, layers, templates, polylines, trimming, extending, stretching, fillets, arrays, dimensions. Dimensioning principles and conventional representations.

Orthographic Projections: Systems of projections, conventions and application to orthographic projections - simple objects.

Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines, planes, simple solids.

Course Outcomes (CO):

On completion of this course, student will be able to

- Use computers as a drafting tool. (L2)
- Draw isometric and orthographic drawings using CAD packages. (L3)

Text books

1. K.L. Narayana, Bheemanjaneyulu, Engineering Graphics with Autocad, New age International Publishers, 2018.
2. T Jeyapoovan , Engineering Graphics Using Autocad, Vikas Publishing House, 2015
3. Dr. C. Elanchezhian and Dr. B. Vijaya Ramnath , Engineering Graphics Using AutoCAD, Medtech; 7/e, 2018
4. H. M. Allen , Engineering Graphics Using Autocad Course Manual, Ronjon Pub; 2/e,1993
5. Dennis E. Maguire , Engineering Drawing from First Principles: Using AutoCAD, Butterworth-Heinemann, 1998

Communicative English Lab
(Common to all Branches of Engineering)

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
22A0014P	0 :0:3:0	1.5	CIE:30 SEE:70	3 Hours	HSC

Course Objectives:

This course will enable students to:

- Students will be exposed to a variety of self instructional, learner friendly modes of language learning
- Students will learn better pronunciation through sounds, stress, intonation and rhythm
- Students will be trained to use language effectively to face interviews, group discussions, public speaking
- Students will be initiated into greater use of the computer in resume preparation, report writing, format making etc.

Syllabus **Total Hours:48**

List of Experiments

1. Phonetics
2. Describing objects/places/persons
3. Role Play or Conversational Practice
4. JAM
5. Etiquettes of Telephonic Communication
6. Group Discussions
7. Debates
8. Oral Presentations
9. Interviews Skills
10. Reading comprehension
11. E-mail Writing
12. Resume Writing

Course Outcomes (CO):

On completion of this course, student will be able to

- Listening and repeating the sounds of English Language
- Understand the different aspects of the English language proficiency with emphasis on LSRW skills
- Apply communication skills through various language learning activities
- Analyze the English speech sounds, syllable division, stress, rhythm, intonation for better Listening and Speaking Comprehension.
- Evaluate and exhibit acceptable etiquette essential in social and professional settings
- Create awareness on mother tongue influence and neutralize it in order to Improve fluency in spoken English.

Suggested Software: Walden InfoTech / Young India Films

Reference Books:
1. Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014. 2. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018. 3. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational. 4. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012. 5. A Textbook of English Phonetics for Indian Students by T. Balasubramanyam
Online Learning Resources/Virtual Labs:
1. www.esl-lab.com 2. www.englishmedialab.com 3. www.englishinteractive.net

Engineering Physics Lab (Common to CE and ME)					
Course Code	**L:T:P:S**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0008P	**0 :0:3:0**	**1.5**	**CIE:30 SEE:70**	**3 Hours**	**BSC**

Course Objectives:

This course will enable students to:

- Understand the role of Optical fiber parameters in engineering applications.
- Recognize the significance of laser by studying its characteristics and its application infinding the particle size.
- Illustrates the magnetic and dielectric materials applications.

Syllabus **Total Hours:48**

Note: In the following list, out of 12 experiments, any 2 experiments must be performed in a virtual mode

List of Experiments

1. Determine the thickness of the wire using wedge shape method
2. Determination of the radius of curvature of the lens by Newton's ring method
3. Determination of wavelength by plane diffraction grating method
4. Determination of dispersive power of prism.
5. Determination of wavelength of LASER light using diffraction grating.
6. Determination of particle size using LASER.
7. To determine the numerical aperture of a given optical fiber and hence to find its acceptance angle
8. Determination of dielectric constant by charging and discharging method.
9. Magnetic field along the axis of a circular coil carrying current –Stewart Gee's method.
10. Study the variation of B versus H by magnetizing the magnetic material (B-H curve)
11. Rigidity modulus of material of a wire-dynamic method (Torsional pendulum)
12. Sonometer: Verification of the three laws of stretched strings

Course Outcomes (CO):

On completion of this course, student will be able to

- Determine the radius of a curvature and / or thickness of thin wire using microscope with the helpof interference concept (L2)

- Evaluate the wavelength of various colors of grating and also dispersive power of prism by spectrometer using the principle of diffraction (L2)
- Evaluate wavelength of light source and particle size with He-Ne laser using the principle of diffraction Estimate the numerical aperture of a given optical fiber and hence to find its acceptance angle (L2)
- Estimate the dielectric constant of a given material (L2)
- Examine the hysteresis loss of the magnetic material by B- H curve and Estimate the magnetic field of a circular coil carrying current along the axis (L2)
- Estimate the mechanical properties of given string using Torsional pendulum and sonometer (L2)

Textbooks:

1. Engineering Practical Physics B Mallick S Panigrahi, 1st, Edition, Cengage Learning Publishers
2. A Text book of Engineering Physics Practical, Dr. Ruby Das, Dr. Rajesh Kumar, C. S. Robinson, Prashant Kumar Sah, UNIVERSITY SCIENCE PRESS (An Imprint of Laxmi Publications Pvt. Ltd.)

Reference Books:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers, 2017

E-resources:

1. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University
2. https://www.scribd.com/doc/81569075/Physics-Lab-Manual
3. http://www.mlritm.ac.in/assets/img/Lab%20manual%20Physics.pdf
4. https://bmsit.ac.in/public/assets/pdf/physics/studymaterial/Physics%20lab%20manual_cbcs%20%20-%20kavichintu.pdf