

# E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai

Accredited by NAAC with 'A' Grade | Accredited by NBA

MECHNAGAPATTINAM – 611 002



## B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

### Full Time Curriculum and Syllabus

#### First Year – First Semester

| Course Code              | Course Name                         | L | T | P | C | Maximum Marks |    |       |
|--------------------------|-------------------------------------|---|---|---|---|---------------|----|-------|
|                          |                                     |   |   |   |   | CA            | ES | Total |
| <b>Theory Course</b>     |                                     |   |   |   |   |               |    |       |
| 1701MA101                | Engineering Mathematics-I           | 3 | 2 | 0 | 4 | 40            | 60 | 100   |
| 1701PH101                | Applied Physics for Engineers       | 3 | 0 | 0 | 3 | 40            | 60 | 100   |
| 1701EN101                | Technical English                   | 3 | 0 | 0 | 3 | 100           | 0  | 100   |
| 1701CH104                | Applied Chemistry                   | 3 | 0 | 0 | 3 | 40            | 60 | 100   |
| 1701GE102                | Basic Civil Engineering             | 3 | 0 | 0 | 3 | 40            | 60 | 100   |
| 1701GE103                | Basic Mechanical Engineering        | 3 | 0 | 0 | 3 | 40            | 60 | 100   |
| <b>Laboratory Course</b> |                                     |   |   |   |   |               |    |       |
| 1701HS151                | Physics and Chemistry Laboratory –I | 0 | 0 | 2 | 1 | 50            | 50 | 100   |
| 1701GEX52                | Communication Skills Laboratory     | 0 | 0 | 2 | 1 | 50            | 50 | 100   |
| 1701GEX53                | Workshop Practice                   | 0 | 0 | 2 | 1 | 50            | 50 | 100   |

L – Lecture | T – Tutorial | P – Practical | C – Credit | CA – Continuous Assessment | ES – End Semester

1701MA101

**ENGINEERING MATHEMATICS I**  
(Common to all B.E / B.Tech Degree Programmes )

| L | T | P | C |
|---|---|---|---|
| 3 | 2 | 0 | 4 |

**COURSE OBJECTIVES:**

1. To educate Matrix Algebra Technique and curvature Theory
2. To impart knowledge of Techniques in solving Ordinary Differential Equations and to apply in solving Modern Engineering Problems
3. To acquaint the students about functions of several variables and also to familiarize the students in infinite series and their convergence

**COURSE OUTCOMES:**

On the Successful completion of the course, Students will be able to

- CO1: Analyze the characteristics of a linear system with Eigen value and Eigen Vectors  
CO2: Recognize and solve Higher order Ordinary Differential Equations  
CO3: Solve Derivative of special functions and apply it in solving Geometrical problems  
CO4: Apply Partial Derivatives in finding Maxima and Minima of a function  
CO5: Test the convergence of any series

**UNIT I EIGEN VALUE PROBLEMS**

**9 Hours**

Characteristic equation - Eigen values and Eigen vectors of a real matrix – Properties - Cayley– Hamilton theorem- Diagonalization of Matrices - Reduction of a quadratic form to a canonical form by orthogonal transformation – Application of Matrices in Structural Engineering and image processing

**UNIT II ORDINARY DIFFERENTIAL EQUATIONS**

**9 Hours**

Higher order linear differential equations with constant coefficients – Cauchy’s and Legendre’s linear equations – Method of variation of parameters in solution of ordinary differential equations.

**UNIT III DIFFERENTIATION AND GEOMETRICAL APPLICATIONS**

**9 Hours**

Derivative of special functions (Trigonometry, Exponential, Logarithmic), Derivative by rule (Product, Quotient, Chain rule), Curvature in Cartesian co-ordinates – Centre and radius of curvature – Circle of curvature- Evolutes and involutes.

**UNIT IV MULTIVARIABLE CALCULUS**

**9 Hours**

Functions of two variables and solutions (Partial derivatives and Euler’s theorem)–Taylor’s series–Maxima and Minima – Application of Partial Derivatives to find the optimum requirement using Lagrangian multipliers.

**UNIT V SEQUENCES AND SERIES**

**9 Hours**

Sequences: Definition and examples – Series: Types and Convergence – Series of positive terms – Tests of convergence: Comparison test, Integral test and D’Alembert’s ratio test – Alternating series – Leibnitz’s test – Application of Sequences in real life.

**TOTAL: 45 + 15 HOURS**

**FURTHER READING:**

1. Modeling and solutions using Newton’s Law of Cooling of Bodies
2. Differentiation of implicit Functions, Jacobians and Properties

**REFERENCES:**

1. Veerarajan R., “Engineering Mathematics”, updated second edition for semester I and II,(2017)
2. Grewal. B.S, “Higher Engineering Mathematics”, 44th Edition, Khanna Publications, Delhi, (2014).
3. Bali N. P and Manish Goyal, “Text book of Engineering Mathematics”, Sixth edition, Laxmi Publications(p) Ltd.,(2014).
4. Glyn James, “Advanced Modern Engineering Mathematics”, 3<sup>rd</sup> Edition, Pearson Education, (2012).
5. P.Kandasamy, K. Gunavathy and K. Thilagavathy, Engineering Mathematics ,Volume II, S. Chand & Co ., New Delhi, (2009)
6. Erwin Kreyszig, Advanced Engineering Mathematics,9<sup>th</sup> Edition, Wiley International edition, (2006)
7. Ramana B.V, “Higher Engineering Mathematics”,Tata McGrawHill Publishing, New Delhi, (2007).
8. M K Venkataraman, Engineering mathematics, Volume I, 2<sup>nd</sup> ed., National Publishing Co.(2003)
9. nptel.ac.in/courses/111105035, www.nptelvideos.in/2012/11/Mathematics.html
10. www.learnerstv.com/Free-maths-video lectures - ltv348-page1.htm

1701PH101

**APPLIED PHYSICS FOR ENGINEERS**  
(Common to all B.E. / B.Tech Degree Programmes)

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**COURSE OBJECTIVES:**

1. To impart knowledge in properties of matter, crystallography and ultrasonic.
2. To understand the applications of lasers and fiber optics.
3. To implement the principles of quantum physics in the respective engineering fields.

**COURSE OUTCOMES:**

- On the successful completion of the course, students will be able to
- CO1: Realize the concept of properties of matter and apply the same for practical applications.
  - CO2: Identify the suitable laser source for fiber optic communication applications.
  - CO3: Determine the velocity of ultrasonic waves and apply the same for day today applications.
  - CO4: Classify the different types of crystal structures and analyze their properties.
  - CO5: Comprehend the efficacy of quantum equations in modern areas.

**UNIT I PROPERTIES OF MATTER**

**9 Hours**

Elasticity: elastic and plastic materials – Hooke's law – elastic behavior of a material – stress – strain diagram – factors affecting elasticity. Three moduli of elasticity – Poisson's ratio – torsional pendulum – twisting couple on a cylinder. Young's modulus – uniform bending – non-uniform bending. Viscosity: coefficient of viscosity – streamline and turbulent flow – experimental determination of viscosity of a liquid – Poiseuille's method.

**UNIT II APPLIED OPTICS**

**9Hours**

Interference: air wedge – theory – uses – testing of flat surfaces – thickness of a thin wire. Laser: introduction – principle of laser – characteristics of laser light– types: CO2 laser – semiconductor laser (homojunction). Fiber optics: principle of light transmission through fiber – expression for acceptance angle and numerical aperture – types of optical fibers (refractive index profile and modes) – fiber optic communication system (block diagram & description).

**UNIT III ULTRASONICS**

**9Hours**

Ultrasonics: introduction – properties of ultrasonic waves – generation of ultrasonic waves –magnetostriction - piezo electric methods – detection of ultrasonic waves – Determination of velocity of ultrasonic waves (acoustic grating). Applications of ultrasonic waves: pulse echo method, SONAR – measurement of velocity of blood flow – modes of operation (A scan, B Scan & C Scan).

**UNIT IV SOLID STATE PHYSICS**

**9 Hours**

Crystal Physics: lattice – unit cell – crystal systems – Bravais lattices – Miller indices – „d“ spacing in cubic lattice – calculation of number of atoms per unit cell, atomic radius, coordination number and determination of packing density for SC, BCC, FCC and HCP structures – X-ray diffraction: Laue's method – powder crystal method.

**UNIT V QUANTUM MECHANICS**

**9 Hours**

Quantum Physics: development of quantum theory – de Broglie wavelength – Schrodinger's wave equation – time dependent and time independent wave equations – physical significance. Application: particle in a box (1D) – degenerate and non-degenerate states. Electron Microscopy-SEM, TEM - principle and working – problem solving.

**TOTAL: 45 HOURS**

**FURTHER READING:**

Neutrino's – expanding universe

**REFERENCES:**

1. D.S.Mathur, Elements of Properties of matter, 5th edition, S.Chand & Company Ltd., NewDelhi,2012.
2. Charles Kittel, Introduction to Solid State Physics, 8th edition, Wiley India Pvt. Ltd., New Delhi,2012
3. Arthur Beiser, Shobhit Mahajan and S. Rai Choudhury, Concepts of Modern Physics, 6th edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi,2010.
4. B.K.PandeyandS.Chaturvedi,EngineeringPhysics,1st edition,CengageLearningIndiaPvt.Ltd.,New Delhi, 2012.
5. Halliday and Resnick, Fundamentals of Physics, John Wiley and Sons, Inc,2011.
6. Ian Morison, Introduction to Astronomy and Cosmology, John Wiley and Sons, Ltd,2013.
7. <http://nptel.ac.in/>

**1701EN101**

**TECHNICAL ENGLISH**

(Common to all B.E / B. Tech Degree Programmes)

| <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
|----------|----------|----------|----------|
| <b>3</b> | <b>0</b> | <b>0</b> | <b>3</b> |

**COURSE OBJECTIVES:**

1. To develop the ability to read and comprehend technical texts in the field of Engineering
2. To develop vocabulary building through the study of word construction
3. To develop ability to write formal definitions of technical terms and expression.
4. To recognize various grammatical structures that will aid the student improve his/her theoretical knowledge.

**COURSE OUTCOMES:**

On the successful completion of the course, Students will be able to

- CO1: Demonstrate satisfactory conversational skill in the engineering setting using flawless English
- CO2: Demonstrate satisfactory writing skill in engineering technical writing
- CO3: Demonstrate satisfactory presentation skill in technical presentation
- CO4: Demonstrate satisfactory communication skill in active business and technical discussion

**UNIT I**

**9 Hours**

Articles-Preposition-Subject-Verb-Object-Adjective-Adverb-Conjunction-Nouns- Usages of Have, has, had- Simple Present-Simple Past-Simple Future-Self introduction-Framing Questions

**UNIT II**

**9 Hours**

Present Continuous-Past Continuous-Future Continuous-Describing a place, person or thing-Framing negative questions-Gerund-Listening to Articles, speeches and audios

**UNIT III**

**9 Hours**

Present perfect-past perfect-future perfect-writing short paragraph-sentence pattern- Infinitive-Tag questions- Reading newspaper cutting, Present perfect continuous –Past perfect continuous-Future perfect continuous

**UNIT IV**

**9 Hours**

Essay Writing -Types of sentences-Prefix-suffix-word formation-Dialogue writing- Active voice- passive voice-impersonal voice –Synonyms and Antonyms-phrasal verbs- Punctuation-Common Errors-Letter writing

**UNIT V**

**9 Hours**

Group Discussion – Face-to-Face Dialogue –Facing an Interview- Presenting a Report – Introducing Oneself-introducing one's own projects – conversation Practice.

**TOTAL: 45 HOURS**

**FURTHER READING:**

Letters from a Father to His Daughter- Jawaharlal Nehru

**REFERENCES:**

1. Meenakshi Raman, Sangeetha Sharma, "Technical Communication :English Skills for Engineers" Oxford University Press: New Delhi, 2016.
2. Rizvi Ashrav.M, "Effective Technical Communication" Tata McGraw Hill: New Delhi, 2017
3. Herbert, A.J, "Structure of Technical English", London English Language Society. <https://archive.org/details/in.ernet.dli.2015.136456>
4. J.D. O'Connor, Better English Pronunciation Paperback, 2nd edition, 162 pages, Published September 16th 2013 by Cambridge University Press, October 23rd 1967
5. Nehru, Jawaharlal. Letters from a Father to His Daughter, Puffin Books, 2004

1701CH104

## APPLIED CHEMISTRY

(Common to B.E. – ECE & EEE Programmes) L T P C  
0 0 3

### COURSE OBJECTIVES:

1. Recall the terminologies of electrochemistry and explain the function of batteries and fuel cells
2. Choose appropriate instrumentation technique for interpreting analytical data.
3. Understand the fundamentals of corrosion, its types and polymers with its applications with its electrochemical reactions

### COURSE OUTCOMES:

On the successful completion of the course, students will be able to

- CO1: Construct an electrochemical cell and measure its potential  
CO2: Identify the components and processes in batteries and infer the selection criteria for commercial battery systems with respect to different applications  
CO3: Utilize electrochemical data to formulate an electrochemical half-cell and cell reactions for corrosion control processes  
CO4: Differentiate the polymers used in day-to-day life based on its source, properties and applications  
CO5: Identify the applications of analytical methods for the estimation of elements in aqueous media

### UNIT I ELECTRO CHEMISTRY

9 Hours

Cell terminology-Electrochemical cells- Electrolytic cells- Cell reactions- Daniel cell-Difference between electrolytic cells and electrochemical cells. Reversible cells and irreversible cells -types- EMF series and its applications - Nernst equation (derivation and problems).Single electrode potential - Hydrogen electrode - Calomel electrode - Glass electrode - pH measurement using glass electrode.

### UNIT II CORROSION AND ITS CONTROL

9 Hours

Corrosion – types-chemical, electrochemical corrosion (galvanic, differential aeration) - Factors influencing corrosion -corrosion control – material selection and design aspects - electrochemical protection – sacrificial anode method and impressed current cathodic method. Protective coatings: Electroplating of gold and electroless plating of nickel. Paints - Constituents and Functions.

### UNIT III NON CONVENTIONAL ENERGY RESOURCES AND STORAGE DEVICES

9Hours

Introduction- nuclear energy- nuclear fission, nuclear fusion- nuclear chain reactions- breeder reactor- Nuclear Reactor-solar energy conversion- solar cells- wind energy. Batteries and fuel cells: Types of batteries- alkaline battery- lead storage battery nickel- cadmium battery- lithium battery- fuel cell H<sub>2</sub> -O<sub>2</sub> fuel cell- applications

### UNIT IV POLYMER AND ITS APPLICATION

9Hours

Introduction: Classification of polymers – Natural and synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerization. Addition (Free Radical Mechanism) condensation and copolymerization. Fabrication of Plastics. Application –Conducting polymer.

### UNIT V INSTRUMENTAL TECHNIQUES OF CHEMICAL ANALYSIS

9 Hours

Laws of photochemistry - Grothus–Draper law, Stark–Einstein law and Lambert-Beer Law. Electromagnetic spectrum - UV-visible and IR spectroscopy – principles, instrumentation (Block diagram only) - Applications. Colorimetry- principles, instrumentation (Block diagram only) estimation of iron. Flame photometry – principles, instrumentation (Block diagram only) estimation of sodium.

**TOTAL: 45 HOURS**

### FURTHER READING:

1. Alloys-ferrous and nonferrous alloys
2. Cambridge structural database (protein data bank)-noting databank
3. Unique properties of nano material- introduction to quantum materials, quantum dots, supramolecular materials and molecular crystal engineering – molecular machines and devices- Logic gate using electronics material for moleculelectronic.

### REFERENCES:

1. Ashima Srivastava and Janhavi N, “Concepts of Engineering Chemistry”, ACME Learning Private Limited., New Delhi, 2010.
2. Ravikrishnan A., “Engineering Chemistry”, Sri Krishna Hi-tech Publishing Company Pvt. Ltd. 2016.
3. RenuBapna and Renu Gupta., “Engineering Chemistry”, Macmillan India Publisher Pvt. Ltd, 2010.
4. Willard Merritt and Dean Settle, Instrumental methods of analysis, CBS publishers, Seventh edition, 2012.
5. Dara S.S, Umare S.S. “Engineering Chemistry”, S. Chand & Company Ltd., New Delhi. 2010.
6. <https://www.ccdc.cam.ac.uk/solutions/csdsystem/components/csd/>
7. [https://link.springer.com/chapter/10.1007/978-3-642-28030-6\\_2](https://link.springer.com/chapter/10.1007/978-3-642-28030-6_2)
8. [www.santarosa.edu/~yataiia/4D/QuantumDotsMk2.ppt](http://www.santarosa.edu/~yataiia/4D/QuantumDotsMk2.ppt)
9. [onlinelibrary.wiley.com/doi/10.1002/9780470661345.smc107/pods](http://onlinelibrary.wiley.com/doi/10.1002/9780470661345.smc107/pods)
10. [https://en.wikipedia.org/wiki/Molecular\\_electronics](https://en.wikipedia.org/wiki/Molecular_electronics).
11. Jain and Jain, “Engineering Chemistry”, Sixteenth edition, Dhanpatrai publications, 2012

|                  |  |          |          |          |          |
|------------------|--|----------|----------|----------|----------|
| <b>1701GE102</b> | <b>BASIC CIVIL ENGINEERING</b>                 | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
|                  | (B.E – Electrical and Electronics Engineering) | <b>3</b> | <b>0</b> | <b>0</b> | <b>3</b> |

**COURSE OBJECTIVES:**

4. To educate students about basic surveying
5. To impart knowledge about the building materials, foundations and superstructures
6. To impart knowledge about the solid mechanics and fluid properties

**COURSE OUTCOMES:**

On the successful completion of the course, Students will be able to

- CO1: Realize the concepts of basic surveying
- CO2: Select & utilize the suitable building materials
- CO3: Demonstrate the classifications of foundation and superstructures
- CO4: Explain the properties of solids
- CO5: Explain the properties of fluids

**UNIT I GENERAL & BASICS OF SURVEYING 9 Hours**

General introduction to Civil Engineering - types of buildings - Surveying – Principles, Objectives, Horizontal measurements with chain and tapes, Ranging; Levelling – Instruments, Reduction of levels; Modern surveying Instruments.

**UNIT II BUILDING MATERIALS 9 Hours**

Building materials – Stones, Bricks, Sand, Cement, Cement mortar, Cement concrete, Steel, Timber, Decorative finishes, Paints.

**UNIT III FOUNDATIONS & SUPERSTRUCTURE 9 Hours**

Foundations: Types, Bearing capacity – Requirement of good foundations. Superstructure: Brick masonry – stone masonry – beams – columns – lintels – roofing – flooring – plastering.

**UNIT IV BASICS OF SOLID MECHANICS 9 Hours**

Stress and strain at a point – Tension, Compression, Shear Stress – Hooke’s Law – Relationship among elastic constants – Ultimate Stress – Yield Stress – Factor of Safety- beams and bending – types of loads-methods of joints – method of sections.

**UNIT V FLUID PROPERTIES 9 Hours**

Fluid – definition, distinction between solid and fluid - Units and dimensions - Properties of fluids - density, specific weight, specific volume, specific gravity, temperature, viscosity, compressibility, vapor pressure, capillarity and surface tension.

**TOTAL: 45 HOURS**

**FURTHER READING:**

The testing methods of materials and applications of solids and fluids.

**REFERENCES:**

1. Ramamrutham S., “Basic Civil Engineering”, Dhanpat Rai Publishing Co. (P) Ltd. (1999).
2. S. Rajput, Strength of Materials, S. Chand & Co., 2006
3. R. K. Bansal, Fluid Mechanics and Hydraulic Machines, Laxmi Publications, New Delhi, 2005
4. S. K. Duggal, Building Materials, New Age International (P) Ltd., 2003
5. Seetharaman S., “Basic Civil Engineering”, Anuradha Agencies, (2005).
6. Shanmugam G and Palanichamy M S, “Basic Civil and Mechanical Engineering”, TataMcGraw Hill Publishing Co., New Delhi, (1996).
7. <http://nptel.ac.in/>

1701GE103

**BASIC MECHANICAL ENGINEERING**  
(B.E - EEE Programme)

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**COURSE OBJECTIVES:**

1. To impart basic knowledge on Mechanical Engineering.
2. To explain the component of power plant units and detailed explanation to IC engines their working principles.
3. To explain the R & AC system.
4. To explain the system of forces and free body diagram.
5. To study about the manufacturing process.

**COURSE OUTCOMES:**

On the successful completion of the course, students will be able to

- CO1: Identify the components used in power plant cycle.  
CO2: Demonstrate working principles of petrol and diesel engine.  
CO3: Explain the components of refrigeration and Air conditioning cycle.  
CO4: Explain the force system and free body diagram.  
CO5: Explain the manufacturing process.

**UNIT I POWERPLANTENGINEERING**

**9 Hours**

Introduction, Classification of Power Plants – Working principle of steam, Gas, Diesel, Hydro-electric and Nuclear Power plants – Merits and Demerits – Pumps and turbines – working principle of Reciprocating pumps (single acting and double acting) – Centrifugal Pump.

**UNIT II ICENGINES**

**9 Hours**

Internal combustion engines as automobile power plant – Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Boiler as a power plant.

**UNIT III REFRIGERATION AND AIRCONDITIONINGSYSTEM**

**9 Hours**

Terminology of Refrigeration and Air Conditioning. Principle of vapor compression and absorption system – Layout of typical domestic refrigerator – Window and Split type room Air conditioner.

**UNIT IV BASIC CONCEPTS ANDFORCESYSTEM**

**9 Hours**

Introduction to mechanics - idealization of mechanics - laws of mechanics - principle of transmissibility - vector - addition, subtraction and product. Force- types - system of forces - resultant forces - composition of forces - resolution of force-free body diagram for real world systems.

**UNIT V MANUFACTURINGPROCESSES**

**9Hours**

Basic Concepts, Demonstration, measurement and experiments: Turning, facing, drilling, internal and external thread cutting, boring, grooving, taper turning in lathe. Milling using end-milling cutters. drilling using universal drilling machine -sheet metal spinning, deep drawing, forging of clay models, making water tank using FRP, sheet metal work-arc welding, brazing, riveting -investment casting, sand casting, injection molding, vacuum molding, blow molding -powder coating.

**FURTHER READING:**

Water Supply and Transportation Systems - Engineering Materials and Manufacturing Processes

**TOTAL: 45 HOURS**

**REFERENCES:**

1. Venugopal K. and Prahuraja V., "Basic Mechanical Engineering", Anuradha Publishers, Kumbakonam, 2000.
2. Shantha Kumar S R J., "Basic Mechanical Engineering", Hi-tech Publications, Mayiladuthurai, 2000.
3. F.P. Beer, and Jr. E.R Johnston, Vector Mechanics for Engineers - Statics and Dynamics, Tata McGraw-Hill Publishing Company, New Delhi, 2007.
4. Roger Timing, Engineering Fundamentals, Newnes, 2002.
5. C. F. Gerald and P. O. Wheatley Applied Numerical Analysis, Pearson Education 2003.

|                  |   |          |          |          |          |
|------------------|---|----------|----------|----------|----------|
| <b>1701HS151</b> | <b>PHYSICS AND CHEMISTRY LABORATORY-I</b>       | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
|                  | (Common to all B.E. / B.Tech Degree Programmes) | <b>0</b> | <b>0</b> | <b>2</b> | <b>1</b> |

#### **COURSE OBJECTIVES:**

1. The Objective of this course is to make the students gain practical knowledge to co-relate with the theoretical studies
2. To achieve perfectness in experimental skills
3. To bring confidence and ability to develop and fabricate engineering and technical equipment's.
4. To train the students to analyse the water sample
5. To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis

#### **COURSE OUTCOMES:**

On the successful completion of the course, students will be able to

- CO1: Realize the concept of properties of matter and apply the same for practical applications.
- CO2: Identify the suitable laser source for fiber optic communication applications.
- CO3: Determine the velocity of ultrasonic waves and apply the same for day today applications.
- CO4: Classify the different types of crystal structures and analyze their properties.
- CO5: Comprehend the efficacy of quantum equations in modern areas.
- CO6: Identify the pH of the solution.
- CO7: Find the iron content of the water sample using potentiometer.
- CO8: Explain and demonstrate the conductance of the solution.
- CO9: Interpret the hardness and metal ions present in the water.

### **PHYSICS**

#### **LIST OF EXPERIMENTS:**

1. Determine the moment of inertia of the disc and calculate the rigidity modulus of a given wire using torsion pendulum (symmetrical masses method).
2. Find the elevation of the given wooden beam at the midpoint by loading at the ends and hence calculate the Young's modulus of the material by uniform bending.
3. Determine the coefficient of viscosity of the given liquid by Poiseuille's method.
4. From the interference, fringes from the air wedge setup and calculate the thickness of the given wire.
5. By applying the principle of diffraction, determine the wavelength of given laser light and the average particle size of lycopodium powder using laser source.
6. Determine the
  - (i) Wavelength of ultrasonic in a liquid medium
  - (ii) Velocity of ultrasonic waves in the given liquid
  - (iii) Compressibility of the given liquid using ultrasonic interferometer.

### **CHEMISTRY**

#### **LIST OF EXPERIMENTS:**

1. Determination of total, temporary & permanent hardness of water by EDTA method
2. Determination of strength of given hydrochloric acid using Ph. meter
3. Estimation of iron content of the given solution using potentiometer
4. Estimation of sodium present in water using flame photometer
5. Corrosion experiment – weight loss method
6. Determination of molecular weight of a polymer by viscometry method
7. Conductometric titration of strong acid Vs strong Base

**TOTAL: 45 HOURS**

#### **REFERENCES:**

1. D.S.Mathur, Elements of Properties of matter, 5th edition, S.Chand & Company Ltd., New Delhi, 2012.
2. Charles Kittel, Introduction to Solid State Physics, 8th edition, Wiley India Pvt. Ltd., New Delhi, 2012.
3. Arthur Beiser, Shobhit Mahajan and S. Rai Choudhury, Concepts of Modern Physics, 6th edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2010.
4. B.K. Pandey and S. Chaturvedi, Engineering Physics, 1st edition, Cengage Learning India Pvt. Ltd., New Delhi, 2012.
5. Halliday and Resnick, Fundamentals of Physics, John Wiley and Sons, Inc, 2011.
6. Ian Morison, Introduction to Astronomy and Cosmology, John Wiley and Sons, Ltd, 2013.
7. Daniel R. Palleros, "Experimental organic chemistry" John Wiley & Sons, Inc., New York (2001).
8. Furniss B.S.Hannaford A.J, Smith P.W.Gand Tatchel A.R., "Vogel's Text book of practical organic chemistry", LBS Singapore (1994).
9. Jeffery G.H., Bassett J., Mendham J. and Denny Vogel's R.C., "Textbook of quantitative analysis chemical analysis", ELBS 5th Edn. Longman, Singapore publishers, Singapore, 1996.
10. Kolthoff I.M., Sandell E.B. et al. "Quantitative chemical analysis", Mcmillan, Madras 1980.



1701GEX52

**COMMUNICATION SKILLS LABORATORY**  
(Common to all B.E. / B.Tech Degree Programmes)

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 2 | 1 |

**COURSE OBJECTIVES:**

This Lab focuses on using multi-media instruction for language development to meet the following targets:

1. To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts
2. Further, they would be required to communicate their ideas relevantly and coherently in writing.
3. To prepare all the students for their placements.

**COURSE OUTCOMES:**

On the successful completion of the course, students will be able to

- CO1: Accomplishment of sound vocabulary and its proper use contextually.
- CO2: Flair in Writing and felicity in written expression
- CO3: Enhanced job prospects.
- CO4: Effective Speaking Abilities.

**LIST OF EXPERIMENTS:** The following course content to conduct the activities is prescribed for the Communication Skills Lab:

- 1. Activities on Fundamentals of Inter-personal Communication and Building Vocabulary** - Starting a conversation - responding appropriately and relevantly - using the right body language - Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.
- 2. Activities on Reading Comprehension** - General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
- 3. Activities on Writing Skills** - Structure and presentation of different types of writing - letter writing/ Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing - planning for writing - improving one's writing.
- 4. Activities on Presentation Skills** - Oral presentations (individual and group) through JAM sessions / seminars / PPTs and written presentations through posters/ projects/ reports/ e-mails/ assignments etc.
- 5. Activities on Group Discussion and Interview Skills** - Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conferencing and Mock Interviews.

**TOTAL: 30 HOURS**

**ADDITIONAL EXPERIMENTS:**

Phonetics

**REFERENCES:**

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009
2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, and Pearson Education 2011.
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**1701GEX53**

**WORKSHOP PRACTICE**  
(Common to all B.E. / B.Tech Degree Programmes)

| <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
|----------|----------|----------|----------|
| <b>0</b> | <b>0</b> | <b>2</b> | <b>1</b> |

**COURSE OBJECTIVES:**

1. To provide hands on training for fabrication of components using sheet metal and welding equipment /tools.
2. To develop skill for using carpentry and fitting tools to make simple components and metal joints.
3. To provide hands on training for preparing the green sand mould-using foundry tools.
4. To provide training for making simple household electrical & pipe line connections using suitable tools.
5. To develop the skill to make / operate/utilize the simple engineering components.

**COURSE OUTCOMES:**

On the successful completion of the course, students will be able to

- CO1: Fabricate simple components using sheet metal & welding equipment/tools.  
CO2: Make simple components / joints using carpentry and fitting tools.  
CO3: Prepare green sand mould using suitable tools.  
CO4: Make simple household electrical & pipe line connections using suitable tools.  
CO5: Make / operate / utilize the simple engineering components.

**LIST OF EXPERIMENTS**

1. Forming of simple object in sheet metal using suitable tools (Example: Dust Pan / Soap Box) (or) making simple object using Metal Spinning Machine. (Example: Aluminum Cup) **4 Hours**
2. Prepare V (or) half round (or) square (or) Dovetail joint from the given mild Steel flat. **4Hours**
3. Fabrication of a simple component using thin and thick plates. (Example: Bookrack) **2 Hours**
4. Making a simple component using carpentry power tools. (Example: Electrical switch Box/Tool box/ Letterbox) **2Hours**
5. Construct a household pipe line connections using pipes, Tee joint, Four way joint, elbow, union, bend, Gate way and Taps (or) Construct a pipe connections of house application centrifugal pump using pipes, bend, gate valve, flanges and foot valve. **4Hours**
6. Prepare a green sand mould using solid pattern/split pattern. **4Hours**
7. Study of gas welding equipment and its demonstration **2Hours**
8. Soldering Practice for simple printed circuit board. **4Hours**
9. Construct a domestic electrical wire connections using indicator, one-way switch with calling bell, two-way switch with lamp, one-way switch with fan regulator and one-way switch with socket. **4 Hours**

**TOTAL: 30 HOURS**