

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 (CSE, EEE, MECH)

NAGAPATTINAM – 611 002



B.E. Electronics and Communication Engineering

Full Time Curriculum and Syllabus

First Year – Second Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
Theory Course								
1701MA201	Engineering Mathematics II	3	2	0	4	40	60	100
1701PH202	Semiconductor Physics and Devices	3	0	0	3	40	60	100
1701CH201	Environmental Studies	3	0	0	3	40	60	100
1701GE201	Basic Civil and Mechanical Engineering	3	0	0	3	40	60	100
1701EC201	Circuit Theory	3	2	0	4	40	60	100
	Language Elective	3	0	0	3	100	-	100
Laboratory Course								
1701GEX52	Communication Skills Lab	0	0	2	1	50	50	100
1701GEX53	Workshop Practice	0	0	2	1	50	50	100
1701HS251	Physics and Chemistry Laboratory - II	0	0	2	1	50	50	100

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

1701MA201

ENGINEERING MATHEMATICS II

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

L	T	P	C
3	2	0	4

COURSE OBJECTIVES:

1. To develop an understanding of the standard techniques of Complex variable theory to apply in areas such as heat conduction, elasticity, fluid Dynamics and flow of electric current
2. To train the students with the concepts of Vector calculus needed for problems in all Engineering Disciplines
3. To make the Students apply Laplace Transform to create a new domain in which it is easier to handle the problem that is being investigated

UNIT I ANALYTIC FUNCTIONS

9 Hours

Analytic functions – Cauchy Riemann Equations – Properties – Determination of Analytic function using Milne Thomson’s method, Conformal Mappings – Mappings of $w = z + a$, az , $1/z$ – Bilinear Transformation – Application of Analytic Functions.

UNIT II COMPLEX INTEGRATION

9 Hours

Cauchy’s fundamental theorem (statement only) – Application of Cauchy’s Integral formula – Laurent’s series – Classification of singularities – Cauchy’s Residue theorem (statement only) – Contour integration.

UNIT III MULTIPLE INTEGRAL

9 Hours

Double integration – Cartesian and polar coordinates – Change the order of Integration – Applications: Area of a curved surface using double integral – Triple integration in Cartesian co-ordinates – Volume as triple integral.

UNIT IV VECTOR CALCULUS

9 Hours

Gradient, Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration: Green’s theorem in a plane, Gauss divergence theorem and Stokes’ theorem (excluding proofs) – Applications of the above theorems to find surface area of a closed region and volume of cube and parallel piped.

UNIT V LAPLACE TRANSFORM

9 Hours

Laplace Transform – Conditions for existence – Transform of Elementary Functions – Basic Properties – Transform of Unit step function and Impulse function – Transform of Periodic function – Inverse Laplace Transform – Convolution Theorem (excluding Proof) – Initial and Final value Theorems – Solution of Linear ODE of Second order with constant coefficient using Laplace Transform techniques.

TOTAL: 45 + 15 HOURS

FURTHER READING:

1. Volume of Cylindrical and spherical polar co ordinates.
2. Application of Integral theorems in finding Volume/Area of Hemispheres, cylinders etc.

COURSE OUTCOMES:

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

- CO1: Construct Analytic functions and trace the image of a region using transformation.
- CO2: Solve complex integrals.
- CO3: Apply multiple integral technique to find area and volume.
- CO4: Compute surface and volume integral in vector field.
- CO5: Apply Laplace Transform in solving Boundary value problems of second order ODE.

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 Pvt. Ltd., 2014.
4. Glyn James, “Advanced Modern Engineering Mathematics”, 3rd Edition, Pearson Education, 2012.
5. P.Kandasamy, K. Gunavathy and K. Thilagavathy, Engineering Mathematics, Volume II, S. Chand & Co., New Delhi, 2009.
6. Ramana B.V, “Higher Engineering Mathematics”, Tata McGraw Hill Publishing, New Delhi, 2007.
7. Veerarajan R., “Engineering Mathematics”, fifth Edition, Tata Mc Graw Hill Publishing Company, New Delhi, 2006.
8. M K Venkataraman, Engineering mathematics, Volume I, 2nd 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

1701PH202

SEMICONDUCTOR PHYSICS AND DEVICES

(Common to B.E. - ECE & EEE Programmes)

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

1. To explain the properties of conducting, semiconducting and dielectric materials
2. To understand the working mechanism of junction diodes
3. To impart knowledge in optical and magnetic materials

UNIT I QUANTUM THEORY OF SOLIDS

9 Hours

Emission of electron: types of thermionic emission – principle – Richardson equation – secondary emission – principle – work function – Fermi-Dirac distribution function and its temperature dependence significance of Fermi energy – density of energy states – calculation of density of electrons and Fermi energy at 0K – average energy of electrons at 0K – Problem solving.

UNIT II SEMICONDUCTOR PHYSICS

9 Hours

Intrinsic semiconductors: the law of mass action – expression for density of electrons and holes – determine of carrier concentration – band gap energy. Extrinsic semiconductors: carrier concentration in p-type and n-type semiconductors. Hall Effect: theory – experimental determination of Hall voltage – applications – Problem solving.

UNIT III JUNCTION DIODE CHARACTERISTICS

9 Hours

Introduction – pn junction diode – volt-ampere characteristics – diode current equation – static and dynamic resistances – space charge – diffusion capacitance – junction diode switching times. Diode circuit with DC voltage source. Applications: full wave rectifier – capacitor filters – clamper circuits.

UNIT IV DIELECTRICS

9 Hours

Introduction: fundamental definitions in dielectrics – expressions for electronic and ionic polarizations – orientation polarization (qualitative) – space charge polarization – Langevin Debye equation – frequency and temperature effects on polarization – expression for internal field (cubic structure) – Clausius – Mosotti equation – dielectric loss-applications of dielectrics – problem solving.

UNIT V MAGNETIC MATERIALS

9 Hours

Magnetic materials: basic definitions – properties of Dia, Para and Ferro magnetic materials – explanation of hysteresis curve based on domain theory – hard and soft magnetic materials, Ferrites, Spinels – applications. Magnetic storage device: principle – working – giant magneto resistance.

TOTAL: 45 HOURS

FURTHER READING:

1. Motion of an electron in uniform and non-uniform magnetic fields-electric and magnetic fields in a crossed configuration.

COURSE OUTCOMES:

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

- CO1: Identify different types of emission of electrons and significance of Fermi function
- CO2: Explore the carrier concentration and its variation with temperature of different semiconducting materials
- CO3: Analyze the I-V characteristics of a junction diode
- CO4: Investigate the various polarization mechanisms in dielectrics
- CO5: Select appropriate optical and magnetic materials for data storage devices

REFERENCES:

1. Jacob Millman, Christos C Halkias and Satyabrata Jit, “Electronic Devices and Circuits”, McGraw Hill Education (India) Private Limited, New Delhi, 2014.
2. Willam D.Callister, “Materials Science and Engineering an Introduction”, John Wiley and Sons, Inc., 2010.
3. Halliday and Resnick, “Fundamentals of Physics”, John Wiley and Sons, Inc., 2011.
4. R.S.Sedha, “A textbook of Applied Electronics”, S.Chand & Company Ltd., New Delhi, 2010.
5. S.O.Pillai, “Solid State Physics”, New Age International Publications, New Delhi, 2010.
6. M.N.Avadhanu and P.G.Kshirsagar, “A Text Book of Engineering Physics”, S.Chand & Company Ltd., New Delhi, 2011.

1701CH201

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

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

1. Realize the interdisciplinary and holistic nature of the environment.
2. Understand how natural resources and environment affect the quality of life and stimulate the quest for sustainable development.
3. Recognize the socio-economic, political and ethical issues in environmental science.

UNIT I ECOSYSTEMS AND BIODIVERSITY

10 Hours

Concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – Oxygen cycle and Nitrogen cycle – energy flow in the ecosystem – ecological succession processes – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – hot – spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man – wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Documentation of the medicinal plants in your native place.

UNIT II NATURAL RESOURCES

10 Hours

Forest resources: Use and over – exploitation, deforestation, case studies – timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and overutilization of surface and ground water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer – pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources. Energy Conversion processes – Biogas – production and uses, anaerobic digestion; case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Documentation of the effect of modern Agriculture in your nearby Village.

UNIT III ENVIRONMENTAL POLLUTION

9 Hours

Definition – Source, causes, effects and control measures of: (a) Air pollution – Mitigation procedures – Control of particulate and gaseous emission, Control of SO_x, NO_x, CO and HC) – Technology for capturing CO₂ (metallo- organic frame works) (b) Water pollution – Waste water treatment processes. (c) Soil pollution – soil waste management: causes, effects and control measures of municipal solid wastes – (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – role of an individual in prevention of pollution – pollution case studies. Documentation study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT

8 Hours

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – environmental ethics: Issues and possible solutions – 12 Principles of green chemistry – consumerism and waste products – environment protection act – Air act – Water act – Wildlife protection act – Forest conservation act – The Biomedical Waste (Management and Handling) Rules; 1998 and amendments – scheme of labeling of environmentally friendly products (Ecomark) central and state pollution control boards – disaster management: floods, earthquake – Public awareness. Analyze the recent steps taken by government of India to prevent pollution (Green India and Clean India).

UNIT V HUMAN POPULATION AND THE ENVIRONMENT

8 Hours

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – Environmental impact analysis (EIA) – GIS – remote sensing – role of information technology in environment and human health – Case studies. Documentation study of the Human health and the environment in nearby Hospital (Statistical report).

TOTAL: 45 HOURS

FURTHER READING:

Human rights: E – waste and biomedical waste – Identification of adulterants in food materials

COURSE OUTCOMES:

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

- CO1: Describe the importance of ecosystem and its conservation.
- CO2: Differentiate various natural resources and the urgent need to conserve the natural resources.
- CO3: Explain the different types of pollution and its effects.
- CO4: Describe the various environmental protection acts.
- CO5: Explain the major diseases, women, child development and the impacts of population explosion.

REFERENCES:

1. Trivedi. R.K., “Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards”, Vol. I and II, Enviro Media, 3rd edition, BPB publications, 2010.
2. Cunningham, W.P.Cooper, T.H. Gorhani, “Environmental Encyclopedia”, Jaico Publishing House, Mumbai, 2001.
3. Dharmendra S. Sengar, “Environmental law”, Prentice hall of India PVT LTD, New Delhi, 2007.
4. Rajagopalan. R, “Environmental Studies-From Crisis to Cure”, Oxford University Press, 2005.
5. Benny Joseph, “Environmental Science and Engineering”, Tata McGraw-Hill, New Delhi, 2006.
6. https://en.wikipedia.org/wiki/Carbon_capture_and_storage
7. Ravikrishnan. A., “Environmental Science and Engineering”, Sri Krishna Hi-tech Publishing Company Pvt. Ltd.

1701GE201	BASIC CIVIL AND MECHANICAL ENGINEERING	L	T	P	C
	(Common to B.E. / B.Tech. – CSE, ECE & IT)	3	0	0	3

COURSE OBJECTIVES:

1. To impart basic knowledge on Civil and Mechanical Engineering.
2. To explain the materials used for the construction of civilized structures.
3. To understand the fundamentals of construction of structure.
4. To explain the component of power plant units and detailed explanation to IC engines their working principles.
5. To explain the R & AC system.

A – CIVIL ENGINEERING

UNIT I SURVEYING AND CIVIL ENGINEERING MATERIALS 9 Hours

Surveying: Objects – types – classification – principles.

Civil Engineering Materials: Bricks – stones – sand – cement – concrete – steel sections

UNIT II BUILDING COMPONENTS AND STRUCTURES 9 Hours

Foundations: Types, Bearing capacity – Requirement of good foundations.

Superstructure: Brick masonry – stone masonry – beams – columns – lintels – roofing – flooring –plastering – Mechanics – Internal and external forces – stress – strain – elasticity.

B – MECHANICAL ENGINEERING

UNIT III POWER PLANT ENGINEERING AND PUMPS 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 IV IC ENGINES 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 V REFRIGERATION AND AIR CONDITIONING SYSTEM 9 Hours

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

TOTAL: 45 HOURS

FURTHER READING:

1. Mechanics of solids.
2. Structural Design.
3. Thermal Engineering, Fluid mechanics, Heat and mass transfer.

COURSE OUTCOMES:

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

- CO1: Explain the survey and usage of construction material and proper selection of construction materials.
- CO2: Know about the building structures.
- CO3: Identify the components of power plant.
- CO4: Demonstrate working principles of petrol and diesel engine.
- CO5: Explain the components of refrigeration and air conditioning.

REFERENCES:

1. Ramamrutham S., “Basic Civil Engineering”, Dhanpat Rai Publishing Co. (P) Ltd., New Delhi, 1999.
2. Seetharaman S., “Basic Civil Engineering”, Anuradha Agencies, 2005.
3. Venugopal K. and Prahuraja V., “Basic Mechanical Engineering”, Anuradha Publishers, Kumbakonam, 2000.
4. Shantha Kumar S R J., “Basic Mechanical Engineering”, Hi-tech Publications, Mayiladuthurai, 2000.
5. Shanmugam G and Palanichamy M S, “Basic Civil and Mechanical Engineering”, Tata McGraw Hill Publishing Co., New Delhi, 1996.

1701EC201

CIRCUIT THEORY
(B.E. Electronics & Communication Engineering)

L	T	P	C
3	2	0	4

COURSE OBJECTIVES:

1. To study the basic laws on circuits and calculate the voltage and current in it using basic theorems.
2. To apply the concept of transients and resonance in series and parallel circuit.
3. To explore graph theory techniques applied to network topologies.

UNIT I BASICS OF CIRCUIT ANALYSIS

9 Hours

Basic components and electric circuits, voltage and current laws, Basic mesh and nodal analysis, source transformation techniques, Star delta transformation techniques, Phase relationship for R, L and C. Impedance, Admittance for R, L and C elements.

UNIT II NETWORK TOPOLOGIES

9 Hours

Concept of Duality, Dual network, Graphs of a network, Trees, twig, link and branches, Incidence matrix, Tie-set matrix formation and cut-set matrix formation of a graph.

UNIT III NETWORK THEOREMS AND APPLICATIONS

9 Hours

Linearity – Thevenin's theorem – Norton's theorem – Super position theorem – Maximum power transfer theorem – Reciprocity theorem – Compensation theorem – Tellegen's theorem – Millman's theorem.

UNIT IV TRANSIENTS

9 Hours

Differential equations – Laplace Transform – steady state and transient response: DC response of RL, RC and RLC circuit – Sinusoidal response of RL, RC and RLC circuits.

UNIT V RESONANCE AND COUPLED CIRCUITS

9 Hours

Resonance: Natural frequency and Damping Ratio – Series Resonance – Parallel Resonance – Quality Factor. Coupled Circuits: Self – inductance – Mutual inductance, Dot conversion – Coupling Coefficient – Ideal Transformer – Tuned Coupled Circuits.

TOTAL: 45 + 15 HOURS

FURTHER READING:

Simulation of Circuits and Evaluation of its parameters – Basic Concepts and Definitions, Analysis of Simple Circuits, Nodal and Mesh Equations – Circuit Theorems, Natural Response, Forced and Total Response in RL and RC Circuits.

COURSE OUTCOMES:

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

- CO1: Evaluate the voltage, current and power for ac and dc electric circuit using basic laws.
- CO2: Evaluate the voltage, current of electric circuit using Graph theory techniques.
- CO3: Design simple network for the complex network by exploring circuit theorems.
- CO4: Design and test the dc and ac transient circuits using test signals.
- CO5: Design and test circuit for a desired cut off frequency using resonant and coupled circuits.

REFERENCES:

1. William Hayt, JV Jack, E Kemmerly and Steven M Durbin, “Engineering Circuits Analysis”, Tata McGraw-Hill, 2013.
2. Joseph Edminister and Mahmood Nahri, “Theory and Problems of Electric Circuits”, Tata McGraw-Hill, 2008.
3. A Sudhakar, S Shyammohan and Palli, “Circuits and Network (Analysis and synthesis)”, Tata McGraw-Hill, 2010.
4. L Robert Boylested, “Experiments in Circuit Analysis to Accompany Introductory Circuit Analysis”, PHI, 2002.
5. M .Russell, Mersereau and Joel R. Jackson, “Circuit Analysis - A System Approach”, Pearson Education, 2009.
6. Steven T. Karris, “Circuit Analysis I with MATLAB Applications”, Orchard Publications, 2004.

1701GEX52

COMMUNICATION SKILLS LAB
(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.

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

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.

REFERENCES:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009
2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
3. Technical Communication by Paul V. Anderson, 2007. Cengage Learning pvt. Ltd. New Delhi
4. English Vocabulary in Use series, Cambridge University Press 2008.
5. Management Shapers Series by Universities Press (India) Pvt Ltd., Himayatnagar, Hyderabad 2008.
6. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw Hill 2009.
7. Books on TOFEL/ GRE/ GMAT/ CAT/ IELTS by Barron's/ DELTA/ Cambridge University Press.

1701GEX53

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

L	T	P	C
0	0	2	1

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 house hold electrical & pipe line connections using suitable tools.
- 5.To develop the skill to 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. | 4 Hours |
| 3. Fabrication of a simple component using thin and thick plates. (Example: Book rack) | 2 Hours |
| 4. Making a simple component using carpentry power tools. (Example: Electrical switch Box/Tool box/ Letter box. | 2 Hours |
| 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. | 4 Hours |
| 6. Prepare a green sand mould using solid pattern/split pattern. | 4 Hours |
| 7. Study of gas welding equipment and its demonstration | 2 Hours |
| 8. Soldering Practice for simple printed circuit board. | 4 Hours |
| 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

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 house hold electrical & pipe line connections using suitable tools.
- CO5: Make / operate / utilize the simple engineering components.

1701HS251

PHYSICS AND CHEMISTRY LABORATORY-II
(Common to all B.E. / B.Tech Degree Programmes)

L	T	P	C
0	0	2	1

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 equipments.
4. To make the student acquire practical skills in the wet chemical and instrumental methods for quantitative estimation of hardness, alkalinity, metal ion content, corrosion in metals and cement analysis.

PHYSICS

LIST OF EXPERIMENTS:

1. Using lees disc apparatus, determine the coefficient of thermal conductivity of a bad conductor.
2. Find the band gap value of the given semiconductor diode. Based on the band gap value, identify the given semiconductor.
3. With the aid of spectrometer, find the angle of Prism and refractive index of the medium.
4. Determine the wavelengths of polychromatic source in the visible region using spectrometer grating.
5. Find the depression at the midpoint of the given wooden beam subjected to non-uniform bending and determines the Young's modulus of the material of the beam.
6. Find the given unknown resistance using Carey-Foster's Bridge.

CHEMISTRY

LIST OF EXPERIMENTS:

1. Conductometric Precipitation titration of BaCl_2 Vs Na_2SO_4
2. Estimation of dissolved oxygen in a water sample/sewage by Winklers method.
3. Estimation of chloride content in water by argentometric method.
4. Conductometric titration of mixture of acids.
5. Comparison of alkalinities of the given water samples.

Additional Experiments:

1. Estimation of heavy metals in the given solution by EDTA method.
2. Determination of concentration of unknown colored solution using spectrophotometer.

TOTAL: 30 HOURS

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 : Illustrate the EMF of the Redox reaction.
- CO7 : Compare the Alkalinity of given water Sample with their standards.
- CO8 : Identify the Concentration of metal ion present in water sample.
- CO9 : Outline the precipitation titration using Conductivity meter.
- CO10: Interpret the dissolved oxygen present in the water.

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. Laboratory Manual on Engineering Chemistry, S.K. Bhasin, S. Rani, Dhanpat Rai Publishing Company, New Delhi, 2011.
8. Daniel R. Palleros, "Experimental organic chemistry" John Wiley & Sons, Inc., New Yor (2001).
9. Furniss B.S. Hannaford A.J, Smith P.W.G and Tatchel A.R., "Vogel's Textbook of practical organic chemistry", LBS Singapore (1994).
10. Jeffery G.H., Bassett J., Mendham J.and Denny vogel's R.C, "Text book of quantitative analysis chemical analysis", ELBS 5th Edn. Longman, Singapore publishers, Singapore, 1996.
11. Kolthoff I.M., Sandell E.B. et al. "Quantitative chemical analysis", Mcmillan, Madras 1980.